

海岸巡防署 海洋生物的多樣性保育

CGA's Efforts in Preserving Marine Biodiversity

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壹、前言

台灣四面環海，為一典型海洋國家，海洋生態資源豐富，為觀光及娛樂漁業重要資產，近年來民眾對海洋遊憩活動需求日增，海洋資源利用朝向多元化發展，海洋資源的永續利用為國人當共同關切議題，如何有效管理海洋、保護海洋資源、維護海洋生態海岸與海域自然景觀，確保國家海洋權益，為當前重要課題。

貳、海洋生物的多樣性

海洋是生命的誕生和孕育之地，它不但佔了地球表面71%面積，生物棲地體積的99%，同時更在人類文明的演進中扮演著重要的角色。它不但提供人類食物、交通運輸，也同時主宰著地球的物質循環、氣候變化及整個生態系正常的運作，如果海洋受到污染破壞，陸地上的生命也就會跟著滅亡。目前所發現的34個動物門中，海洋其實就佔了33門，而且其中有15門的動物只能生活在海洋的環境，13門可以棲居陸地。^{註1}，豐富多樣化的海洋生物不但提供人類食物、休憩與等醫藥多功能的需求，也藉由調節氣候、分解廢棄物、保護海岸、提供新鮮空氣等等，成為地球上最大的生命維生系統。

台灣面積雖小，佔全球陸地面積的比例可能只有千分之三，但台灣海洋生物的種類之多，卻可高達全

Port I .Preface

Taiwan is surrounded by ocean and is typical oceanic country. It has abundant marine resource and can be served as the major assets for tourism and entertainment. In recent years, the people have increasing demands for recreational activities in the sea, so the usage of oceanic resources has become diversified. The sustainability of marine resources is one urgent issue that people care about. It is also urgent to consider the questions of how to effectively manage the ocean, protect marine resources, maintain marine ecology, and coastal natural habitats.

Port II .The Biodiversity of Marine Animals

Ocean is the mother and growing ground of all forms of lives, it accounts for 71% of the total earth area and 99% of biological habitats. It also plays an important role in the progress of human civilization. It not only provides food and transportation medium for people, but also dominates the substance cycle of earth, changes of climate, and the function of our ecology. If the ocean is polluted, the lives on land will also extinct. Among the current 34 animal divisions, 33 of them are found in

球物種的十分之一^{註2}(圖1)。造成台灣海洋生物資

台灣周邊海域海洋生物甚具多樣性，約佔全球物種的十分之一 (邵，1998)

海洋生物類別	全球	台灣	佔比比例
分類群數			
魚類	24,000~28,000	2,300~2,800	1/10
海龜	7~8	5	>1/10
海蛇	21	14	>1/10
海鳥	316	50	>1/10
蟹類	>10	7	>1/10
海星	>85	25	>1/10
無脊椎動物			
珊瑚	2,500	250	1/10
蟹	2,500	300	>1/10
蝦	4,500	507	>1/10
棘皮動物(海星、海膽、海參等)	6,000	>450	>1/10
植物			
海藻	12,000	600	>1/10
海草	50	8	1/10

圖1 摘錄於行政院農業委員會漁業署。

Pic.1 Adopted from Fishery Agency, Council of Agriculture, Executive Yuan.

源豐富的主要原因，除了因為台灣地理位置優越，正好位在全球最大陸棚區的邊緣(圖2)，以及全球



圖2 摘錄於行政院農業委員會漁業署。

Pic.2 Adopted from Fishery Agency, Council of Agriculture, Executive Yuan.

海洋生物物種最繁茂的東印度群島的北緣外，更主要的原因是台灣海域、岸的棲地多樣性非常高(圖3)。這包括了複雜的海流、地形、水溫、底質與水深等的生態因子的多樣化。台灣的竹圍是地球上紅樹林(水筆仔純林)分佈的最北界，蘭嶼也是海蛇分佈最北界，台灣恆春半島南端也是地球上珊瑚礁分佈的北方次極限(再高緯度祇剩稀疏的耐寒珊瑚群眾)^{註3}。

the ocean. There are 15 divisions that can only live in ocean while 13 of them are able to dwell on land. The rich variety of ocean creatures provide food to people, the ocean itself also satisfy our recreation and medical needs. Through regulating climates, decomposing wastes, protecting coast, and supplying air, the ocean has become the largest life-supporting system on earth.

