讓黑嘴端鳳頭燕鷗永續生存

黑嘴端鳳頭燕鷗國際保育行動綱領研討會

2007 年 7 月 2 日

主辦：社團法人中華民國野鳥學會

協辦：連江縣政府

台灣大學森林環境暨資源學系

補助：行政院農業委員會林務局

編輯：社團法人中華民國野鳥學會

封面設計：社團法人中華民國野鳥學會

封面及封底相片：張壽華

出版：社團法人中華民國野鳥學會

Mei-Ichi Chen

◎社團法人中華民國野鳥學會

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目　　錄

黑嘴端鳳頭燕鷗(CCT)國際保育行動綱領研討會

日期：2007 年 7 月 2 日

時間：上午 9 點～下午 5 點 30 分

地點：台灣大學森林環境暨資源保育學系一樓　林一教室

時　間	項　目	內　容	負責/講者	備　註
0830-0900	報　到		中華鳥會	
0900-0920	開　幕	致　辭	林務局、連江縣政府長官	
0920-1000	專題報告	台灣西部海岸鷗科狀況概述	袁孝維	
1000-1030	休　息(茶點)			
1030-1110	兩岸 CCT 狀況報告（一）	馬祖列島燕鷗保護區狀況報告	張壽華	
1110-1140	全球 CCT 狀況報告	Bird Life	陳承彥	simba
1140-1210	保育行動計畫	Bird Life	陳承彥	
1210-1400	午　餐			
1400-1530	兩岸 CCT 狀況報告（二）	大陸沿海黑嘴端鳳頭燕鷗的分佈記錄及受脅因素分析	陳水華	
		浙江韭山列島黑嘴端		
		鳳頭燕鷗繁殖群現狀和面臨的保護困境	陳蒼松	
		福建沿海的調查記錄與分析	江航東	
1530-1540	討　論			
1540-1600	休　息(茶點)			
1600-1730	保育合作座談		中華鳥會	
1730	會議結束			

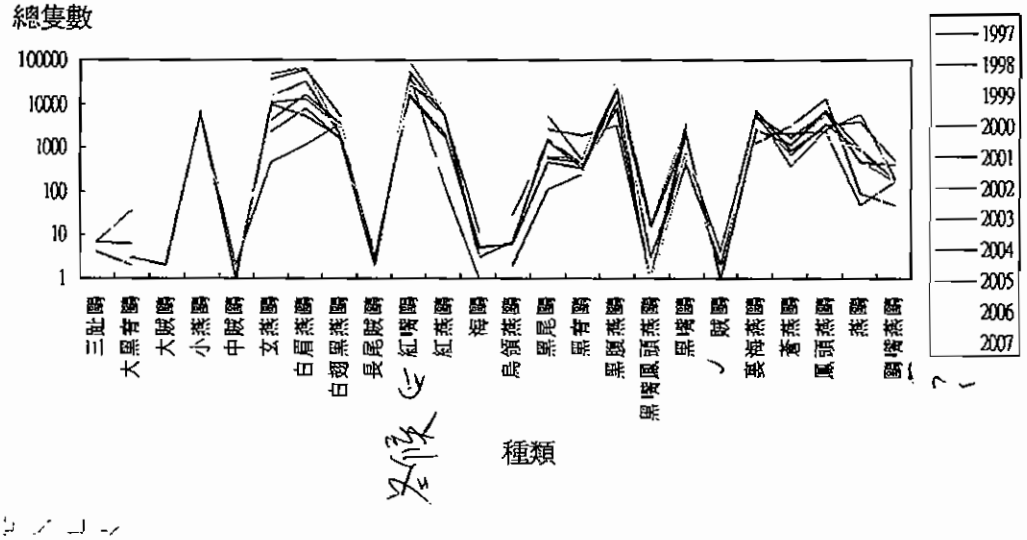
台灣西部海岸鷗科狀況概述

袁孝維（台大森林環境暨資源學系）

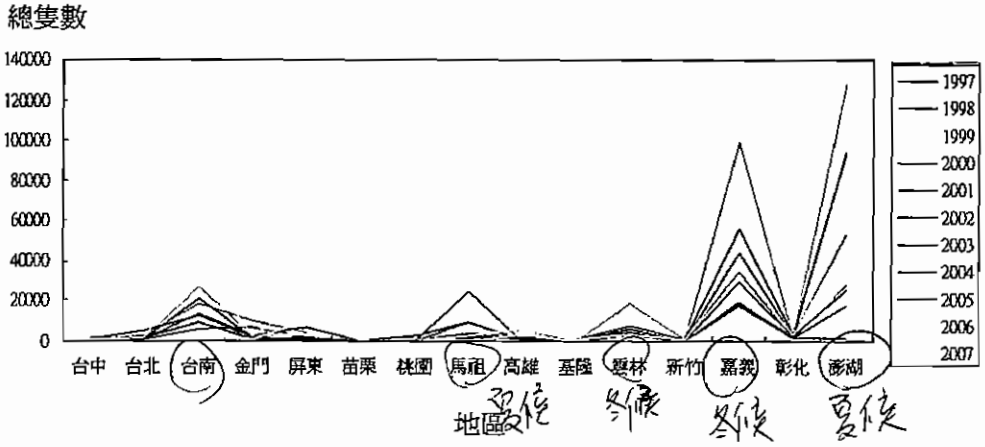
大綱

- 1997～2007年鷗科鳥種數量變化圖
- 西部地區各縣市鳥種數量圖
- 優勢種逐年數量圖
- 黑嘴端鳳頭燕鷗數量圖

1997～2007年西部鷗科鳥種數量變化圖



西部地區各縣市鳥種數量圖



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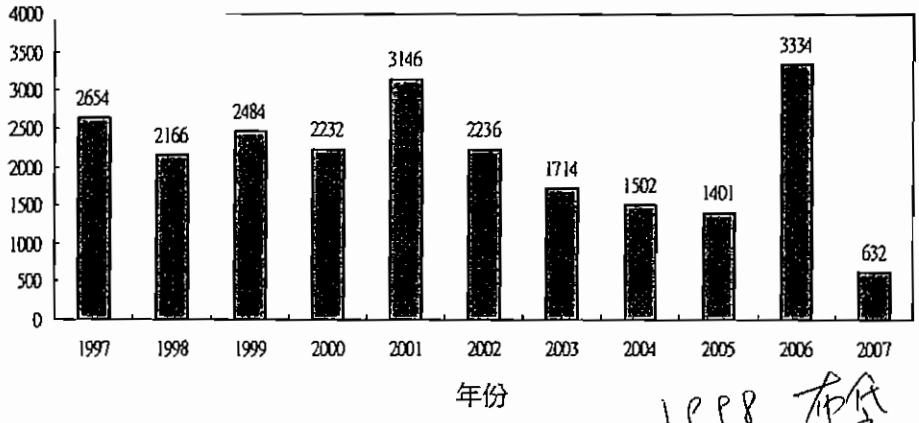

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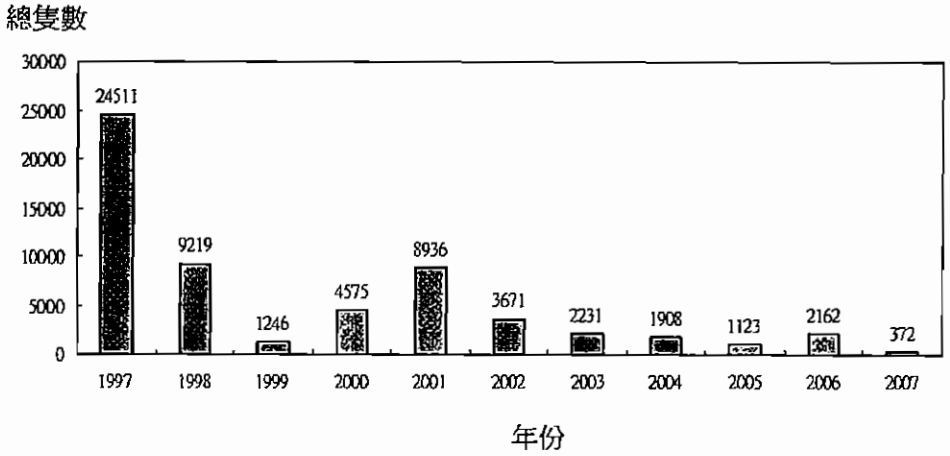
馬祖



黑腹燕鷗在夏季高位現主字有疑問.

