

自然文化景觀調查研究 計畫成果提要集(五)

Summary of Reports on Studies and Investigation
of Nature/Culture and Landscapes (5)
(1992)

行政院農業委員會印行
中華民國八十一年六月

序

本會自民國七十三年九月接辦自然文化景觀工作以來，每年均由各研究機構及學術單位提出研究計畫，經本會自然文化景觀審議小組審定後，交由各執行單位辦理。另配合野生動物保育法執行，與各自然保留區、保護區之經營管理，本會亦補助各相關單位辦理相關事宜。各項研究計畫均能照預定進度進行，並已獲致顯著成果。

爲便於社會各界共同了解、多方探討及促進今後自然文化景觀工作之推展，加強野生動物保育法之執行，繼續珍稀動植物、地景之調查與生態研究，以及櫻花鉤吻鮭之復育研究等，特邀請各計畫執行人撰寫執行結果之中、英文提要，由本會彙整編印成集。

本書除了本會提供之八十一年自然文化景觀有關計畫一覽表，及保育大事紀外，共有八十年度之保育研究計畫提要四十三篇；保育執行計畫提要六十一篇。每篇並附有作者之聯絡地址，以便日後讀者可直接和計畫執行人討論。而英文部分，除可供國外人士研究參考之用外，將有助於促進國際間學術之交流。

本會訂於本（八十一）年六月間舉行自然文化景觀調查研究計畫成果研討會，本書於此時問世，富有重大意義。諸承各位計畫執行之專家學者，及參與編纂工作同仁襄助玉成，使本書得以順利出版，特申謝忱。付梓前夕，謹綴數語，是爲之序。

行政院農業委員會副主任委員
兼自然文化景觀審議小組召集人 林享能 謹識

中華民國八十一年六月

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011	八卦山、大肚山春季灰面鵟過境調查	台灣省野鳥協會-----
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行政院農業委員會八十一年度自然文化景觀有關計畫一覽表
行政院農業委員會

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2	臺北縣野生動物保育計畫	<i>Taipei County wildlife conservation project</i>
3	宜蘭縣野生動物保育計畫	<i>I-lan County wildlife conservation project</i>
4	桃園縣野生動物保育計畫	<i>Taoyuan County wildlife conservation project</i>
5	新竹縣野生動物保育計畫	<i>Hsin Chu County wildlife conservation project</i>
6	苗栗縣野生動物保育	<i>Miaoli County wildlife conservation project</i>
7	台中縣野生動物保育計畫	<i>Taichung County wildlife conservation project</i>
8	南投縣野生動物保育計畫	<i>Nantou County wildlife conservation project</i>
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14	屏東縣野生動物保育計畫	<i>Pingtung County wildlife conservation project</i>
15	台東縣野生動物保育計畫	<i>Taitung Country wildlife conservation project</i>
16	花蓮縣野生動物保育計畫	<i>Hualian County wildlife conservation project</i>

計畫序號	中 文 名 稱	英 文 名 稱
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18	基隆市野生動物保育計畫	Keelung City wildlife conservation project
19	新竹市野生動物保育計畫	Hsin Chu City wildlife conservation project
20	台中市野生動物保育計畫	Taichung City wild life conservation project
21	嘉義市野生動物保育計畫	Chia-yi City wild-life conservation project
22	台南市野生動物保育計畫	Tainan City wildlife conservation project
23	彰化縣大肚溪口水鳥保護計畫	Waterfowl conservation project of Tadu estuary
24	澎湖縣貓嶼鳥類保護區保護計畫	Penghu County Mao-yu islandbird conservation project
25	八十一年度台北市野生動物保育工作計畫	Project for strengthening promotion of wildlife conservation in Taipei Municipal City
26	苗栗三義火炎山自然保留區管理維護計畫	The management and preservation of the Hoyenshan nature preserve in Mioli
27	自然文化景觀宣揚工作計畫	The publicizing program of natural and cultural heritage
28	台灣鼬獾(<i>Melogale moschata subaurantiaca</i>)族群生態學之研究	A study on the population ecology of the Taiwan ferret badger (<i>Melogale moschata subaurantiaca</i>)
29	穿山甲之繁殖保存研究 (IV)	Studies on the conservation of Chinese pangolin <i>Manis pentadactyla pentadactyla</i>
30	臺灣黑熊之生態調查及其經營管理策略 (三)	Study and management of Formosan black bear (III) (<i>Selenarctos thibetanus formosanus</i>)
31	宜蘭仁澤台灣獼猴猴羣生態之研究 (一)	Study of population ecology of formosan macaque in Jentse, Ilan (I)
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33	臺灣地區山地鄉對野生動物資源利用的調查 (三)	An investigations on the consumption of the wildlife resource by the aborigines in Taiwan (III)

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34	臺灣長鬃山羊之生態研究 (5) --由食物與排泄物中的能量及營養變化探討臺灣長鬃山羊在食物網中的生態區位	The ecological study of formosan serow (<i>Capricornis crispus swinhoei</i>) -- Energy and nutrient dynamics in its food and pellet
35	台灣越冬型蝴蝶谷之生態研究	Ecology on the overwintering aggregation of butterflies ("butterfly valleys") in Taiwan
36	花東海岸山脈地景調查	Landscape study of the coastal range, eastern Taiwan
37	泥火山地區植物調查 (第二年)	Investigation of plant communities at muddy volcanic areas in Taiwan (2nd. year)
38	本省原生闊葉樹林植物社會資料庫之建立	Establishment of database of the virgin broad-leaves forest in Taiwan
39	翡翠樹蛙之研究	The study of emerald green tree frog (<i>Rhacophorus smaragdinus</i>)
40	台灣一葉蘭保留區管理維護計畫	The management and preservation of Taiwan pleione nature reserve
41	大武山自然保留區哺乳動物相調查 (二)	Study of the mammalian fauna of Tawu Mountain nature reserve (II)
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44	插天山自然保留區管理維護計畫	The management of Cha-tian nature preserve
45	礁溪台灣油杉自然保護區管理維護計畫	The management and preservation of Chiachsi Taiwan keteleeria nature reserve
46	大肚溪口鳥類保護計畫	Wildbird conservation project of Tadu estuary
47	宜蘭縣南澳鄉直額絨螯蟹生態保育之研究	Studies on the conservation of <i>Eriocheir rectus</i> (Crustacea, Decapoda, Grapsidae) in Nanao
48	澎湖縣湖西鄉海豚資源之保育利用規畫	The planning on the conservation and utilization of dolphine resource at Hu-shi, Peng-hu County

計畫序號	中 文 名 稱	英 文 名 稱
49	澎湖縣自然文化景觀調查 (二)	Research on natural and cultural singhts in Penghu: II
50	臺灣中西部海岸小燕鷗繁殖族群之初步調查	A preliminary survey on the breeding population of the little tern (<i>Sterna abifrons</i>) along the central west coast of Taiwan
51	櫻花鉤吻鮭族群生態與復育研究 (3)	Study on polulation ecology and restoration of formosan landlocked salmon (3)
52	閩渡自然保留區植羣演替與底棲動物組成關係之研究	Study on the relationship between macrobenthos and succession of vegetation at Kwandu nature preserve
53	大甲溪流域粗首鱖生態學之研究	Study on the ecology of <i>Zacco pachycephalus</i> in Tachai Stream
54	櫻花鉤吻鮭及其他大甲溪魚類寄生蟲之研究	Studies on parasites of the formosan landlocked salmon and other fishes in Tachia River
55	屏東縣青山溪生態調查及保育研究	Ecological survey and conservation study of Ching-shan Stream, Pingtung County
56	秀姑巒溪流域農業生態調查暨雁鴨為害防治技術研究	The investigation of agricultural ecology on the Hsiukuluon River and prevention studies on the damage from wild ducks
57	台灣溪流環境保育活動之推廣	Promotion on the stream environmental protection of Taiwan
58	八十一年度自然生態保育技術改進計畫	Technical improvement on natural conservation project of FY 1991
59	八十一年度青年自強活動中橫生態保育研習營	
60	芝山岩自然步道解說員訓練營	Seminar of Chi-shan-yan natural walk's guide training
61	自然環境保護教育	A nature awareness education project
62	自然生態保育兒童讀物寫作培育計畫	
63	現階段執行野生動物保育法之問題及衝突分析	Conflict assessment and problem forecasting on the execution of current wildlife conservation law
64	廣播節目「彩虹天地-大自然的聲音單元」	Radio program: 「The Beautiful World-Sounds of Nature」

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65	屏東縣隘寮溪、青山溪溪流保育宣導教育	<i>A conservational education guidance of Ay-liau and Ching-shan Stream, Pingtung County</i>
66	親子科學研習營	<i>Parent-child scientific study workshop</i>
67	台灣自然保留區簡介之編印	<i>Prints of pamphlet for nature preserves of Taiwan</i>
68	澎湖縣自然保育及宣導計畫	<i>Propagation project of education on natural environmental conservation in</i>
69	墾丁高位珊瑚礁自然保留區之經營研究	<i>The studies and management of Kenting natural areas on high coral reefs</i>
70	南澳湖泊及原始闊葉樹林保護區經營管理計畫	<i>The management of Nanao pond hardwood nature reserve</i>
71	哈盆自然保留區管理及規劃	<i>Planning and management of Ha-pen nature reserve</i>
72	台東台灣蘇鐵自然保留區管理維護計畫	<i>Management and preservation of cycas natural reserve in Tai-tung</i>
73	大武壠台灣穗花杉自然保留區管理維護計畫	<i>Management and preservation of anentotaxus nature reserve in Ta-wu</i>
74	淡水紅樹林自然保留區管理維護計畫	<i>The manangement and preservation of Tan-sui mangrove nature reserve</i>
75	坪林台灣油杉自然保留區管理維護計畫	<i>The management and preservation of Pin-lin Taiwan keteleeria nature reserve</i>
76	台灣地區猛禽調查計劃	<i>Raptors census project of Taiwan</i>
77	圈養野生動物所需空間之探討	<i>Space and furniture requirement of wild animal in confinement</i>
78	蘭嶼角鴞之社會行為及棲地利用	<i>The social behavior and habitat utilization of Lanyu scops owl</i>
79	台灣地區鳥類繫放計劃	<i>Bird banding project of Taiwan</i>
80	臺南縣境內六甲鄉水流東地區密集化石地質景觀之調查 (二)	<i>Investigation on concentrated fossil geological landscapes in Liu-chia, Shiu-liu-tung, Tainan Hsian (II)</i>
81	蓮華池地區自然資源保育計劃	<i>The conservation plan of natural renewable resources in Lien-hau-chin area</i>
82	出雲山自然保留區管理維護計畫	

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83	鴛鴦湖自然保留區管理維護計畫	Yuen-yang lake natural area reserve protection and maintenance project
84	澎湖玄武岩自然保留區管理維護計畫	Penghu natural basalt reserve management project
85	高雄縣四德化石區保護	The protection plan of Syh-der fossil area
86	六龜十八羅漢山地景保護	The landscape protection program of Mt. Eighteen Buddhas in Liow-guei
87	烏山頂泥火山自然保留區保護計畫	The management and preservation of Wu-san-din mud volcano nature reserve
88	大武山自然保留區緩衝區管理維護計畫 (II)	The management and preservation of Mt. Ta-wu nature reserve and buffer area (II)
89	大武山自然保留區、緩衝區管理維護計畫 (壹)	The management and preservation of Mt. Ta-wu nature reserve and buffer area (I)
90	茶茶牙賴山台灣穗花杉自然保護區管理維護計畫	
91	台灣特有飛蜥種類之調查研究與復育試驗 (三)	Translocation test and field survey of endemic species of agamid lizards in Taiwan area (III)
92	櫻花鉤吻鮭棲息地巡邏保護	The protection of land-locked samon (<i>Oncorhynchus masou</i>) habitats
93	清水溝溪魚保護計畫	
94	森林溪流淡水魚類保育工作計畫	The conservation planning of fish in the forest area
95	八十一年度青年自強活動鴛鴦湖自然生態保育研習營	
96	八十一年寒暑假青年自強活動生態保育環境維護研習會 (七)	F.Y. 1991 nature conservation and environment protection work shop (VII)
97	鳥類保育工作研習會實施計劃	
98	全民「自然保育」錄音專訪	
99	臺灣野生動物清查和資料庫建檔之規劃及執行	Wildlife inventory and its data base (databank)

計畫序號	中 文 名 稱	英 文 名 稱
	高雄市壽山地區台灣獼猴(<i>Macaca cyclopis</i>) 族群繁殖、食性之調查,及維護保育之規劃	<i>A study of the breeding and feeding habituation and the protecting organization of Macaca cyclopis in Kaoshiung Sou-shan Mountain zone</i>
101	金門自然生態保育計畫	
102	台中縣鶯鷺鳥調查保護計畫	
103	新豐紅樹林調查保護計畫	
104	台中縣巨木調查保護計畫	
105	基隆海蝕地形保護	<i>The protection of Keelung abrasion coast</i>
106	保護野生動物宣導及徵文比賽	<i>Wildlife protection propaganda and composition contest</i>
107	"台灣蛾類圖說 (5)"編印及出版品分配計畫	<i>Publication and distribution of "Illustrated moths of Taiwan (5)"</i>
108	八十一年度高雄市野生動物保育工作計畫	<i>Project for strengthening promotion of wildlife conservation in Kaohsiung Municipal City</i>
109	保育鳥類查核與環誌計畫	<i>Checking and banding project for caged conserved birds</i>
110	七家灣溪櫻花鉤吻鮭棲地改善計畫	<i>A project of improving habitate for land-locked salmon</i>
111	保護區野生動物調查、經營保育技術訓練講習 會	<i>Field technique training for the study, management and conservation of wildlife in nature reserve</i>
112	台灣地區野生鳥獸養殖成功現況調查計畫	<i>Feeding and breeding success records of captive wildlife in Taiwan</i>
113	台灣省特有生物研究保育中心籌建規劃	<i>Planning on the establishment of Taiwan Endemic Species Research Institute</i>
114	野生動物保育國小兒童徵文內容分析	<i>Content analysis of elementary school children's writing about wildlife conservation</i>
115	犀牛角管理研討會	<i>Workshop on a programme to control Taiwan's trade in rhino horn</i>

八十一年度自然保育大事紀

- 80.07 本會核定一百二十餘項自然文化景觀調查研究與執行相關計畫。
- 07.09 台灣省農林廳召開『台灣特有生物研究保育中心籌建委員會第一次委員會議』。
- 07.16 國貿局召開『第三次研商訂定野生動植物進出口管理規範草案事宜會議』。
- 08 本會余主任委員赴歐訪問團由我國駐英戴代表陪同拜訪世界野生動物基金會（WWF）總部。
- 08.01 國貿局召開『第四次研商訂定野生動植物進出口管理規範草案事宜會議』。
- 08.13 台灣省農林廳召開『台灣特有生物研究保育中心籌建委員會第二次委員會議』。
- 08.16 台灣省農林廳召開『野生動物保育工作手冊編撰小組第五次會議』。
- 09 本會與兒童日報社及財團法人國際美育自然生態基金會合辦保護野生動物徵文比賽。
- 09 遴派林業處李副處長三畏與台灣大學楊平世教授代表我國參加國際野生動物及魚類協會（IAFWA）假美國阿肯薩斯州舉行之一九九一年年會。
- 09.03 國貿局召開『第五次研商訂定野生動植物進出口管理規範草案事宜會議』。
- 09.11 本會召開『研商櫻花鉤吻鮭自然保留區週邊造林事宜及造林樹種之選定會議』。
- 09.17 與環保署、教育部繼續合作製作公害防治及生態保育親子社教兒童電視節目。
- 09.19 台灣省農林廳召開『野生動物保育工作手冊編撰小組第六次會議』。
- 09.24 本會召開『研訂野生動物檢疫辦法第三次會議』。
- 09.27 台灣省農林廳舉辦『自然生態保育方向與策略研討會』。
- 09.28 自然文化景觀審議小組暨技術組第三十九次聯席委員會。
- 10.01 台灣省農林廳邀集各縣市政府研商如何貫徹執行八十一年度野生動物保育計畫事宜及野生動物保育業務座談會。
- 10.05 本會會同相關單位於淡水台灣省家畜衛生試驗所舉辦『第四次銷燬走

私沒入野生動物產製品活動暨保護野生動物徵文比賽頒獎典禮』，共銷燬包括象牙、犀牛角、動物皮、動物骨等，共計達二千餘公斤，另徵文比賽共錄取優選與佳作一百五十九件。

- 10.06 中華民國自然生態保育協會國際野生動植物交易調查紀錄委員會台北分會（TRAFFIC TAIPEI）成立。
- 10.16 台灣省農林廳召開『野生動物保育工作手冊編撰小組第七次會議』。
- 10.28 自然文化景觀審議小組暨技術組第四十次聯席委員會。
- 10.29 本會召開『研商掃蕩危害野生動物案件計畫』。
- 11.05 本會派湯科長曉虞至行政院環境保護小組報告自然保育概況，深受肯定。
- 11.14 本會召開『野生動物保育法修正草案第一次會議』。
- 11.26 本會協助英國中央電視公司及國際保育人士拍攝我國水警緝私過程。
- 12.09 『野生動物檢疫辦法（草案）』報院。
- 12.15 台灣大學李玲玲副教授與人猿基金會馬可仕先生至印尼參加十五至廿日舉行之『國際人猿會議』。
- 12 本會補助林試所製作之『藍鵲飛過』影片入圍八十年第二十八屆金馬獎最佳紀錄片。
- 12 本會編印『違反野生動物保育法案例彙編』送各主管機關、警察與相關單位參考。
- 12.30 農林廳與桃園等四個縣政府共同舉辦『掃蕩危害野生動物保育法案件計畫講習會』。
- 81.01. 協助郵政總局郵政博物館辦理『台灣森林資源綜合特展』。
- 01.10 本會召開『研商行政院農業委員會野生動植物及其產製品鑑定技術小組設置要點（草案）會議』。
- 01.11 十一日至二十日在全台灣地區同步執行『掃蕩危害野生動物保育法案件活動』，共查獲違法案件一百二十五件；其中移送法辦二十四件，行政罰鍰四十九件，拆除獵具與其他案件五十二件。
- 01.16 本會林副主任委員率有關人員赴華西街掃蕩危害野生動物山產店。
- 01.21 自然文化景觀審議小組暨技術組第四十一次聯席委員會。
- 01.26 行政院核定成立『行政院農業委員會生物資源調查策劃小組』。
- 01.30 台灣省農林廳召開『台灣特有生物研究保育中心籌建委員會第三次委員會議』。