Though Taiwan is small and probably only accounts for three thousandth of global territory, the marine creatures in Taiwan are as many as one tenth of global species. The major condition that enriches the marine creatures is its ideal geographical location. It sits on the rim of the largest continental shelf in the world (see Pic. 2) and just locates at the northern tip of Maluku Islands which possesses the most variety of marine creatures. One of the other reasons is that Taiwan has a variety of habitat forms on coastal and marine territory regions (see Pic. 3). This fact indicates that Taiwan has a diversity of biological factors that include complex sea current, topographical reasons, sea temperature, base components, and sea water depth. Taiwan's Jhuwei is the northern tip of mangrove (in this case, Kandelia candle) distribution and Orchid isle also the tip of sea serpent distribution. The southern tip of Hengchun Peninsula is the second tip of coral reef distribution in the north (if going further north, only sparse of cold resistant coral reefs are left).

These marine creatures that are highly diversified almost distribute around the coral reef (the so-called marine tropical rain forest), sea weed bed, continental shelves, mangroves, and river mouth. The narrow strip of coast is the one that is frequently interfered, changed, or damaged by human activities.



圖3 摘錄於行政院農業委員會漁業署。

Pic.3 Adopted from Fishery Agency, Council of Agriculture, Executive Yuan.

這些多樣性極高的海洋生物大多分佈在珊瑚礁「俗稱海中熱帶雨林」、海草床、陸棚、紅樹林、及河口等沿岸地帶，而這狹窄的沿岸地區，卻又最容易受到人為活動的變更、干擾或破壞。

參、海洋生物的多樣性保育

一、海洋生態系遭受破壞的原因：

海洋生物多樣性及全球之漁產量早已在迅速衰退，造成之原因可分為人為因素以及自然因素，人為因素而有(一)漁民的過漁及誤捕；(二) 海洋生物棲地遭受破壞；(三) 海洋之污染；(四) 海洋生物外來種之移入；而自然因素為(五) 全球變遷。

(一) 漁民的過漁及誤捕— 由於新型漁法、漁具不斷發明，使魚、蝦無所遁形，無法逃避，再加上漁民之誤捕(如海龜)，浪費資源，造成許多魚種已商業性滅絕。大型魚已愈來愈少，瀕臨絕種(鯨、鯊...)。另外，非法電、毒、炸魚、違法底拖破壞等，使海域漁業資源枯竭，魚獲量減少影響漁民生計，更破壞海洋生態。

(二) 海洋生物棲地遭受破壞— 特別是近20-30年來海岸溼地次第淪陷，台灣自然海灘之「寶」島，即將變成水泥人工化的「堡」島，海岸迅速消失。

(三) 海洋之污染：船舶之污染、有毒廢棄物排放、油污...使台灣海岸常發生魚群、文蛤等之暴斃事件；核電廠的熱排放使珊瑚之白化等等。

(四) 海洋生物外來種之移入— 人為之棄養及水產養殖外來種之不慎逸出等，改變原來的海洋生態系。

Port III. The Preservation of Marine Biodiversity

I. Reasons that the marine ecology is destructed:

The marine biodiversity and global fishing amount have been rapidly decreasing are artificial and natural causes to the fact. There four artificial causes: (I) The excessive and careless fishing of fishermen; (II) Destruction on the marine habitats; (III) Marine pollution; (IV) The invasion of foreign marine species. The natural cause is: (V) Global changes.

(I) The excessive and careless fishing of fishermen--Owing to inventions of new fishing methods and tools, any fish or shrimps are impossible to escape. Some fishermen also carelessly catch creatures other than fish (such as turtles) that cause resource waste. Therefore the situation has caused some species total extinction. Large fish have become less and faced extinction (such as whales, sharks, ...). Furthermore, illegal fishing that is done with electrocution, poison, bombing, and bottom towing have run out of fishery resources. The decreasing of fishery resources has greatly influenced the fishermen's lives and further destructed the marine environment.

(II) Destruction on the marine habitats— In the most recent two to three decades, the wet lands near the coastal area have gradually submerged. Taiwan once boasted itself of having natural beaches, but now beaches have receded for artificial concrete banks.

(III) Marine pollution—There are often pollutions caused by ships, toxic waste leaks, oil pollution, and other pollutions that make fish schools and clams to decease suddenly. The heat exhaust of nuclear plants also whitens the coral reefs.