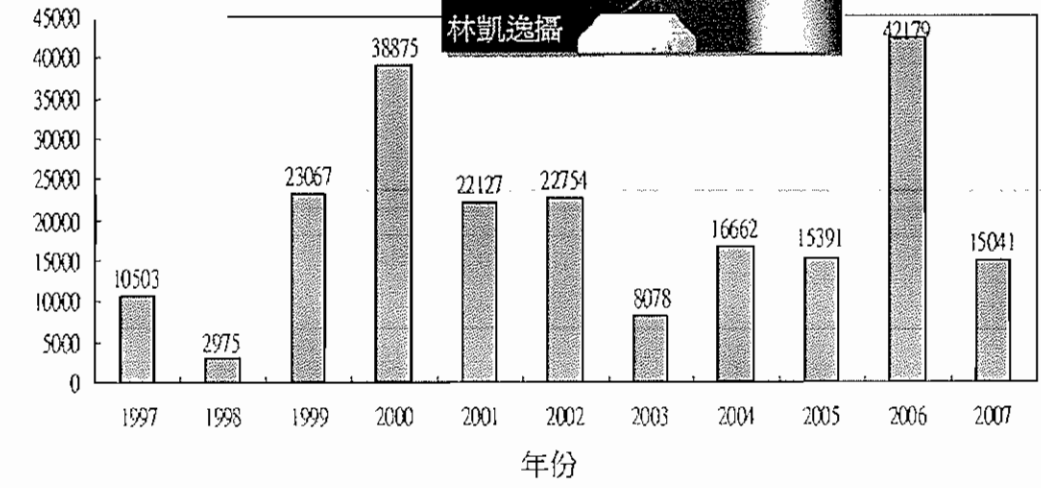
優勢種逐年變化圖

- 取五種優勢種，觀察其逐年的數量變化。
- 最後針對黑嘴端鳳頭燕鷗，觀察其逐年數量變化。

黑腹燕鷗


Photo By:Victor Lin
林凱逸攝


廖本興攝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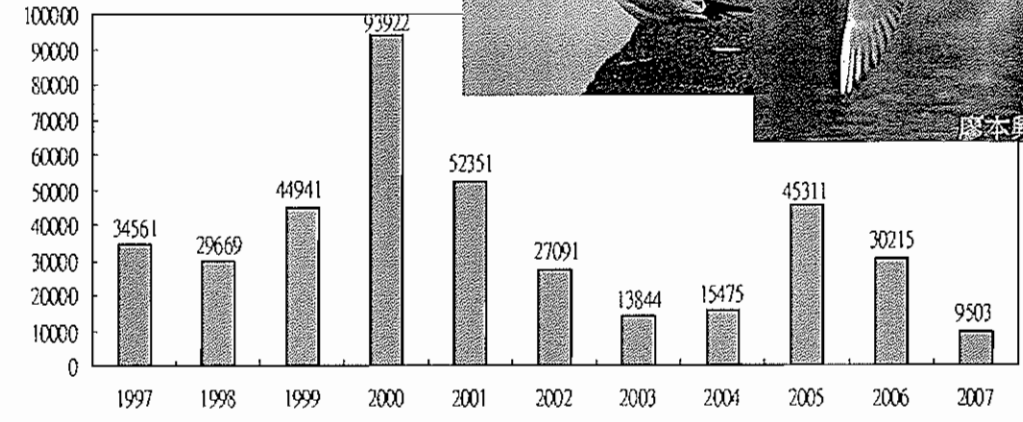
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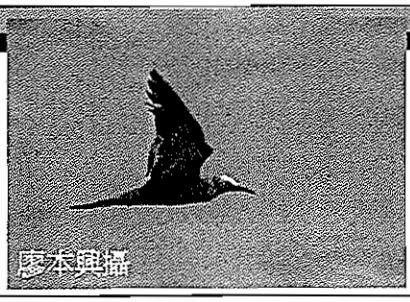
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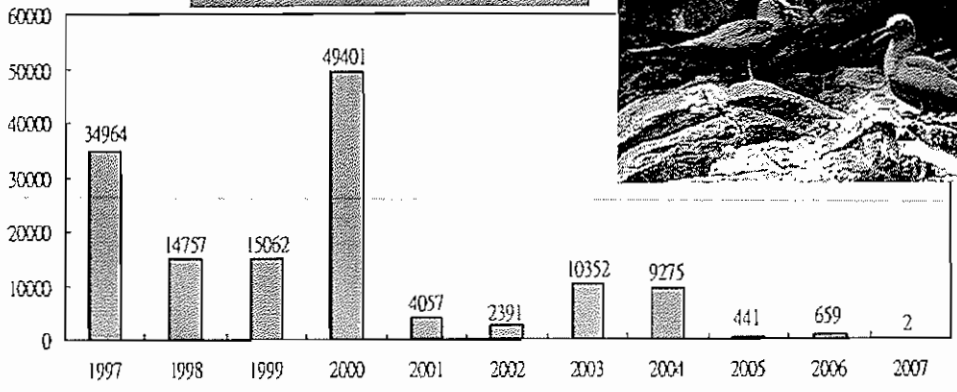
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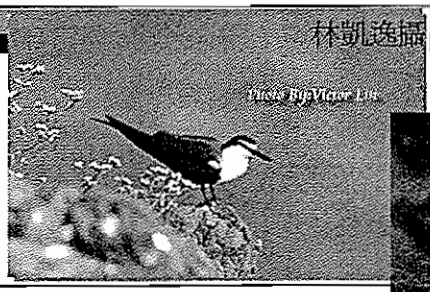
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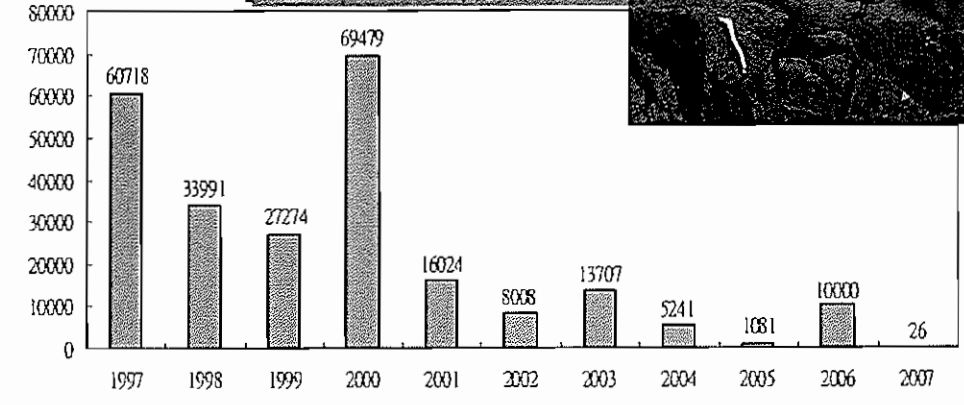
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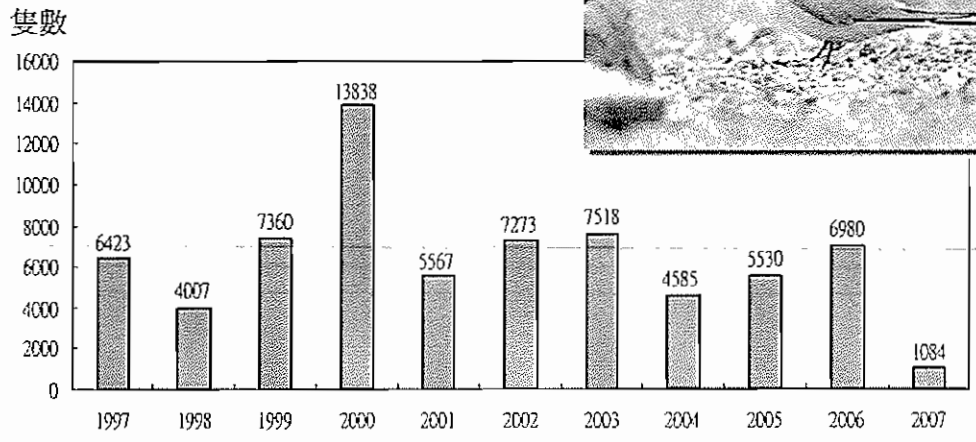
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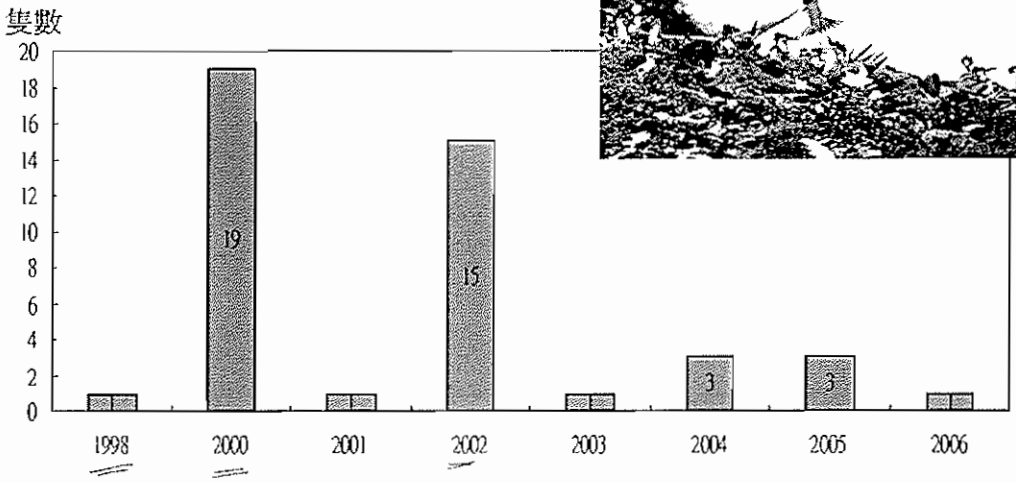
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馬祖列島燕鷗保護區狀況報告

張壽華（連江縣政府）

一、馬祖列島地理位置

馬祖列島位於台灣西北西方，四面環海，孤懸於閩江口外，散佈在東經119度51分至120度31分，北緯25度55分至26度44分之間。全縣由南竿、北竿、東引、西引、東莒、西莒、高登、亮島、大坵、小坵等大小36個島嶼組成，總面積29.6平方公里，其中以南竿島10.43平方公里最大，最高峰為北竿鄉碧山295公尺，南竿鄉雲台山250公尺最負盛名。

列島星羅棋佈，各島間以南竿、北竿距離最近，東引、莒光間最遠。馬祖離台灣114海里，與近在咫尺的中國大陸（高島）相距僅9,250公尺，因此在地理位置上與中國大陸有密不可分的關係。行政區域隸屬於福建省連江縣、主要分南竿、北竿、東引及莒光等四鄉，而南竿鄉介壽村是行政中心所在地。

二、馬祖列島燕鷗保護區

（一）緣起

馬祖地質大半以花崗岩為主，各島嶼面積狹小，地型多丘陵且崎嶇不平，但陸上、海洋生物資源相當豐富，無人島礁眾多，且為東亞候鳥遷移路線的中繼站，每年春、秋季便有成千上萬的鳥類在此過境、渡冬或繁殖。本縣東引鄉之雙子礁，北竿鄉之三連嶼、中島、鐵尖島、白廟、進嶼，南竿鄉之瀏泉礁，莒光鄉之蛇山等八座島礁，為孤立於各鄉外之無人島嶼，附近海域漁產豐富，平時除漁民前往捕魚、撿食海產外，人跡罕至，造就為珍貴海鳥聚集繁殖地。惟近年來大陸漁民越界捕魚、炸、電魚等情況嚴重，少數漁民亦不時登岸撿拾鳥蛋、海芙蓉等，使島嶼及海洋自然生態環境破壞殆盡，為維護列島自然生態及保護海鳥棲息環境，劃設海鳥保護區加強管理措施，以保育馬祖列島珍貴海鳥資源。

（二）保護區野鳥現況及棲息環境

1.野鳥現況：

八十二年戰地政務解除後，地方政府有感於生態資源資料乏如，委請學

者專家合作進行一連串的鳥類、昆蟲、植物、兩棲爬蟲、地景及海洋資源的研究調查，根據資料顯示，在保護區內棲息的鳥種 23 科 56 種，其中以繁殖的夏候鳥燕鷗數量最多，根據老漁民的說法，在 50~70 年代其數量曾高達數萬隻，然因長期軍方砲擊及漁民濫拾鳥蛋結果，致使島上海鳥數量遽減(在莒光蛇山、東引雙子礁有白眉燕鷗大量死亡調查紀錄)。紀錄中在保護區上繁殖的鳥類計有黑嘴端鳳頭燕鷗、白眉燕鷗、大鳳頭燕鷗、紅燕鷗、蒼燕鷗、黑尾鷗、岩鷺、叉尾雨燕等八種，其中瀕臨滅絕的神話之鳥-黑嘴端鳳頭燕鷗繁殖紀錄為全世界第一筆，而黑尾鷗在東引繁殖紀錄亦是全國獨一無二，珍貴無比。

近幾年來在列島繁殖的燕鷗群數量約在 9000 隻左右，其中白眉燕鷗、蒼燕鷗為保育類鳥種，紅燕鷗在歐美國家列為瀕臨絕種鳥種，大鳳頭燕鷗數量更是全國之冠，尤以黑嘴端鳳頭燕鷗的再發現，大幅提昇我國在國際上生態保育之地位，如此珍貴鳥類資源，尤應國人重視並加強保育管理。

2.棲息環境

馬祖地區位於福建省閩江口，大量河水注入海中帶來大量的無機鹽類及有機物質，海域的營養鹽較豐富。此外，馬祖列島位舟山群島西南端一帶，漁場海底係我國大陸棚地，水淺而傾度緩慢平坦，又居暖寒海流南北相匯之銜，為多種經濟性魚類索餌、生殖、越冬及洄游必經之地，因此洄游性魚類、近岸性魚類、河口性魚類、岩礁性魚類及棲居性魚類非常豐富，海中資源可謂取之不竭，充份供應海鳥食物來源。

各保護區面積狹小，沒有河川、溪流，各島嶼除終年覆蓋原生植物外，皆為裸露岩塊，其植物計有 30 科 45 種，其中以有刺灌叢植被之柘樹、魯花樹、菝契、紅梅消，原始灌叢植被之厚葉石斑木、濱柃木，山坡草本植物群落之紅花石蒜、油菊，海崖、海岸草本植物群落之狗娃花、薤白、海芙蓉、石板菜、茅毛珍珠菜、細葉假黃鶴菜等為主。

（三）保護區劃設依據及公告

保護區劃設依據野生動物保育法第十條及同法施行細則第十二條辦理。民國八十八年十二月二十四日由主管機關行政院農業委員會同意劃設，並由

連江縣政府於八十九年一月二十六日正式公告為國家第十二處野生動物保護區。

（四）分區規劃與保護利用管制事項

分區規劃 (保護區面積合計 71.6166 公頃) 本計劃區之各島嶼為無人島礁，然為因應島礁週邊海域炸魚、濫捕行為及觀光事業蓬勃後人為干擾等，特規劃核心區及緩衝區如下：

1.核心區：各保護區陸域部份，面積 11.9171 公頃。包括雙子礁、三連嶼、中島、鐵尖島、白廟、進嶼、瀏泉礁、蛇山等島嶼。

2.緩衝區：各保護區島礁低潮線向海延伸 100 公尺內之海域部份，面積 59.6995 公頃。

（五）管制事項

1.共同管制事項：

(1)禁止獵捕、宰殺、騷擾、虐待一般類與保育類野生動物、鳥類或撿拾、破壞鳥蛋等行為。

(2)禁止各種開發、建設、疏浚、探採礦、採取土石、採集砍伐植物、或其他破壞自然生態環境等行為。但在不破壞野生動物主要棲地及影響野生動物棲息情況下，主管機關得設置必要之保育維護及解說設施。

2.核心區特別管制事項：

(1)全年嚴禁民眾攀登或進入核心區，但為學術研究或自然教育目的者不在此限，惟需先向主管機關申請許可後，始得為之。

(2)非燕鷗繁殖季節(每年十月至翌年三月)，漁民得登岸採擷貝類或海(紫)菜，但不得違反本保護區保護利用管制事項(共同、緩衝區及其他保護利用管制事項)。

3.緩衝區特別管制事項：

緩衝區內嚴禁按鳴喇叭、放煙炮、餵飼海鳥或其他干擾海鳥之行為。

√4.其他管制事項

依野生動物保育法及漁業法等規定辦理。

（六）罰則

凡違反上列管制事項者，依野生動物保育法之規定，處新台幣五萬元以上二十五萬元以下罰緩。

（七）保護區內之燕鷗

1.鷗科鳥類全世界八十九種，台灣十八種，在馬祖繁殖的夏候鳥六種，冬候鳥二種，過境鳥六種，合計十三種（其中黑尾鷗有冬候鳥及夏候鳥不同族群較為特殊）。

2.鷗科屬海洋性鳥類，分佈於全球，本種分兩類型；鷗類：體型肥胖，嘴粗，翼寬長，尾短不分叉。趾間有蹼，善游泳，常浮游水面或於陸地覓食，個性較不怕人。主要棲息於海岸、河口地帶，以魚、蝦類及撿拾大自然垃圾為食。燕鷗類：體型纖細，嘴尖細，翼狹長，尾長大多分叉。不善於游泳，不浮於水面，僅俯衝入水覓食，主要以魚蝦等表層海洋性生物為食。

遷移性的黑尾鷗及黑脊鷗，冬季在馬祖是普遍的冬候鳥，馬祖列島週邊海域成為牠們度冬區，這群來自北方的嬌客，從每年十二月下旬來到馬祖，其中黑尾鷗的族群遠大於黑脊鷗，並以東引、莒光及福沃等三處港口數量最豐富，每年四月份離境北返。隨著春季洄游性魚類的到來，來自南方的另一黑尾鷗族群，在每年三月下旬悄悄地來到東引繁殖，初到之際，會在繁殖區附近的海面上嬉戲、玩耍、培養感情，求偶交配的行為在繁殖區礁岩上完成，主要繁殖地在長長鼻、小紫沃及老鼠沙的岩壁上。

