

Exploratory Trips for Sea Turtles in Guangdong Province, China – A Road to Conservation from Tradition, Culture and Science

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From late March to early April 2013, we visited several places of Guangdong Province (廣東省) of China (Map 1) to experience and understand every possible element relating to sea turtles, ranging from traditional culture to science/ research, through the eyes of local people.

On March 30, we visited Nanao (南澳鎮), a fishing village on the east coast of the Mirs Bay (大鵬灣) (Map 2). The place is of interest for investigation since a bycatch adult female green turtle in Hong Kong stayed for a few days in the coastal waters of Nanao according to a telemetry study from January to March 2013 (Annex). Local people of Nanao are mostly fishermen operating coastal fishing, such as trawling, in the Mirs Bay and Daya Bay (大亞灣). A local fisherman commented that they seldom accidentally caught sea turtles and they released sea turtles if they encountered any in good belief. There were many restaurants and stalls selling seafood and dried seafood products in the port. We saw a stuffed green turtle taxidermy of carapace length 60cm mounted on wall of a local stall as decoration to bring good luck (*feng shui*). In two of these shops, taxidermies of green turtles and hawksbill turtles were on sale. These taxidermies were juvenile turtles of carapace length ranging from 30 to 40 cm. A stuffed green turtle specimen was sold at RMB 1,800 while a hawksbill at a much higher price of RMB 3,000. The origin of these turtle specimens was unknown. A plastic replica mold of a green turtle was seen priced at only RMB 280 in another local store. We learnt from an owner of a local seafood restaurant that a Buddhist temple associated with the restaurant from time to time held small-scale events of release of marine resources and a larger-scale release activity every July 15 on the Chinese lunar calendar. Sometimes sea turtles were released in these events, during which at one time a large loggerhead turtle was released. We saw a nice bronze statue of Guan Yin (觀音) and a stone statue of Long Gui (an auspicious god image of dragon head and turtle body 龍龜) at the Buddhist temple.

We then visited Xuwen County (徐聞縣) and Zhanjiang City (湛江市) for 5 days. Zhanjiang is renowned for its production of jellyfish and aquaculture products, notably shrimps. Xuwen is located in the far south of the Leizhou Peninsular (雷州半島), north to Hainan Island across the Qiongzhou Strait (琼州海峽) (Map 3). The majority of local people at Xuwen are farmers and fishermen operating in the coastal waters of the Qiongzhou Strait, the Leizhou Bay (雷州灣) and the Beibu Bay (北部灣). A few of them still operate a traditional fishing method used for more than 200-300 years, known as set-net (圍網). Structure of a set-net is similar to that of a pound net, where fishing net is set vertically in the coastal water column in a 'maze' by stakes and any fish enter into the set-up are collected in a pocket at the end of the maze. Sea turtles occasionally came into these set-nets without harm and the fishermen released these by-catch turtles in good faithful belief in return of a spiritual blessing.

In a 1-km long sandy beach of Bai Sha Gang (白沙港) of Xuwen, we paid solemn respect and burned incense to a pristine burial place of a nesting green turtle from Hong Kong. The turtle was reported to be dead due to entanglement with a static fishing net in the coastal waters of the Qiongzhou Strait. The dead turtle was then buried respectfully in the prayers of Buddhist by the local people.

Afterwards, we had the honorable opportunity to tour around the Xuwen National Coral Reef Nature Reserve (徐聞珊瑚礁國家級自然保護區, <http://www.xwcoralreef.com/English/default.asp>) in the accompaniment of the Reserve director and staff. The Reserve was established in 1999 and lies in the southwest of Leizhou Peninsular, covering a coastline of 35km and an area of about 14,000 hectares. It is one of the only two National Nature Reserves designated for coral reef conservation in the mainland China, where over 80 species of corals occur in the 10,000-hectare reef. The Reserve has an extensive area of intertidal zone of 300 to 400m width subject to a tidal difference of 5 to 6m daily. Tide recedes in the morning from January to May while at night from June to December.

During fishing moratorium of the South China Sea from May to August, on June 6 every year, Chinese provincial governments along the coastline organize events of restocking of marine resources for the public. In 2011, the Reserve participated in such event where 60 to 70 sea turtles, predominately of carapace length 20cm and a few 50cm, were released along with other marine resources, such as groupers and horseshoe crabs. These sea turtles were sourced from confiscation by the Fisheries Administration (漁政) and donation from the local fishermen. The Reserve planned to

continue their involvement of marine conservation by setting up a large tank for rehabilitation of protected marine animals including sea turtles.