- 02.08 本會林副主任委員及湯科長曉虞拜訪星雲法師，希望遏止放生活動共同支持協助政府推行自然保育工作。
- 02.10 遴派林業處李副處長三畏與台灣大學王鑫教授代表我國參加國際自然保育聯盟（IUCN）於十至二十一日在委內瑞拉舉行之第四屆國家公園及保護區世界大會。
- 02.10 本會贊助中華民國兒童文學學會、信誼基金會舉辦『自然生態保育兒童文學寫作研習班』。
- 02.11 本會邀集衛生、貿易、警政等相關單位與各級主管機關舉行『台灣犀牛角買賣管理方案研討會』。
- 02.22 師範大學舉行『第三屆生態學與動物行為研討會』。
- 02.25 國貿局召開『第六次研商訂定野生動植物進出口管理規範草案事宜會議』。
- 02.28 本會於高雄市萬壽山風景區管理所舉辦『第五次銷燬走私沒入野生動物產製品活動』，共銷燬包括象牙、犀牛角、標本、動物皮、動物骨等，共計達六百餘公斤。
- 02.28 本會函請退輔會森林開發處停止執行『鴛鴦放養觀察研究計畫』以避免破壞保留區原有生態體系。
- 02.29 財團法人保護人猿基金會正式登記成立，本會准予備查。
- 03.02 遴派林業處保育科湯科長曉虞與師範大學王穎教授，以中華民國自然生態保育協會國際野生動植物交易調查紀錄委員會台北分會（TRAFFIC TAIPEI）名義，參與三月二日至十三日於日本京都舉行之『華盛頓公約組織（CITES）第八屆會員大會』。
- 03.09 財團法人國際美育自然生態基金會正式登記成立，本會准予備查。
- 03.11 國科會生命科學研究推動中心與中研院植物所等相關單位於十一至十二日在中研院舉行『中美台灣植物地理與資訊管理研習會』。
- 03.12 本會與經濟部共同會銜公告插天山、南澳闊葉樹林、澎湖玄武岩、台灣一葉蘭、出雲山、烏山頂泥火山等六個自然保留區。
- 03.16 自然文化景觀審議小組暨技術組第四十二次聯席委員會。
- 03.17 台灣省農林廳舉行本會補助宜蘭縣等十一縣市政府與單位野生動物保育專用越野吉普車各乙輛贈車典禮暨召開台灣省執行掃蕩危害野生動物保育法案件計畫檢討會。
- 03.17 本會召開『野生動物檢疫辦法草案修正案事宜會議』。
- 03.24 台灣省農林廳為培訓各級生態保育人員專業素質，假鞍馬山莊舉辦三

梯次之『鳥類辨識及保育研討會』。

- 04.13 本會與台灣大學及林試所合辦『野生動物經營管理保育技術訓練班』，邀請外籍專家羅賓遜博士 (Dr. Alan Rabinowitz) 與伊莉莎白博士 (Dr. Elizabeth L. Bennett) 於十三至二十七日假林試所六龜分所扇平工作站，邀訓林業與國家公園等相關單位保育業務承辦人。
- 04.14 本會邀集相關單位與學者專家舉行『研商文化資產保存法施行細則自然文化景觀部分修正草案會議』。
- 04.16 本會林副主任委員及湯科長曉虞赴佛光山與佛教界會面，並介紹國際自然保育趨勢及國內執行概況與法規。
- 04.19 本會會同林務局、武陵農場等相關單位配合『種二千萬棵樹救台灣水源活動』於武陵農場七家灣溪護魚林進行生態造林。
- 04.20 台灣養豬科學研究所於竹南該所舉辦『野生動物疾病臨床研習會』。
- 04.23 行政院核定成立台灣省特有生物研究保育中心。
- 04.27 國科會生命科學研究推動中心與中研院植物所等相關單位於二十七至二十九日在中研院舉行『台灣動物資源資料庫建立研討會』。
- 04.30 本會邀集相關單位舉行『擬訂野生動物採集證申請程序及有關事項座談會』。
- 05.02 本會邀請立法委員助理共三十人赴關渡與淡水河紅樹林自然保留區參觀自然保育計畫執行成果。
- 05.08 本會邀集相關單位與學者專家召開『金門縣慈湖水鳥自然公園規劃座談會』。
- 05.10 遴派台灣大學副教授周蓮香赴港出席十日至十八日舉行之『國際海洋動物協會 (I A A A M) 第二十三屆年會』。
- 05.11 遴派中央研究院劉小如研究員出席十一日至十七日於德國柏林召開之『第四屆國際猛禽保育與研究年會』。
- 05.11 本會邀集交通部、環保署、內政部、經建會等單位開會研商鴨票 (自然保育郵票) 發行事宜。
- 05.11 本會邀集相關單位、民間團體、個人舉行『為老樹尋根活動座談會』。
- 05.13 台灣省農林廳召開『台灣特有生物研究保育中心籌建委員會第四次委員會議』。
- 05.15 環保署召開『海岸土地開發對濱線生態自然環境資源之影響座談會』。

- 05.19 本會函送『文化資產保存法施行細則自然文化景觀部分修正草案』，請文建會彙整。
- 05.22 自然文化景觀審議小組暨技術組第四十三次聯席委員會。
- 05.27 本會邀集相關單位與學者專家召開『生物資源調查工作推動座談會』。
- 05.27 台北市家畜衛生檢驗所於廿七、廿八兩日在屏東技術學院舉辦『八十一年野生動物臨床病例診斷技術研討會』。
- 05.29 文建會與中華文化復興運動總會舉辦『文化資產維護與保存座談會』。
- 05.31 國家公園學會知性之旅工作小組在台大思亮館國際會議廳舉行『環境解說教育研討會』。
- 06.01 遴派林業處保育科湯科長曉虞與中興大學陳明義教授及環保署等機關單位組團赴巴西參加聯合國環境與發展研討會（UNCED）於一日至十四日所舉行地球高峰會議之『The '92 Global Forum 系列座談會』。
- 06.01 教育部假中央圖書館舉辦『教育部八十一年度環境教育研討會』。
- 06.17 本會與師範大學合辦『野生動物皮毛類產製品鑑定研習會』。
- 06.19 本會舉行『第五屆自然文化景觀保育研究計畫成果發表會』。

櫻花鉤吻鮭族群生態與復育研究(二)

林曜松¹ 張崑雄¹ 戴永禎¹

摘 要

至西元1916年，櫻花鉤吻鮭才在臺灣地區被發現，目前在本地的族群已經面臨瀕臨絕種的危機。於西元1984年文化資產保護法訂定後，才開始進行保育的工作。中華民國行政院農業委員會資助保育及進行其生物、物理、化學環境研究所需之經費。除了基本研究之外，放流及保護措施也同時在進行中。而且農委會也同時推動有關櫻花鉤吻鮭的大眾教育工作。然而，根據自1985年以來對櫻花鉤吻鮭族群生態之調查顯示，其估計族群數量由2,000尾已減至少於1,000尾左右。所以臺灣地區櫻花鉤吻鮭的命運在本世紀結束之前，實在值得憂慮。

本論文第一章說明臺灣地區櫻花鉤吻鮭的演化與分類地位、以及自開始保育後所做的研究、和未來保育的方向與計劃。第二章繼續自1987至1989年的族群計數研究，發現於七家灣溪的櫻花鉤吻鮭最近仍然在減少中，並說明颱風與攔砂壩對其族群的影響。第三章研究櫻鮭在不同季節內對溪流棲地物理性因子的需求，以及其空間分布的變化。第四章則以體長頻度資料估算 von Bertalanffy 成長曲線之參數，藉此初步了解櫻花鉤吻鮭的生活史。

自1987年9月至1989年1月間，七家灣溪內櫻鮭的族群量自將近1,800尾減少至約650尾。根據研究資料顯示，族群量有明顯的季節性變化，亦即在7至10月間，族群量相當穩定，但是在冬季則有減少的趨勢。當水溫低於12℃時，櫻鮭躲在洞穴中的比率增加。在上述期間，櫻鮭族群量一直在減少。魚群的減少，主要是因為幼魚的數量持續在減少，而成魚的數量則較為穩定。在七家灣溪中，二者族群量在時間上的變化，可能與攔砂壩的位置有很大的關係。另一方面，洪水及攔砂壩對鮭魚族群及分佈也有很大的影響。

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武陵農場魚類教育中心解說設施細部規劃

林曜松¹ 張崑雄¹ 張竣文¹ 莊鈴川²

摘 要

本計劃旨在收集有關大甲溪魚類生態的資料，其中包括大甲溪的自然環境，魚類相，其他動物相，人為開發的過程及人為開發所造成的影響。利用所收集到的這些資料，進一步規劃解說教育的內容，設計多項解說設施。

大甲溪所產的 52 種淡水魚中，共有 38 種為純淡水生魚類。在這 38 種魚類當中，包括台灣特有種 8 種，特有亞種 1 種，本土種 19 種，以及引進的外來種 10 種。兩棲類有 2 科 3 種，鳥類則有 5 科 6 種，此外尚有 2 種小型哺乳類。水棲昆蟲方面則共有 6 目 34 科，種類相當豐富。

本解說規劃的目標計有下列 4 項：1 加強宣導功能，提高經營成效；2 加強與學校教育和社會教育之合作協調；3 協助遊客欣賞自然環境之美，以瞭解人類與生物之間的關係；4 提供遊客完善的解說環境和高品質的戶外教育機會。具體的作法則是根據已收集到的資料，以文字、圖片、圖表，錄影帶等方式，依各種資料的性質，分成 6 個解說單元，並配合相關的設施，安置於解說教育中心內。同時安排解說員在現場為遊客解說，提供諮詢服務。此外，並製作“台灣山區常見的魚類及溪流昆蟲與調查”彩色摺頁，便於遊客隨身攜帶查閱。

除了上述解說設施的設置外，在棲地管理上應實施遊客承載量和環境保護之管理政策，以減輕人為壓力。該地區之解說工作，最好由解說員作定時或預約導覽。同時應在適當之地點設置垃圾桶，避免遊客亂丟垃圾；以及安置防止人為破壞環境的設施。至於在解說教育中心的營運管理上，除了設置適當的管理單位及人員，並可印製參觀指南或解說手冊，辦理各式講習班和短期教育活動，以及建立義工制度，使解說教育中心的功

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臺灣獼猴之族群生態研究

林曜松¹ 吳海音¹

前言

臺灣獼猴 (*Macaca cyclopis*) 為臺灣特有的哺乳動物之一，分佈在臺灣低海拔以至海拔3000公尺以上的地區。過去在非法獵捕及棲息地破壞的雙重壓力下，臺灣獼猴的族群數量一度受到相當大的威脅，但近年來在野生動物保育觀念的推廣下，濫捕野生動物的情形已有所改善，而國家公園及生態保護區的設立，更為臺灣獼猴及其它野生動物提供了生息的場所。

本文以臺灣南端墾丁地區一臺灣獼猴族群為研究對象，描述其族群動態及生活史上之特徵值。由於研究長達五年半，且對猴群中每一個體都可辨識，因此可隨時回溯各時期或各猴隻的背景資料，故可較詳盡地分析及陳述獼猴族群的動態。

方法

本研究在臺灣南端墾丁國家公園範圍內之恆春自然生態保護區中進行（東經120°49'，北緯21°58'）。自1985年3月到1990年8月間每月赴研究地一次，調查猴群組成的變化，追蹤研究區中雄猴的動向，並觀察其它相關的社會行為。當猴群中有幼猴出生時，設法分辨其性別，判斷其出生日期；當有猴隻失蹤時，則向當地人查詢，以瞭解有無獵捕之情事。觀察時以雙眼及單筒望遠鏡觀察行為及輔助個體的辨識。由於研究猴群中的個體數不多，故可依猴隻的體型及臉部特徵進行個體辨識，只有少數群外雄猴因出現時間過短，無法辨識。

1985年研究開始時，以一猴群為觀察對象，稱之為S群。S群在1987年中分裂為二群，分別稱為S1及S2群。分群後S1群佔原S群大部份的活動範圍，S2群則略往東北方向移動。由於對S2群的追蹤較為困難，故分群後的觀察，以S1群為主，但在S2群出現時，仍儘可能觀察記錄其中各項行為及活動。

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結 果

在五年半的期間，研究區中的獼猴數目自 10 隻增加到 29 隻。研究區中獼猴族群的年成長率在 -5 % 到 50 % 間，平均年成長率為 25.2 %。1985 年至 1989 年的 12 月，及 1990 年 8 月時，個別猴群的大小在 9 至 16 隻間變動。除 1988 年 12 月至 1989 年 6 月間 S1 群中同時有兩隻雄性成猴外，研究期間各猴群中皆僅有一隻雄性成猴。各猴群中成猴的雄雌性比在 2 : 3 到 1 : 4 間，若包括三歲以上但尚未生產過的雌猴，則雄雌性比在 2 : 4 到 1 : 6 間。1985 年時 S 群中僅 3 隻當年出生的幼猴，而無一至三歲的幼猴，幼猴數與群中所有個體數的比值僅 0.3，此數值在 1986 年時上升到 0.5。分群後的兩猴群在 1987 年到 1989 年間幼猴所佔比例相近（0.44 ~ 0.58），但到 1990 年時，S1 群中的幼猴比例高出 S2 群甚多（0.56 vs. 0.30）。

墾丁地區臺灣獼猴的交配及生產具明顯的季節性。1987 年 10 月至 1990 年 4 月間，在 S1 群中共記錄到 304 次交配行為，90 % 集中在 11 月至 1 月間。研究期間獼猴族群中共有 28 隻幼猴誕生，幼猴出生的月份分布在每年 2 月至 8 月間，其中 75 % 集中在 4 月至 6 月間。在 28 隻幼猴中，兩隻性別不明，其餘 26 隻的雄雌性比為 12 : 14，與 1 : 1 的性比無顯著差異。六個生殖季中可生育的雌猴共計 35 隻次，生殖率為每年每隻雌猴生殖 0.8 隻幼猴（28 / 35）。猴群的年生殖率因猴群而異，S 群及 S1 群的年生殖率較高，其三年生殖率的平均值分別為 0.91 與 0.89。而 S2 群之生殖率變化較大，三年年生殖率之平均值僅有 0.44。

雌性臺灣獼猴初次生產的年齡為四或五歲。雌性幼猴在 30 個月至 33 個月大時，性皮膚初次開始發生變化，次年的交配季性皮膚再度變化，此時雌猴與雄猴間交配頻繁，並於隔年初次生產。研究中記錄到雌猴最早的生產年齡為 50.5 月齡。雌猴兩次生產間相隔的時間為 10.5 ~ 24.0 個月，平均 15.4 個月。由於臺灣獼猴的生殖具明顯的季節性，雌猴在某一年交配季時若未能受孕，便須等待來年的交配季才有機會交配生殖。因此生產間距可分為兩組，間隔一年及間隔二年。間隔一年組的平均值為 12.8 個月（ $n = 14$ ），間隔二年組平均 22.5 個月（ $n = 5$ ）。

研究區中幼猴在五歲以前的存活率為 0.82，若比較各年齡層的存活率，則以 0 至 1 歲的存活率最低（0.82），一歲以上的幼猴皆存活到研究結束時。獵捕為造成研究區內獼猴死亡的主要原因。研究期間共有七隻個體被認定為死亡，包括二隻雌性成猴及五隻幼猴，其中有五隻的死亡直接或間接與獵捕有關。

綜觀五年半期間遷入及遷出研究區的猴隻以雄性成猴為主。研究期間，共有四隻雄性成猴及一隻雌性成猴遷入研究區並加入猴群，兩隻雄猴遷出研究區。由於雄性成猴遷入遷出頻繁，造成猴群中的雄猴亦時有變動，且其變動的時間多發生在交配季中。研究期間加入猴群的雄猴計有 6 至 8 隻，其中 5 隻停留時間較久，最長可達 28 個月以上。

大甲溪石鱮之族群分布研究

林曜松¹ 張明雄¹

前 言

臺灣石鱮 (*Acrossocheilus paradoxus*) 分類地位上屬鯉目鯉科光唇魚屬，為臺灣特有種的淡水魚之一，廣泛分佈於臺灣西部各水系及東部的部分溪流中、下游。其垂直分佈可自平地到海拔 1500 公尺。

有關石鱮的研究，早期均以分類與分佈為主；近年始有學者對其生態及生殖生物學進行研究。本研究之目的，乃針對大甲溪的石鱮，進行其分佈、相對豐度及族群結構之了解，以做為大甲溪魚類保育及經營管理之參考。

研究方法及材料

本研究之調查範圍為谷關壩以下至出海口之大甲溪主流，及十文溪、裡冷溪、東卯溪、橫流溪以及沙連河等五條支流，其間共設立22個調查站（見表一）。由於調查範圍長達70公里，因此調查頻率以季節為單位；自 78 年 9 月進行至 90 年 2 月。

調查方式乃以背負式電魚器為取樣工具，以間歇性連續放電進行魚類採集。為比較各站間之相對豐度，每次電魚時間相同，約進行40分鐘。收集之魚隻測量其體長、數量後，除少數以10%福馬林固定攜回實驗室外，其餘皆釋回原河段中。將每季的資料分析，比較捕獲量及體長組成之季節性變化；另外，由各站捕獲之結果，分析其分佈概況及族群結構。

結 果

大甲溪的石鱮主要分佈在天輪壩至東勢之間的主流及其支流的下游。主流中的族群量遠多於支流的族群量（757：171）；主流中的平均捕獲量以天輪壩到天輪電廠，及天輪電廠到石崗壩二河段最多。支流中則以東卯溪、裡冷溪下游較多，沙連河下游次之，沙連河上游最少；其他支流調查站則未曾發現。

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大甲溪的石鱚數量有明顯的季節與年間變化；79年春、夏、秋三季，主流的石鱚數量相近，冬季則顯著增加；支流亦有相同情形。78年主流族群數量無顯著季節性差異，但支流的族群量，則是秋季多於冬季，顯示有年間差異的存在。兩年資料相較，大甲溪石鱚數量有增加之趨勢。

大甲溪主流每季捕獲之石鱚，各種體長均有出現，其中以 50 — 100 mm 及 100 — 150 mm 兩區間之魚隻在各季出現之比例均佔較多數，而 50 mm 以下之稚魚在夏、秋兩季出現之比例較高；支流中則以 50 — 100 mm 體長區間的石鱚佔大多數，50 mm 以下的稚魚大量出現在秋、冬兩季。

討 論

1 十文溪全段、裡冷溪、東卯溪與橫流溪上游，皆無石鱚分佈，其原因可能與攔沙壩的存在有關。

2 天輪壩以上與石崗壩以下的大甲溪河段，其石鱚數量遠低於天輪壩到石崗壩間河段之石鱚數量，且族群結構亦不相同；此應與天輪壩和石崗壩的阻攔有關。

3 由體長小於 50 mm 的幼魚出現比例顯示：石鱚的生殖季很長，由春季至秋末。

4 主流終年皆可捕獲 50 mm 以下之幼魚，支流則有些季節未捕獲；顯示支流提供成魚棲所，其主要功能應是做為生殖場所。

5 兩年的調查結果有些許的差異，可能與兩年間颱風季節的長短有關。

表一 大甲溪魚類調查站位置及編號

區域名稱	主 流 及 站 名	支 流 及 站 名
A 區	谷關壩至天輪壩 (A1, A2)	小雪溪，鞍馬溪 (無)
B 區	天輪壩至天輪電廠 (B1, B3, B4, B7)	稍來溪 (無) 十文溪 (B2-1, B2-2), 裡冷溪 (B5-1, B5-2), 東卯溪 (B6-1, B6-2)
C 區	天輪電廠至石崗壩 (C2)	橫流溪 (C1-1, C1-2) 沙連河 (C3-1, C3-2)
D 區	石崗壩之下 (D1, D2, D3, D4, D5)	無