3.燕鷗型的大鳳頭燕鷗等亦是隨著洄游性的魚類抵達馬祖，過境的族群從每年的四月下旬至五月中會先觀察到，然真正在馬祖列島繁殖的燕鷗比較晚到，從每年五月中旬以後才陸續抵達各保護區，其到達的順序為蒼燕鷗-紅燕鷗-大鳳頭燕鷗-黑嘴端鳳頭燕鷗-白眉燕鷗，且越北的島嶼（東引）會越晚到達。隨著繁殖季的結束，每年八月底，燕鷗便依序開始南返，直至九月中旬才結束這一季精彩的活動。

4.鷗科鳥均雌雄同體，喜築巢於懸崖峭壁岩石上、草地上或海灘上，有些築巢（黑尾鷗），有些不營巢（大鳳頭燕鷗），有些集體繁殖（大鳳頭燕鷗），有些離群索居（蒼燕鷗）。燕鷗每胎產蛋的數量（每窩 1-3 枚）會隨著不同種類、年齡及生理的成熟度而增減，亦會受當年繁殖地之食物種類豐富

度影響。燕鷗的孵化期隨著種類不同及體型大小而略有差異，大約在 21-30 天之間，孵化的任務由親鳥輪流擔任，由於是半早熟性之物種，且其食物又為高蛋白高熱能之性狀，因此，雛鳥在出生後 30-40 天左右，在親鳥教導下即可順利飛行。

三、*關於黑嘴端鳳頭燕鷗*

1.命名的由來：黑嘴端鳳頭燕鷗（Chinese Crested Tern）學名為 ***Sterna bernsteini***，屬名 Sterna 源自拉丁語，=tern（英語）=燕鷗；而種名 ***bernsteini*** 是紀念德國的動物學家 Heinrich Agathon Bernstern（1826-1856）。

2.外型特徵： 體長 36 公分，嘴為橘黃色，嘴的尖端、佔嘴長度三分之一的部份為黑色，且最尖端有一白點，此為最重要辨識特徵。頭部黑色具有冠羽，背部淡灰色，初級飛羽第一至四根顏色較黑，餘為白色，腳黑色。繁殖後頭部黑色冠羽部份逐漸褪為白色之冬羽。停棲時，尾羽、翼尖幾乎等長，尾羽分叉明顯。一巢生一個蛋，常混雜在大鳳頭燕鷗中與其一起活動、繁殖。飛行時，拍翅頻率適中而幅度深，飛行速度慢而優雅。鳴聲與大鳳頭燕鷗相似但較細並且尖銳。

3.繁殖與遷移：根據調查資料顯示，來馬祖繁殖的黑嘴端鳳頭燕鷗最早在五月初就會來到馬祖列島保護區中，但以六月初到來比例較高，且均是與鳳頭燕鷗一起抵達，其繁殖亦是與鳳頭燕鷗在一起。牠們會把蛋直接生在有短草的土坡地面上。推測黑嘴端鳳頭燕鷗應該是在六月初到中旬生蛋，和鳳頭燕鷗一樣一巢只生一枚蛋，孵化期約 25-30 天，雛鳥為半早熟性，絨毛羽色為灰色系，個體之間顏色變異大，腳黑色，嘴淡黃色或灰色，約 30-40 天可飛行。目前沒有任何有關黑嘴端鳳頭燕鷗遷徙的資料；研判牠們的繁殖區應在北回歸線以北的中國大陸沿海島嶼，度冬區則在東南亞海域；台灣嘉義八掌溪口是南遷北返的過境點。

四、*馬祖地區歷年來黑嘴端鳳頭燕鷗的紀錄與分析*

（一）紀錄

1、1998 年在鐵尖，至少有一隻混雜在鳳頭燕鷗鳥群中，其行為應在孵蛋。

2、1999 年在中島，根據拍攝影片顯示，至少有一隻混雜在鳳頭燕鷗鳥群中。

3、2000 年在中島，發現有三對繁殖，各有一隻幼鳥誕生。八隻成鳥4隻幼鳥.

4、2001 年在中島，五月初發現一隻，但後來失去蹤影。

5、2002 年在三連嶼，六月初發現有繁殖跡象，但後來失去蹤影；七月下旬在莒光蛇山發現至少三對繁殖，各育一隻幼鳥。

6、2003 年在瀏泉礁、進嶼各發現一隻，不知是否有繁殖。

7、2004 年白廟、鐵尖共發現六對，各育一隻幼鳥。

8、2005 年在三連嶼，發現二隻，繁殖狀況不明。

9、2006 年在三連嶼，發現至少三對，各育一隻幼鳥，並有一隻第一年度夏亞成鳥。

10、2007 年在蛇山，發現有三個巢，四隻成鳥。

（二）分析

1.從資料顯示，黑嘴端鳳頭燕鷗在 1998 年進行野鳥調查時所拍攝之照片中，就在馬祖鐵尖島礁中存在，當時因未仔細觀察而未被發現。據此推估，黑嘴端鳳頭燕鷗可能在更早之前就一直在馬祖繁殖。

2.真正確認黑嘴端鳳頭燕鷗在馬祖時間為 2000 年的六月。連江縣政府委託梁皆得先生拍攝「燕鷗的故鄉-馬祖」記錄影片時被確認，並於當年的八月在農委會開記者會宣佈。

3.歷年黑嘴端鳳頭燕鷗在馬祖出現最早時間為五月初，最晚為六月中旬，離開馬祖南遷時間大都在八月底至九月初之間。

4.自 1998-2007 年，黑嘴端鳳頭燕鷗每年均在馬祖列島燕鷗保護區出現，數量不一，最少成鳥一隻，最多成鳥十二隻。其中除 2001 年及 2003 年沒有發現繁殖外，其餘年代均有。

5.黑嘴端鳳頭燕鷗每年在馬祖列島繁殖的島礁不同，除東引雙子礁未紀錄過外，其於七個保護區島礁均有過紀錄。

6.五月初燕鷗剛到達馬祖之初，是燕鷗是否會利用該島礁一個重要時間點，因此，這時保護區是否有干擾及是否有充足食物，決定燕鷗是否會棲息繁殖決定性條件。

7.黑嘴端鳳頭燕鷗每年均混雜在鳳頭燕鷗中遷移、生活及繁衍，其兩族群間有一

定關聯性，值得探討。

五、黑嘴端鳳頭燕鷗面臨的威脅與危機

（一）世界性海洋漁業資源的匱乏，及人類過魚、電、炸魚之影響，導致每年棲息的燕鷗數量逐年減少。

（二）未解除戒嚴前，馬祖地區實施戰地政務，大部份的無人島礁都被用來當做砲擊訓練的靶場，造成多少燕鷗死亡不得而知。在解除戰地政務後，燕鷗保護區的設立，讓這些在島上棲息的燕鷗得以受到法律的保護。棲地之保護，雖由地方政府經營管理及海巡之巡護，惟本區與大陸僅一水之隔，大陸漁船越界捕魚、電、炸魚，上保護區採集貝類海產等干擾並撿拾鳥蛋之情事屢屢發生，對一個數量極度稀少的鳥種而言，這種獵捕壓力極可能會在幾年之內就導致物種的滅絕。

（三）近年來觀光遊憩賞鷗活動對燕鷗棲息是否造成影響，有賴持續調查研究資料彙整評估，裨作為往後是否持續辦理或調整賞鷗活動參考依據。

（四）燕鷗繁殖季節正逢夏季颱風盛行，天災造成燕鷗大量死亡，亦是燕鷗面臨族群減少之主要因素之一。

六、兩岸合作方向與保育具體建議

（一）大陸漁船越界捕魚對燕鷗之棲息繁衍影響不大，但電魚、炸魚之行為及鐵殼船雙拖、使用流刺網等在馬祖海域捕漁，造成漁群大量減少主因，近而影響燕鷗棲息數量。況且，燕鷗繁殖季節是大陸地區實施禁漁期期間，不知為何還有許多船隻來馬祖捕漁、甚至電漁炸漁，因此，兩岸如何共同打擊犯罪，保護海洋漁業資源，是現階段共同努力方向與目標。

（二）大陸東南沿海地區及馬祖周邊海域無人島礁，可能是主要黑嘴端鳳頭燕鷗繁殖棲地，因此，共同維護其棲地安全，監測及同步全面調查，亦是兩岸未來合作方向。

（三）根據往年海巡查緝方式分析，近年來，大陸漁船越界捕漁已改變策略，在海巡休息時或夜間捕漁，因此，連江縣政府目前正積極地僱用漁船將在保護區內下網之漁網具沒入，乃為現階段防範越界捕漁最有效方式。

（四）黑嘴端鳳頭燕鷗DNA建立、繫放及衛星追蹤，是未來幾年工作重點，對於此物種全面的了解，有助於保育工作落實。

七、結論

黑嘴端鳳頭燕鷗是瀕臨滅絕的珍稀鳥種，也是世界共同鳥類資源，無論在國際間及兩岸三地都有共同來保育維護其棲地、物種不被破壞滅絕的責任及神聖使命，希望藉著這次的研討會能研擬出具體保育行動綱領，落實執行。

Action Plan for the Conservation of

Chinese Crested Tern (*Thalasseus bernsteini*)

First consultation draft

July 2007

BirdLife INTERNATIONAL

Table of Contents

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Executive Summary

I. Introduction

The Chinese Crested Tern has long been one of the ornithological enigmas in eastern Asia. After twenty-one birds were collected on Muguan Dao[1], a group of islands near Qingdao, Shandong Province of eastern China in June and July 1937, it had all but disappeared apart from a few, mostly unconfirmed records from China, Thailand and Indonesia. It is thought to be at the verge of extinction, and even feared extinct, until breeding birds were found on Mazu[2] Islands, on the coast of Fujian Province, eastern China in June 2000. Subsequently another breeding population was found in the coast of Zhejiang Province of eastern China. Post-breeding Chinese Crested Terns have been recorded recently in Fujian and Shanghai from June to September. Birds apparently on passage migration were recorded in southern Taiwan (Bazhang[3] River Estuary on 17 April 1998 and 21 October 2000). Three birds were reported at the Xisha Archipelago[4] in the South China Sea in April 2004. This species probably winters on islands in the South China Sea.

The rediscovery of this species is good news but their survival is found to be under very severe pressure. The total population is very small, probably not more than 50 birds, and they are under very heavy exploitation of egg collection by fishermen from eastern China. Apart from removing eggs of Chinese Crested Tern it also caused considerable disturbance, this has probably resulted in the breeding birds (at least the Zhejiang population) do not nest on the same site every year. Until recent years Mazu had been safe from disturbance due to militarily tension across the Taiwanese Strait. In recent years this tension reduced, mainland fishermen at times come and collect eggs on some of the islands and this has become an increasing threat to terns breeding in Mazu.

After the compilation of the Threatened Birds of Asia: BirdLife International Red Data Book (2001), which highlights the Chinese Crested Tern as one of the species at highest risk of extinction in Asia, this species was added to a appendix of the Convention for Migratory Species (CMS) in 2002. BirdLife was invited to draft a conservation action plan for the Chinese Crested Tern under the auspice of the CMS.

Almost all recent records of the Chinese Crested Terns are from China (both mainland and Taiwan), therefore a small meeting was organized in Hangzhou in May 2006 and

[1] Also transliterated as Mukuantao

[2] Also transliterated as Matsu or Matzu

[3] Also transliterated as Pachang or Pachang Hsi (Hsi = River)

[4] Also known as the Paracel Islands. Xisha is the Chinese name of the islands. The islands are also known as Hoang Sa Islands in Vietnam, whieh also claim her sovereignty over the islands.

invited specialists from both sides of the Taiwanese Strait to discuss drafting of the action plan. Professor Yuen Hsiao-wei of National Taiwan University, Dr. Chen Shuihua of Zhejiang Natural History Museum and Simba Chan of BirdLife International Asia Division discussed issues on conservation of this critically endangered species. Additional information was received from birdwatching societies of Fujian Province.

The editors feel grateful to the help from Dr. Cao Lei (University of Science and Technology of China), Mr Chang Shou-hua (Wild Bird Society of Mazu), Mr. Jiang Hangdong (Xiamen Birdwatching Society), Mr. Yang Jin (Fujian Birdwatching Society), Mr. Victor Yu (Wild Bird Federation Taiwan) and Ms Zheng Huaizhou (Fujian Normal University), Ms Kanitha Krishnasamy (Malaysian Nature Society), Mr. Yeap Chin Aik (Malaysian Nature Society) for their contribution of data and conservation recommendations. The draft had been read and commented by xxxxxxxx. ....We would like to express our gratitude to their useful input on what actions should be taken to this almost unknown species.

It seems Chinese Crested Tern is running out of time, if conservation actions are not done immediately, we may lose this species again in just a few years. It is important that government agencies at all levels across the Taiwanese Strait to establish a channel of communication and coordination. At this stage it is probably best done through NGOs and academic institutions. Eventually the best scenario is both sides of the Taiwanese Strait work together on conservation of this species.