We then visited a sandy beach at Jiao-wei (角尾鄉) of Xuwen in the southernmost tip of the mainland China, where waters of the Qionghai Strait and the Beibu Bay meet. As advised by the local fishermen, nestings of green turtles were observed on the beach from May to June in 2012. A rich diversity of seaweed were washed ashore on the beach, they are *Sargassum* spp., *Caulerpa* spp, *Ulva* spp., *Padina* spp. and *Hypnea* spp and coralline algae. Some of them are known to be consumed by green turtles. Seaweeds were more abundant from February to March, as observed by the local.

Moreover, we attended to an aquaculture farm (in Chinese 宜人海珍養殖場) on the eastern coast of Nao Zhou (硃洲島) of Zhanjiang and were honored to discuss with the owner Mr. LIANG Aizhou (梁愛洲). Nao Zhou is an island located in the far east of the Leizhou Peninsular. The farm cultured fry of horseshoe crabs, shrimps, abalones and gastropods. It served as a research institute of the Guangdong Ocean University (廣東海洋大學) and participated in sea turtle conservation as a rehabilitation centre of marine wildlife (廣東省水生野生動物救護基地) in association with the Administration of Ocean and Fisheries of Guangdong Province (廣東省海洋與漁業局). It regularly held release event of sea turtles and joined the official release activity every June 6. There was a large outdoor pool that housed about 20 individuals of sea turtles, including 2 males and 4 females and mostly juveniles. Courtship of green turtles was observed inside the pool. A female green turtle attempted to make nest in 2011 in the sand of the pool but the eggs were eventually deposited underwater and failed to hatch. Several tanks indoor kept a few juvenile green turtles under medical treatment and a few individuals of other species, namely loggerhead, hawksbill and olive ridley. All these sea turtles in the farm were received as by-catch from local fishermen and Fisheries Administration of Nao Zhou, where coral and seaweed occur around the Island. This suggests potential foraging ground of sea turtles in the coastal area of Nao Zhou. As advised by the owner of the aquaculture farm, green turtles used to nest in the beach of Liang-jiao (亮角), next to the farm, before construction of a resort village. We then left a satellite transmitter from City University of Hong Kong to the owner of the aquaculture farm as the owner was very interested in putting on a turtle to be released in coming months.

At the end of the trip, we took the opportunity to consult with the professors of aquaculture and visit museum of marine resources at the Guangdong Ocean University. Taxidermy of green turtles and hawksbill turtles from Spratly Islands/

Nansha Islands (南沙群島) of the South China Sea and Hainan were exhibited in the museum. In a local store at Zhanjiang, several stuffed specimens of green turtles and hawksbills and hawksbill products were on sale. A taxidermy of green turtle of carapace length 40cm was sold at RMB 4,800, hawksbill of carapace length 40cm at RMB 4,000 and of 70cm at 48,600.

Marine resources along the coast of Guangdong, at least in Nanao, Xuwen and Nao Zhou, appear to provide suitable habitat for sea turtles to forage and nest. We recognize the deeply-rooted traditional linkage of sea turtles with Chinese people as one of the core drives to sea turtle conservation. Despite trade in sea turtle products still persists, the concerted and growing efforts in sea turtle conservation by different parties from the general public to the government hopefully continues to sustain sea turtle populations in the region. As we presented in the 33rd International Sea Turtle Symposium at Baltimore, USA in 2013 about “The Xunliao Guangdong Province Experience: Releasing Sea Turtles for Restocking and Conservation Awareness in China”, which illustrates some of the unique aspects of China's spectacular sea turtle release phenomenon. China has vigorous and growing sea turtle conservation and research programs that deserve praise and partnership to improve the status of regional stocks. Ideas are set forth for the possibility of enhanced conservation study involving both cultural and biological science perspectives. We encourage people outside of China to learn, understand and work together more of this unique multi-disciplinary way in conservation of sea turtles.

We are sincerely thankful for the hospitality and friendship of all the wonderful people we met in Guangdong, in particular CHEN ling (陳玲), Director LIU wei (劉煒局長), LIAO Baolin (廖寶林), DENG Jianhong (鄧建洪), LIN Mingwei (林明偉), LI Guanbei (黎冠貝), LIANG Aizhou (梁愛洲) and LIANG Wanning (梁萬寧). The following images give views of the wonderful experiences we had in Guangdong involving sea turtles, local people, and their rich culture.