臺灣野生茶樹種源保存及利用（三）

馮鑑淮* 王雨全 林木連 陳右人 張清寬 邱再發

前 言

依據早期研究台灣野生茶之專家的報導，清康熙36年（西元1697年）郁永河所著裨海遊的附冊番境補遺中即記載在水沙連（今埔里一帶）山區有丈高的野生茶。由康熙56年（西元1717年）發行的諸羅縣志中已提到「水沙連出中有一種，味別、能消療暑瘴」，並對水沙連的原始森林，茶樹生長狀況皆有描述，赤崁筆談雍正六年（1723）也指出「.....通事每年入山.....焙製」。日據時代除了積極發展本省茶業外，也陸續有不少植物學者進行野生茶之調查與分類，光復後尚有橋本實等（1967）來台進行調查。隨後，國人也感有勘查之必要，遂有吳等（1970，1972），史等（1972）、何與王（1984），發表有關野生茶之調查報告。楊與呂（1987）除了綜合以上之資料之外，比對珍藏於各地之標本並親自調查大部份山區的野生茶，認為確認與現有栽培種不同，遂將之定為茶之亞種並命名為武威山茶學名是：

Camellia sinensis (L.) O. Ktze, subsp. *buisanensis*(sasaki) Lu & Yang.
近年來國人已了解生態保育之重要性，並加強各種生態資源的調查與保護，遂在農委會之支持下，進行全省野生茶之調查，其中西部之調查已在王等（1990）之努力之下完成。在調查東部山區野生茶之生育狀況及其性狀，以供作進一步研究所需。

調查區域與經過

本次調查區域位於台東縣鹿野鄉永康山，依林務局關山工作站提供之地圖顯示，北方為鹿寮山，西北方為鹿鳴山，屬於林務局關山工作站第14林班。從泰平檢查哨進入山區後，到達野生茶分布之最高處1060公尺，含調查時間共約需5小時行程。

調查結果

台東縣鹿野鄉永康山之野生茶樹分布在850公尺至1060公尺間西南坡向的原始林與次生林中，其數量正急速減少中。茶改場台東分場曾經於數年前調查該區域，並採集一樹幹標本幹圍8.4公分，直徑27.5公分，樹齡101年。

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由於本區野生茶多分布於原始林中，應屬於原生的山茶，依其性狀應類似呂與楊（1987）所指的武威山茶，顯示本種山茶之分布可達到中央山脈東側，這也是茶樹原生分布的最東緣。

本地之野生茶樹自根部萌發吸芽的現象極為普遍，此點與栽培品種包含小葉種或大葉種茶樹不同。在分枝性上，由於這些野生茶樹雖屬喬木性，但有自基部長出徒長枝及被伐倒後可萌發極多不定芽之特性，與灌木型的小葉種及山茶屬的油茶（*Camellia tenuifolia* Hay），光葉茶梅（*Camellia transnokiensis*）和能高山茶（*Camellia nokiensis*）較為接近，反而與喬木性的大葉種不同。通常大葉種茶樹在被伐至主幹後，僅能萌出少數芽或甚至於死亡。

採集自生長於4個不同海拔各10株茶樹上的芽葉，度量其葉長、葉寬、葉厚、節間徑及其他農藝性狀後發現，葉片長寬與面積均以採自海拔900公尺處者最大，其次為採自海拔980公尺最高者，而以採自海拔850公尺高者最小，葉面積分別為 $34.7 \pm 7.99 \text{ cm}^2$ ， $32.89 \pm 6.207 \text{ m}^2$ 及 $21.81 \pm 5.635 \text{ cm}^2$ ，葉厚、節間徑與節間長也均以採自海拔900公尺處之樹最大。

不同海拔區內之野生茶樹的其他農藝性狀。大部份野生茶樹具又中等光澤葉型多為披針形，少數為長橢圓型，雖然大部份之葉面極平，但仍有少數有中等皺紋，僅為一株皺紋明顯。反轉度其內折度的差異極大，其餘各種性狀仍有稍大的變異。因此雖然從葉形上看似乎頗為相近，但實際上為一混雜之族群，更顯示出其為原生狀態。由於此處野生茶的長寬比較一般栽培種大，因此葉形上均較栽培種細長。本區天然的實生苗很少，但是自地下根部發出吸芽之現象，卻很普遍，因此大多是以種狀況更新，此點與其他茶樹均不相同。

野生茶樹種原蒐集與利用

本計畫於三年內，已調查眉原山、日月潭德化社，鹿谷鄉鳳凰山、六龜鄉南鳳山及鳴海山，嘉義縣番路鄉瀨頭（草山）及水井等西部山區均發現有野生茶樹存在。東部山區根據調查顯示台東縣永康山也有野生茶樹之分布。

依農藝性狀分析結果屬山茶。以上各地區野生茶經蒐集地下生長之幼苗及插穗扦插繁殖，已建立野生茶種原圃，供作為雜交育種材料。魚池分場利用野生茶與栽培種進行人工雜交，所得新品系正進行選拔中。

花東海岸山脈地景調查（二）

王 鑫*

馮治華**

許玲玉**

黃國峰***

摘 要

地景是人類認知與知覺活動的對象，也是人類生活實踐的場所，以及維生系統的基礎。再者介於保育與開發之間的問題愈來愈受重視，所以需要將特殊和重要的地景、資源加以保育，以免因受到開發而遭受破壞。

本研究即以Litton (1968) 有關的地景評價作業方法為基礎，加以修改而使用。經過室內地圖分析、航照判釋、野外調查等工作，結合地形、地質、水文、坡度等的分析。最後經過地景分區、分析與評估作業而成。

地景分區則依據地景的規模大小、範圍、及空間封密性作成階層性的分區：連續地景、地景區帶及地景單元。因此在本文內，將花東海岸山脈中段（秀姑巒溪以南，九岸溪、富家溪以北）的範圍總共區分為六個地景單元，各個地景單元還細分成一或二個副區。

本研究在區域景觀的分析與評估作業中，利用景觀評價表格，依各景觀美質評估項目：統一性、生動性、繁雜性、稀少性及完整性，對各地景單元進行評估，這些評價表格可以做為劃分保護區的參考。

依據調查成果，建議將 300公尺等高線以上地區或是適當的高度以上地區劃為緩衝區，規定在緩衝區內禁止開發行為，包括農場開墾、採礦等或限制現有開發活動之規模或強度。而將里牙津山、織羅山、馬太林山、麻汝蘭山、水母丁山、三間屋山、北花東山、花東山、烏帽子山、安通越山、大莊越山、成廣澳山、開眼山及分水崙山等劃為保護區。

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自然保育教育及宣導整體綱要計畫

王 鑫*

朱慶昇**

摘 要

本研究在檢討自然保育教育及宣導的成果並研擬整體系統綱要，其目的在於整合農委會的自然保育教育及宣導工作委託計畫，並配合其他公私立機構的環保教育計畫，以擴大整體效果。

本計畫分兩階段進行，本年度已完成的工作包括：

1. 學習理論與宣導理論之回顧。目的在依據前人的理論與實証研究，探尋有效的自然保育教育架構。
2. 自然保育教育與宣導的課題分析，探討在教育與宣導過程中，如何選擇主題。目的在於言而有物，不是泛泛的大題目而已。本項檢討指出在辦理教育活動的時候，一定要有明確的題目和 受教對象。
3. 管道分析與實施策略的研究是在判斷怎麼做的問題。從實際的案例中，再鑑定教育與宣導方案實施的途徑和方法。本項研討的結果分別列出了實施的途徑以及適當的時機。
4. 回顧國科會、環保署以及內政部國家公園體系的环境教育計畫。目的在尋求合作的機會，並希望藉著互助合作擴大整體成果。

研究最後，並對自然保育宣導與教育的未來方向、重要課題及重要工作、與教育及宣導管道與優先作法等各方面研擬具體建議，提出可供參考的教育與宣導系統架構。

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台灣長鬃山羊之生態研究(四)－食草種類 及食草之能量和養分季節變化之分析

呂光洋 黃郁文
張巍薩 陳定昆 曹潔如

臺灣長鬃山羊在中高海拔的食物除玉山圓柏及玉山小蘗外，以草本植物為主。而草本植物中又以玉山薊及玉山金梅為主食。其啃食痕跡包括嫩葉、嫩芽、老葉及花。當中又以嫩葉、嫩芽為主。某些臺灣長鬃山羊食物的熱含量、氮含量及粗纖維含量有隨季節改變而改變的情形，如玉山薊、玉山小蘗的氮含量於秋季至冬季有遞減現象，而玉山薊的粗纖維含量此時卻有增加的趨勢，此種在冬季食物品質有轉差的現象普遍發生在位於中高海拔凍原帶的植物。唯將臺灣長鬃山羊對各種食物的利用情形與食物品質變化作一對照，並未發現有任何正負相關性，此種泛食性行為，可能與其覓食的代價（Cost）及獲益（Benefit）的平衡性有關；例如臺灣長鬃山羊如在秋冬季採行選食策略，則必須擴大其活動領域，而增加其暴露在冰雪封凍的危險性以及增加能量的負擔。

臺灣長鬃山羊的生理代謝及改變活動範圍的代價與獲益變化有待進一步的研究。

臺灣區野生動物資料庫(三)蜥蜴類(I)

呂光洋

賴俊祥

本報告乃是依據臺灣地區兩棲類動物資料庫所建立之本島野生動物資料庫模式，嚐試轉移以建立蜥蜴類動物的資料庫。處理的資料是以臺灣師範大學生物系一九八五至一九九一年所蒐集的蜥蜴類野外調查紀錄，利用個人電腦及套裝軟體成立臺灣地區蜥蜴類動物資料庫，並對其地理分布與海拔分布輸出結果進行初步分析。

資料庫的硬體規劃，以60K RAM 之 PC AT TURBO為資料處理主機，監視器、印表機、硬式磁碟機等為週邊設備，軟體規劃以MS-DOS、文星中文系統為作業環境，dBase III 語言撰寫資料庫各項功能之程式模組。資料處理以林務局之臺灣地區像片基本圖為分布地點座標標準量化之依據，原始紀錄則經格式化與代碼化後鍵入資料庫。

初步規劃之資料庫系統已將座標查詢、資料查詢、資料輸入與資料修改四項資料編輯的功能轉移成功，地理分布、海拔分布二項資料分析功能也修改完成。由資料庫現有的1690筆紀錄對各種類進行地理分布類型及海拔分布類型作初步的歸類，記可分為泛分布類型七種、廣分布類型三種、局部分布類型七種及局限分布十二種。就海拔分布而言，低海拔者有十八種，中海拔者有六種，中高海拔者有三種，而泛海拔者僅二種。

由本報告初步結果看來，資料庫模組建立後，進行轉移是可行的。

大肚溪口水鳥保育區整體發展構想研究

李瑞琮*

中文摘要

大肚溪口水鳥保育區，目前被稱為「鳥類生態公園區」，面積 270公頃，四周有觀光養殖區、公共服務區、水岸發展區、伸港垃圾掩埋場、台中火力發電廠、彰濱工業區等重大工程正在興建中。

本研究案主要目的，即是針對上述伸港區土地使用背景下，調查本水鳥保育區所面臨的開發難題，研究未來發展應如何定位，以及擬訂出適宜之整體發展構想策略，提供有關單位作為日後行政協調和推動本案整建工作之依據。此外，本案尚引進一些較為特殊的觀念及作法融入規劃策略內，如「人工棲地整建」、「複層防風林」、「親水性堤防」、「黏土層保水法」、「經營承載量設定」、「自然教育園」、「環境監測共同網」等。原則上本案水鳥公園之未來發展，主要建議以人工棲地之方式予以重建。它可視為一個大型之生態實驗場，園內90%之土地系提供各種鳥類、野生動植物、生態、或是環保等方面之相關研究場所。其餘10%為提供遊客解說服務、行政管理、生態研究、及各種公共設施使用。

關鍵字：大肚溪口，水鳥資源保育，人工棲地重建，水鳥公園，環境教育。

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台灣地區植物紅皮書
稀有及瀕危植物種類之認定與保護等級之評定

賴 明 洲*

我國文化資源保存法（民國七十一年公布）第六章“自然文化景觀”中規定，自然文化景觀共有生態保育區、自然保留區及珍貴稀有動植物三大項。同一法令的施行細則（民國七十三年公布）第69—70條規定，珍貴稀有動植物，指依本法規定，本國所特有之種植物或族群數量上稀少或有絕滅危機之動植物。主管單位為辦理自然文化景觀之指定及解除其指定等事項，得委託文化學術機構或專家學者調查研究。

本研究為作者接受中央行政院農委會保育科（主管自然文化景觀）自民國七十六年至七十九共計四年期間之經費補助，在全台各地進行野外調查所獲致之結果。

台灣地區原產的四千多種維管束植物（包括蕨類及種子植物——即裸子植物和被子植物兩類）依其稀有程度及危險性兩項因素評選之，計區分為絕滅級者 3 種，瀕危級者 14 種，漸危級者 62 種，稀有級者 422 種，合計共為 501 種如下：

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	蕨 類 (24科)	裸子植物 (8科)	雙子葉植物 (95科)	單子葉植物 (23科)	合 計 (150科)
絕 滅 級	0	0	3	0	3 種
瀕 危 級	1	4	7	2	1 4 種
漸 危 級	5	1 3	3 0	1 4	6 2 種
稀 有 級	5 0	1	2 5 0	1 2 1	4 2 2 種
合 計	5 6 種	1 8 種	2 9 0 種	1 3 7 種	5 0 1 種

一．稀有植物種類之認定

此必須就其稀有程度 (Rarity) 與危險性 (Danger degree) 兩項因素同時予以考慮之。

(一) 依時間及空間分佈上的稀有程度而認定者：

1. 珍稀之子遺殘存或斷續 (隔離) 分佈種 (Relics, remnants or disjuncts) : 第三紀後半期以後的地質史上的變動結果, 原先廣泛生長於北半球溫帶地區的屬群, 至今大部份殘存在東亞及北美東部兩地。例如流疏樹, 台灣馬鞍樹。台灣穗花杉、鐘萼木台灣水青岡等則為我國或台灣地區之珍稀子遺殘存種。

- 2.分佈狹隘之固有種 (Narrow endemics) : 爲台灣的固有特產種類，而且存在於非常有限的地區內，可能很快地消失。例如紅頭鐵莧，烏來杜鵑。
- 3.邊際分佈種 (Species on the edge of their range) : 爲舊熱帶分佈之北限種，尤以分佈於蘭嶼、綠島及恆春半島等地區者，如賽赤楠，恆春鉤藤 等。
- 4.族群稀少種 (Small population species) : 僅存在於典型或有限的生育地，或在其分佈區內只有很少的群體，或雖有較大的分佈範圍，但只是零星存在著的種類。如吊鐘花、馬銀花、大武杜鵑、柞木等。

(二) 依危險性之理由而認定者：

- 1.開發行爲，例如：
 - 森林伐採 (logging)
 - 草地或草原之開發 (destruction of grassland)
 - 濕地、池沼或河川之開發 (destruction of wetland)
 - 石灰岩等之採掘 (mining)
 - 水壩建設 (construction of dam for electric and water supply)
 - 道路工事 (construction of road)
 - 其他的開發行爲
- 2.採集行爲，例如：
 - 園藝用途之採集 (collection for horticulture)
 - 藥用之採集 (collection for pharmacy)
- 3.其他：
 - 植物演替之進行 (succession)
 - 野生動物之食害 (herbivory by naturalized animals)
 - 不明原因 (unknown)

二．保護等級之評定：

各國植物紅皮書中均有其地區性自訂之評級或保護指標，然目前仍以 IUCN 1978年所訂之評級最廣受採用。其通用之評級各說明如下：

1. 絕滅 (Extinct, Ex)：指已不再出現於野外自然生育地者。
2. 瀕危 (Endangered, E)：指族群數目刻已銳減，且自然生育地亦日漸減少。假如構成威脅的原因繼續存在，則將處於可能絕滅危險者。這些植物通常其地理分佈有明顯的侷限性，僅僅生存於典型的地方或出現在脆弱的生育地，可能因為它們的生殖能力很弱，或它們所據以生長的特殊生育地遭受破壞，被劇烈地改變或已退化至不適其生長；或者由於過度開發，病蟲害等為害所致。
3. 漸危 (Vulnerable, V)：指因人為的或自然的原因，如生育地的開發破壞，或其它環境因子所改變等所致，在可以預見的將來，很可能成為瀕危的種類。
4. 稀有 (Rare, R)：指族群在全球的分佈上很少，然卻無絕滅危機，亦非處於漸危之狀況。如單屬科、單種屬或少種屬的代表種類，或分佈區內只有很少的群體，或是由於存在於非常有限的地區內，可能很快地消失，或者雖有較大的分佈範圍，但只是零星存在著的種類。
5. 未定者 (Indeterminate, I)：指不易於現階段確定係上述何一等級者。

台灣獼猴野外供餌之研究（三）

李 玲 玲¹

前 言

台灣獼猴為本省特有種動物中體型最大，且極待保育之哺乳動物。為便於野外追蹤及研究，及加速其基本生物資料之收集，本計畫乃依日本靈長類資深研究人員川村俊藏教授及乘越皓司教授之建議，並借助其多年之經驗，在宜蘭縣仁澤地區嚐試以野外供應台灣獼猴食物，吸引猴群到餌站附近逗留，以便增加野外觀察之機會。

材料與方法

自1988年12月至1991年6月間，由林務局羅東林區管理處派員每隔1~2天前往仁澤地區餌站供應蘋果、香蕉、地瓜、花生、筍、百香果及大豆等食物，供餌之同時並估算及記錄自前次供餌後食物被取食量。台大動物系之研究人員則每月至少在仁澤地區停留2至5天對當地獼猴進行野外觀察。野外觀察乃沿當地之道路、小徑及溪床巡視以發現猴群。每次發現猴群均加以追蹤並記錄其出現地點、位置、隻數、組成、行為、其移動路線、方向及活動情形。此外，並藉直接觀察獼猴所食用之天然食物，如植物的不同部份，及收集糞便在實驗室內進行分析，以研究台灣獼猴之食性。

結 果

調查結果顯示前一年在仁澤地區所記錄的5群猴群其猴群大小及活動地點均略有變動。其中JR群原有的22~31隻個體，現已分為兩群，JL群由26隻個體增為31隻，原DS群之活動區域內，出現一群具有二十餘隻個體的猴群。由於以往DS群的記錄太少，無法確定兩者是否為同一群。根據觀察之結果，仁澤地區台灣獼猴所食用之植物種類至少有構樹、大葉楠、愷葉懸鉤子、五節芒、台灣芭蕉等，然而直接觀察與糞便分析所得食性之結果有相當大的差異。

1.國立台灣大學動物學系

總結與建議

由於餌站之食餌遭松鼠及其他動物取食，使獼猴實際得到食餌之機會大減，影響供餌之效果。加上附近地區仍有多項干擾因素，亦會影響獼猴前往餌站取食之活動，因此建議暫停供餌，待充分掌握該地區獼猴之活動及食性後，再設計較佳之供餌方式。

台灣黑熊之生態調查及其經營管理策略 (II)

王 穎¹ 陳添喜²

台灣黑熊之生態調查及其經營管理策略 (II)

1990年8月至1991年7月，吾人對臺灣黑熊 (*Selenarctos thibetanus formosanus*) 之分布、行為、食性及熊類在臺灣被飼養之概況做一初步調查，結果顯示共發現黑熊及其痕跡46次（眼見16次痕跡30次），大部分在中央山區，且多集中於集水區之交界處，其中以濁水溪(14)、淡水河(10)、高屏溪(5)及立霧溪(5)四區記錄較多；其出現地點之林相則分別為混生林（36.96%）、闊葉林（34.78%）、針葉林（26.09%）及草生地（2.17%）；其海拔分布在500-3600 m之間，而以1000-3000 m出現較多。全年則以12月發現次數最多，其次為3-5月。