II. Distribution:

All known records of Chinese Crested Terns are confined to eastern Asia. With a few exceptional records (mostly unconfirmed) from Thailand, the Philippines, Malaysia (Sarawak), Indonesia, Cambodia and Singapore, all records were from Chinese waters. Historic breeding site located on the southern side of the Shandong Peninsula, while all recent known breeding records are from the coast of Fujian and Zhejiang, just south of the Yangtze Estuary. A recent (2006) survey in the islands of Shandong has not revealed signs of breeding on islands surveyed.

Post-breeding birds are recorded at Beidaihe in Hebei (June 1978), Yellow River Delta in Shandong (September 1991), Chongming Dongtan in Shanghai (September 2004), Min Jiang Estuary, Fujian (August 2004, June – August 2005), and Bachang River Estuary in Chiayi, Taiwan (April 1998 and October 2000). One recent record of three birds in Xisha Archipelago in the South China Sea in April 2004 suggests that the Chinese Crested Tern winter on islands in the South China Sea. It has not been recorded from Guangdong, Hainan nor Vietnam but may occur.

III. Status

① International threatened status

The Chinese Crested Tern was listed as "Indeterminate" in the first International Red Data Book of birds (King 1981) as there was not enough data to evaluate its status. The ICBP[5] Birds to Watch: World Checklist of Threatened Birds (Collar and Andrew 1988) listed it as a threatened species. It was regarded as Critically Endangered in the revised edition of Birds to Watch II six years later (Collar and Stratsfield 1994) because of its extremely low global population. This category remained unchanged on the BirdLife International on compilation of Red Data Book of Threatened Birds of Asia (2001) and to the date of publication of this Action Plan.

② Protection status

1. International

a. Convention of Migratory Species (CMS):

The Chinese Crested Tern has been listed in the CMS Appendix I of the Convention of Migratory Species since 2002. It means the status of being in danger of extinction is recognized by the CMS and CMS Parties strive towards strictly protecting these animals, conserving or restoring the places where they live, mitigating obstacles to migration and controlling other factors that might endanger them. Besides establishing obligations for each State joining the Convention, CMS promotes concerted action among the Range States of many of these species.

b. Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES):

It is not listed on the CITES appendices.

c. The Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention):

Apart from Chongming Dongtan, where only one bird was seen briefly on 5 September 2004, all sites that the Chinese Crested Tern has been recorded are not designated as Ramsar Sites.

2. National and local legislation

a. China

[5] International Council for Bird Preservation, the name of BirdLife International prior to 1994

i. Mainland

Listed as a Nationally Protected Species (Second Class) since 1989. A county-level waterbird protected area of 2,921 ha was established at the Min Jiang Estuary in 2003. A protected area on marine ecosystem of 114,950 ha was established at Jiushan Islands of Zhejiang in 2003.

ii. Taiwan

The Chinese Crested Tern is not listed as a Protected Species in Taiwan. However, the breeding site is located in the Mazu Islands Tern Protected Area established on 26 January 2000. Landing on the islands are prohibited. The islands are patrolled by guards with supports from the Wild Bird Society of Mazu at breeding season.

b. Philippines

Birds listed on the IUCN threatened list are protected in the Philippines and Chinese Crested Tern is no exception.

c. Thailand

Protected in Thailand as all bird except 60 species are protected in Thailand

d. Malaysia

.Protected in Sabah and Sarawak under the Protection of Wildlife Act (1972) but not on Peninsula Malaysia.

(Vietnam and Indonesia?)

IV. Threat analysis

① Habitat loss

The islands where the Chinese Crested Tern breeds are small uninhabited islands. There is no imminent development pressure to these breeding sites. However, the disappearance of breeding colonies in northern China may be the result of human settlement and development on the islands in Shandong. Coastal wetlands where the Chinese Crested Tern visits after breeding season are under heavy development pressure as coastal southeastern China is the region of fastest economic development in China. Coastal wetlands are reclaimed to become farmland, aquacultural pond or industrial estates. Although a county-level protected area has been established at the Min Jiang Estuary, demand of land for industry and housing estates is very high and reclamation is still severe at this important site for the Chinese Crested Tern.

② Habitat degradation and pollution

The booming industry and population in southeastern China results in a high level of pollution, both as domestic sewage and industrial effluent. According to a survey conducted by the Department of Oceanography and Fishery of Zhejiang Province in 2005, 64% of the coastal water in Zhejiang is moderately or seriously polluted. Monitoring results from benthos such as mussels revealed high level of agrochemical and heavy metal. Situation at the estuaries is even worse. Peak of red tide in Zhejiang is May to June, large amount of fish are killed and food availability to the breeding Chinese Crested Tern is reduced. At the Min Jiang Estuary, Fujian, Sewage from nearby Changle City is directly discharged into the estuary. Landscape of the Mini Jiang Estuary has also deteriorated as a result of various human activities and encroachment.

③ Exploitation

This is the biggest threat to this Critically Endangered species. At both breeding grounds (Mazu Islands in Fujian and Jiushan Islands in Zhejiang), collection of seabird eggs are reported to be serious. Seabird eggs are collected by local fishermen, who believe wild eggs have better nutritious value than poultry eggs. Collection of eggs forces Chinese Crested Terns to switch their breeding sites in every other year in the waters of Zhejiang. At Mazu, until recent years the

surrounding waters had been restricted zone due to the military tension between Beijing and Taipei. This has changed as economic tie grows. Fishermen from nearby Fujian villages frequently come to ~~Mazu~~ to collect seabird eggs, exploiting the situation that the soldiers at ~~Mazu~~ would not want to risk the political trouble of detaining mainland fishermen.

④ Disturbance

Most serious disturbance is from landing of fishermen to breeding islands for egg collecting. Other fishery activities at or near the breeding grounds, such as shellfish collection, would also deter breeding birds from their feeding grounds. At Mazu, tourism is another source of disturbance. As tourism and leisure photography in mainland is also on the increase, it will become a problem to the breeding ground in Zhejiang. Hainan Province is reported to have plans to develop Xisha into a tourist destination. That might cause more disturbances to the Chinese Crested Tern that migrates or winters on these islands.

⑤ Predators

So far there has been no study on the predators to the Chinese Crested Tern colony. If the islands are infested with rats or feral cats it would be a negative factor to the breeding success.

⑥ Overfishing

Although China has announcement laws on restriction of fisheries at certain time of the year to conserve fish stock, illegal fishing still exist. Overfishing will reduce the food source of the Chinese Crested Tern

⑦ Natural Disaster

Strong typhoons pass Fujian and Zhejiang in summer. In August 2004 two big typhoons devastated the tern colonies on Jiushan Islands.

2001年出版
亚洲鸟类红皮书：3.出32.3种
亚洲亟需保护鸟种

V. Conservation actions recommended

① Short-term objectives (within five years after publication of this action plan)

Acronyms of organizations

BLA	BirdLife International Asia Division	NBBC	National Bird Banding Center, China
COA	Council of Agriculture (Taiwan)	NTU	National Taiwan University
COS	China Ornithological Society	SFA	State Forestry Administration, China
DENR	Department of Environment and Natural Resources, the Philippines	WBFT	Wild Bird Federation Taiwan
		WBSJ	Wild Bird Society of Japan
FJBWS	Fujian Bird watching Society	XMBWS	Xiamen Bird Watching Society
KFEM	Korean Federation of Environmental Movement	ZJWBS	Zhejiang Wildbird Society
KNIER	National Institute of Environmental Research, Republic of Korea	ZMNH	Zhejiang Museum of Natural History
MONRE	Ministry of Natural Resources and Natural Environment, Vietnam		

1. Legal status

As the existence of Chinese Crested Tern had not been positively proven until 2000, it had long been ignored or considered to be a species that no longer existed, so it would not be a surprise to find despite its rarity it has never been treated as a high conservation priority. However, since the rediscovery it is found that exploitation of egg collection is the biggest threat to this species, urgent measures to stop this need to be implemented without delay. The conservation measure and enforcement will be strengthened when the Chinese Crested Tern is listed at the highest protection level. Laws and regulations should be imposed to plug all possible loopholes, including the possibility of international trade to zoos or collectors.

Program	Activity	Responsible organization	Implementation progress	Further specific actions to undertake	Priority
Strength protection status	Listing it at the First Class of Protected Species in China (Mainland)	SFA	Listing the Chinese Crested Tern at the highest protection level when the Protected Species List is revised		Moderate
	Appropriate protection status drafted by the Fishery Administration in China	Fishery agencies in China, SFA, local forestry and relevant government agencies in Fujian and Zhejiang	Holding a meeting to draft relevant regulations on fishery, particularly for Fujian and Zhejiang. Regulations may include a stricter control of fishing near the known breeding colonies of Chinese Crested Terns and how to compensate the loss of the fishing community.	Local governments and organizations to promote the regulation. Make sure all fishery communities understand what those regulations are for	High
	Taiwan: Listing it as a protected species	Relevant government agencies.	Relevant government agencies: Officially list Chinese Crested Tern as a protected species		Moderate
	Vietnam: Listing it as a protected species	MONRE	Listing Chinese Crested Tern as a protected species		Moderate
Stop exploitation	Laws on prohibition of seabird egg collection must be enforced all over coastal eastern China	SFA, local government in Fujian and Zhejiang, COS, NBBC, birdwatching societies in Xiamen, Fujian, Zhejiang and Shanghai, Wild Bird Society of Mazu, BLA and partners.	SFA and local government: Enforce the law to prohibit seabird egg collection. COS, NBBC, birdwatching societies in China: Promote the law especially to fishery communities. WBFT, WBS Mazu: Coordination of information on egg collection at Mazu. BLA and partners: Assisting in communication and information.	All: Produce printed material, broadcasting programme, tevevision programme etc. to promote the regulation. Keep vigilance at all breeding grounds	High

	Selling and consuming seabird eggs should be banned in eastern China	SFA, local government in Fujian and Zhejiang, COS, NBBC, birdwatching societies in Xiamen, Fujian, Zhejiang and Shanghai	SFA and local government: consider a ban on selling and consumption of seabird eggs in eastern China. This will contribute not just to the conservation of the Chinese Crested Tern but also the Black-faced. Spoonbill and Chinese Egret.	COS, NBBC, birdwatching societies in China: Promote the law by the mass media and public events	High
Prevent possible internationa l trade	Listing the spccies to CITES	SFA, DENR	Propose listing this species to the CITES appendix to stop possible trade.		Moderate

2. Understanding the distribution and population

Virtually we do not know much about the distribution of the Chinese Crested Tern except the two breeding sites and a few recent post-breeding records. Wintering ground of the Chinese Crested Tern has never been reported, but it seems likely to be in the South China Sea. Thorough surveys should be conducted in the islands of Shandong, where breeding colonies were known until 1930s. Records in late 20th century in Hebei and Shandong suggests the possibility of breeding birds still exist in Shandong. Xisha Island should be thoroughly studied as Dr. Cao of University of Science and Technology of China found three birds briefly at Xishazhou on 4 April 2004 (the survey period was March to April 2003 and April to August 2004) The fact that the Chinese Crested Terns were only found in early April but not rest of the survey suggested they were not likely to occur in summer. Promotion material to ask for colonies or flocks of Crested Tern species should be made available to fishery communities not only in China but also Vietnam, the Philippines, Malaysia (particularly eastern Malaysia) and Indonesia in searching for the wintering and staging ground of the Chinese Crested Tern.

Program	Activity	Responsible organization	Implementation progress	Further specific actions to undertake	Priority
Production of painted materials	Promotion material (e.g. poster and leaflet) produced mainly targeting at China fishery communities for information and prevent exploitation and disturbance to breeding colonies.	COS, BLA and partners, birdwatching societies in China	BLA: Identify funding sources COS, BLA and partners: Organizing workshop on what materials to be produced. Birdwatching societies: Production and distribution of materials.		High
	Posters and leaflet of information for potential wintering countries, particularly Vietnam, the Philippines, Malaysia and Indonesia	BLA and partners	Fundraising and produce material on the importance the Chinese Crested Tern and asking for information. In national languages.	A focal person at each organization to collect and disseminate information on Chinese Crested Terns	Moderate
Education Programme	Education programme made to promote concept of conservation of the Chinese Crested Tern to the fishery communities in Fujian and Zhejiang	SFA, COA, BLA, birdwatching societies	SFA and forestry bureaus: Legal support and guidance. COA, BLA: Organizing workshop on programme design and training of educators. Birdwatching societies: Conducting education programme at the fishery communities.	A workshop to evaluate the effectiveness held two years after the programme started.	High

5. Biological studies on the Chinese Crested Tern

Almost nothing is known on the biology of the Chinese Crested Tern. This makes designing conservation measures to this species rather difficult as its behaviour and needs could on be assumed to be similar to other crested terns. Good biological study on the behaviour of this species, particularly factors that might be contributing to its rarity, is urgently needed. At the first stage the researchers should seek for advice of experts on other crested tern species to design their study programme. The population is very small and fragile that all efforts must be take not to affect the survival of this species at the studies.

Workers of Jiushan Island Nature Reserve found that after removal of fish nets in the nature reserve, number of terns decreased. It has been suggested some limited fishing activities may be beneficial to terns as it helps them to find food. The relationship is worth studying. At the same time the risk of fishnets to terns must also be evaluated.