探索中國廣東省海龜之旅 – 保育始於傳統文化及科學

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從 2013 年 3 月下旬到 4 月上旬，我們走訪了中國廣東省幾個地方（圖 1），從當地人民的視角體驗及了解各種與海龜有關的元素，範圍包括從傳統文化到科學研究。

在 3 月 30 日，我們造訪位於大鵬灣東海岸的漁村南澳鎮（圖 2）。根據從 2013 年 1 月至 3 月的衛星追蹤研究（附錄），一隻在香港誤捕的成年雌性綠海龜在南澳近海待了幾天。南澳當地人士大多是在大鵬灣和大亞灣經營沿海捕魚的漁民，如拖網。當地漁民說，他們甚少誤捕海龜，如果真的誤捕海龜，會把牠放生，相信可帶來好運。南澳港口有許多餐館和小攤賣海鮮及海味產品。我們在一間小店內看到一隻背甲約長 60 厘米的綠海龜標本，掛在牆上作為裝飾，以帶來風水運氣。有一些店鋪售賣綠海龜和玳瑁的標本，這些標本的背甲長度從 30 厘米到 40 厘米不等。一隻綠海龜標本以人民幣 1,800 元出售，而玳瑁則賣得更高的價格，約人民幣 3,000 元一隻。這些海龜標本的來源不明。而一隻塑料製的仿真綠海龜模型則賣人民幣 280 元。一間當地海鮮餐廳內的佛教寺廟定期在農曆 7 月 15 日舉行大大小小規模的放生活動，包括海龜。佛教寺廟中擺放著銅製觀音像及石造龍龜。

然後，我們到徐聞縣及湛江市遊覽 5 天。湛江市著名生產水母(水蜇)和水產養殖產品，特別是蝦。徐聞縣位於雷州半島的最南部，在瓊州海峽的北岸，海南島的對岸（圖 3）。徐聞當地人民大多是農民和沿海水域（如瓊州海峽、雷州灣和北部灣）作業的漁民。有些當地人經營用於 200-300 年以上的傳統捕魚方法 – 稱為定置網/圍網。圍網是一組在沿海用木柱垂直固定設置的漁網，造成“迷宮”，使任何魚類進入裝設後不能離開，被收集在圍網末端的口袋。海龜偶爾游進這些圍網，通常不會對海龜造成任何傷害，漁民會放流海龜，相信此舉可帶來吉祥好運。

在 1 公里長的徐聞白沙港沙灘上，我們莊嚴地拜祭來自香港的產卵綠海龜。據了解，該海龜在瓊州海峽附近被漁網糾纏而淹死，隨後被當地人恭敬地在佛教祈禱中埋於沙灘。

之後，我們很榮幸有機會隨保護區人員遊覽徐聞珊瑚礁國家級自然保護區 (<http://www.xwcoralreef.com/English/default.asp>)。該保護區成立於 1999 年，位於雷州半島西南部，佔 35 公里的海岸線，面積約 14,000 公頃。這是中國唯一兩個國家級自然保護珊瑚礁保護區的其中一個保護區，區內孕育超過 80 種珊瑚，共 10,000 公頃的珊瑚礁。該保護區內有一個廣闊的潮間帶，寬度為 300 至 400 米，每天的潮汐差距為 5 至 6 米。從 1 月到 5 月於早上退潮，從 6 月到 12 月則在晚上。

每年 6 月 6 日 (即從 5 月至 8 月中國南海的休漁期期間)，中國沿岸的省及市政府為公眾組織和舉辦海洋資源增殖放流活動。在 2011 年，徐聞珊瑚礁國家級自然保護區參與有關放流活動，如石斑魚和馬蹄蟹，當中野放 60 至 70 隻海龜，大部分背甲長 20 厘米和幾隻長 50 厘米。那些海龜均來自當地漁政及漁民的捐贈。該保護區繼續積極參與海洋保育，剛建成一個大水池，以修復受保護的珍稀海洋動物，包括海龜。

接著，我們到處於中國大陸最南端的徐聞角尾鄉，是瓊州海峽和北部灣的相交點。當地漁民表示，在 2012 年 5 月到 6 月觀察到綠海龜產卵。角尾鄉沙灘上發現豐富多樣的海藻被衝上岸，包括馬尾藻、蕨藻(海葡萄)、石莖、團扇藻、沙菜和珊瑚藻。當中有些品種是綠海龜會吃的。當地漁民表示，2 月到 3 月的海藻數量及品種比較豐富。