以無線電發訊器MOD-500 S9型裝置於太魯閣國家公園擬野放之黑熊，由其訊號改變之情形與實際觀察結果比較，實際觀察情況為“活動”時，其訊號改變在4-36之間。而以訊號改變次數在3-4次做為判定“活動”與“不活動”之分野，所造成之誤判最低（5.3%）。

由十日之行為觀察結果顯示，此一黑熊在飼養情況下，其一日之活動呈早（5-9時）晚（14-19時）兩個高峰，此時段內，約有70%-100%之時間在活動。而在夜20:00至次日4:00內活動量幾近於零，呈休息狀態。

觀察期間共採植物28科51種，其中熊經常食者有16種，佔31.37%，主要屬殼斗科、桑科、薔薇科、天南星科、桔梗科、蓼科、五味子科及禾本科等八科，且多以嫩芽及果實為主。其他偶食者包括五節芒嫩芽、白珠樹、臺灣胡桃、臺灣羊桃之果實以及月桃花等。整體而言，吃食部位為果實，其次為嫩芽或葉芽，其中殼斗科之堅果及菜芽懸鉤子屬的漿果、天南星科之果序，為其嗜食之食物。

由臺灣地區熊類養殖戶之調查（n=54），所養殖之熊類共179隻；其中臺灣黑熊16隻、亞洲黑熊25隻；其他尚包括馬來熊（102）、美洲黑熊(19)、棕熊(15)及北極熊(2)，其中臺灣黑熊之年齡在3-10歲之間，體重在60-180公斤之間。

1, 2: 國立臺灣師範大學生物研究所

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澎湖自然文化景觀調查(二)

郭金龍¹ 洪國雄²

一、研究目的

本調查研究，依第二年之計劃進行，調查澎湖本島、白沙島群以外各島嶼之地質地形景觀及澎湖群島的植物。其目的有四：

- (一)補充前一年調查之遺漏及建立其他地質、地形景觀（除柱狀玄武岩景觀以外）之基本資料。
- (二)調查野生植物的種類與分佈，以建立植物資產資料，供學術研究及教學資源之參考。
- (三)調查野生植物的固有種、稀有種，以供植物保育之參考。
- (四)調查野生植物的抗鹽、抗旱性，以供「冬季綠化」澎湖的參考，並推廣其觀光效益。

二、研究方法

- (一)依五千分之一的基本圖、過去的文獻及參考田野調查的資料，實地進行各種地質、地形景觀調查。
- (二)設定評量指標，評量各種地貌景觀之優劣。
- (三)調查「夏季植被相」與「冬季植被相」之差異性。
- (四)調查各植物的數量和密度，以「指標」篩選出各地區的優勢社會，將全島植物分為：海崖社會、岩礫珊瑚礁社會、沙灘社會等三大社會。

三、研究成果

甲、地質地景方面：

經野外調查，玄武岩柱狀節理景觀尚有西嶼池西與七美西北灣、大獅風景區附近、分岔仔等地的景觀頗佳。其他地質、地景觀有：

- (一)望安島東安至西安與東嶼坪西南岸等地區之沙岸景觀。
- (二)望安天台山、將軍船帆嶼和東吉濱臨港口等地之微輝長斑岩片理景觀。

1.台灣省立馬公高級中學

2.澎湖縣立馬公國民中學

(三)小門嶼西部及七美燈塔附近之小門嶼層之地景。

(四)貓嶼之岩脈、頭巾嶼及東嶼坪之岩壁、七美嶼龍埕之褶曲等景觀。

乙、植物方面：

由於澎湖群島地形特殊，季風、雨量等「逆境因子」限制了植物的生長，植物相甚為單調。截止三月底止，調查之植物種類計約50科140種。其植物相如下：

(一)蕨類僅於七美、西嶼、虎井發現少量，裸子植物大都屬人工培植，被子植物則散生全島，若干種類並形成區域性的優勢社會。

(二)固有種：澎湖大豆、澎湖決明、澎湖金午時花，除後者外，餘則零散分佈。

稀有種：海茄苳、姬草海桐、賽山藍等數量極少。

(三)冬季植被相：1.根的演化—馬鞍藤、石菰蓉、蔓荊等。

2.莖的演化—過江藤、仙人掌、濱刀豆等。

3.葉的演化—馬齒莧、鹽地鼠尾粟、刺濱麥等。

四、結論與建議

澎湖群島除玄武岩地質地形外，尚有頗具規模的海蝕及海積地形，以及其他地質景觀，應善加維護。澎湖因生態環境特殊，對於固有種植物之推廣與造林之規劃等，也應妥善處理。本研究建議如下：

(一)各工程單位應在工程規劃之前，先做自然生態之評估，以明該工程對地景之衝擊，減少其破壞之程度。

(二)由於「環境阻力」大於「生物潛能」，本縣的固有種、稀有種數量甚少，也不易成優勢種。再加上人為的破壞，其生機已岌岌可危。若能集中於種苗圃培育，並移植至文化中心、公園等各文教據點，設立說明牌，可收保護及教育之雙重效果。

(三)較具特殊景觀的植物：如蘆薈、仙人掌、綠珊瑚、龍舌蘭、天人菊等分區栽培（如文教中心、觀光據點、縣道公路旁），除具有綠化之功外，並可兼收觀光之實效。

(四)政府的造林計劃宜做調整。光復後四十餘年來，由於樹的選擇不當（綠化的樹種還是以榕樹為宜）及栽種的地點不宜等二大因素影響，以致在澎湖的綠化投資不見效益。

台灣引進野生動物對生態體系的影響

鳥獸部分

林 俊 義

全世界各地區至少 330種鳥獸類，共計1559次的引進案例（哺乳類計 788件；鳥類計 771件）。其中40%的哺乳類引進被記錄有生態影響，而鳥類僅有 5%。草食性哺乳動物所造成植被和棲地上的生態影響佔居多數，鳥類則影響較不大。經由掠食作用產生的生態影響，多發生在引進絕對肉食性的哺乳動物種類，鳥類亦影響不大。競爭現象雖不易被觀察，但在引進鳥獸種類中競爭引起的生態影響，亦有所記錄。由引進種帶入的疾病和寄生蟲的散播是一大隱憂，特別是外來種鳥類身上。另外，家畜野生化所造成的影響亦值得注意。引進種對海島產生的負面生態影響，其嚴重性大於大陸地區，尤其是草食及掠食者動物，但影響程度則視引進種的族群變動而定。雖然生態影響有其通式(General pattern)可尋，但任一引進種所造成的影響卻難以預測，唯一能避免這些影響的辦法便是決不輕易引進任何生物。

台灣地區原本特殊的自然生態體系中，哺乳類與鳥類的生態棲位可能已達飽和狀態，因此屬於人為引進來的鳥獸並不容易於野外獲得生息空間。但因近四十年來，我們盲目的開墾破壞，急劇性的改變了原本的生態結構。雖然目前尚無明顯的外來種哺乳類造成生態影響，但引進種鳥類拓殖成功的速度驚人，由於這些種類皆生息於低海拔的都市、農作物等地區，所造成的生態影響除已成為農作物的害鳥外，且已與台灣本地的親緣種進行雜交，或極有可能會雜交，使本土種的基因特有性消失。另一方面，台灣較古老而特殊的中高海拔山區環境業已受伐木，高山農業活動等的人為干擾破壞，未來外來鳥獸可能侵入此區造成激烈的生態影響。另外，台灣本地鳥類地理分佈隔離的自然演化結果，也受環境開發、放生活動及飼養逸出等人為活動關係而明顯改變。

大武山自然保留區哺乳動物相調查（一）

李玲玲¹ 鄭錫奇¹

前言

自民國75年12月至民國79年6月，大武山自然資源調查小組先後前往大武山自然保留區內大南、知本、太麻里、金崙、大竹五大集水區、小鬼湖及南北大武山等區域，和保留區北部及西部緩衝區進行動、植物資源、地質、地理及人文之調查。對於大武山自然保留區之資源狀況及所面臨之干擾情形已有初步之了解，並已根據初步調查結果提出對該保留區經營管理之建議。然為確實掌握保留區內生物資源狀況，不同海拔、季節動物之數量與分布之變化，及保留區成立後，生物相逐年之變化，經營管理之成效，長期深入之研究與追蹤及資料庫之建立實屬必要。本計畫之目的在調查太麻里溪低、中海拔哺乳動物相種類、分佈及相對數量之季節性變化，以逐步建立該區之哺乳動物資料庫。

調查方法

本計畫所調查的範圍為大武山自然保留區境內之太麻里河流域海拔1063公尺以下之區域。自79年7月至80年6月，每個月由研究人員1~4人與山胞嚮導一人組隊前往調查區域一次，每次停留時間5~7天。每次調查時，研究人員均自台東縣金峰鄉介達附近起，沿太麻里溪步行約6~7小時至溪邊定點營宿（海拔400公尺），並以此定點為中心沿溪流及其兩岸山區選擇適當之路徑，深入調查，調查範圍最高海拔達1063公尺。調查方式依動物種類之不同而略有差異，包括沿線調查、捕捉調查及訪問調查等。由於連續颱風來襲，該區部分路徑坍方及溪水暴漲有數次無法進入調查區域工作，因此只有6次之完整記錄用於資料分析。

結果

綜合各種哺乳動物調查結果顯示，台灣獼猴、大赤鼯鼠、白面鼯鼠、食蟹獾、野豬、山羌、及山羊為本區最常發現之動物種類。一般而言，各個月份均可發現痕跡或目擊個體，各月發現之數量並無顯著差異。且在分布方面亦幾涵蓋所有調查路線及海拔，且均

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在海拔 400 公尺即可發現。另外一些種類如蝙蝠類及刺鼠的數量則可能較有季節性之變化，需進一步擴大調查。至於本區數量較少且受捕獵壓力較大之種類，如穿山甲、水鹿、及白鼻心等由於數量少，分佈亦有限，其受保護之優先性更高，因此其可能分布地點之檢視、巡邏及其數量之變動尤需注意。

太麻里溪低、中海拔地區，目前深入打獵之人數稍減，然專業獵人、在外圍地區短期打獵之非專職獵人，以及電、捕魚類，摘採植物者仍多。此外私人登山遊憩之壓力及開路築壩等干擾，均嚴重威脅保留區之資源及生態體系之維護，亟望管理單位能加以重視，並予以改善。

建 議

請參考「大武山自然保留區經營管理與保育計畫」（羅等，1989）。

1. 在太麻溪入口處設置檢查哨，加強進入該通道之人員管理，並加強太麻里溪流域之巡邏取締工作。
2. 隨時層報大武山自然保留區內及鄰近地區不法之干擾行為，配合中央及地方行政與警力予以糾正。
3. 聯合附近保育團體及學校，加強與地方之聯繫、溝通與保育宣導教育。

穿山甲之繁殖保存研究

趙榮台¹

摘要

為瞭解臺灣穿山甲之一般生物學及其現況，在野外調查穿山甲棲息環境；嘗試於室內飼育臺灣穿山甲；並在臺灣全島各地面訪捕捉穿山甲的獵人 56 人、交易穿山甲的商人 10 人，以及穿山甲皮革加工製造商 5 人。

本研究結果顯示臺灣穿山甲目前尚分佈於中央山系的周邊地區，全島所有的山麓丘陵及台地、海岸山脈、大屯火山區、臺北盆地、埔里盆地以及屏東沖積平原。500 m 上下為臺灣穿山甲最常出現的海拔高度，而 2,000 m 左右應是臺灣穿山甲的垂直分佈上限。臺灣穿山甲的體重一般在 4.2 ~ 4.8 Kg，體重上限在 8.5 Kg 左右，雄獸比雌獸重。室內飼育的臺灣穿山甲有體重上下起伏的現象。

臺灣穿山甲棲息在林地、芒草區等 14 類光線充足而燥的環境。白蟻和螞蟥是臺灣穿山甲的主要食物。臺灣穿山甲挖掘的洞穴可以分為居住和覓食的洞穴：前者較深、使用的時間較久，故多為固定的舊洞；後者較淺、經常更換、故常是新鮮的洞穴。洞穴常位於斜坡、稜線、茅草區等 14 種排水順暢、採光良好而土層較厚的環境。居住的洞穴深度在 3 ~ 5 m 間，其構造由 1 條隧道和 1 ~ 數個臥室組成。臥室的直徑為 30 ~ 60 cm，室內舖有樹葉或茅草。

臺灣穿山甲的行動包括行走、爬樹和游泳。臺灣穿山甲每年 6 ~ 8 月（農曆 5 ~ 7 月）發情交配，次年 3 ~ 5 月（農曆 2 ~ 4 月）生產，每胎一仔，偶爾才有雙胞胎。臺灣穿山甲為夜行性，每晚活動範圍為 300 m ~ 2 km，但雄獸在發情活動範圍可達十公里。

臺灣穿山甲的經濟利用包括以其皮革生產皮革製品，以其鱗片（甲片）製藥或避邪、製作標本、以及提供食用。這些經濟誘因對穿山甲造成強大的獵捕壓力，其中尤以皮革加工所造成之獵捕壓力最大。估計在 1950 ~ 1970 年代僅為供應皮革生產而獵捕之

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臺灣穿山甲每年高達 6 萬隻。臺灣穿山甲的皮革加工工業在 1980 年左右結束，但由於食用、藥用以及標本製作的市場需求，臺灣穿山甲的獵捕壓力迄今未獲紓解。強大的獵捕壓力加上棲息環境的破壞（尤其是噴撒農藥），已使得臺灣穿山甲這項寶貴的野生動物資源幾近枯竭。

台灣山羌之生態及行為研究 (V)

—棲地特性與吠叫行為

王 穎¹ 陳怡君²

台灣山羌之生態及行為研究 (V) —棲地特性與吠叫行為

自民國79年8月至80年7月間，在玉山國家公園黃麻溪流域山風至瓦拉米地區針對台灣山羌 (*Muntiacus reevesi micrurus*) 在野外之吠叫行為及棲息環境進行實地調查。結果顯示本區之主要樹種為巒大杉、柳杉、楓香、台灣檫、台灣胡桃及華八角楓，主要植型可分為七種型態，由多至少依次為人工針闊葉混淆林 (ABC型)、人工針葉樹與次生闊葉樹混淆林 (AB'C型)、人工闊葉林 (AB型)、次生闊葉林 (B'型)、人工闊葉樹與次生闊葉樹混淆林 (ABB'型)、高草原—開闊疏林 (S型) 及人工針葉林 (AB型)。

山羌活動樣區內之草本覆蓋度均大於第4級 (25—50%)，最高者為第7級 (大於95%)，以第5級 (50—75%) 佔43.8%為最高，其次為第6級 (75—95%) 佔37.5%；其內獸徑之平均坡度為34.2度 ($n=27$, $SD=6.56$)；平均寬度33.7公分 ($n=26$, $SD=6.44$)；地面基質幾乎皆為土壤與石礫組成，平均比例為1.71；有75%之獸徑其土石比大於1.25；獸徑地面落葉覆蓋程度以第3級 (5—25%) 佔37.5%為最高；獸徑上空1公尺以下植被之垂直覆蓋度以第3級佔29.4%為最高，水平覆蓋度平均為32.8% ($n=16$, $SD=15.1$)。山羌對活動區朝向之選擇沒有特殊偏好，然當樣區之坡度越大時，樣區之朝向與區內獸徑之平均朝向角度也相差越大，有顯著之差異 ($P<0.05$)，顯示山羌對獸徑之利用有相當之選擇性。

就山羌之吠叫行為而言，其每回合的持續時間最短為1分鐘，最長為16分鐘，每回合吠聲次數至少為1聲，最多為105聲，吠聲頻率最小為1聲/分鐘，最大為14聲/分鐘，平均吠聲頻率為6.5聲/分鐘 ($SD=2.04$)。在各種持續時間下所得之平均吠聲頻率沒有顯著差異，然而持續時間在六分鐘內之吠叫回合，其每一分鐘的吠聲頻率在開始及中段均維持相近的頻率，至末一二分鐘時則有漸降的趨勢，持續時間大於六分鐘者雖樣本數甚少，但亦有類似的趨勢；比較不同持續時間下同一分鐘之吠聲頻率，持續時間越長者多半有較高的頻率，顯示同一分鐘之吠聲頻

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率有隨持續時間愈長而增加之趨勢。其吠叫行為之日模式以黃昏時最為密集（ 2.40 ± 2.30 回合／小時），白天最為稀少（ 0.23 ± 0.51 回合／小時）。吠叫行為在不同植型中被記錄的機會以 S 型最大，ABB' 型次之，AC 型最少。

若以 250 公尺或 500 公尺為山羌吠聲傳播範圍之半徑，估計本區之山羌族群，其密度為每公里 1.70（ $r=250$ 公尺）或 0.96（ $r=500$ 公尺）隻，配合植型之分布以 $r=250$ 估計時，以 S 型為最高，B' 型次之，AC 型最低；以 $r=500$ 估計則為 AB 型最高，ABB' 型次之，而以 AC 型最低。

研究期間共目擊山羌九回 11 隻次，以在山風至佳心段（J 段）出現最多，佳心至黃麻段（H 段）最少，若將兩目擊地點間距離超過一公里者，當做兩隻不同的山羌，則在本區至少有八隻山羌。而根據吠聲定位估計，在本區步道附近活動的山羌可能最少有 13 隻，最多有 23 隻，由其地點分布來看，在黃麻至瓦拉米段（W 段）及 H 段有較多之個體活動，並呈較均勻之分布，在 J 段之個體則較集中於人工闊葉林中活動。

不同圈養空間對臺灣獼猴行為的影響

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本試驗目的為了解圈養下的臺灣獼猴 (*M. Cyclopis*) 行為觀察於民國80年的涼季 (二月)，及熱季 (八月和九月)) 在下列5種處理下各進行5天。

1. 大型 (99公尺×80公尺) 圈養草地，內有水池 (15公尺×5.8公尺)。
2. 中型 (240公尺平方) 不規則且有水環繞，內有草地 (138.5公尺平方) 與岩石。
3. 小籠 (3.2公尺立方)。
4. 落地大籠(1) (20.2公尺立方)。
5. 落地大籠(2) (17.2公尺立方)。

以上5種處理之動物觀察隻數分別為14, 9, 4, 2及4隻。行為觀察每天從上午08:00開始，下午17:00結束。第3處理獼猴群躺臥時間最少，第1及2處理則走路時間較其它處理顯著的多 ($P < 0.01$)，而第3處理有顯著多的恐嚇行為。第3, 4及5處理的觀望行為較多。第3處理的自淫及自殘發生頻度最多。第3, 4及5處理的刻板走動行為發生最多 ($P < 0.01$)。觀察結果顯示較小的空間，有較高頻度的異常行為。

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蘭嶼角鴞之社會行爲及棲地利用

劉 小 如

從事蘭嶼角鴞生態與行爲研究之五年之中，一直以解答角鴞對棲地之利用，及確定限制角鴞繁殖及族群大小之因子爲重要目標。五年中雖已對角鴞展現之生物現象有廣泛瞭解（見劉1986、88、89、90），對導致此等現象之機制卻所知有限。另於五年野外工作即將結束之際，突然發現蘭嶼角鴞可能是領域性的，同時其領域性可能直接或間接影響角鴞之棲地利用與繁殖。