Program	Activity	Responsible organization	Implementation progress.	Further specific actions to undertake.	Priority
Searching for breeding colonies	Detailed survey on islands in Shandong, Zhejiang and Fujian	SFA. NBBC, research institutions, birdwatching societies (Fujian, Xiamen, Zhejiang etc), BLA	SFA: Financial and legal support to the survey. BLA and partners: Financial support and international coordination. NBBC, BLA and partners: Provide training to the surveyors. NBBC, research institutions: Design and coordinate the survey. Local forestry bureaus and birdwatching societies: Conduct surveys.	NBBC, Research Institute Data analysis and legal protection measures. SFA and relevant agencies: Establishment of nature reserve.	High
Migration study	A meeting to develop a safe method of marking and studying migration of the Chinese Crested Tern	National governments, Banding schemes and international experts on terns	All: Discussion on useful marking methods or other technique to study the migration.	Design a test it on other crested terns for improvement of technique.	Low
Survey for migration and wintering sites	Survey Xisha Island for migration/ wintering birds	SFA, NBBC, COS	SFA: Financial and legal support NBBC, COS: Conduct the survey.		High
	Survey the islands in South China Sea for wintering sites	Government agencies in China mainland, Taiwan, Vietnam, Philippines, Malaysia, Brunei, Indonesia, BLA and partners	Government agencies around South China Sea: Provide financial and legal support to the survey. BLA and partners: Coordinate and conduct the survey.		Moderate to Low

3. Establishment and safeguarding important sites

Of the important sites to the Chinese Crested Tern, only Mazu is properly protected. At the other two sites that area known to be important to the Chinese Crested Tern: Jiushan Island and Min Jiang Estuary, only lower administrative level protected areas were established and almost no resources to the management. The importance of these two sites must be addressed with more resources to better management, particularly to Jiushan Islands and any breeding grounds discovered in future. Egg collection and disturbance to the tern colonies should be strictly prohibited.

Program	Activity	Responsible organization	Implementation progress	Further specific actions to undertake	Priority
Establishment of protected area	Upgrade the status of protected area in Jiushan Islands	Relevant government agency, ZNHM	Propose the protected area be upgraded to national level.	Ensure good staffing and facilities for patrolling.	High
	Upgrade the status of protected area at the Min Jiang Estuary	SFA, Fujian Forestry Bureau	Propose the protected area be upgraded to national level.	Site land use management plan for the Min Jiang Estuary.	High
	Protected area to be establish when new breeding colonies or wintering site are found	Relevant government agencies in all potential range countries	Designation of protection area.	Management planning for the new protected areas.	High
Enforce ban on landing the breeding islands	The ban made known to fishing communities	Relevant government agencies			High
	Sign boards should be put on the islands	Relevant government agencies			Low
	Guard post should be established near the island with regular patrol	Relevant government agencies			High

4. Promotion and education

Although the Chinese Crested Tern is one of the most threatened species in Asia, it is largely unknown to the public because it has not been recorded for many decades. Promotion on the status of the Chinese Crested Tern to the general public, particularly areas where it occur or could occur, is in urgent need. It can be used as a flagship species for conservation of sub-tropical seabirds in eastern Asia.

Program	Activity	Responsible organization	Implementation progress	Further specific actions to undertake	Priority
Study the breeding biology of the Chinese Crested Tern	Collect baseline information on breeding biology of the Chinese Crested Tern in Zhejiang and Fujian, including nesting, food, foraging sites, clutch size etc.	SFA, NBBC, COS, BLA and partners, other research institutes, birdwatching societies.	SFA: Provide legal supports NBBC, COS: Design study programme. BLA and partners: International advice on study programme. NBBC, COS, research institutes and birdwatching societies: collecting information in the field.	Workshops should be held to exchange information and experience with the Taiwanese counterpart regularly	High
	Conducting breeding biology study of the Chinese Crested Tern at Mazu	COA, NTU, BLA and partners, Wild Bird Society of Mazu	COA: Legal and financial support NTU and other institutes: Design study programme BLA and partners: International advice on study programme NTU, research institutes, Wild b\Bird Society of Mazu: collecting information in the field.	Workshops should be held to exchange information and experience with the mainalnd counterpart regularly	High
Study the feeding behaviour of terns near breeding ciolonies	Study the relationship between fish nets and foraging success of terns (including other crested tern species) at the potential breeding ground of Chinese Crested Terns	SFA, COA, Research institutes in Zhejiang, Fujian and Taiwna	SFA, COA: Legal and financial support Research institutes : conduct study on the effects of fish nets to tern species (particularly crested terns)	Evaluate whether there are relationship on foraging success and fish nets. Also evaluate the risk of fish nets to the terns	High

6. Coordination on conservation and information exchange

Researchers from China mainland and Taiwan should establish an official channel of communication on conservation issues. This should be expanded to include other countries when wintering ground is found in that country. As the islands in the South China Sea is claimed by many countries, each country should consult with its Foreign Affairs Department for the advice on cooperation but not raising unnecessary political issues.

Program	Activity	Responsible organization	Implementation progress	Further specific actions to undertake	Priority
Unofficial communication channels between mainland and Taiwan	Establish the informal channels by regular meeting and focal points at both sides of the Taiwanese Strait.	Relevant government agencies and organizations			High

② Long-term objectives (beyond 2010)

1. Monitoring of Chinese Crested Tern and the habitats

Program	Activity	Responsible organization	Implementation progress	Further specific actions to undertake	Priority
Monitoring number of the Chinese Crested Tern	Breeding bird survey/census	NBBC, local forestry bureaus, birdwatching societies in China, WBFT, Wild Bird Society of Mazu	Agree on what data are to be collected during the census. Draft a standardized census form for the database of the Chinese Crested Tern. Coordination of breeding bird census at all known sites. A coordinated dissemination of information	Keep a database of numbers and location of nests at the breeding site every year.	High
	Keep records of Chinese Crested Terns at all possible post-breeding sites, particularly the Min Jiang Estuary	NBBC, local forestry bureaus, birdwatching societies in China	Collecting all reliable information	Keep all records at the database	Moderate
Habitat monitoring	Monitor the environmental factor such as water quality and land use changes at sites frequently used by the Chinese Crested Tern at the Min Jiang Estuary	Local forestry bureaus, birdwatching societies in Fujian	Agree on what data are to be collected and draft a monitoring plan for Min Jiang Estuary. The monitoring should also cover habitats important to other globally threatened waterbirds such as Black-faced Spoonbills, Saunders's Gulls, Swan Geese and Dalmatian Pelicans at the Min Jiang Estuary. Annual report on the monitoring should be made available to government agencies and relevant conservation organizations	Report on the monitoring should contribute to the land management of the Min Jiang Estuary	High
Database and storage system	Develop a central database and information center of Chinese Crested Tern. It can be expanded to be a seabird database for tropic and sub-tropical western Pacific	NBBC, COS, COA, BLA and partners	Discussion how to establish a regional database center for the Chinese Crested Tern		Moderate

2. Education and public awareness

Program	Activity	Responsible organization	Implementation progress	Further specific actions to undertake	Priority
Education programme for important sites	Develop education programme, particularly for schools, using the Chinese Crested Tern as a flagship of seabird conservation	BLA and partners, COS, birdwatching societies in China and Wild Bird Society of Mazu			High
Establish an education resource center	Discussion on developing am education resource center for seabird/waterbird conservation in China mainland and/or Taiwan	BLA and partners, other conservation and education organizations in China mainland and Taiwan			Moderate

3. Establish a long-term cooperative mechanism

Program	Activity	Responsible organization	Implementation progress	Further specific actions to undertake	Priority
Twining important sites of Chinese Crested Terns	Taiwan, Fujian and Zhejiang should establish a close communication system. Mazu and Jiushan should be twinned protected areas with regular cross-visit to study the management of breeding areas. International experts on seabird/tern conservation should participate in design of management at the beginning stage	SFA, COA, COS, local organizations and birdwatching/wild bird societies in mainland and Taiwan, BLA and partners	Start discussion on how to establish informal links between important sites and organizations involved in Chinese Crested Tern eonservation. This should include regular information exchange, site management, research and coordination in law enforcement.		High
Regular meeting and exchange of information	Organizations from China mainland and Taiwan, and other Asian countries when important wintering areas for Chinese Crested Terns are found, should hold regular meetings on information exchange and joint actions on conservation of the Chinese Crested Tern	SFA, COA, COS, local organizations and birdwatching/wild bird societies in mainland and Taiwan, BLA and partners			Moderate

Appendix 1 Important sites to the Chinese Crested Tern

Jiushan Islands, Xiangshan County, Zhejiang Province

Location: 29deg20'30"- 29deg28'36"N 122deg0'18"-122deg15'24"E
Area: 730ha in total.
Simple description of the site: A group of 28 islands and 48 atolls in the East China Sea. The nearest point is mainland is about 18.5 km. The island where breeding birds were found in 2004 is a small uninhabited island of 1.5 ha. Main vegetation on the island is bush and grasses in the central concaved area. The higher sides of the island (northwestern and southern side) are mostly bare soil or rocks. Tern colonies are mainly found in these exposed area or area with dried vegetation.
Number estimated: About 10-20 Chinese Crested Terns in the whole area. Zhejiang Natural History Museum surveyed the 1.5 ha island mentioned above from 28 July to 2 August 2004. At this survey a total of 1760 eggs were found. Most (95%) of the tern nests had only one egg, a few had two and only 3 or 4 nests had 3 eggs. Eggs were not hatched during the survey.
Wetland type: Island and seacoast
Land ownership and land use: State owned and uninhabited
Contacts of management authority/authorities: Zhejjiang Jiushan Archipelago Oceanic Ecosystem Provincial Nature Reserves Administration
Threats: Egg collection, overfishing and other human disturbance
Conservation measures taken: Zhejjiang Jiushan Archipelago Oceanic Ecosystem Provincial Nature Reserve (Province level) was established in 2003.
Contacts of local researcher/conservation organizations: Dr. Chen Shuihua, Zhejiang Museum of Natural History

Min Jiang Estuary, Changle City, Fujian Province

Location: app. 26deg01'N 119deg38'E
Area: app. 3000 ha
Simple description of the site:
Number estimation: Three Chinese Crested Terns were found by Mr. Liu Bofeng (Fujian Wildlife Monitoring Center) and Mr. Yu Xi (Fujian Province Forestry Survey and Planning Institute) on 31 July 2004. Two birds were seen in 2005 and three birds on 16 July 2006.
Wetland type: River mouth estuary
Land ownership and land use: State owned? Farmland and urban use?
Contacts of management authority/authorities: Fujian Forestry Bureau
Threats: Reclamation and unplanned development. Jinfeng Town that is adjacent to the Min Jiang Estuary has heavy textile industry and expanding. Pollution of water effluent from Changle City.
Conservation measures taken:
Contacts of local researcher/conservation organizations: Fujian Bird-watching Society?

Mazu Islands Tern Nature Reserve, Lianjiang County, Fujian Province[6]

Location: 26deg13'N 120deg02'E
Area: 71.6ha (land area 11.9 ha)
Simple description of the site: Eight small barren islands with sparse vegetation. It is located at the convergence of warm and cold sea currents and gifted with rich fish resources. The area was 'protected' as military restricted area until recent tears. Thousands of terns breed on these islands. It was during one of the regular patrol to these islands that the breeding Chinese Crested Terns were found.
Wetland type: Island and sea coast
Land ownership and land use: State owned? No human settlement and it is now a nature reserve (established in January 2000). The only economic activities are fishery and tourism?
Contacts of management authority/authorities: Lianjiang county government?
Threats: Used to be an army shooting practice ground. The biggest threat now is illegal egg collection and fisheries from other places in Fujian.
Conservation measures taken: Nature reserve established in January 2000.
Contacts of local researcher/conservation organizations: Wild Bird Society of Mazu

[6] Under the administration of Taipei

Appendix 2: Records of the Chinese Crested Tern

Number of Chinese Crested Tern observed on Mazu Island

Year	Adult	Nestling
2000	Four pairs	Four birds
2001	One bird	None
2002	Three pairs	Two birds
2003	Two birds	None
2004	Six pairs	3 birds
2005	Two pairs	None

(From Mr. Chang Shou-hua, Chairman of Wild Bird Society of Mazu)

References

BirdLife International (2001) Threatened Birds of Asia: the BirdLife international Red Data Book. BirdLife International, Cambridge, U.K.

Cao, L., Pang, Y.L. & Liu, N.F. Waterbirds of the Xi Sha Archipelago, South China Sea. Waterbirds (in press).

Chen Shuihua, Yan Chong-wei, Fan Zhongyong, Chen Cangsong, Zhang Fanggang (2005) The Breeding Colony of Chinese Crested Tern at Jiushan Archipelago in Zhejiang. Chinese Journal of Zoology 40(1): 96-97 (in Chinese)

Liang, C.T., Chang S.H. and Fang W.H. (2000) Discovery of a breeding colony of Chinese Crested Terns. Oriental Bird Club Bull. 32:1819

Zhang Kejia, Yu Xi, Gan Xiaojing, Melville, D.S. (2004) Chinese Crested Tern at Chongming Dao, Shanghai, China. BirdingAsia.