此外，我們參觀了位於湛江硇洲島東岸的宜人海珍養殖場及與場主梁愛洲經理交流。該養殖場主要飼養馬蹄蟹、蝦、鮑魚和東風螺的苗。它亦作為廣東海洋大學的研究單位，並擔任廣東省水生野生動物救護基地，協助廣東省海洋與漁業局收容及修復海龜。該養殖場定期舉行放流海龜活動，並支持每年 6 月 6 日的官方海洋資源增殖放流活動。該養殖場內設置一個大型室外水池，水池一端是深 1.5 米的沙層，池內飼養約 20 隻綠海龜，其中包括 2 隻雄性及 4 隻雌性，主要是未成年的海龜。根據場主梁經理及護理員梁萬寧先生觀察，水池內綠海龜曾有交配行為。在 2011 年，一隻雌性綠海龜試圖在池內沙層造卵窩，但母龜最終在水裡產下龜蛋，孵化失敗。室內有幾個水池飼養正接受治療的未成年綠海龜及其他品種的海龜，如玳瑁、赤蠵龜和欖蠵龜。養殖場收容的海龜來自當地硇洲島沿岸作業的漁民和漁政。珊瑚和海藻環島而生。這表明硇洲島沿岸一帶可能是海龜的覓食及棲息地。場主梁經理表示，養殖場附近的亮角沙灘，在未建度假村前，有綠海龜產卵。梁經理對海龜衛星追蹤研究感興趣，我們把香港城市大學提供的衛星追蹤儀交給梁經理，安裝到未來幾個月內放流的海龜上。

在行程的尾聲，我們有幸與廣東海洋大學致力水產養殖研究的教授們交流，並參觀大學的博物館。博物館內展出來自中國南海南沙群島及海南島的綠海龜和玳瑁

的標本。另外，湛江當地有商店銷售綠海龜和玳瑁標本及玳瑁製成品：背甲長 40 厘米的綠海龜售價為人民幣 4,800 元；背甲長 40 厘米的玳瑁售人民幣 4,000 元，背甲長 70 厘米的玳瑁售人民幣 48,600。

我們相信廣東沿岸豐富的海洋資源為海龜提供合適的覓食地及產卵地，至少根據在南澳、湛江徐聞及硃洲島的觀察。我們認為與海龜根深蒂固的傳統聯繫是中國保護海龜的其中一個核心動力。儘管海龜產品貿易依然存在，期望由不同人士從公眾至政府通力合作的海龜護理工作可繼續維持海龜種群。我們於美國巴爾的摩 (Baltimore) 的第 33 屆國際海龜研討會上發表的簡報“中國廣東省巽寮的經驗：在海洋資源增殖及保育意識放流海龜的角色”，說明了中國獨有的放流海龜活動。中國具有充滿活力和不斷拓展的海龜護理工作和研究，值得讚揚及被廣泛認識，與其他夥伴合作，以維持及提升該地區的海龜種群。我們鼓勵大家去學習、認識了解和共同建造中國獨有並多層次的保育海龜方法：保育始於傳統文化及科學。

我們衷心感謝在廣東遇到所有美妙及熱情好客的人，尤其是陳玲、劉煒局長、廖寶林、鄧建洪、林明偉、黎冠貝、梁愛洲及梁萬寧。以下圖片記載我們在廣東各地方的美好時光。請大家細心欣賞感受。



Map 1 Guangdong Province, China 圖 1 中國廣東省

(Source 來源: <http://www.chinamaps.org/china/provincemaps/guangdong-map.html>)