蘭嶼角鴞之領域性不論於性質及表現方式上均不同於其他鳥類，也因此一直沒有被發現。根據往年之研究，蘭嶼角鴞個體之活動範圍即使在生殖季節亦有相當大幅度的重疊，同時在重疊區中從未見過敵對行爲。角鴞之領域性，乃於利用錄音帶回播法估算族群數量時，因在邊緣棲地中引起兩隻相鄰雄角鴞之打鬥，方被發現。因而決定以1990至1991的時間，專門研究此種鳥之領域性及社會行爲，並進一步探討其社會行爲對族群及繁殖之影響。

從事六十個定點回播實驗，發現角鴞的反應有季節上及性別上之差異。雌雄角鴞均會以鳴叫回應，只是雄鳥全年均會回應，但雌鳥在五至九月間很少反應，可能與此時雌鳥多躲在洞中孵蛋或育雛有關。

角鴞的領域應是由雄鳥建立維持的。從事領域邊界判定時，發現邊緣棲地中雄性角鴞之領域面積很大，邊界明顯，且互不重疊。於核心棲地活動之角鴞則無明顯之領域，各隻雄鳥之活動範圍重疊度很高，但每隻鳥的活動範圍中可能均有不與他鳥共用的核心部位。以無線電追蹤角鴞活動時，可見除配偶外角鴞極少同時出現在同一地點，故其活動地點累積起來雖重疊度很高，實際上角鴞很可能在重疊區維持著動態的領域邊界，而靠鳴叫來互相知會彼此的所在位置。

角鴞對領域的維護並非十分嚴密，各領域中仍有其他雄鳥活動。被發現在別隻角鴞的領域中活動者通常均未鳴叫，此等角鴞多可以在其他角鴞的範圍中活動而相安無事，少數則會引發敵對行爲。過去六年所見二十七次敵對行爲多出現在生殖季初期，雌雄兩性都會主動展現敵意，或被攻擊，但從未見過雌鳥攻擊雌鳥。

在核心地區繁殖的雄鳥一年之中在繁殖地區活動的月份較多，尤其佔有較好樹洞的個體幾乎很少離開巢樹附近。若此現象是由於雄鳥怕離開期間巢洞被其他鳥佔用，則顯

示巢洞之擁有者有優先權，即一旦使用後別隻並不會來挑戰爭奪，曾見兩隻雄鳥於一優良樹洞在秋天空出來時在附近對叫，第二年其中較老的一隻就利用該巢洞繁殖。另有兩對角鴞同時在一個樹洞中繁殖，其中一對成功另一對失敗。

分析巢洞利用史可見角鴞之配偶可以維持數年，有些雌鳥雖數度更換配偶仍使用同一個巢洞，有些則雄鳥未換但雌鳥更換數次，也有一個雌鳥隨著雄鳥另覓繁殖巢洞的記錄。

更換配偶時不知是配偶主動離去，還是因新鳥到達而被迫離去，或是緣於配偶死亡。但因核心棲地中巢洞樹量多有限，無洞之角鴞會頻頻探看附近的巢洞，即使在洞中已有他鳥使用繁殖時也是如此。

角鴞幼鳥在離巢後約一個月時會移往他處活動，在二歲以後才會開始繁殖，有些雌鳥甚至到三歲時才開始繁殖，但不一定回到出生地繁殖。

高雄市壽山地區台灣獼猴之族群分佈與棲地利用之調查

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本研究自民國79年7月調查至80年6月止，在高雄市壽山地區實施台灣獼猴的分佈及習性的調查。經十七次的初步調查及複查估計族群之總數至少在76隻以上，分佈在壽山的三個主要地點，並可區分為5個小族群，且從民國80年4月開始發現5隻出生不久的幼猴。本地之族群密度約為34.61隻／平方公里。台灣獼猴是屬於多雄性與多雌性群體生活，性別比為雄比雌是2.44比1，未成熟猴約佔族群總數的百分之五十二。故壽山獼猴族群中雄者比雌者多。每族群大小約6至20隻獼猴。族群密度較國內現有之調查數值為高，除了觀察區域未能完全掌握之外，民衆的餵食行為也是造成猴群集中的原因。性別比傾向於多雄猴群，亦與國內目前的調查呈現不同的社會結構，原因仍待觀察。壽山獼猴大部份棲息於山區陰密靠岩壁上的喬木松樹上、或竹林中。雖然其食物種類隨季節而變化，但獼猴主要食物包括核果類、毬果類及漿果類或嫩葉等。至於本地之棲息環境有日益嚴重的萎縮趨勢，蓋來自民衆的衝擊是其主因，所以我們建議應立即設立「高雄市壽山地區台灣獼猴自然保護區」加以保護，以免遭受進一步的傷害，以維持這一塊離高雄市區最近且最佳之自然動物觀賞及教育解說地區不至於消失。

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大甲溪魚類寄生蟲之研究（一）

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大甲溪全長124 公里，其豐盛的水力資源除供飲用水，發電，灌溉及工業用之外，並孕育了豐富的魚類資源。然而魚類多少都會受某些寄生蟲的感染，而引起寄生性的病害，所以寄生蟲是影響魚類存活率的因素之一。除魚本身的寄生蟲外，也有一些人體寄生蟲是以魚為其中間宿主，此類寄生蟲與人類的健康也有很大的關係。本研究對櫻花鉤吻鮭及大甲溪其他淡水魚類進行寄生蟲調查，以提供大甲溪魚類保育及經營管理之參考。

自1990年7月至1991年4月，以壓平法及消化法檢查大甲溪魚類之寄生蟲感染狀況。共檢查了鯽魚，台灣石鱚、鯢魚、粗首鱚及平頰鱚（統稱溪哥）、台灣纓口鰍及台灣間爬岩鰍（統稱平鰭鰍）、花鰍、褐吻鰕虎、脂鯢及櫻花鉤吻鮭等十一種魚。除櫻花鉤吻鮭因係瀕臨絕種魚類，僅檢查兩條固定魚體，其餘均不定期至東勢、谷關及附近支流採樣。

壓平法共檢查181隻魚，僅15隻(8.3%)感染寄生蟲成蟲期，感染率最高者為櫻花鉤吻鮭，受檢的兩隻魚中即有一隻感染鉤頭蟲其餘依次分別為脂鯢（1/8，12.5%），溪哥（7/56，10.8%），鯽魚（2/19，10.5%），石鱚（3/37，8.1%），鯢魚（1/23，4.3%），而平鰭鰍（10）及褐吻鰕虎（17）均未檢查到寄生蟲。就各種寄生蟲感染濃度來看，一般而言，每隻魚僅有1~3隻蟲體寄生，僅1991年2月25日檢查的脂鯢，其鰓部寄生之單世吸蟲多達10隻以上，其次為1991年4月5日檢查之溪哥，帶蟲者平均每隻含6.7隻鉤頭蟲。

檢查所得之寄生蟲計四大類，包括吸蟲、線蟲、鉤頭蟲及節肢動物，寄生部位以鰓及腸道為主寄生於鰓的有兩種單世吸蟲及一種撓足類，而寄生於腸道者則有三種兩世吸

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蟲，一種線蟲及四種鉤頭蟲。就魚種來看，以東勢產的溪哥腸道所含的寄生蟲種類最多，共有三種兩世吸蟲及三種鉤頭蟲。一隻魚同時感染寄生蟲種類最多者為東勢採得的一隻溪哥，共有兩種兩世吸蟲（共3隻）及一種鉤頭蟲（2隻），其次為另一隻溪哥，感染一種兩世吸蟲（2隻）及一種鉤頭蟲（1隻），其餘則均僅感染一種寄生蟲。

消化魚肉的結果顯示，受檢之褐吻鰕虎、平鰭鰍、鯢魚及脂鯢魚肉中均未發現吸蟲類之囊蚴，而石鱚、鯽魚及溪哥多少有吸蟲類之囊蚴寄生，其中以台中異形吸蟲之囊蚴較常見，也有少數台北異形吸蟲之囊蚴，另在花鰍檢出一個未知名之囊蚴。

雖然各類寄生種之輕度感染，可能無礙魚類之健康，但重度感染則可造成嚴重的傷害。例如魚類魚鰓部單世吸蟲之重度感染，可能刺激上皮組織，造成失血，二度感染甚至死亡；鉤頭蟲則由於其前端體表被有許多小鉤，極易刺激腸壁，甚而造成腸穿孔而導致死亡。因此寄生病對魚類健康之影響值得重視。

七家灣溪櫻花鉤吻鮭保育區水域農藥殘留監視

李國欽 翁懷慎 李貽華 胡淑萍 *

中文摘要

七家灣溪是國寶魚櫻花鉤吻鮭主要棲息區，為保護該棲息地之水質，乃沿七家灣溪選擇五處地區採樣－武陵橋、湧泉、養殖池、果三區及七家灣溪與有勝溪會合處進行水中農藥殘留之監測。本年度（80年度）計採177件樣品，分析梨山地區常用農藥30種，177件樣品皆未檢測到農藥之殘留。根據武陵農場之用藥紀錄統計用藥量，79年全年之用藥調查結果顯示，仍以殺菌劑之用量居多，佔全用藥量之90.4%，殺蟲劑次之，佔6.6%。近年來高冷蔬菜之栽培有增加之趨勢，用藥種類有些改變，尤以殺蟲劑之使用量有逐漸增加之趨勢。對於七家灣溪流域水中之農藥殘留監測，本所自75年2月即開始進行，五年來（至80年6月止）共分析1102件樣品，其中有二件測得農藥殘留，77年10月分別於繁殖場及果三區附近發現，其殘留農藥為達馬松及美文松，其殘留量皆未超過3 ppb。

櫻花鉤吻鮭為七家灣溪水域之重要資產，防止農藥污染而為害國寶魚是不容忽視及間斷之工作，本計畫應依國寶魚放養地區之設置，擴大範圍繼續追蹤調查農藥使用情形及其殘留，以確實了解農藥使用是否影響水質，以防農民用藥習慣不同時造成影響而不知，並加強保護區之設置，避免非法濫墾，以防農業經營影響水源而影響國寶魚生長之環境。

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本省原生闊葉樹林植物社會資料庫之建立

林則桐¹ 邱文良¹

本省植物相十分豐富，植物社會變化也很大，雖有許多相關的調查研究，然而因記錄的方式不同，很難比較數個地區間植物社會或植物相之異同。本計畫之目的在針對原生闊葉樹林，於個人電腦上建立一套易於使用的資料庫系統，使植物社會調查資料可以交換、累積，進而建立本省原生闊葉樹林植物社會資料庫；此一資料庫除供研究外，並可提供保育決策時完整之背景資料。

本年度初步建一套臺灣維管束植物名錄管理系統，以支援未來植物社會資料之登錄系統，目前已建好“臺灣植物誌”中所有原生植物之資料庫，並具有學名之新增、修改、查詢、刪除、恢復等功能，可以很方便地管理臺灣維管束植物名錄。

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泥火山地區植物調查(第一年)

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摘 要

本研究旨在探討台灣泥火山之植物資源。研究地區包括烏山頂、滾水坪、深水、羅山及泡泡等五處泥火山。就其生育地環境、噴泥與土壤理化性質、植物社會構造與組成、植物成分及形態解剖等加以探討，以供自然保育與環境教育之參考。

台灣泥火山由於長期噴出泥漿，形成鹽生環境，噴泥電導度可高達66.5mmhos/cm，pH值介於7.3~9.1，噴泥和鹽度影響泥火山的植物組成與植群分佈。在五處泥火山調查到的維管束植物計有77科 256種。其優勢植群分為五節芒型、鹵蕨-澎佳嶼飄拂草-冬青菊型、蘆葦型、白茅型、鋪地黍型。其中五節芒型分佈在深水及泡泡泥火山泥流處，鹵蕨-澎佳嶼飄拂草-冬青菊型則生長在羅山及泡泡泥火山噴口四周，蘆葦型見於滾水坪泥火山噴口周圍，白茅型位於烏山頂泥火山噴口四周，鋪地黍型同時在烏山頂、滾水坪、羅山泥火山噴口四周出現。鹽分較高的噴口周圍以禾本科和深根性植物佔優勢。

在諸泥火山地區中，泡泡泥火山較為偏僻，植群亦保存得較為完整。泡泡泥火山地區之植群演替，隨著噴泥理化性質之改變，由而鹽生草澤趨向中生植物群落。

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由解剖觀察得知，冬青莢葉片之表皮細胞已特化成頗似鹽腺構造之腺體。另由鹵蕨葉肉組織發達之鞘尾構造等特徵，亦足以顯示泥火山鹽生植物對鹽分所作之適應。

台灣蝶類保育研究文獻資料庫之建立

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一、前言：

台灣向有“蝴蝶王國”之稱，已知的種類達400種（陳，1987），每千平方公里之蝶種達11.1種，乃世界著名之蝶產地。然而據Owen（1971），Unno（1974），Marshall（1982），Severinghaus（1977），Morton & Collins（1984），陳（1981）及楊（1989，1990）之報告，由於都市化、森林之經營利用、農牧地之開發、農藥大量使用及人為過度捕殺等因素，加之近年來蝶類棲地迭遭破壞，蝶類數量亦明顯減少；其中，寬尾鳳蝶（Agehana maraho）、大紫蛺蝶（Sasakia charonda formosana）及珠光鳳蝶（Troides magellanus）已依文化資產保存法公告為瀕臨絕種之動物。另外，曙鳳蝶（Atrophaneura horishana）及黃裳鳳蝶（Troides aeacus kaguya）亦已依野生動物保育法（行政院農委會編，1989），則為珍貴稀有之保育類野生動物。綜合前人之研究，有關這五種蝶類之報告不多；而文獻資料之蒐集乃蝶類研究之基礎，為瞭解台灣400種蝶類往昔研究之概況，有系統之整理文獻目錄，並依科級分類之序列，依種整理出分類形態、生活史、分佈、食物、行為及習性等資料，對未來蝶類研究方向及保育工作均將有莫大裨益。

二、材料與方法：

1. 在國內、外之圖書館廣泛蒐集有關台灣蝶類研究之文獻，並依作者、年代、標題建立卡片。
2. 拜訪或以信函連絡方式向相關專家、學者蒐集有關文獻，同時亦建立卡片。
3. 依分科方式，把各種類之分類、形態、生活史、分佈、行為、習性及遺傳進化等項輸入電腦中建檔。
4. 把上述結果編纂成台灣蝶類文獻目錄集，並評述重要之出版物。
5. 根據蒐集資料之結果分析蝶類研究不足之處，確定亟待研究之方向，提供蝶類保育研究之基礎。

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三、結果與討論

由所蒐集之文獻得知，台灣產蝶類之科學性研究歷史可溯至1866年；其中前人所蒐集之文獻中，以邱（1958，1966）及濱野（1987）最多，而尚有部份文獻則分別發表於諸多日文雜誌，例如“動物學雜誌”、“昆蟲世界”、“昆蟲學雜誌”、“台灣博物學會學報”、“Zephyrus”乃早期台灣蝶類研究文獻最多之日文期刊。到了第二次世界大戰之後，有關台灣蝶類研究報導較多之日文期刊，例如“新昆蟲”、“蝶と蛾”、“ヤマトガ”、“Kontyu”及“昆蟲と自然”等。

至於台灣蝶類圖鑑及目錄，較重要的有：(1) 1906年三宅恆方之“台灣產蝶類圖說”，彩色圖示台灣51種蝴蝶；同年其又出版“台灣產蝶類目錄”136種。(2) 1909年松村松年發表“台灣產蝶類目錄”230種。(3) 1919年松村松年發表“新日本千蟲圖解III”記錄包括台灣產蝶類272種。(4) 1932年之江崎悌三之“台灣產蝶類圖說”描述150種台灣蝶類。(5) 1959年岡野磨磋郎、大藏丈三郎之“原色台灣蝶類圖譜”，此書為彩色圖鑑，記載台灣產蝶類269種。(6) 1959年白水隆之“原色台灣蝶類大圖鑑”，此書可算集大成，共記載台灣蝶類329種；至1982年已增修第九版，乃研究台灣蝶類不可或缺之圖鑑。(7) 1971-1980年，山中正夫之“台灣產蝶類分佈”(1-6)。(8) 1974年陳維壽之“台灣區蝶類大圖鑑”。(9) 1984年張保信及蔡百峻之“台灣的蝴蝶世界”以生態照片介紹台灣118種蝶類。(10) 1988-1991年內田春男之“台灣之蝶類、自然及人類”(1、2)亦以生態照片記錄台灣產三百餘種蝶類，其中許多種類均有卵、幼蟲、蛹及成蟲期之圖片。(11) 1987年濱野榮次之“台灣蝶類生態大圖鑑”，以標本及生態照片記載台灣產三百多種蝶類。(12) 1985-1987蔡百峻之“墾丁國家公園蝶類生態簡介”及“玉山的蝴蝶”。(13) 1990年之陳建志“太魯閣國家公園蝶類資源”。

在整理文獻過程中發現外國人對台灣蝶類研究貢獻匪淺，其中較著名者有英人Robert Swinhoe, Herbert Elger Hobson, Alfred Ernest Wileman；德人Hans Sauter, Hans Fruhstorfer；加拿大醫生George Leslie Mackay及日人三宅恆方、松林松年、江崎悌三、鹿野忠雄、野村健一、山中正夫及白水隆。至於國人方面，王雨卿、張保信及陳維壽先生在蝶類調查、生態研究及推廣教育方面亦有相當卓著的貢獻。也由於上述專家學者之貢獻和努力，終為台灣蝶類研究奠下良好的基礎。然而，儘管第一年所蒐集之報告已達1200篇左右，但尚有許多研究仍有不足之處，盼第二年本研究完成之後，此文獻資料庫建立之後能有助於往後蝶類之研究者，亦盼望能從文獻評述中找出今後亟待研究和蝶類保育之方向。

台灣特有飛蜥種類之調查研究與復育試驗

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本研究僅針對生活於低海拔的三類台灣特有飛蜥種類的野生族群，進行重點調查，且擇選一人工綠地進行復育試驗。本文是本研究之第二階段之結果摘要。

本階段試驗自79年4月至80年10月間，於擇定之復育區內共計進行釋放七次；總共釋放95隻。其中，雌的斯文豪氏攀蜥8隻，雄的5隻；雌的台灣箕作氏攀蜥10隻，雄的21隻；雌的南台箕作氏攀蜥17隻，雄的34隻。於80年釋放得61隻攀蜥，將合併於第三階段的結果分析中。

34隻於79年秋季前釋放的攀蜥中，有11隻雄性攀蜥，其於復育區野地生活確定已超過一年，最長的有 586天；其中 3隻是斯文豪氏攀蜥(釋放5隻)，1隻是台灣箕作氏攀蜥(釋放2隻)，6隻是南台箕作氏攀蜥(釋放13隻)。雌性的則有5隻被確定有過冬，最長的計有530天；其中1隻是斯文豪氏攀蜥(釋放8隻)，1隻是台灣箕作氏攀蜥(釋放1隻)，3隻是南台箕作氏攀蜥(釋放5隻)。此初步結果顯示此三類野地攀蜥已可生存此復育區內。但是進一步釋放試驗和棲地改進維護須將持續，以期能有至少一類攀蜥可在此野地建立穩定族群。

各類攀蜥之種源調查及採集地點包括北部地區5個，中部地區的5個，以及東部地區的 1個；另有作為比較研究之用(採得標本不用於釋放)，海拔一千公尺以上的調查及採集地點3個。比較近十五年的調查記錄和日據時代文獻的記載，分佈於各地中低海拔的台灣特有飛蜥種類族群的數量，近年來已有急劇減少的傾向。開發後殘餘分散的綠地已是台灣特有飛蜥種類的最後可棲息之地。除了再引入復育外，對各保留綠地的〈就地保育〉已是刻不容緩。總共14 個調查區中，在北部地區的兩個(紗帽山和虎頭山公園)可選為進行〈就地保育〉的先前工作。紗帽山地區豐盛的數量與相當程度的歧異，可為