大陸沿海黑嘴端鳳頭燕鷗的分佈記錄及受脅因素分析

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一、*大陸繁殖海鳥研究現狀*

長期以來，大陸鳥類學家對海鳥的調查、研究非常缺乏（Xu & Melville, 1994），尤其對於在中國沿海無人島嶼上繁殖的種類，由於遠不可及，研究報告更是稀少。此前對海鷗和燕鷗類在大陸沿海的分佈和居留狀態的資料存在許多缺失和謬誤。

二、*我們的調查經歷*

2001 年、2002 年春夏季節分別對浙江舟山五峙山列島和寧波象山韭山列島進行過繁殖海鳥調查，未髮現有黑嘴端鳳頭燕鷗的記錄。

2003 年 6 月：與顏重威先生啓動舟山群島繁殖海鳥調查專案，有目的地尋找黑嘴端鳳頭燕鷗，當年沒有記錄。

2004 年 6 月－7 月：系統查對國內收藏海鷗和燕鷗類標本的主要標本館和博物館，包括大連自然博物館、黑龍江省博物館、東北林業大學鳥類標本館、中科院動物研究所鳥類標本館、北京自然博物館、上海科技館、復旦大學鳥類標本館；繼續進行舟山群島和韭山列島的繁殖海鳥調查。

2005 年 6－8 月：重復舟山群島、韭山列島的調查

2006 年 6－8 月：浙江中南部島嶼包括韭山列島、漁山列島、台州列島、洞頭列島、北鹿列島和南鹿列島的調查。

2007 年 6 月：韭山列島調查

通過四個繁殖季節的調查，共調查了 2000 餘個島嶼，幾乎覆蓋了絕大多數浙江沿海的無人島嶼。初步探明了在浙江沿海島嶼中繁殖的海鳥的分佈、資源狀況及其受脅因素。

三、*大陸沿海黑嘴端鳳頭燕鷗的分佈記錄*

1）標本記錄：

- 1913年福建福州1隻標本（上海科技館）
- 1925年4月福建福州2隻標本（中科院動物研究所）
- 1937年6月青島外海沫官島2隻標本（中科院動物研究所）

2）調查照片記錄：

•2004年8月浙江韭山列島約10對

•2004年－2007年6月、8月福建閩江口2－4隻

•2007年6月浙江韭山列島4對

3）觀察記錄：

• 1978 年在中國河北的北戴河

• 1991 年在中國的山東東營黃河三角洲

• 2004 年 8 月上海崇明東灘 1 隻

• 2004 年 4 月 西沙群島 3 隻

四、大陸沿海黑嘴端鳳頭燕鷗的分佈記錄分析

透通過分析大陸沿海現有的野外黑嘴端鳳頭燕鷗的分佈記錄，我們認爲：

1）1937 年 6 月青島外海沫官島、1978 年河北北戴河、1991 年山東東營黃河三角洲的記錄應該屬於山東沿海的繁殖群，該繁殖群很可能是黑嘴端鳳頭燕鷗的單種繁殖群，且在 1991 年之前依然存在。目前對山東沿海島嶼的調查沒有發現黑嘴端鳳頭燕鷗，存在兩種可能，一是山東沿海繁殖群消失了，二是對山東沿海的調查還不夠徹底，不排除該繁殖群繼續存在的可能。

2）2004 年、2007 年在浙江韭山列島發現的繁殖群屬於浙江沿海繁殖群。該繁殖群主要在韭山列島保護區內繁殖，但可能存在在周邊一定範圍內（如南部的漁山列島）轉移繁殖點的現象。該繁殖群是目前發現的最大的繁殖群。

3）1913 年、1925 年福州、2004－2007 年閩江口發現的個體屬於福建沿海繁殖群，目前主要在馬祖列島繁殖，閩江口爲該繁殖群在繁殖前期和後期重要的覓食和棲息場所。在繁殖群自上個世紀初以來一直存在，在不同年份間同樣存在在一定範圍內轉移繁殖點的現象。目前不排除在福建沿海其他島嶼存在少量繁殖個體的可能。

4）2004 年西沙群島的記錄和此前同樣在 4 月份大量在西沙群島採集的大鳳頭燕鷗的標本記錄，說明西沙群島是大鳳頭燕鷗和黑嘴端鳳頭燕鷗的越冬區或者過境點，有待於進一步核查。

5）根據目前的調查結果和分佈記錄，總體上依然支援黑嘴端鳳頭燕鷗在全球的數量不足 50 只的基本判斷。

五、大陸沿海黑嘴端鳳頭燕鷗受脅因素

• 撿蛋

海鷗和燕鷗類由於是集群繁殖，許多漁民趁機上島撿拾鳥蛋作爲食物進補或出售。據我們調查，上島撿蛋現象在我國沿海地區非常普遍，上島撿蛋對繁殖海鳥的威脅常常是毀滅性的，是目前我國沿海島嶼繁殖海鳥的最大威脅，嚴重的可導致某一繁殖點甚至某一繁殖區域某一年度繁殖完全失敗。

• 人爲幹擾：無人島開發、上島挖貝

近年來，各地掀起了一股無人海島開發熱。在無人海島的生物資源尚未摸清的狀況下，盲目開發無人海島潛伏著許多生態危機。對繁殖的海鷗與燕鷗同樣構成了威脅。目前，各地無人島開發的規模並不大，但在浙江沿海的無人島上，普遍放養了山羊，有海鳥繁殖的島嶼也不例外。山羊雖然不會直接傷害海鳥，但可造成海島植被的破壞，以及對繁殖海鳥帶來驚擾。同時，在沿海島嶼，上島挖貝現象非常普遍，漁民上島挖貝一方面對海鳥繁殖會造成很大的干擾，同時，這些挖貝的漁民也是撿蛋的主要人員。

• 海洋漁業資源日益枯竭

繁殖海鷗與燕鷗的食物資源直接來自於上層魚類。過度捕撈已經導致漁業資源日益惡化。雖然我國沿海在夏季普遍實行了休漁期，但違法張網捕撈現象仍然屢禁不絕。

• 海洋水質量惡化

隨著沿海經濟的高速發展,近岸海域的生態環境持續惡化。海洋水質的惡化，勢必影響到近海漁業資源，不僅直接影響到繁殖海鳥的覓食，污染物的沈積還威脅到了海鳥的繁衍和生存。海水污染也是誘發赤潮的主要因素。赤潮可導致海鳥主要食物——上層小魚的死亡。長時間大面積的赤潮危害更大。2004 年，浙江省共發生赤潮 38 此，發生面積累計 16000 多平方公里。赤潮高發期集中在 5—6 月，正是海鳥繁殖季節。

• 颱風

夏季是大陸沿海颱風多發季節，颱風可摧毀繁殖中的海鳥的巢卵和雛鳥。2004年8月"雲娜"和"鯰魚"的颱風摧毀浙江象山韭山列島大鳳頭燕鷗和黑嘴端鳳頭燕鷗混合繁殖群，導致1760個巢卵全部毀棄。

六、近期保護建議

•促動有關管理部門遏制撿蛋現象的發生

•加強沿海地區，尤其是繁殖分佈區周邊漁民和群衆的保護宣傳，使之自覺不撿鳥蛋

和不食鳥蛋

- 進一步開展繁殖點、種群數量、越冬點的調查和監測
- 擴大保護區的範圍
- 明確海鳥的管理職責，加強各部門間的協調與管理

七、*海峽兩岸保育合作建議*

- 加強交流：繁殖種群資訊交流，學術研究交流， 保護和管理交流
- 馬祖列島繁殖群的協作管理，杜絕上島撿蛋現象的發生，閩江口覓食地的保護。

浙江韭山列島黑嘴端鳳頭燕鷗繁殖群現狀和面臨的保護困境

陳蒼松 （浙江自然博物館）

韭山列島(圖 1)位於大目洋東側，地處北緯 29°22′30″到 29°28′36″，東經 122°09′08″到 122°18′24″由 76 個島礁組成，總面積 114950 公頃，距大陸最近點 18.5 公里，行政區劃隸屬象山縣爵溪街道；韭山列島植被良好，種類繁多，灌木茂盛，自然生態資源豐富。該保護區生物類群豐富，是我省重要的水鳥繁殖和停息點。

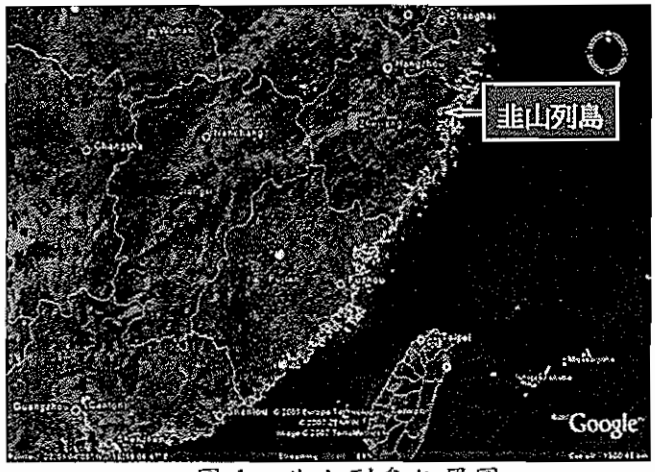

圖 1、韭山列島位置圖

在韭山列島繁殖的水鳥主要有鳳頭燕鷗、黑嘴端鳳頭燕鷗、黑尾鷗，褐翅燕鷗、粉紅燕鷗、牛背鷺、黃嘴白鷺等。其中以鳳頭燕鷗和黑尾鷗的繁殖種群數量最大。它們主要分佈在將軍帽、積穀山、蚊蟲山、大青山、麒麟頭、下竹山等島嶼中(圖 2)。鳳頭燕鷗和黑嘴端鳳頭燕鷗混合繁殖群位於將軍帽島嶼(圖 3)，該島為一無人小島，長約 150 米，寬約 130 米，陸域面積約為 1.5 萬平方米。島的西北部和東南部相對突起，各有一片相對平緩裸露的土坡和岩地，黑嘴端鳳頭燕鷗和鳳頭燕鷗的混合繁殖群的巢即位於這兩片裸露地帶(圖 4)。

2004 年 8 月初，我們在該島嶼上發現近 5000 隻鳳頭燕鷗和約 10 對黑嘴端鳳頭燕鷗(圖 5)，當年由於遭遇撿蛋(圖 6)和兩次颱風襲擊(圖 7～10)，該繁殖群全部繁殖失敗。

2005 年 6 月和 8 月調查，保護區內有少量鳳頭燕鷗，但未發現黑嘴端鳳頭燕鷗。

2006 年 6 月和 8 月調查，同樣未發現黑嘴端鳳頭燕鷗。

2007 年 6 月初，我們在將軍帽島嶼又發現了鳳頭燕鷗和黑嘴端鳳頭燕鷗的混合繁殖群。鳳頭燕鷗的數量約為 2000 隻，黑嘴端鳳頭燕鷗的數量約為 4 對。

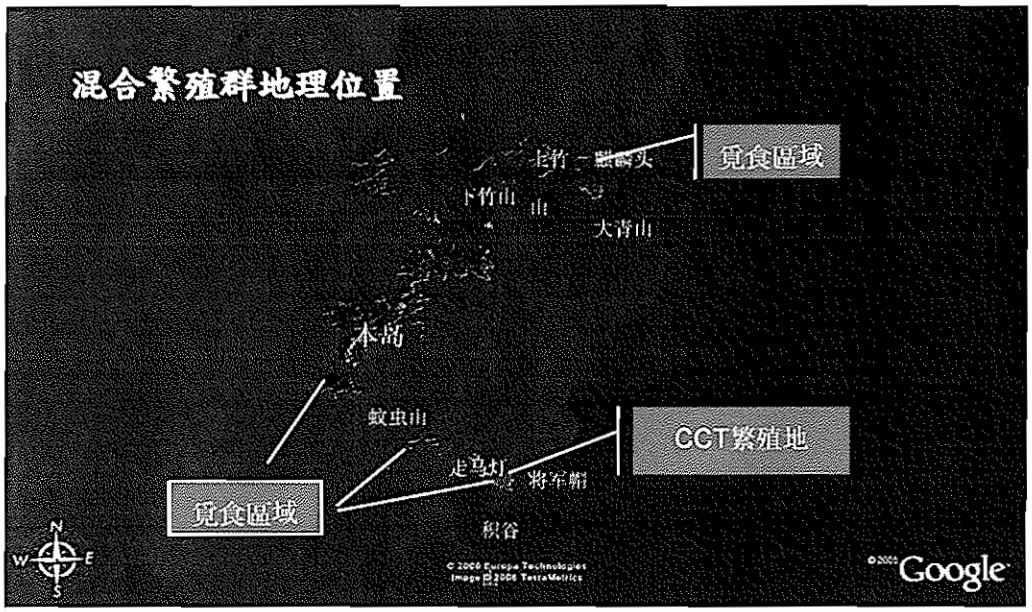

圖 2、韭山地區黑嘴端鳳頭燕鷗繁殖區域圖

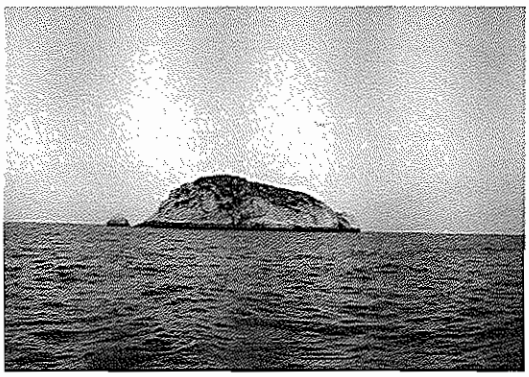

圖 3、將軍帽島嶼

圖 4、繁殖地區為裸露地帶

圖 5、黑嘴端鳳頭燕鷗雛鳥

關於韭山列島繁殖群存在下列困惑：

1）為何2004年產卵時間為8月初，而2007年卻是6月初，是否2004年初次繁殖時間也是6月初，但遭遇撿蛋之後，在8月初再次產卵繁殖？

2）2005和2006年為何不見該繁殖群，這兩年我們在浙江沿海周邊島嶼調查中也沒有發現該繁殖群，那麼，這麼大的混合繁殖群這兩年在何處繁殖？

3）影響韭山列島黑嘴端鳳頭燕鷗棲息繁殖和繁殖成果的主要因素有哪些？干擾和繁殖失敗是否造成2005年和2006年黑嘴端鳳頭燕鷗轉移繁殖地點的主要原因？在保護區內的漁業生產對繁殖海鳥的覓食有益還是有害？如何控制等？