Map 2 showing the location of Nanao of Guangdong Province, China

圖 2 中國廣東省南澳鎮

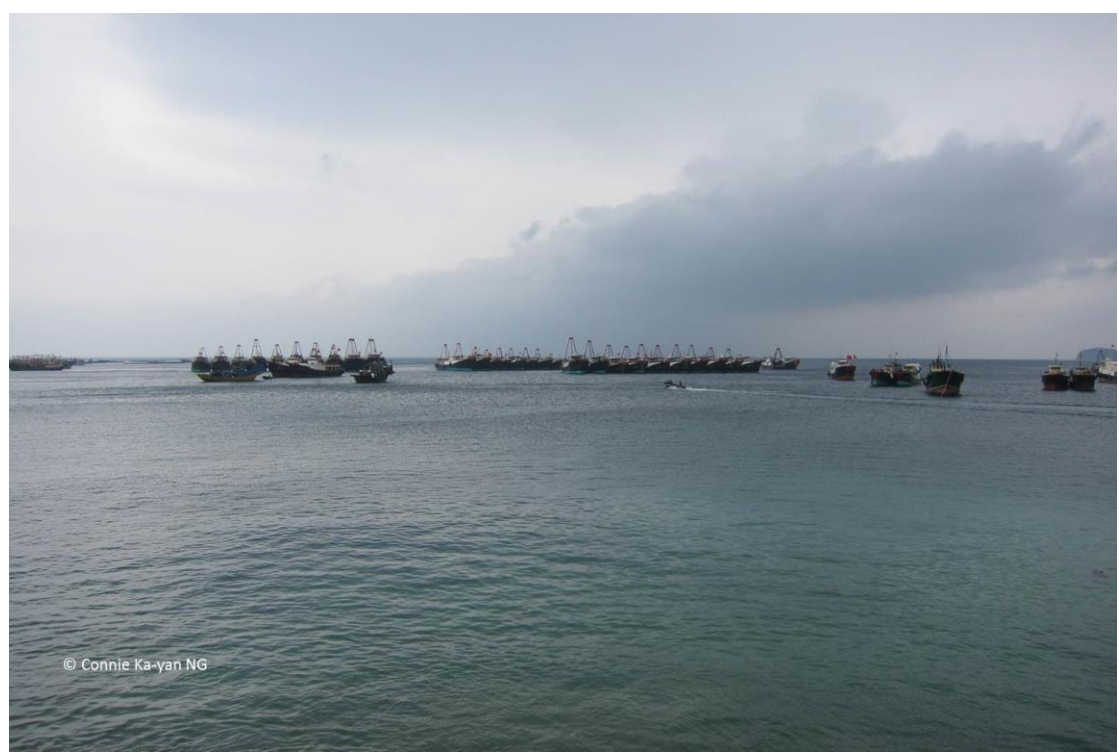
(Source 來源: Google Map Access on 19 May 2013)



Map 3 Zhanjiang of Guangdong Province, China

圖 3 中國廣東省湛江

(Source 來源: <http://ilc.net.cn/map/guangdong/zhanjiang.jpg>)



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Picture 1. Nanao, on the east coast of the Mirs Bay, Guangdong Province, China
圖 1. 位於中國廣東省大鵬灣東邊的南澳鎮

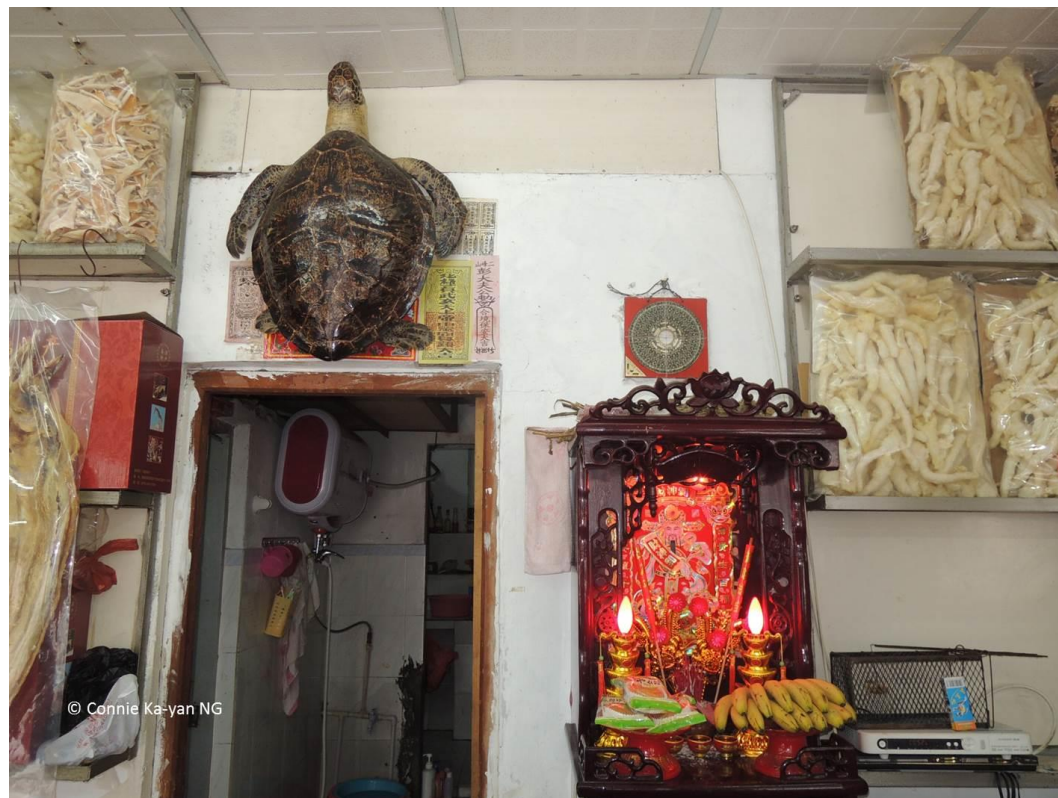


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Picture 2. Nanao, on the east coast of the Mirs Bay, Guangdong Province, China
圖 2. 位於中國廣東省大鵬灣東邊的南澳鎮