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斯文豪氏攀蜥種源的基因庫；而虎頭山公園可呈現斯文豪氏與箕作氏兩種攀蜥不同棲地的選擇。若有適當的規劃再加以適度的行政力，這兩個地區的保育極為可行。

東亞國際候鳥繫放先驅計畫

莊永泓¹

摘要

自七十九年七月一日至八十年六月卅日期間，由各地繫放員執行繫放作業，利用霧網捕鳥。自架網完畢後，定時巡網、解鳥，將解下的鳥一一上腳環並做記錄。記錄項目包括嘴長、全頭長、最大翼長、跗蹠長、尾長、重量等，並做成幼鳥的判斷，記錄完資料後，於適當的時機將鳥放飛，人員停止作業，並將霧網拆下。

本年度野外作業累計，總共在 11 個點作業 148 次，共計繫放了 3254 隻次。其中以埔里狀況最佳，共捕捉了 1334 隻次、回收了 50 隻次，埔里是台灣地理中心，四面環山的盆地，非常適合推展陸鳥繫放，又因春天家燕、棕沙燕及黃鸝鶯常大量出現於甘蔗田中，因此這 3 種鳥也成為繫放的大宗。

全年度中，有 151 隻次是同地點不同時間的回收鳥，另外在跨國異地回收的情況方面，今年沒有捉到國外繫放的鳥，而國外發現台灣繫放的鳥，則共有 7 隻次，有 3 隻在蘇聯發現，分別為漂鵲、小水鴨、白眉鴨，有 4 隻在大陸上海發現，分別有赤足鵲 2 隻、中杓鵲及濱鵲各 1 隻。這也是第一次從蘇聯及大陸傳來的回收訊息。

所有資料收集至繫放中心，以 PC-286 電腦處理。主要以 dBase、Lotus 及 PE2 三種軟體處理，主要功能在於建檔、輸入、修改及查詢。已經輸入電腦之資料有野外工作日誌、野外鳥類記錄、繫放人員名錄、國外聯絡單位、腳環使用狀況、器材借用登記表、各種表格及一般書信公文等。

在制度方面，開始執行繫放資格證制度，將繫放人員分成高級、初級及實習繫放員三種等級，初級及實習繫放員必須在高級繫放員的監督、指導下才能進行作業，以確保鳥類的安全。另由野鳥學會理事長、繫放中心主任及部份高級繫放員組成繫放委員會，每半年定期舉辦一次例行性繫放委員會議，就繫放之組織、制度及技術等各種問題提出討論並擬定對策。

目前已有聯絡的外國繫放單位有：大陸、日本、香港、馬來西亞、新加坡、澳洲、紐西蘭，另有丹麥負責協助聯絡蘇聯，且已獲得英國、日本、澳洲的繫放員手冊，有助於我們訂定較完整的繫放制度。

1. 中華民國野鳥學會 台北市復興南路一段295巷13弄6號2樓

桶后溪水棲昆蟲資源及生態研究

楊平世 黃國靖

前言：

據Dehoney (1983) 之報告，水棲昆蟲之種類約佔河域底棲無脊椎動物中90%，而生物量(biomass)則佔92%，可見水棲昆蟲在溪流中實佔極為重要的角色。

桶后溪係林務局之轄區，林相豐富，溪流未遭污染，魚況相當良好，為理想之溪釣場；林及許(1991)為規劃此河域為溪釣場之典範，曾在此進行石鱚之生態研究。本研究則就此河域水棲昆蟲資源及關生態研究進行調查，希冀累積歷年調查結果，分析桶后溪水棲昆蟲群聚之組成、各採樣站蟲相組成、優勢種類及季節性變化，建立溪流基礎生態資料。

材料及方法：

1. 水棲昆蟲資源調查：

水棲昆蟲採集係以50x50cm之定面積水網在各採樣站作每月一次之定期採集；為避免每次採集於同一地點調查而影響其蟲數之變化，故每一採樣站之調查範圍為50公尺河域，每次在此調查範圍之不同點採集；每站共採三次，分別為河流兩岸及中央點。標本採集後置於70%之酒精中保存，再攜回實驗室分類及鑑定。本分類之依據主要參酌津田(1962)，何及徐(1977)，楊氏等(1980, 1986a, 1986b, 1990a, 1990b)，黃(1987)，川合(1985)，Lehmkuhl(1979)，Merritt & Cummins(1984)，Wiggins(1977)及Harper(1984)，並記錄各種之數量，以獲知各月份蟲數的變化、季節消長、年中族群密度及優勢種類等；此外，並探討水棲昆蟲與水文因子間之關係。

2. 水質及水文調查：

有關河域物理化學特性之調查項目與方法如下：

- (1) 河寬：以軟尺在各採樣點之固定位置測量。
- (2) 河深：以直尺每隔一公尺量其水深。
- (3) 水溫：以溫度計測量各採樣站水溫。
- (4) 流速：以Hydro-bios kiel digirtal folw meter 流速計測量，測量點與測量水深位置相配合。
- (5) 酸鹼度：以WTN pH 90/set pH meter 測量水之酸鹼度。
- (6) 溶氧量：以Hanna-HE 8543 Dissolved oxygen meter 測定樣站之溶氧量。
- (7) 導電度：以WTN LF 90 Conductivity meter 測量。

結果與討論：

1. 各採樣站之環境狀況：第一站河底以礫石為主，兩岸無植被相當開闊。第二站底質以中小型卵石為主，一岸有木本植物，遮蔽度中等。第三站底質以大型卵石為主，兩岸均有較高之植被，遮蔽度和前者相似。第四站為水潭環境，底質以泥沙為主，兩岸均有高大植被，遮蔽度良好。

2. 水棲昆蟲種類：累積歷年結果共發現此河域有8目41科86種水棲昆蟲，其中蜉蝣目有7科21種；毛翅目12科19種；襉翅目6科12種；雙翅目6科15種；鞘翅目4科9種；蜻蛉目3科7種；廣翅目1科2種；鱗翅目1科1種，水棲昆蟲資源頗為豐富。

3. 各主要目之優勢種如下：

蜉蝣目－Choroterpes sp.TCA；Baetis sp.TBA；

Ephemerella sp.TEA 及 Rhithrogena sp.TRA。

毛翅目－Stenopsyche marmorata。

襉翅目－Neoperla sp.TNA 及 Neoperla sp.TNB。

雙翅目－Chironomus sp.TCA。

鞘翅目－Eubrianax sp.PEA。

蜻蛉目－Euphaea sp.TEA。

廣翅目－Protohermes grandis。

4. 各採樣站種類及個體數之季節性變化均以冬季最多；月份之發生量則以1、2月份為最多；惟各目間仍有些差異。不過，全年各月份之個體數和種類數間之關係有頗密切之正相關性。

5. 水文調查結果：

- (1) 河寬：各採樣站之河寬均以夏季月份最寬，冬季者最窄；在枯水季最窄者，在1.1—1.3公尺之間。而以第三採樣站為最寬，在2.1—2.5公尺間。
- (2) 水深：第四採樣站係水塘(pond)，深度最深；平均為5.1公分。季節性變化亦以夏季為最深，和前者一樣係受雨季及降雨量之影響。
- (3) 流速：明顯受水量影響，以夏季者為最大。以第三站為例，流速在0.2 m/sec—1.1 m/sec 之間。
- (4) 水溫：平均水溫以夏季之8、9月份最高，可達攝氏22度；而以冬季之1、2月份最低，在10—13度之間。
- (5) pH值：各採樣站間差異不大，平均值在7.1—7.7之間；而以冬季之pH值最低。
- (6) 導電度：各採樣站在8月份時均達最高，其中第四站高達123.6 us/cm。
- (7) 溶氧量：各採樣站全年之溶氧量均高，在8—12 ppm. 之間；其中以5月春、夏之際最高，8月份最低。

建議：

1. 可將本調查結果攝製成錄影帶或摺頁，供作環境教育之素材。
2. 宜積極進行其他水生物之調查，以規劃此河域為溪釣場之典範。
3. 此區為理想環境教育訓練之場所，今後農委會不妨藉此辦理各項訓練活動。

台灣野生動物疾病防治計畫

邱慧英¹ 梁鍾鼎¹ 張文發¹ 翁仲男¹

簡述 79年7月至80年6月於台灣地區採集109例野生動物病材之臨床及病理學探討

本計畫之目的在提供病理人員一個學習野生動物疾病的機會，以及收集有關野生動物疾病，營養和行為的基本資料。希望能降低台灣地區動物園內動物的死亡率，期使野生動物的質與量均能提昇為目標。在過去的一年中，我們曾經對109隻動物做過屍體解剖診斷其致死原因，總結出下列問題，在此提出以供參考：

1. 人畜共同傳染病的潛在危險：

在解剖的病例中有三隻鹿、一隻猴子和一隻象感染結核桿菌。為了公共衛生及動物健康方面的考量，我們建議應避免動物遊客之直接接觸。

2. 管理問題：

剖檢病例中維他命E缺乏之病例共八件及五隻鸛鵒磷酸鈣中毒，因此管理技術有進一步加強之必要。

3. 臨床診斷之應用不足及治療設備缺乏：

目前除了台北動物園在設備，獸醫人員及臨床治療較完善外，台灣地區其它動物園因獸醫人員不足及設備缺乏之情況下，無法有效提昇治療效率。因此加強臨床醫療設備的添購，診斷技術短或中期之訓練均有助於動物園獨力醫療作業之發展。

4. 復育工作之不完善：

由於缺乏專業人員及專業技術的情況下，目前除了梅花鹿、台灣黑熊、老虎等飼育較佳外，其餘稀有動物及一般動物的復育工作均無法有效拓展，因此應選派專職人員赴國外做相關研究之短或中期訓練。

1. 台灣養豬科學研究所

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國內圈養瀕臨絕種哺乳類之調查與血統書建立計劃 陳寶忠 鄭雅愛

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國內圈養瀕臨絕種哺乳類之調查與血統書建立計劃 陳寶忠 鄭雅愛

國內圈養之瀕臨絕種哺乳動物大部份飼養於動物園與遊樂場，少數種類被民間飼養以當寵物。自野生動物保育法實施以後，飼養該些動物者須填具資料卡報請縣市主管機關備查，唯所填報資料是否確實（如種名等）則有待查証，且國內所圈養之該些動物一直未能作全盤有系統的管理及有效的掌握該些動物的流向，為加強其保育與管理工作，而有本計劃之推展。

本計劃以各瀕臨絕種哺乳動物之種為單位，依縣市主管機關報備之資料為依據，至各動物園、遊樂場以及民間飼養戶調查鑑定其動物種別、數量、年齡、性別、來源及血緣等，以建立動物之個體檔案，並記錄其繁殖、死亡、異動等狀況，以完成血統書管理系統。

本計劃期間為二年，本年度為第一年計劃，共調查國內公私立動物園及遊樂場15處，計調查鑑定瀕臨絕種哺乳動物有金剛猩猩、人猿、黑猩猩、大長臂猿、白手長臂猿、環尾狐猴、褐狐猴、藤狐猴、白頸狐猴、毛耳侏儒狐猴、棉頭絹猴、白眉長臂猿、叢林犬、馬來熊、亞洲黑熊、水獺、棕鬚狗、美洲山獅、豹貓、譚氏金貓、雲豹、美洲豹、花豹、虎、獵豹、亞洲象、非洲象、格利威斑馬、蒙古野馬、山斑馬、馬來亞貘、白犀牛、黑犀牛、劍角羚羊、弓角羚羊、阿拉伯羚羊等計37種 471隻。私人圈養動物之現場調查，本年度主要以人猿、長臂猿為主，但飼主若同時有飼養其他種類時，則一併查証，共計查証有23縣市，計查証有人猿、長臂猿、黑猩猩、彩面山魈、虎、亞洲黑熊、馬來熊、雲豹、花豹、譚氏金貓、美洲山獅等計18種 232隻。其中數量最多之前五種動物分別是人猿 150隻、虎74隻、馬來熊65隻、白手長臂猿56隻、黑手長臂猿49隻，由於這是第一年調查資料，相信在第二年調查時，動物之種類數量都將有所變動。

保育類野生動物報備登錄工作為國內初次辦理，依所登錄之資料作實地查訪已發現的問題有：1.本身未擁有是類動物，但卻有登錄資料。2.本身擁有是類動物，卻以他人名義報備。3.於甲縣飼養卻於乙縣登記。4.有異動，卻不辦理變更登記。5.飼主常以其他理由拒絕或拖延查証工作。6.登記之動物名稱普遍有誤。7.民間飼養動物之安全及衛生條件普遍堪慮。8.有發現瀕臨絕種動物已被放生的案例。為加強保育類野生動物之保育與管理，實有待加強輔導飼主對動物及飼養管理以及保育法之正確認知。

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台灣地區猛禽調查

林文宏¹

摘要

猛禽在生態系中扮演著高層消費者的重要角色，其族群原本就數量少、繁殖慢，加上人為迫害，很容易銳減，甚至瀕臨絕種。

本年度的調查對象設定為日行性猛禽中之 6 種留鳥，計畫目標為：建立電腦資料庫、調查分布範圍與族群數量、檢討族群趨勢與保育現況。

調查方法是以統一表格填寫紀錄，將紀錄輸入資料庫中。所整理的紀錄除本年度的野外調查外，也包括歷年所有文獻資料與觀鳥人士之個人筆記等。資料庫之地理座標採用內政部所出版的「台灣地區二萬五千分之一地形圖」為基本地圖，以每 $1/8^{\circ} \times 1/8^{\circ}$ 將台灣地區分為 261 區，區內則採橫麥卡脫每平方公里的方格線為座標系。

分析項目包括：分布率、棲息環境、生態習性、調查誤差、族群數量與保育現況。部份數據來自資料庫之統計。

截至 1991 年底為止，猛禽資料庫共輸入 5146 筆紀錄，函蓋 187 區，資料分布率達全台灣地區的 72%，但分布並不均勻。資料量的多寡並非必然代表該區猛禽的多寡。完全無資料的區共有 74 個，分別屬於偏遠高山、已開發平原及偏遠離島三種情形。

調查結果顯示 6 種留鳥猛禽的分布率依序為：大冠鷲 56%、鳳頭蒼鷹 45%、松雀鷹 34%、赫氏角鷹 16%、林雕 11%、鳶 11%。其中鳳頭蒼鷹、松雀鷹及大冠鷲為本島全島性平均分布；赫氏角鷹為全島山區零散分布；林雕及鳶則為區域性分布。6 種猛禽中僅有鳶的分布及於離島。6 種猛禽中除了鳶偏好水域與溼地外，其餘 5 種的棲地皆為森林，但對於森林的型態與利用方式並不盡相同。

估計 6 種猛禽在全台灣地區的族群數量依序為：大冠鷲至少 1900 隻、鳳頭蒼鷹至少 1000 隻、松雀鷹至少 400 隻、鳶 175 隻、林雕及赫氏角鷹都約 100 隻。最後 2 者中，林雕的實際數量可能高於估計值，而赫氏角鷹可能低於估計值。

本文並檢討保育現況，其中建議將鳶增列入保育類野生動物「珍貴稀有」名錄中。

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翡翠水庫及其水系魚類寄生蟲相之調查

鍾虎雲

中文摘要

由翡翠水庫水系採集14種魚及一種蝦共計498尾，其中20尾鱒魚及15尾香魚為水庫附近水域養殖者，28尾台灣鏟頭魚則為水庫上游集水區之山溪所捕。

檢查結果發現8種原蟲類寄生蟲：Myxobolus koi, Myxidium sp. (M. matsui ?), Glugea plecostossi, Trichodina sp., Chilodonella sp., Hemiophrys sp., Ichthyophthirius multifiliis 及1種未能鑑定之纖毛蟲。4種單生吸蟲類 (monogenic flukes): Gyrodactylus nipponensis, Pseudodactylogyrus bini, P. anguillae and Dactylogyrus sp.。1種條蟲類 (Cestoda): Bothriocephalus sp.。1種鉤頭蟲 (Acanthocephalus): Neoechinorhynchus sp.。3種圓形動物 (Nematoda): Anguillicola crassa, Capillaria sp. 及一種未能鑑定之圓蟲。4種橈腳類 (Copepoda) 之甲殼寄生蟲: Lernaea cyprinaceae, Ergasilus sp., Sinergasilus sp. (S. majar ?), 及二種未能鑑定種名者計23種。

15種魚蝦中鯉魚，鯰魚及大目孔感染寄生蟲的種類較多，而且魚體上寄生蟲的數目亦較大。白鰻及台灣鏟頭魚次之。寄生蟲之感染率無明顯之季節變化。除少數例外，多數感染魚上之寄生蟲量都很稀少，如條蟲及甲殼類寄生蟲每條魚上約有蟲二，三隻到十餘隻，香魚之微孢子蟲可能在體腔內形成數十個囊胞 (cyst)。魚之鰓吸蟲 (Dactylogyrus 及 Pseudodactylogyrus) 每條魚之鰓可能有數十至數百尾，但少數鯉魚鰓部之吸蟲數多過十萬尾以上，而魚並無顯著症狀出現。水庫鰻魚及香魚與養殖同種魚之寄生蟲相幾近雷同，可能為信徒放生及人工放養之結果所致，值得注意。

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台南縣境內六甲鄉水流東地區密集化石地質景觀之調查(I)

鍾 廣 吉

摘 要

出露在本區的岩層有六雙層、二重溪層和炭下寮層，六雙層為較疏鬆之厚層砂岩，大致呈南北走向，分佈在最西側，二重溪層為砂岩與泥質砂岩交互出現的岩層，走向變化較大，由西側到東側從東北，東西到西北，圍繞於本區的西南側，炭下寮層為厚層砂岩夾薄層之泥質砂岩，此岩層的走向大致呈東西向。

分佈在此區有一向斜構造位於東側，而沈積構造的交錯層和剝刮再堆積的構造則相當普遍，亦為一重要的地質現象。

炭下寮層為厚層砂岩夾薄層之泥質砂岩，由厚層砂岩至薄層之泥質砂岩界限區分佈有密集之扇貝化石，此種條件仍由於堆積厚層砂岩的環境為適合扇貝生活的環境，泥質砂岩的環境則已不適合扇貝生活，所以促使此生物大量死亡，而可以形成密集化石層，大略可以歸納下列特徵：

- (1) 種類近乎單一：密集化石層內的化石肉眼看得到的以扇貝為主，而且幾乎是僅扇貝，不易看到其他類，若有也僅零散幾個，類此密集的單一化石密集層並不很多。
- (2) 相當密集：化石層中之扇貝化石已達到互相重疊的密集狀態，密密麻麻地，水平方向也已達到一個接一個的程度，似已是屍體堆所形成的化石層。
- (3) 厚度在30~50公分，密集化石呈層，厚度在30~50公分，呈往南延伸的一化石層，大致為鈣質之岩層，相當地堅硬。
- (4) 分佈相當廣闊：此化石層之水平分佈範圍相當廣闊，但並沒有集中在一個地方，大致有三區，北側一區接近民宅，位置空曠，南側有二區，均分佈於溪谷中，較西側區不但規模大，量多，保存好，而且隱蔽，適合列入保護區。
- (5) 保存完好：就密集扇貝化石層而言，此區南側的西區算是保存相當完好的露頭，但此區的標本之保存亦非所認為之完好，大致上扇貝之二片殼以分開者為多，而每片殼則保持完好未破裂，但也有少量