(IV) The invasion of foreign marine species— Some foreign marine species that are bred by artificial farms or have been dumped purposefully,

(五)在自然因素方面，海洋生物所可能遭受的危
害除了全球變遷的溫室效應所引起的水溫上升、海
平面上昇、海流氣候急遽變化，紫外線增加殺傷浮
游幼生等因素外，又以颱風對熱帶地區之沿岸，特
別是珊瑚礁之破壞最烈。此外還有赤潮^{註4}、魔鬼
海星大量繁生，El Nino 之效應等等，這些因素其實
也可能和人為因素所導致的全球變遷有關。1997-
1998 之聖嬰及反聖嬰現象，已使全球35 個以上的
50個國家地區的珊瑚面臨白化的嚴重威脅^{註5}。在
自然的災害如颱風、聖嬰所造成的破壞，雖然劇
烈，但得以恢復的很快。但是珊瑚因為人為因素的
慢性但卻不可逆的破壞，把環境污染毀壞了才是真
正永久的萬劫不復。

台灣珊瑚礁受破壞之真正原因依序應為^{註6}：

- 1.濫墾、濫建造成水土流失，造成海水混濁，使
珊瑚白化。
- 2.污水及圾垃造成海水優養化，藻類等繁生，
造成珊瑚死亡或繁殖量降低。
- 3.過漁及觀光客濫食海洋生物，造成珊瑚礁魚
類、蝦蟹、貝類、海膽大量減少，產生生態上
不平衡。
- 4.水中旅遊活動的缺乏管制，大量踐踏及破壞珊
瑚。
- 5.電廠排水溫度過高。
- 6.炸魚及盜採珊瑚。
- 7.非經常性的天災造成破壞。

二、海洋生物多樣性保育策略

(一)落實執行國家海洋生物多樣性保育政策。

(二)履行「一九八二年十二月十日聯合國海洋
法公約中有關跨界魚群與高度洄游魚群之相關條文
協定^{註7}」(Agreement for the Implementation of the
Provisions of the United Nations Convention on the Law
of the Sea of 10 December 1982 Relating to the Con-
servation and Management of Straddling Fish Stocks and
Highly Migratory fish Stocks)等相關公約及海岸巡防
法漁業巡護工作。

(三)依「兩岸人民關係條例」等相關法令持
續對大陸漁船非法之捕魚進行驅離、查扣等執法^{註8}
(圖4, 5)。

which might change the original marine ecology.

(V) In the natural cause, the marine creatures
might be endangered by the rising of sea
temperature, sea level, and sea current that are
caused by greenhouse effect. The increasing level
of ultra-violet also inhibits the growth of plankton.
Typhoons have also done damage to coastal ar-
eas, especially to coral reefs. Besides, there are
also increasing amount of red tide, devil's starfish,
and El Nino effect, which might have something
to do with the global change that is caused by ar-
tificial reasons. From 1997 to 1998, the El Nino
and La Nina effects have posed great threats on
whitening the coral reefs in over 50 locations in
35 countries. Natural disasters such typhoons and
El Nino effect might be acute but it is possible to
recover to original status. The loss of coral reef is
an irreversible process that is caused by artificial
reasons. If we contaminate the environment, then
we are really in an irreversible disaster.

The sequence of the actual reasons that
cause the damage to Taiwan coral reefs is:

1.Unlimited cultivation and construction that
cause losses of earth and water, which further in-
cites the murkiness of sea water that whitens the
coral reef.

2.Polluted water and trash have caused
eutrophication in sea water, which allows algae to
breed at enormous amount. Then coral dies be-
cause of this eutrophication or has less fertility.

3.Excessive fishing and improper feeding
from tourists. These are the facts that cause ma-
jor decrease of coral reefs, fish, shrimps, crabs,
shells, and sea urchins. This has caused an eco-
logical imbalance.

4.Lack of regulation for water activities, mas-
sive treading and destruction on corals.

5.High temperature of exhaust water from the
power plant.



圖4 淡水海巡隊96年1月至6月海上驅離大陸漁船案件
Pic.4 The Danshui Offshore Flotilla drove away Chinese fishing boats from January to June in 2007.



圖5 驅離大陸漁船越區捕魚。
Pic.5 Driving away Chinese fishing boats that fished in our waters.



圖6 巴拿馬籍化學輪「對二甲苯」洩漏情形。
Pic.6 The leak of PX (para-xylene) of a chemical ship from Panama.

- (四).執行海洋污染法令對海洋污染行為執行取締、蒐證、移送等事項(圖6)。
- (五).執行中華民國專屬經濟海域及大陸礁層法、漁業法令等相關法令，防止過度捕撈、非法採集、非法電、毒、炸魚、違法底拖破壞和人為破壞等非法海洋活動。

- 6. Fish bombing and coral stealing.
- 7. Often natural disasters.

II. The preservation strategies of marine biodiversity

- (I). Practicing of the preservation strategies of national marine biodiversity.
- (II). Practicing of relating agreements of Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 Relating to the Conservation and Management of Straddling Fish Stocks



圖7 配合環保署油污採證。

Pic.7 Compliance of evidence collecting by EPA.