Picture 3. Restaurants and stalls selling seafood and dried seafood products in Nanao
圖 3. 於南澳鎮售賣海鮮的商店



Picture 4. A green turtle taxidermy as decoration in local store, Nanao
圖 4. 於南澳鎮商店內的綠海龜標本裝飾



Picture 5. Taxidermies of hawksbill turtles on sale, Nanao
圖 5. 於南澳鎮商店內售賣的玳瑁標本



Picture 6. A Buddhist temple associated with a local restaurant, Nanao
圖 6. 位於南澳鎮一間餐廳的佛廟



Picture 7. Events of release of marine resources, including sea turtles, held at the Buddhist temple, Nanao

圖 7.佛廟定期舉辦放生活動，包括海龜



Picture 8. A bronze statue of Guan Yin and a stone statue of Long Gui at the Buddhist temple, Nanao

圖 8.佛廟內的銅製觀音像及石製龍龜



Picture 9. Events of release of marine resources, including sea turtles, held at the Buddhist temple, Nanao

圖 9.佛廟定期舉辦放生活動，包括海龜



Picture 10. George BALAZS, Connie Ka-yan NG and Director LIU wei (from left to right), Xuwen of Zhanjiang

圖 10.佐治柏樂滋、伍家恩及劉煒局長(由左至右)於湛江徐聞



Picture 11. A burial place of a nesting green turtle from Hong Kong at Bai Sha Gang of Xuwen, Zhanjiang

圖 11. 一隻在香港產卵後的綠海龜被埋於湛江徐聞白沙港的地方



Picture 12. A burial place of a nesting green turtle from Hong Kong at Bai Sha Gang of Xuwen, Zhanjiang

圖 12. 一隻在香港產卵後的綠海龜被埋於湛江徐聞白沙港的地方



Picture 13. Set-net drying at Bai Sha Gang of Xuwen, Zhanjiang

圖 13. 在湛江徐聞白沙港的圍網



Picture 14. A burial place of a nesting green turtle from Hong Kong at Bai Sha Gang of Xuwen, Zhanjiang

圖 14. 一隻在香港產卵後的綠海龜被埋於湛江徐聞白沙港的地方



Picture 15. LI Guanbei, George, DENG Jianhong and LIAO Baolin (from left to right) at Bai Sha Gang of Xuwen, Zhanjiang
圖 15. 黎冠貝、佐治、鄧建洪及廖寶林(由左至右)於湛江徐聞白沙港的地方



Picture 16. Connie with historical coral skeleton at Xuwen National Coral Reef Nature Reserve, Zhanjiang
圖 16. 伍家恩與千年珊瑚骨骼合照於湛江徐聞珊瑚礁國家級自然保護區



Picture 17. Exhibit of coral specimen at Xuwen National Coral Reef Nature Reserve, Zhanjiang

圖 17. 在湛江徐聞珊瑚礁國家級自然保護區內的珊瑚標本展覽



Picture 18. Public education hall at Xuwen National Coral Reef Nature Reserve, Zhanjiang

圖 18. 在湛江徐聞珊瑚礁國家級自然保護區內的公眾教育展館



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Picture 20. Local people processing jellyfish at Xuwen, Zhanjiang
圖 20. 在湛江徐聞當地人在整理海蜇