呈碎片者。

(6) 略具方向性：僅略為有方向性，但不明顯，而且方向性呈局部性有其自己的方向，整個水流東地區並沒有一致的方向性。

(7) 類似此產狀者，在台灣南部為唯一者。

此區的扇貝密集化石層具有以上七點特性為相當特殊的自然文化資產，附近地區尚有其他的觀光區如關仔嶺，曾文水庫等，此區恰在其中途部，在感性的觀光中配合以此知性的資源，是一相當有利的觀光，自然文化資產。

就景觀的類別而言，這些密集化石層大略可以歸屬於：

1. 小景觀：每個單一的化石即為一小景觀，有其獨立性，每個小區域，小格局，小規模的小地點也各構成一小景觀，均為個別獨立可提供欣賞的資源的小單位，因此具有小景觀的特色。
2. 主題景觀：此區整體而言，或各小單位而言，提供視覺的材料均為相當明顯的主題，化石，密集化石，化石層，為相當具體的實體，應為主題景觀之類，也表示在欣賞此區的景觀之時僅有一主題，沒有其他課題或目標可挑選或代替的。
3. 封閉景觀：此地區南側的西區裡，位置相當隱蔽，四周均有刺竹林圍繞，形成一封閉的完整小地區，可以構成一封閉景觀，但此現象並非可以長久性者，若有一天全部竹林被伐完，也就失去封閉的圍牆，目前的確是一封閉景觀的形態。
4. 全景景觀：北側一區為一廣闊的地區，視野也可及較遠，若由南往北賞景，景界並非僅局限於一小格局，可及於周圍，構成一全景景觀。

而構成此區各類景觀的要素有：

1. 形體：如完整的地形體，完整的化石，均為一形體的要素，形體的狀態即引導賞景者去組合成各組合體的形態。
2. 線條：此地區構景的線體有直線，曲線，不規則線，直線有長直線，短直線，曲線有單個與複雜者，不規則者更複雜，這些線條的要素共同組合成各種形體，各具有不同的供賞景的價值。

此化石密集層在文化資產上亦可扮演下列的學術與教學的功能。

- (1) 化石分類、個體發生、群落、古生態、古沈積條件的探討之學術性研究。
- (2) 廣闊平坦的空間與遠離交通頻繁的公路，具有相當的安全性，為提供各級師生地球科學，環境科學教學很好的場所。

恆春半島之沈積地質景觀調查

宋國城

一. 前言

根據第一年的野外調查結果。我們認為恆春半島保留了完整而且罕見之大陸斜坡至大陸隆堆之沈積地質現象。這些地質現象包括海底峽谷,海底河道,深海沖積扇,海底崩移構造,海底泥流等,皆是彌足珍貴之地質景觀,應加以妥善規劃保護。

二. 研究目的

本年之研究主要在規劃出比較具體的沈積地質景觀項目,分佈範圍,交通網路以及應該規劃之設施,並建議劃設自然保留區之可行性。

三. 研究方法

綜合第一年野外調查之成果,將沈積地質景觀之特性及分佈在地形圖上展示,並配合現有交通網路,地質景觀之主題,作適當之規劃。

四. 研究成果

我們認為下列七條路線和局部地區應妥善規劃,適當地保護以作為教學及研究之用:

(1) 枋山溪海底河道及崩移景觀

由屏鵝公路進入枋山溪,沿著南迴鐵路施工道路向東行,可觀察一系列之海底河道,沈積崩移,塊體滑動,濁流岩相等地質特徵,可代表大陸斜坡之半深海沈積環境。尤其具有一保存完整外形之海底河道,值得加以維護。

(2) 獅子頭海底河道景觀

位於枋山與楓港間之屏鵝公路旁,有一平頂狹長之山稜,在稜線附近山露厚層砂岩,形成陡峭岩壁,可觀察火焰構造,旋捲構造,假結核構造,可指示地層已被倒轉。此處兼具沈積學與構造學之教學意義。

(3) 竹坑海底峽谷景觀

位於屏鵝公路楓港與車城中間之竹坑,沿竹坑溪向東行約一公里,河谷出露巨厚礫石層,其中之礫石具有頗佳的圓度,並懸浮於基質中,可觀察正,反級層,及水道侵蝕現象,是代表海底峽谷之沈積景觀。

(4) 四重溪海底河道及崩移景觀

沿屏鵝公路南下到車城左轉進入四重溪,在海口教練場對面河谷可觀察砂頁岩互層之地層扭曲成緊密褶皺,形成背斜,向斜,或倒轉背斜與向斜。顯示這些岩層尚在柔軟狀態下,受重力牽引向下滑動,而造成的沈積崩移現象,過四重溪鎮到達石門埔對岸河壁上出露一大型偃臥褶皺構造,亦屬沈積崩移現象。由石門埔前行到達石門峽谷,此處係四重溪溪流穿過石門山而成,岩層走向

西北—東南，由厚層礫岩，砂岩，砂頁岩互層等岩性組成，含有大量火成岩與超基性岩岩屑。代表海底複合河道沈積。再向東行到達海邊之旭海，沿砂灘向北行約1.5公里，有一海蝕崖，出露一大規模海底崩移現象之露頭。此處之崩移規模與現象之特殊，可登錄為教科書上之範例。本路線所經之露頭，如石門埔，石門峽谷與旭海皆應受妥善之保護，以作教學研究之用。

(5) 東門河惡地景觀

由恆春東門城向東行可達二重溪橋，俗稱出火，係瓦斯氣苗經引燃後所成之景觀。沿溪上杉，可觀察到岩層由具有規則層理之砂頁岩互層逐漸轉變為雜亂無章，或具有傾瀉層理之泥岩層，並夾有大小之火成岩，沈積岩，變質岩，甚至是超基性岩之碎塊，係屬大陸斜坡之沈積物受重力牽引導致山崩之產物。露頭經風化侵蝕之後，往往形成惡地地形。

(6) 墾丁外來岩塊景觀

墾丁青年活動中心廣場石板上擁有許多保存良好的沈積構造，例如笛狀鑄形(flute cast)、剝離線理(parting lineation)、漣痕(ripple mark)等可以指示古水流方向的構造，荷重鑄形(load cast)、恐龍皮(dinosaur leather)等可指示地層上下的構造，以及特屬於深海濁流岩相的生痕化石等，有興趣者，可參考有關沈積學的書籍。認識這些沈積構造，對於在野外露頭調查工作非常有幫助。活動中心旁邊可看到矗立著的青蛙石，這是由玄武岩、角閃岩、輝長岩和輝綠岩、以及超基性岩的礫石組成的礫岩，屬於墾丁層中的外來岩石巨塊。由此地向北望去，可見同屬於這類礫岩大岩塊高聳於平緩的山坡上，這些岩塊包括大尖石山、小尖石山、大圓山、大山母山、門馬羅山等，造成地形上相當突兀的孤立山。

(7) 佳洛水海底沖積扇景觀

佳洛水位於恆春半島東南側海岸，是一著名風景區。略成東西走向的厚層砂岩與海岸垂直分佈，岩層受波浪的侵蝕，造成棋盤石、蜂窩岩、風動石等特殊的地形景觀。厚砂岩夾有薄層頁岩，形成層厚向上減薄粒度向上變細的沈積循環。厚砂岩可以觀察到平行紋理，交錯紋理，爬升漣痕旋捲紋理、火筴構造、荷重鑄型、笛狀鑄型、以及碟形和水柱等脫水構造，這些沈積構造都指示佳洛水的厚砂岩是典型的濁流岩。薄砂頁岩互層或泥質砂岩扭曲成緊密的褶皺，軸面大致成東西向，向南傾斜，顯示推擠的力量來自北方。由厚砂岩的沈積循環以及所發現的生痕推測，佳洛水砂岩應屬於深海沖積扇的沈積環境。

五. 建議

本研究建議下列地質應特別加以妥善保留以作教學及研究之目的：

1. 枋山溪4.3公里處，海底河道露頭。
2. 石門埔大型偃臥褶皺。
3. 石門峽谷
4. 旭海北方2公里處海蝕崖

屏東縣隘寮溪和青山溪生態調查與溪流生態保育

汪靜明¹、葉信平²、陳正修²

【摘要】

屏東縣三地鄉隘寮溪上游和青山溪為台灣本島南部高屏溪集水區上游源頭溪，由於先天生態環境條件良好，不但景觀秀麗，同時棲息有許多淡水魚類。因此政府自民國七十八年起，已將青山溪列為「魚類保護區」。本研究自民國七十九年七月至八十年六月，針對隘寮北溪（天鵝湖附近）與青山溪（海神宮附近），進行溪流生態調查與魚類生態之調查研究，俾提供政府做為森林溪流經營管理之參考。

隘寮北溪生態調查結果顯示：在水文方面，水流量介於 $0.03 \sim 0.94 \text{ m}^3/\text{sec}$ ($\bar{X}=0.49$, $CV=60\%$)。在水質方面，水溫為 $15.0 \sim 23.5^\circ\text{C}$ ($\bar{X}=19.3$, $CV=13\%$)；溶氧量DO值介於 $8.0 \sim 13.5 \text{ mg/L}$ ；酸鹼度pH值介於 $7.7 \sim 9.9$ 之間；導電度介於 $0.06 \sim 0.16 \text{ ms/cm}$ ($\bar{X}=0.11$, $CV=27\%$)；硝酸鹽含量介於 $1.3 \sim 1.9 \text{ mg/L}$ ($\bar{X}=1.6$, $CV=13\%$)；溶解性磷酸鹽含量介於 $0.01 \sim 0.07 \text{ mg/L}$ ($\bar{X}=0.04$, $CV=51\%$)；混濁度則介於 $0.4 \sim 8.1 \text{ NTU}$ ($\bar{X}=4.3$, $CV=52\%$)。在魚類相方面，調查至目前為止，僅出現一種魚種，為臺灣石鱚 (*Acrossocheilus formosanus*, 鯉目鯉科)，體長區間 $1 \sim 12$ 公分，以 $3 \sim 5$ 公分居多。

青山溪生態調查結果顯示：在水文方面，水流量介於 $0.02 \sim 3.5 \text{ m}^3/\text{sec}$ ($\bar{X}=1.77$, $CV=59\%$)。在水質方面，水溫為 $17.5 \sim 28.0^\circ\text{C}$ ($\bar{X}=22.8$, $CV=10\%$)；溶氧量DO值介於 $7.7 \sim 11.4 \text{ mg/L}$ ；酸鹼度pH值介於 $8.3 \sim 9.8$ ；導電度介於 $0.17 \sim 0.32 \text{ ms/cm}$ ($\bar{X}=0.25$, $CV=22\%$)；硝酸鹽含量介於 $1.2 \sim 2.1 \text{ mg/L}$ ($\bar{X}=1.7$, $CV=17\%$)；溶解性磷酸鹽含量介於 $0.01 \sim 0.47 \text{ mg/L}$ ($\bar{X}=0.24$, $CV=53\%$)；混濁度介於 $1.1 \sim 7.0 \text{ NTU}$ ($\bar{X}=4.1$, $CV=42\%$)。在魚類相方面，則發現有五種魚類，分別為鱧鰻 (*Anguilla maemorata*, 鰻目鰻麗科)，體長 15 公分，族群極稀；台灣石鱚 (*Acrossocheilus formosanus*, 鯉目鯉科)，體長區間 $3 \sim 11$ 公分，以 $5 \sim 8$ 公分族群居多；台灣馬口魚 (*Candidia barbata*, 鯉目鯉科)，體長區間 $1 \sim 10$ 公分，以 $5 \sim 10$ 公分族群居多；粗首鱧 (*Zacco pachycephalus*, 鯉目鯉科)，體長區間 $2 \sim 9$ 公分，以 $7 \sim 9$ 公分族群居多；川鰾虎 (*Rhinogobius brunneus*, 鱧目鰾虎科)，體長區間 $3 \sim 8$ 公分，以 $5 \sim 8$ 公分族群居多。

綜合生態分析可知，隘寮北溪（海拔約 680 公尺）與青山溪（海拔約 250 公尺）均具有台灣森林溪流所特有之水與石之美。河床的底質成分以漂石與礫石為主。在水文方面，兩者水量雖均不大，但隨季節有枯豐明顯之差異。在水質方面，兩者之水體能見度高，水溫 20 度左右，同為清澈溫水性之森林溪流，而異於其他台灣中北部之高冷森林溪流。在此中低海拔的微鹼性森林溪流中，水體尚未出現明顯之優養化現象，但兩者部分溪

1. 國立彰化師範大學生物系
2. 國立屏東技術學院水產養殖系

彰化市500白沙山莊進德路一號
屏東縣912內埔鄉學府路一號

段已有遊憩所致之人為污染，在硝酸鹽含量上有偏高之現象，且附著性絲狀藻類也有局部繁生之現象。在魚類相調查上，兩溪段有明顯的差異。在隘寮北溪棲息的魚種，僅發現一種；而青山溪則發現有五種。此種魚類均為台灣之原生種，其中除了川鰕虎外，其餘均為特有種（台灣石鱸、台灣馬口魚、粗首鱨）或保育種（鱸鰻）。在族群分佈與相對數量上，隘寮北溪僅有台灣石鱸；而在青山溪魚類保護區，則以台灣馬口魚和川鰕虎較多。

依據本研究調查結果資料可知，隘寮北溪和青山溪的溪流景觀和生態環境具有台灣南部中低海拔溫水性森林溪流特色，而其中之魚類資源亦具台灣森林溪流魚類之代表性。今後之保育研究應朝向魚類在保護區劃定後族群動態與群聚消長，以及當族群量增加後，如何選取適宜之溪段，規劃為魚類垂釣區，俾使在同一溪流中，區分為保護與利用之溪段，以達到多元化經營管理的目標。

蓮華池地區自然資源保育計畫

漆 陞 忠

在人爲活動及各種需求目的之開發利用下，台灣之自然資源、生態環境不斷地遭受破壞與污染，導致各項天然資源逐漸減少，甚至頻臨絕滅之中。近年來政府有鑑於自然環境之重要性，以及民間環保意識之升高，逐漸重視自然資源環境之保護。以臺灣森林資源分佈範圍廣，其生態環境涵蓋大多數之他項自然資源生態體系，並具有絕大的影響，因此選擇一處適當之天然林區，儘速建立一套有系統的自然保護區經營管理保育計畫，計畫內容應包括舊有資料、記錄、以及相關文獻之建檔，各項資源環境之規劃，標本園區之設立，特殊自然資源之培育、繁殖以及生育環境之重建與恢復，尤其對各項自然資源保育觀念一般性知識的簡介、建立現場觀摩及展示示範場所，俾供相關性之從業人員，包括教育人員及各大專相關科系之學生，進行專技訓練、學術研討之實習場所。

蒐集蓮華池地區自然資源文獻160篇，進行整理建檔。設置自然保留區與整理維護已有之自然保護區、植物標本園、試驗集水區及水土保持設施，完成林道護坡9處及L型路邊排水溝300公尺。採集製作昆蟲蝶類標本180種，委託調查鳥類計54種。規劃設置標本園乙處，自然保護區100公頃，修築保護區內人行砌石梯步道200公尺，完成人行木磚步道300公尺，並進行道路網全盤規劃與觀測站之興建。修築野生鳥類觀察飼養舍乙棟，設置大型溫室乙棟及改裝舊有溫室爲溫濕度自動控制設備，以培育稀有植物與藥用苗木，並設置陳列室展示各項資源標本，以供教學觀摩之用。整理已有之植物臘月標本120份，並繼續採集製作。整建藥用植物標本園乙處，面積1.2公頃，並已完成灌溉系統、排水設施及人行參觀步道等相關初步措施，並栽植藥用植物100種。編印“蓮華池森林鳥類”、“蓮華池試驗林植物名錄”及“蓮華池自然保護區”摺頁。

台灣省林業試驗所蓮華池分所

南投縣魚池鄉五城村華龍巷43號

臺灣山毛櫸生態之研究

楊遠波¹、呂勝由²

臺灣山毛櫸又稱水青岡 (*Fagus hayatae*) 屬於殼斗科之山毛櫸屬，為臺灣特產種，屬落葉性喬木。目前僅知其分佈範圍在塔曼山及拉拉山間之稜線兩側，往西北延伸分佈到北插天山，再往東北分佈至台北縣之逐鹿山，均分佈在稜線兩側各 100公尺範圍內。臺灣山毛櫸林之組成約有維管束植物 200種，森林之結構大致分三層，第一層為臺灣山毛櫸，高可達15公尺；第二層為喬木及灌木層，高可達 2至 5公尺間；第三層為草本層。林中山毛櫸樹齡以70~ 100年者佔多數，70年以下者甚少，尤其小苗及幼樹，可能與其不耐陰性有關。臺灣山毛櫸林長在氣候冷涼潮濕，但排水良好之山坡，土壤含石率高，呈酸性。每年3月底至4月中旬是花期，為期 2~3 週，當年 9月~10月果實成熟。雖然每年開花，但不易結實，種子獲得不易，可能為天然更新不良因素之一。

1,2台灣省林業試驗所森林生物系

宜蘭地區水鳥保育區規劃調查研究計畫(研究成果摘要及建議)

許南山

摘要

台灣東部海岸線主要涵及宜、花、東三區，由於花東地區的水鳥資源並不豐富，若要瞭解候鳥在東岸遷移的狀況，只有對蘭陽平原的河口沼澤地進行長期的鳥類調查，方有所獲。所以這次整區的調查便顯得非常重要。

從79年7月至80年6月間對平原上六個主要水鳥據點作為期一年的調查中，共記錄16目43科208種鳥類。依棲息狀態分，留鳥有59種，約佔3成，候鳥中，冬候鳥69種，過境鳥51種，夏候鳥5種，約佔6成；迷鳥及狀況不明者12種，外來種12種，約佔1成。所以蘭陽平原的鳥類資源是以鷗科、鸕鶿科、鶯科、雁鴨科等四大水邊的候鳥族群為主。

各區出現的鳥種數以蘭陽溪口155種最多，其次依序為無尾港140種，竹安138種，新南118種，五十二甲117種，古亭105種。而新南位於蘭陽溪口北岸邊，實屬溪口的一部份，所以實際上蘭陽溪自然保護區鳥種數為162。

一年中在春、秋兩季遷移各有一波高峰，南下時段各地鳥況不一，北返則都以四月份鳥況最好。

每個調查點都超過一百種以上，鳥種平均分佈於各區；由竹安河口至無尾港一線都有水鳥聚集處，由於開發的脚步逼近，人類的活動漸趨頻繁，鳥類棲地已一片片在消失之中，目前已呈零星的點狀分佈，亟待好好的保護與規劃。