近年來，在保護區周邊區域，由於沿海餐飲業的發展，烹食海鳥蛋的現象越來越普遍，導致許多不法分子頻繁地冒險盜撿鳥蛋，即使是保護區也不能倖免。韭山列島保護區的保護壓力越來越大，而保護區的保護力量非常有限，海上保護存在許多現實困難。2007年的繁殖群同樣面臨嚴重的威脅。

周邊海域的環境遭到破壞，由於所在地爵溪鎮紡織和印染業的發展，工業污水對沿海水域環境的污染越來越嚴重。

近海過渡捕撈，漁業資源逐年下降。

除了繁殖海鳥外，韭山列島還是江豚、大黃魚和曼氏無針烏賊的重要繁殖場，但目前的韭山列島省級自然保護區還沒有完全建立獨立的管理機構，還是臨時掛靠在寧波象山縣海洋與漁業局中，管護設置有限，管理力量薄弱。鑒於韭山列島豐富的生物資源和管理上的缺陷，有關部門正在努力將韭山列島升格為國家級自然保護區，希望升格之後，讓黑嘴端鳳頭燕鷗在韭山列島有一個更好的繁殖和棲息環境。

圖6、黑嘴端鳳頭燕鷗的蛋

圖 7、雲娜颱風來之前

圖 8、雲娜颱風之後

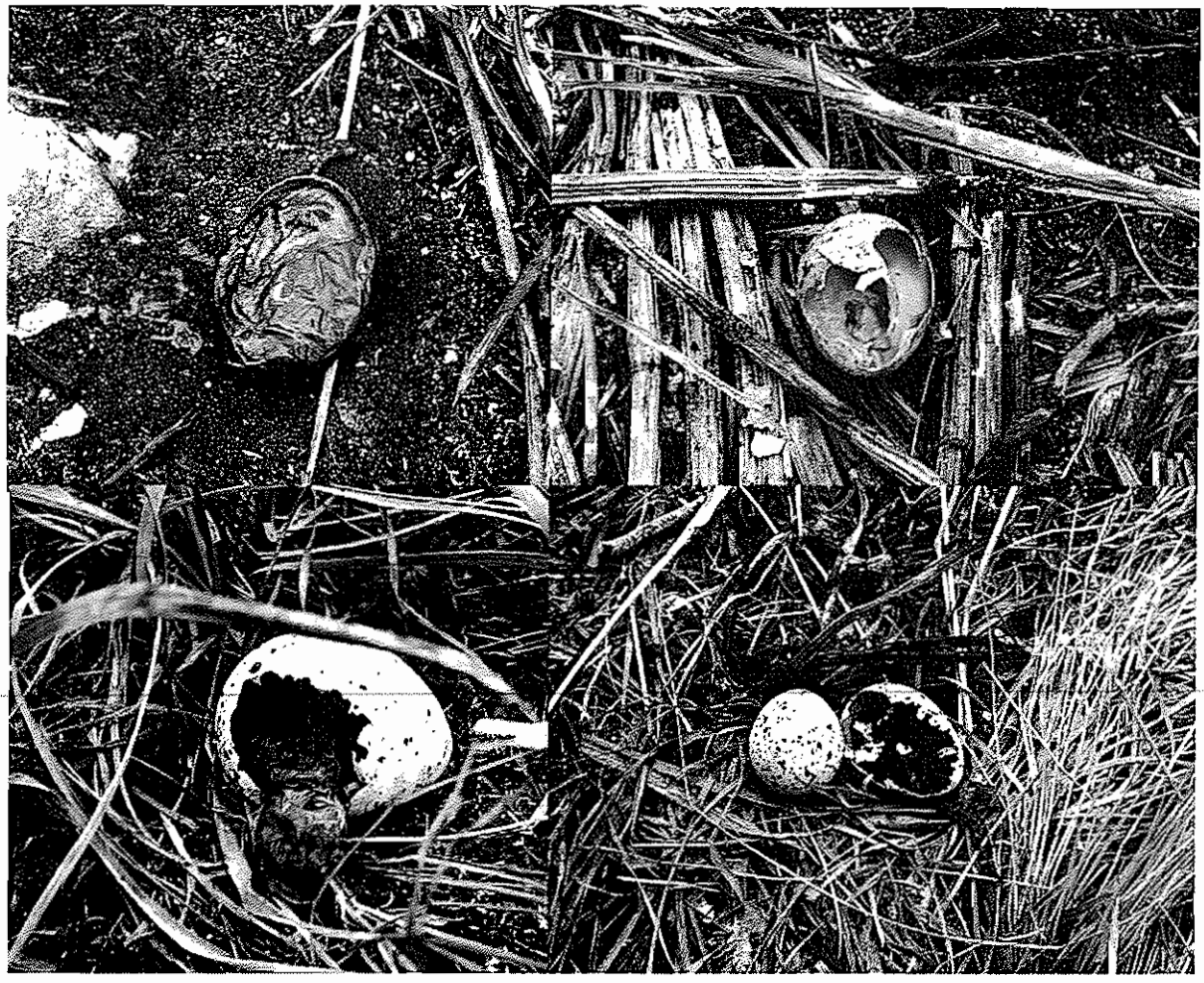

圖 9、鯰魚颱風之後，繁殖完全失敗

福建沿海黑嘴端鳳頭燕鷗調查及其保護對策研究

江航東（廈門觀鳥會）

一、*關於黑嘴端鳳頭燕鷗的歷史資料以及其它地區的最新動態*

黑嘴端鳳頭燕鷗(*Sterna bernsteini*)為全球極危鳥種(Critically Endangered)， 黑嘴端鳳頭燕鷗被發現的最早紀錄是在 1863 年的中國，1937 年在山東青島附近的沐官島採集到 15 雄 6 雌共 21 個標本，以後的 63 年中，黑嘴端鳳頭燕鷗觀察記錄寥寥無幾，僅有 1978 年在中國河北的北戴河和 1991 年在中國的山東東營黃河三角洲等少量觀察記錄。東南亞的菲律賓、馬來西亞、印度尼西亞、泰國有少量標本和觀察紀錄，但都是於 19 世紀末到 20 世紀初採集的。據估計，黑嘴端鳳頭燕鷗的全球數量不超過 100 隻，是目前世界上最瀕危的鳥種之一，故一直被視為極危物種(CR)，被學者專家稱為"神話之鳥"。專家認為，黑嘴端鳳頭燕鷗在中國東部沿海繁殖，可能南遷至南海、菲律賓、馬來西亞等地越冬。由於黑嘴端鳳頭燕鷗的數量極少，因此還沒有關於牠的特徵、特性、棲息地的詳細資料。

2000 年，台灣學者在福建連江馬祖的燕鷗繁殖區拍攝生態紀錄片時，意外地發現在大群的鳳頭燕鷗中有 4 對黑嘴端鳳頭燕鷗，並記錄了 4 個巢，引起了國際鳥類學界的轟動。這是第一個黑嘴端鳳頭燕鷗繁殖地。此後的 4 年來，一直只有馬祖有黑嘴端鳳頭燕鷗的觀察記錄，而且數量只有幾隻到 10 幾隻，極為稀少。2004 年 8 月，陳水華等在浙江象山韭山列島發現了至少 10 對黑嘴端鳳頭燕鷗。2004 年 9 月，梅傅儀博士（David Melville）等人在上海崇明東灘發現 1 隻黑嘴端鳳頭燕鷗與其他燕鷗混群。

據文獻記載，福建的福州曾於 1916 年和 1925 年採集了 2 個黑嘴端鳳頭燕鷗標本，福州下轄的長樂、馬尾、連江地處閩江入海口。

二、*廈門觀鳥會在福建沿海開展調查的方法和結果*

（一）福建沿海的調查

廈門觀鳥會於 2003 年 8 月向英國皇家鳥類學會(RSPB)申請並獲得小額基金 1000 美元，用於在福建沿海尋找黑嘴端鳳頭燕鷗。從 2003 年 10 月開始，我們先對福建沿海漁村和海濱進行調查，初步確定存在海洋鳥類繁殖的島嶼。從 2004 年 4 月到 2005 年 1 月，我們先後對福建沿海南起東山縣贛嶼，北至福鼎市星仔列島共 14 個縣、市的 57 個適合燕鷗棲息、繁殖的近海島嶼和列島(群礁)做了重點調查，前後共歷時 60 於日，行程萬餘公里，範圍含括福建沿海北、中、南各段，具體考察地點為：

福鼎：台山列島、星仔列島、大嵛山島、日嶼

霞浦：西洋島、四腿嶼

寧德：三都島、白匏島、長腰島、橄欖嶼、覆鼎嶼

連江：定海青嶼、嶼仔尾嶼、四母嶼、金鼓礁群島、東洛島、白礁嶼、大/小猴嶼

長樂：汶母頂

平潭：平潭島、鴛鴦島

福清：目嶼島、三塔嶼、牛耳嶼、腿嶼、路島、鵲蚕島、大/小蛇島
莆田：南日島、黄瓜島、鵲笼嶼、后青嶼
泉州：惠嶼
惠安：尖嶼、青嶼、南洋嶼、佳嶼、西嶼
厦门：鰐魚嶼、大/小離母嶼、寶珠嶼、土嶼、大嶝島、檳榔嶼、香山附近礁石
龙海：浯嶼、浯垵
漳浦：草礁群礁、菜嶼列島的红嶼、沙洲島、青草嶼、土礁、垔杯嶼
東山：獅嶼、贛嶼、虎嶼、象嶼

這些島嶼的生態環境多様，河口沙洲如汶母頂，礁石群如草礁群礁，無植被覆蓋的裸岩型島嶼如垔杯嶼，林木茂密的島嶼如鰐魚嶼，樹木稀疏的島嶼如红嶼，低矮灌木和草叢型植被的島嶼如日嶼、青草嶼，生有淡水湖泊的島嶼如大嵛山島、平潭島。

2004 年 8 月 8 日，林植、江航東、陳志鸿等终於在長樂市文岭鎮江墘頭村附近的閩江入海口處一個叫汶母頂的地方（距離馬祖列島 35KM 左右，如圖 1）發現 2 隻黑嘴端鳳頭燕鷗在此棲息。

2005 年，厦門觀鳥會得到世界自然基金会（WWF）的支持，開展了"長樂閩江入海口濕地黑嘴端鳳頭燕鷗棲息地保護計畫"。

在 6 月 3 日至 9 月 18 日的 10 次調查中，一共 4 次目擊到嘴端鳳頭燕鷗。最大目擊數量為 2 隻。

6 月 4 日，厦門觀鳥會在汶母頂發現 2 隻黑嘴端鳳頭燕鷗，這兩隻均為繁殖體，並拍攝了求偶、交配的照片。

2006 年 5 月～7 月，厦門觀鳥會對閩江口調查 4 次，一共 3 次目擊到黑嘴端鳳頭燕鷗，最大目擊數 3 隻。

2006 年 9 月，林劍聲先生在閩江口梅花外沙洲拍到 1 隻黑嘴端鳳頭燕鷗。

2007 年 5 月 11 日，厦門觀鳥會林清賢、胡震宇在閩江口汶母頂紀錄了 4 隻黑嘴端鳳頭燕鷗。而根據福建觀鳥會的調查，5 月 7 日記錄了 7 隻黑嘴端鳳頭燕鷗(圖 2)，為近 3 年來的最高記錄和最早記錄。2004 年～2007 年觀察記錄如圖 3 所示。