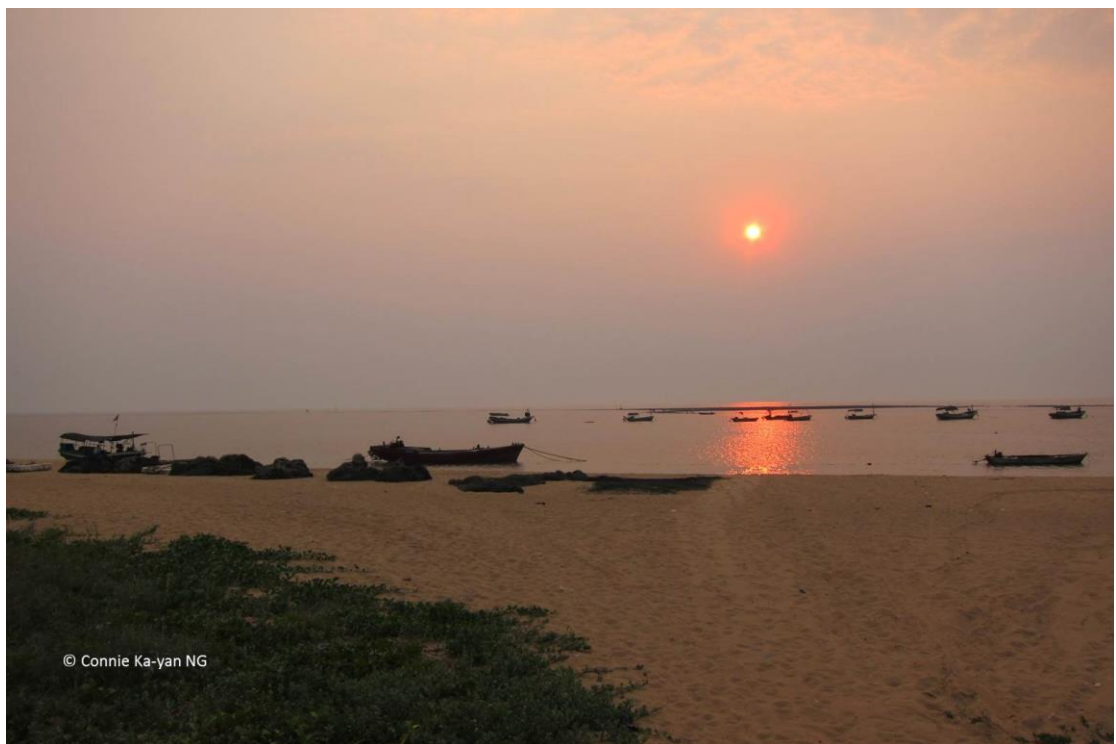
Picture 21. Local people use dead coral skeleton to build houses at Xuwen, Zhanjiang
圖 21. 在湛江徐聞當地人用已死的珊瑚骨骼建房



Picture 22. Local people use dead coral skeleton to build houses at Xuwen, Zhanjiang
圖 22. 在湛江徐聞當地人用已死的珊瑚骨骼建房



Picture 23. Jiao-wei of Xuwen, where the Leizhou Bay and the Beibu Bay meet
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Picture 25. A rich diversity of seaweed were washed ashore on the beach at Jiao-wei
圖 25.在角尾鄉沙灘上發現多種海藻



Picture 26. A rich diversity of seaweed were washed ashore on the beach at Jiao-wei
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Picture 27. Aquaculture farm on the eastern coast of Nao Zhou, Zhanjiang
圖 27.位於湛江硇洲島上的宜人海珍養殖場



Picture 28. Release event of sea turtles regularly held at the beach of the aquaculture farm, Nao Zhou, Zhanjiang
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Picture 29. A large outdoor pool that housed sea turtles with layer of sand at the aquaculture farm, Nao Zhou, Zhanjiang

圖 29.宜人海珍養殖場用作飼養海龜的室外水池連沙層



Picture 30. A large outdoor pool that housed sea turtles with layer of sand at the aquaculture farm, Nao Zhou, Zhanjiang

圖 30.宜人海珍養殖場用作飼養海龜的室外水池連沙層



Picture 31. A large outdoor pool that housed sea turtles with layer of sand at the aquaculture farm, Nao Zhou, Zhanjiang

圖 31.宜人海珍養殖場用作飼養海龜的室外水池連沙層



Picture 32. Green turtles used to nest in the beach of Liang-jiao, next to the farm, Nao Zhou, Zhanjiang

圖 32.宜人海珍養殖場附近的亮角沙灘從前有綠海龜產卵



Picture 33. Connie, LIANG Wanning and George (from left to right) at the aquaculture farm, Nao Zhou, Zhanjiang

圖 33.伍家恩、梁萬寧及佐治(由左至右)於宜人海珍養殖場



Picture 34. Indoor tanks to keep sea turtle of other species at the aquaculture farm, Nao Zhou, Zhanjiang

圖 34.於宜人海珍養殖場室內飼養其他海龜品種的水池



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Picture 35. Indoor tanks to keep sea turtle under treatment at the aquaculture farm, Nao Zhou, Zhanjiang

圖 35.於宜人海珍養殖場室內池內接受治療的海龜



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Picture 36. Connie, LIANG Wanning and LIANG Aizhou (from left to right) with a satellite transmitter at the aquaculture farm, Nao Zhou, Zhanjiang

圖 36.伍家恩、梁萬寧及梁愛洲(由左至右)與衛星追蹤儀於宜人海珍養殖場



Picture 37. George and Connie with professors of the Guangdong Ocean University
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Picture 38. Hawksbill specimen at the museum of the Guangdong Ocean University
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Picture 39. Specimens of green turtles and hawksbills and hawkbill products on sale in a local store at Zhanjiang