- (六)配合中央、地方漁業、環保主管機關，執行漁業資源保育、海洋環境保護工作(圖7)。
- (七)利用海巡服務座談會等宣導，遵行1991年公海禁止使用流刺網決議^{註9}，且加強海洋環境保護與自然資源永續利用的教育。

肆、結論

台灣在地理位置上占有得天獨厚的海洋發展優勢，因此「立足美麗島、放眼大海洋」，在台灣海域涵養特有的台灣海洋生態，而海洋生物多樣性之保育不僅是海岸巡防法中規定之執行事項，且對於穩定、永續的生態體系等方面有重大貢獻，即對國家、人民生活環境品質亦是重要保障。🌍

(本文作者任職於海洋巡防總局第二【淡水】海巡隊)



and Highly Migratory fish Stocks, and other patrol missions of the Coastal Patrol Act.

(III) Practicing forceful propelling and seizure of illegal Chinese fishing boats based on the relating regulation of Statute Governing the Relations Between the People of the Taiwan Area and the Mainland Area (see Pic. 4 and 5).

(IV) Practicing of legal investigation, evidence collecting, and transfer of polluting oceans deeds based on regulations regarding marine pollutions.

(V) Execution of relating regulation on Law on the Exclusive Economic Zone and the Continental Shelf of the R.O.C and fishery regulations to prevent excessive fishing, illegal fishing, illegal electrocution, poisoning, bombing of fish, illegal bottom trawling, and artificial destructive deeds.

(VI) Cooperation with the central and local government units of fishery and environmental protection purposes to execute fishery resource protection, marine environment protection works (see Pic. 7).

(VII) Promotion with Maritime Patrol Service Seminars to education people the importance of marine protection and sustainable uses of natural resources based on the resolution that prohibits the use of gill nets on high seas made in 1991.

PartIV. Conclusion

Geographically speaking, Taiwan has unique advantages in marine development. therefore, we can take advantage of the Formosa and use well the marine resources. Cultivating unique marine ecology in Taiwanese waters and protecting



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- 註3、<http://www.gcaa.org.tw/issue/nuclear/news/cora9803.htm>，2008.02.23
- 註4、赤潮會消耗大量的溶氧，阻塞魚類的鰓，分解時產生毒性物質。行政院農業委員會漁業署。
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- 註6、同上。
- 註7、姜皇池，論聯合國「跨界魚類種群協定」，臺大法學論叢，第三十一卷，第六期，民國91年11月，頁73-182。
- 註8、非法捕魚：係指未經核准擅自使用毒物、炸藥、電氣或增加、變更漁船設備，以斷絕魚類通路採捕水產動植物等，違反漁業法等相關規定之行為。龔光宇，台灣周遭海域大陸漁船越區捕魚現況暨因應對策之探討，p21。
- 註9、姜皇池，論國際漁業規範(下)，法學叢刊，第一七六期，民國88年10月，頁54-55。

marine biodiversity is a necessity in the laws of Coastal Patrol Regulations. The practice has many contributions in building a stable and sustainable ecological system in Taiwan waters, and it is also a protection for the country and people's living quality.

(The author is currently with the Offshore Flotilla 2 of Maritime Patrol Directorate General.)

Reference

- Note 1: Page 84, Ocean of Taiwan, by Dai Chang-Fong, September, 2003.
- Note 2: Marine Biodiversity and Preservation, Sao Guang-Jhao, Institute of Zoology, Academia Sinica.
- Note3:<http://www.gcaa.org.tw/issue/nuclear/news/cora9803.htm>/2008.02.23
- Note 4: Red tide consumes a large amount of dissolved oxygen that block the gills of fish. When dissolving, it produces toxic substances. (Source from Fishery Agency, Council of Agriculture, Executive Yuan.)
- Note 5: Marine Biodiversity and Preservation, Sao Guang-Jhao, Institute of Zoology, Academia Sinica.
- Note 6: Same as the above.
- Note 7: PP73-182 of On UN's Agreement for Straddling Fish Stock, Jiang Huang-Ci, NTU Law Journal, Volume 31, Sixth Period, November, 2002.
- Note 8: Illegal fishing: An act of fishing or catching aquatic animals or plants with unauthorized poisons, dynamites, electrical equipment, or alteration to boat facilities, and any other illegal fishing measures.(Source: Page 21 of Response and Discussion of Chinese Fishing Boats Fishing Illegally in Taiwanese Marine Area.)
- Note 9: PP54-55 of On International Fishery Agreement (2nd Part), Jiang Huang-Ci, Law Journal, 176th Periods, October 1999,