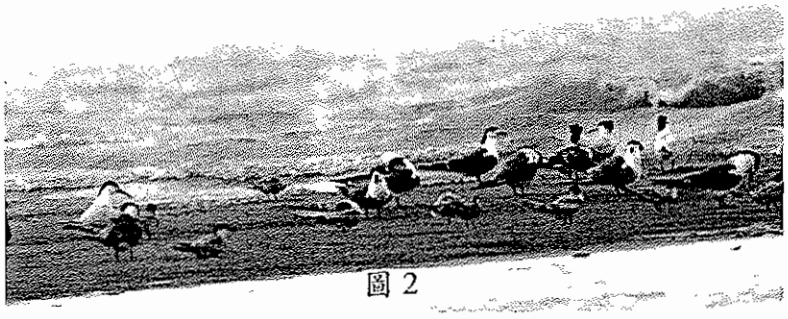

圖 2

（二）厦門觀鳥會對其它地區的調查

2004 年 8 月，厦門觀鳥會對廣東汕頭的南澳島及周邊島嶼進行了調查，未發現黑嘴端鳳頭燕鷗和鳳頭燕鷗。

2005 年 7 月，廈門觀鳥會薛居崢先生前往山東青島的沐官島進行調查，發現島上建有數十棟房屋，並有人員居住，未發現有燕鷗繁殖的蹤跡，訪問當地居民，稱近年來未見有海鳥繁殖。

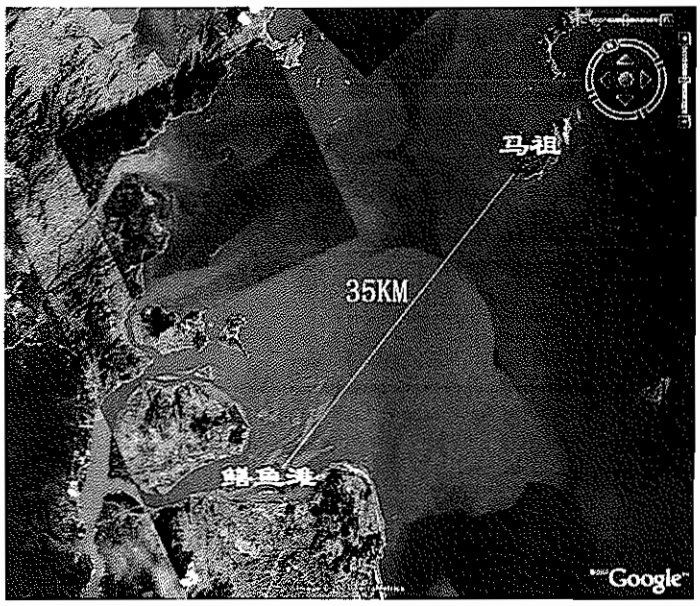

圖 1、調查位置圖

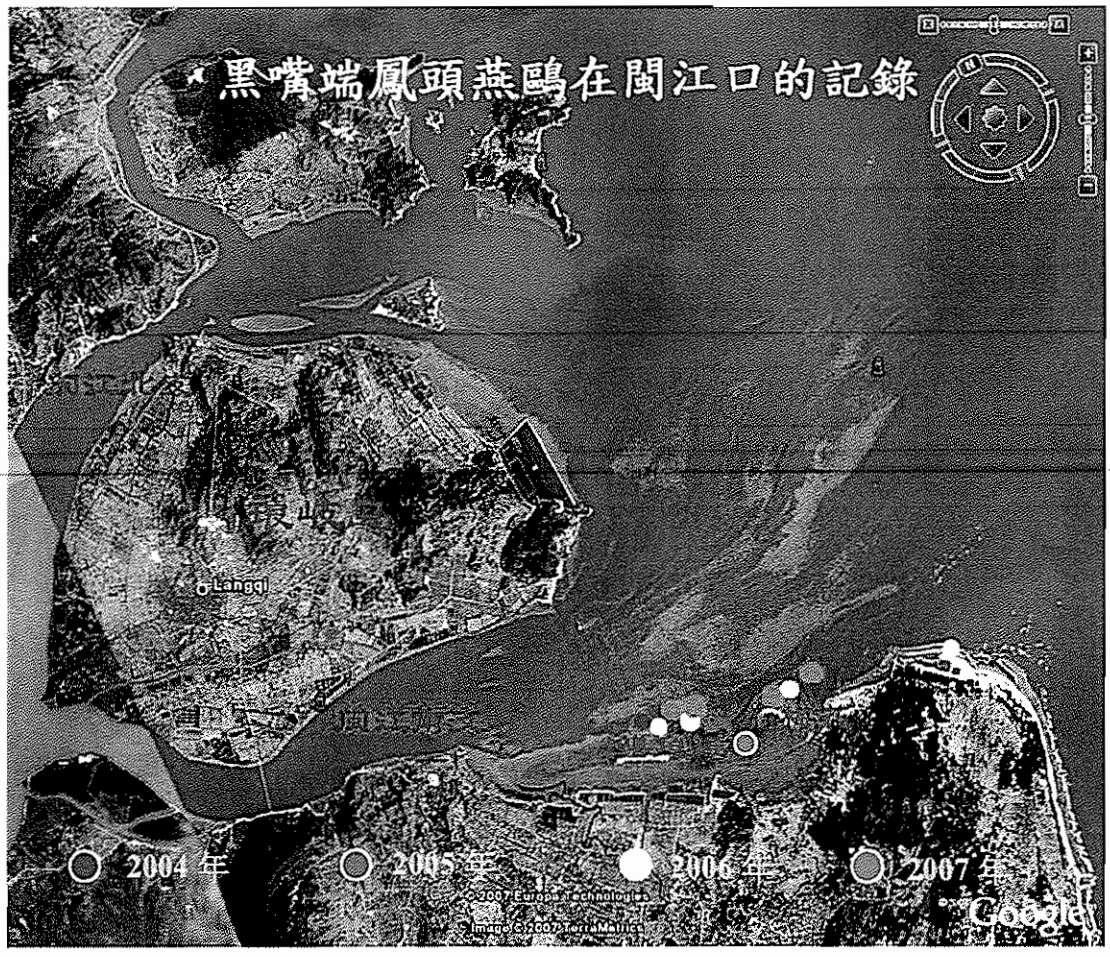

圖 3、黑嘴端鳳頭燕鷗閩江口調查記錄圖

三、*黑嘴端鳳頭燕鷗在福建長樂閩江口濕地的棲息特點*

a) 喜歡在近水的沙洲停留；

b) 與其它燕鷗，特別是鳳頭燕鷗混群(圖 4)，甚至見到繁殖初期有黑嘴端鳳頭燕鷗追逐鳳頭燕鷗的行為；行為與鳳頭燕鷗無明顯不同；從近年來的觀察記錄來看，只有上海的記錄沒有說明與鳳頭燕鷗混群。2006 年 7 月 1 日，更是觀察到 3 種鳳頭燕鷗混群。

c) 在閩江口觀察到的行為主要是休息、沐浴(圖 5)，也有求偶、交配及在淺水處捕魚的行為；

d) 除了天文高潮滿潮時間（以潮水淹沒汶母頂外沙洲為準）以外，其它時間均有機會現身；

e) 出現時間為 5 月～9 月，表現為夏候鳥特徵。

f) 活動範圍從入海口處至沿閩江上溯 7KM 左右。

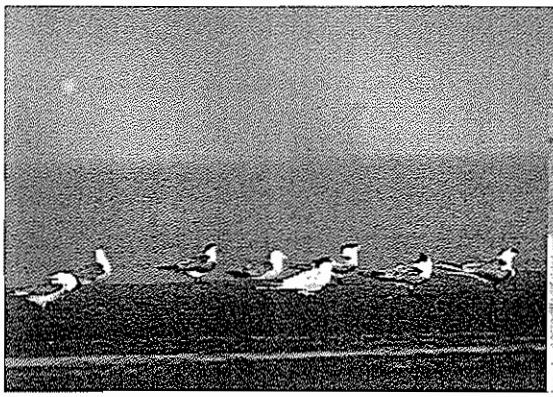

圖 4、混群

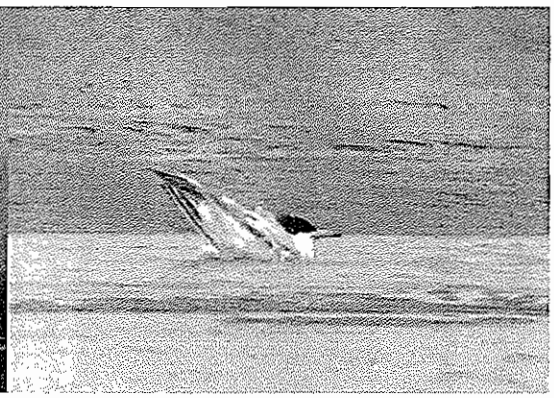

圖 5、沐浴

四、*黑嘴端鳳頭燕鷗在福建的受脅因素*

1、閩江口棲息地的保護力度不夠：閩江口保護區的級別太低，目前剛設立為省級保護區，正申報國際重要濕地；保護區範圍太小，目前主要保護鰳魚灘，應擴大到鰳魚灘以東海岸；鰳魚灘緊鄰長樂市主要排污口，環境污染影響底棲生物生長，影響水鳥的食物；人為干擾影響鳥類的休息 。

2、人為活動(圖 6)以及撿鳥蛋的行為影響燕鷗的繁殖。

3、近海漁業資源的枯竭影響燕鷗的食物供給。對漁民的調查得知，漁民歷來有在近海撿鳥蛋的習慣，但是近年來燕鷗才急遽減少的規律，與捕撈強度的急遽增大更加吻合。

4、天氣影響黑嘴端鳳頭燕鷗的繁殖。如果繁殖季節福建沿海颱風活動頻繁，或者在關鍵時間影響沿海，則對於黑嘴端鳳頭燕鷗的繁殖非常不利。2006 年影響福建中北部的颱風較前幾年明顯偏多，9 月中下旬在閩江口則出現親鳥餵雛的鏡頭，04、05 年 9 月份均未有黑嘴端鳳頭燕鷗的記錄。

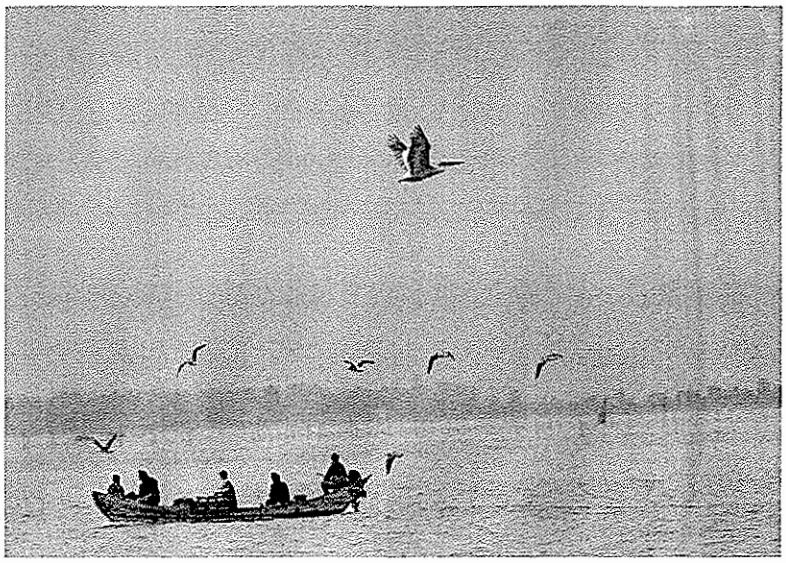

圖 6、人為活動

五、 對開展黑嘴端鳳頭燕鷗保護工作的建議

a) 建議把閩江口、連江南部島嶼、馬祖列島、白犬列島設為一個大的黑嘴端鳳頭燕鷗保護區域，聯合聯合兩岸力量加以保護，呼籲政府重視黑嘴端鳳頭燕鷗的保護工作，促成大保護區的設立。

b) 兩岸聯合開展同步調查工作，掌握閩江口--馬祖列島區域黑嘴端鳳頭燕鷗(圖 7)的數量和活動規律。

c) 兩岸聯合開展閩江口區域生態資源調查，重點研究近海漁業資源的變化以及對燕鷗可能產生的影響。

d) 儘快完成對福建沿海島嶼鳥類資源的普查。儘管廈門觀鳥會對一些島嶼進行了調查，但是福建省擁有 1400 多個島嶼，3300 多公里長的曲折海岸線，還有更多的島嶼的鳥類資料空白，或許其中還有黑嘴端鳳頭燕鷗繁殖地存在。

e) 加强宣傳教育，減少人為干擾和無意識破壞。

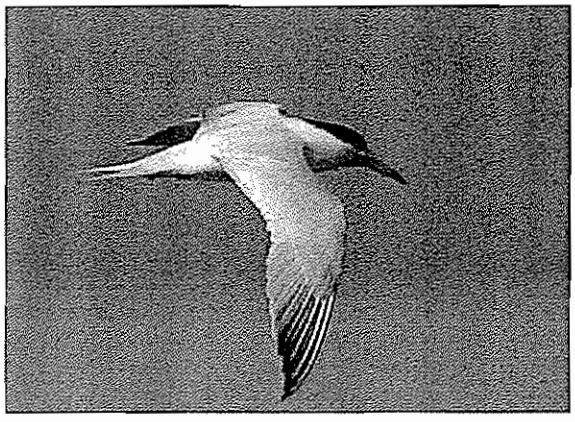

圖 7、黑嘴端鳳頭燕鷗