圖 39. 湛江當地商店售賣綠海龜及玳瑁標本與製成品



Picture 40. Specimens of green turtles and hawksbills and hawkbill products on sale in a local store at Zhanjiang

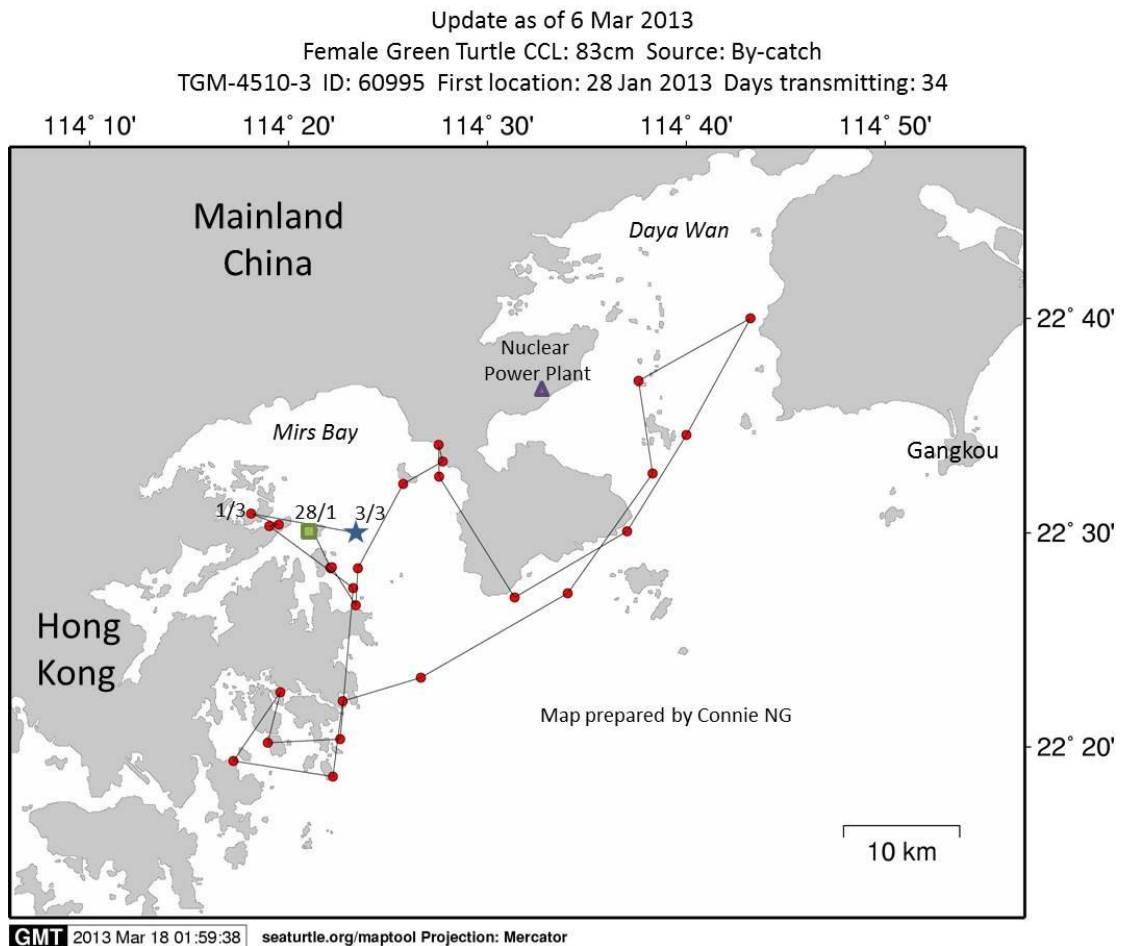
圖 40. 湛江當地商店售賣綠海龜及玳瑁標本與製成品



Picture 41. Restocking of marine resources at Xunliao of Guangdong in June 2012
圖 41.於 2012 年 6 月在廣東巽寮舉行的海洋資源增殖放流活動



Picture 42. Restocking of marine resources at Xunliao of Guangdong in June 2012
圖 42.於 2012 年 6 月在廣東巽寮舉行的海洋資源增殖放流活動



Tracking map of a bycatch adult female Green Turtle released in Hong Kong from January 28 to March 3, 2013

在香港野放的誤捕成年雌性綠海龜的衛星追蹤圖 (追蹤時間: 2013 年 1 月 28 日至 3 月 3 日)

(Source 來源: SEATURTLE ORG Maptool. SEATURTLE.ORG, Inc.

<http://www.seaturtle.org/maptool/>)

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