•宜蘭縣政府農業局長 宜蘭市舊城南路23號

建議：

1. 蘭陽溪自然保護區是蘭陽平原最佳的水鳥棲息地點，但保護河口生態及過境候鳥的工作仍未能落實。對於溪口兩岸果菜種植及河口捕撈、行舟等干擾鳥類的行為應依法予以適度規範；如何重現當年雁鴨保護區的盛況，是值得我們努力的課題。
2. 無尾港及其附近的海面是目前宜蘭最大的水鴨聚集區。台電火力發電廠的陰影，將使這片湖泊走向滅絕之路；因係公有海岸防風林地，應速立法予以保護，以作為縣內觀賞雁鴨科的理想場所。建議納入「台灣沿海地區自然環境保護計劃」，延伸「蘭陽海岸保護區」至無尾港為一般保護區。
3. 五十二甲沼澤區受地主大量填土及干擾漸增影響，水鳥數量已日益減少，亟待謀求兩全其美的辦法予以保護。建議納入冬山河風景區整體規劃中，利用其沼澤濕地及水鳥資源，進行生態教育解說及研究的地點。
4. 古亭、新南大片稻田秋天休耕，正好提供過境候鳥的棲息場所，這是人鳥之間共用大地資源的絕佳範例。蘭陽平原類似的休耕田不少，對水鳥聚集較多的休耕田地主，給予較高休耕補助金，鼓勵其保護區內的水鳥；可作為各鄉鎮之學校師生觀賞鷸雁科水鳥的教育場所。
5. 本地獵捕候鳥的風氣仍盛，尤以竹安及五十二甲為最，主管機關應繼續加強宣導及取締工作。

森林溪流淡水魚類保育工作計畫

邱 健 介

壹、前言

台灣的大小河川有105 條，遍布全省，她們的中、上游多在山坡陡峭的森林區域，由於地理、氣候環境的多變，使得棲息其間的魚類等生物顯得繁複而特殊，目前台灣地區紀錄之一百二十餘魚種中就有半數以上的魚種乃以森林溪流作棲息地；當地下游河川多已遭受嚴重的污染破壞，致水族生物多已完全喪失生機之際，中、上游地區森林溪流魚類資源的保育益顯重要。

貳、目的

本計畫之執行乃為了解本省森林地區魚類分布概況，魚類棲地現況及其所面臨問題之壓力，辦理魚類棲地狀況基本調查，作為魚類資源保育之基礎資料。並在施行棲地調查的河段，加以嚴格的監視保護，並行追蹤調查，以蒐集進一步的魚類資源經營管理資訊。而透過國有林班地巡視，加強全省溪流魚類及其棲地之巡護，配合警、漁政單位嚴格取締毒、電魚及破壞溪流環境之行爲，並探討具體可行之保護措施。另加強林務局森林溪流魚類保育人員之培訓及與學者、專家、社會各界護魚人士之聯繫溝通，以協力共同為維護森林溪流環境而努力。

參、工作方法與成果

由林務局轄下八個林區管理處所屬之卅四個工作站，依其現行業務發展需要，選擇轄區內具有代表性之溪流，根據林務局印行之“森林溪流魚類棲地調查表及使用說明”予以詳實調查。今茲將主要調查項目及具體成果敘述如后：

一、河段位址：將調查河段之溪流名稱、相關之位置及其在五千或一萬分之一像片基本圖上之位置標定，俾便於未來與台灣地區地理資訊系統之發展工作相配合。本調查迄今已調查之溪流河段長達三百餘公里，完成調查報告63篇。

二、河道型態分布：參照美國林務署河道系統分類方法，將河道依其屬性分為A₁，A₂

邱健介：林務局森林育樂組保育課

台北市杭州南路一段2號100

...B₁ , B₂ ...D₂ 等19個類型，俾了解台灣地區森林溪流地質、地理的型態及其分布狀況，據以有系統的歸類俾藉以分析其與魚類棲地環境之關係，並做為溪流環境監測與河川治理工程之參考。調查結果顯示上述19個河道型均有紀錄，其中又以B₂ , B₃ 及 C₃ 三種型態出現的次數最多。

三、濱溪優勢植群分布：記錄生長在溪流兩旁，可直、間接罩蔽河道，影響棲地環境之最優勢樹種四種以上，藉以了解溪流兩岸的植生狀況，以探討其水族生態之關係。調查結果有柳杉、赤楊、台灣樺等四十餘種，其中以芒草出現的次數最多，次為竹類；而木本植物中出現最頻之樹種為相思樹，次為二葉松、楠木、山黃麻、桑樹。

四、主要魚種分布：就調查所見配合文獻記載及對釣魚人士之查訪，依序列出調查河段內主要的魚種，至少四種，藉以了解各溪流現存魚種之分布狀況。調查結果有：櫻花鉤吻鮭、高身鯢魚、溪鱧、何氏棘魷等凡四十餘種，其中以台灣鏟頰魚出現的次數最多，遍及本島北、中、南、東各區域，而其同屬之高身鏟頰魚則僅在南及東部溪流出現。另出現次數較多的魚種為台灣石鱸、鰻魚、鰕虎、溪哥、日本禿頭鯊等。

五、生育環境影響因子：記錄調查區域的環境狀況，現存及潛在威脅水族生態的因子，如毒、電、炸魚，攔砂壩阻隔河道及水源污染之情況等，藉以檢測該溪流之健康狀況，作為魚類棲地改善工作之依據。

該魚類保育工作除需林務人員投入外，喚起社會各階層保育人士之參與亦重要途徑；因此本計劃乃敦聘學者、專家對林務局之魚類保育工作者施予有關技術及新知訓練，並邀集各地區護魚人士舉辦研討會，以激起社會大眾之參與，支持本計畫工作之推展。

肆、結語

溪流魚類保育工作除了直接保護魚類資源外，也保護了我們賴以維生的水源、水質；而魚類棲地改善工作則是泥沙沖蝕控制、固土護坡的方法之一，與水土保持、治山防洪工程相輔相成。另透過魚類棲地的工作，無異於加強河川、溪流環境的保護與監控，此由本計畫之施行而使水資源利用、河川治理工程單位更注意到魚類生育之危機而思構築魚梯，可資明證。此外也可透過計畫的執行緝止毒、電、炸等非法行為，以增殖魚源，讓本省喜愛釣魚的人有良質的漁釣環境；亦可藉此對溪流環境有更深入的瞭解，為日益蓬勃的水域遊憩活動及早做好良性的規劃，由此可見魚類保護工作非僅增加森林資源，尚有一舉數得的實際效益。

桃園池沼水生植物之移植復育

楊遠波^{1.}

桃園縣一帶的池沼數量多，許多水生植物生長其中。過去由於土地需求殷切及魚類的大量養殖，不少種類數量日漸減少，有的甚至消失不見，例如台灣水蘊、澤瀉。

民國七十六年陳擎霞提出桃園一帶池沼中亟待保護的水生植物有台灣萍蓬草及水杉菜兩種。本計畫根據所列之兩種研究它們的繁殖及種植方法。另外，亦在全省選擇地區加以栽植，以使此兩種能在未來生長於各地，達到保育之目的。同時，也在北部地區詳加調查，以瞭解此兩種之確實分佈範圍及評估其稀有之程度。

根據調查結果顯示，台灣萍蓬草除了生長在八張犁一帶三處水池外，亦長在楊梅兩水池中。可惜最近後者已因填土消失。而水杉菜僅發現於楊梅一水池中，如今該水池也因填土消失。

水杉菜及台灣萍蓬草之生長均快，容易移植，地下莖分枝。將分枝之地下莖取出後移種於泥土中即能成活。經過北中南各區試驗栽植後，其適合生長於北部水池沼中。目前，已成功種植於台北植物園、福山植物園、及各零星水池中。

1.台灣省林業試驗所森林生物系，台北市 10728 南海路 53 號

本省河川規劃溪釣區域之可行性研究

張崑雄¹ 鄭炳南² 黃 異³ 林曜松⁴

摘 要

本省利用河川、湖泊、水庫垂釣人口約佔總釣魚人口五分之一，其中利用河川垂釣者約有十萬人，近年來，由於河川環境之變遷，及人爲不當的捕捉魚類，致使原本極爲豐富的魚類資源日漸枯竭，未能使廣大河川釣魚者，達到原有之樂趣。鑑於如何落實河川資源保育工作，及兼顧廣大休閒釣魚人口之需求，本研究計劃主要目的在探討現有的有關適用法令及訂定合宜的河川溪釣管理規則，並且針對台灣目前溪流環境保育工作較週全的幾條河川，進行調查，以選擇較適合作爲規劃溪釣的河川。

由本省現行有關釣魚活動之法規，如漁業法，漁業法施行細則，台灣省漁業管理辦法，野生動物保育法，野生動物保育法施行細則，台灣省河川管理規則等，就其(一)釣魚活動本身之管理規劃。(二)從保育角度對釣魚活動所做之命令或禁止規定，此兩層面歸納結果得知：

一、漁業法對於內陸水域之釣魚活動並無任何規定。

二、依野生動物保育法之規定：屬保育類中禁止採捕之魚類，不得垂釣。

保育類中可供利用之魚的垂釣應依下列方法管制：

1. 縣市政府應先劃定垂釣區並公告各種有關垂釣的事項。

2. 欲垂釣者必須申請垂釣執照，擁有執照者始得垂釣。

三、屬於一般類之魚類則完全開放垂釣，並無任何管制規定。

爲解決此種現象，有下列二種可行方案：

1. 修訂野生動物保育法，納入有關一般類之魚類垂釣規範。

2. 由各地方自治團體自行訂定垂釣管理辦法，適用一般類之魚類垂釣問題。

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2. 中華民國溪流環境協會 台北市南港區研究院路二段 128 號

3. 國立海洋大學海洋法律研究所 基隆市北寧路二號

4. 國立台灣大學動物系 台北市羅斯福路四段 1 號

由於第一案涉及修法問題，曠日費時不易達到目的。似以第二案較為可行，且以本省河川、湖泊、水庫管理實務之現況來看，由地方自治團體自行訂定垂釣管理辦法應較能顧及地方實情而訂出實用之法規。地方自治團體可參考以下七項原則，自行訂定垂釣管理辦法：

- (一)由各縣市及直轄市自行訂定垂釣管理辦法，若有必要，則由縣市或直轄市共同訂定垂釣管理辦法。
- (二)基本上，主管機關應主動規劃及公告垂釣區域，並公告垂釣時期、垂釣方法及垂釣之標的。
- (三)垂釣人應依主管機關之公告申請釣魚證。申請人應參加講習後始得發給釣魚證。
- (四)垂釣時應攜帶釣魚證。
- (五)主管機關得委託民間公益團體辦理各種管理事宜，以補本身人力及能力之不足。
- (六)垂釣管理辦法僅涉及個人之垂釣行為，而不涉及經營船筏而供他人為垂釣之事業。此種事業應暫予禁止。
- (七)垂釣管理辦法未規定之事項適用其他相關法規之規定。

本研究以里佳溪、北港溪、大甲溪、清水溝溪、楠梓仙溪及南勢溪等現有區域性保育團體管理之溪流為主要調查對象，由其地點及水文概況（水溫、流量、平均水深）、自然概況、人文環境（生活狀況、人口、文教、治安、宗教、交通等項）、魚類資源（魚種、魚產量）、護魚地方團體及政府參與推行輔導情況等諸項因素比較之結果，選定以高雄縣三民鄉楠梓仙溪及南投縣國姓鄉北港村北港溪二條溪流較適合做為規劃溪釣區域之河段。

楠梓仙溪與北港溪之溪水清澈，地理位置良好且管理方便，村民對於溪流保育工作有高度熱忱，魚類資源豐富，其中有些魚類如粗首鱲（溪哥仔）、台灣鏢鱖（苦花）、脂鯢（三角鈎）、台灣石鱚（石斑）等，皆可定為垂釣魚種。此外，政府對於此兩溪流基礎生態資料之調查，溪流及魚類等資源保護工作皆有長期計劃。在此完整的資料背景下，配合當地的自治團體訂定垂釣管理辦法，將上述二條溪流規劃為示範性垂釣區域，應可收到溪流環境保育與合理利用之雙層功能，並能做為推動本省各地溪流環境保護工作之借鏡。

八十年度櫻花鉤吻鮭棲息地巡邏保護計劃 (80農林—公務—生態—1.6)執行報告

張民善

一、前言

櫻花鉤吻鮭為冰河時期遺留之生物，全世界僅韓國、日本、歐洲、我國東北及台灣大甲溪上游，分布地均屬寒冷地區，唯台灣之櫻花鉤吻鮭生活於亞熱帶地區，由此證明台灣過去曾度過寒冷時期，並證台灣與大陸曾經是相連之大陸塊。櫻花鉤吻鮭原是降海性之迴流魚類，因地質變動，使原屬降海性魚類變為陸封性魚類，瀕臨絕種命運，因此學術界及各方有識人士均積極發起保護運動。

本計劃由行政院農業委員會與行政院國軍退除役官兵輔導委員會武陵農場共同辦理，透過各項宣傳媒體使全體民眾認識了解自然生態保護之重要性，並培養國民共同參與自然生態宣導保護工作，唯因如此，溪流中之魚群才能有繼續繁衍處處可見之今日。

二、目的

- (一)繼續加強櫻花鉤吻鮭重要性宣導及巡邏保護。
- (二)防止人為改變七家灣溪兩岸之自然環境，以增加鮭魚族群及繼續保留區環境維護及美化。

三、執行情形與成果：

本計劃分為「巡邏保護」、「宣導保護」等兩部份進行，茲將80年度(79年7月1日至80年6月30日止)之執行情形與成果分別說明如下：

(一)執行情形：

- 1.本場七十三年二月十六日接獲行政院頒，將櫻花鉤吻鮭列入生態保育先驅計劃後，二月廿六日即頒布巡邏保護實施要點，將七家灣溪分成十個責任區巡邏保護外，七十三年九月成立保護中心、七十六年元月更名為復育中心，以專責辦理巡邏保護工作，並派有專人負責定期及不定期之巡邏。
- 2.本場透過放映紀錄片、張貼啓示、人員解說，以達宣導之目的，禁止人員接近水域遊憩、捕毒電網魚，嚴禁區內亂丟垃圾及派車定期清運暨勸導果菜農戶採用低毒性農藥，以防止污染溪流，鄰近農地即輔導全面完成構築平台階段及開闢山邊溝、邊

行政院 國軍退除役官兵 武陵農場 台中縣和平鄉平等村武陵路三號
輔導委員會

坡植草覆蓋以加強水土保持措施防治泥砂流入河床。

- 3.七十九年六月農委會提報將河岸兩側三十公尺範圍劃入「櫻花鉤吻鮭自然保留區」後，本場除部份農地被列入保留區配合造林外，沿線鄰近之果菜區十五公頃亦經完成辦理構築平台階段及水土保持措施，以減少泥砂流入河床造成污染。
- 4.配合保留區劃定作業，委託辦理七家灣溪沿岸上地地形測量，分第一、二期辦理地形圖測繪已於八十一年一月卅日完成，提供做為劃定櫻花鉤吻鮭保留區各項作業推動之參考。

(二)執行成效：

- 1.透過各種傳播媒體及解說人員之介紹與宣導，加強了人們對此珍貴稀有之櫻花鉤吻鮭之認識，慕名而來之遊客日益增多。
- 2.自然保留區範圍內責任區及指派專人巡邏形成相當大之監視網，對防止遊客進入及非法捕、毒、電、網、釣魚暨防止污染已收良好成效。
- 3.保護初期之二〇〇餘尾至今已超過二、〇〇〇尾以上，尤在每年十月繁殖季節，溪流中已隨處可見魚蹤，落實了保護之工作。

四、檢討與建議

- (一)七家灣溪上游(武陵吊橋以上)林地，常因豪雨造成崩塌大量石塊流入河中，填積河床及造成河川改道，嚴重影響及改變棲息地原有面貌，建請上游加強林地水土保持措施，以減少大量石塊流入河中。
- (二)每年度櫻花鉤吻鮭棲息地巡邏保護經費逐年刪減影響計畫執行成效，建請寬列預算以利計畫之執行。
- (三)復育中心電力係接自果區，因電壓不足影響電穩定度，常造成用電機具性能，建請專案撥款或擬請列入下年度計畫內辦理改善。
- (四)復育中心應充實軟、硬體設備，作為櫻花鉤吻鮭解說教育中心。
- (五)請繼續辦理人工繁殖及放流魚苗計劃，以增加河中魚數。

台灣獼猴野外供餌之研究(三)－管理部分

黃忠和

一、執行目的

台灣獼猴為本省特有珍稀動物，近年來由於棲地減少，捕獵壓力嚴重，生存備受威脅，極待研究與保育，然以其習性畏人，加以本省山區地形不易觀察研究其生態行為，本計畫目的即由本處在仁澤擇適當地點設立餌站，定期派員供餌吸引猴群並保護之，以利執行計畫研究部分的台灣大學研究人員收集獼猴行為習性資料進行相關研究，並希望猴群能定期出現，未來可逐漸開放民眾參觀，作為保育宣導教育之素材。

二、執行情形

於仁澤猴群常出現活動地點兩處設立餌站，分別是地熱井及清谷屋後方山坡大樹下，以長方型木箱作為餌箱，隔日派專人上山供餌，數量每星期香蕉 5 公斤蘋果 50 個以吸引猴群至該處覓食。

三、結果與建議

- (一)本年度是第三年計畫，然而台灣獼猴野外供餌需長期進行才有顯著效果，若能持續辦理當可吸引獼猴定期出現。
- (二)所供應之香蕉、蘋果雖為台灣獼猴喜愛之食物，但林地內還有其他嚙齒類動物經常前往取食，致使有時猴群到達餌站沒有東西可吃，影響供餌成果，希望能再研究更適合之餌料。

關渡自然保留區管理維護計畫

林木根¹ 莊治宗¹ 張媛¹

關渡沼澤區位於淡水河與基隆河匯合處，擁有大片茫茫鹹草、蘆葦及水筆仔，與生活其間的魚蝦、蟹、貝類及其他無脊椎動物與鳥類等生物構成一完整的沼澤生態體系；充足的自然資源吸引了大批候鳥來此棲息越冬，使關渡成為台灣地區鳥類相最豐富的地區。為了保護沼澤區及生存其間之生物，並提供保育、遊憩、教育之目的，經行政院農業委員會與台北市政府以關渡堤防為界，分別劃設自然保留區及自然公園用地。

本計畫由行政院農業委員會補助，台北市政府建設局執行，全程期限自七十九年七月一日至八十二年六月卅日，全程計畫目標：(一)有效經營管理維護關渡自然保留區(二)於保留區舉辦各項活動，以宣導生態保育觀念，激起民衆保育之共識(三)配合籌建關渡自然公園。

本計畫八十年度執行成果如后：

- 一、加強維護管理自然保留區及自然公園預定地之環境清潔整理。
- 二、印製「自然保育優良作品集」 3,000冊，「彩羽飛揚—台北市賞鳥手冊」 4,800冊，分送有關單位及各級學校參考。
- 三、舉辦「關渡水鳥季」大型賞鳥活動四梯，計有兩萬餘人次參加。
- 四、辦理「第一屆保育人員研習班」，培訓生態資源解說人員，協助推廣保育工作。
- 五、委託台灣大學動物系林曜松教授進行「關渡自然公園解說設施整體規劃」，於八十年五月完成報告。
- 六、蒐集關渡地區鳥類種數及棲地資料。

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哈盆自然保留區管理及規劃執行報告

翁松元¹ 楊遠波¹ 趙榮台¹

前言

哈盆自然保留區，位於臺北縣烏來鄉福山村與宜蘭縣員山鄉湖西村交界之國布林區內，為雪山山脈北段之一部份，面積 332.7 公頃。依據初步調查，區內原生維管束植物有 123 科 472 種，野生動物有 176 科 650 種。

該保留區係於民國七十五年依據「文化資產保存法」之規定公告設立的，其目的在於保護本省北部山區自然生態體系，主要保護的對象為天然闊葉樹林與棲息其間之野生動物，以供為基因保存、永久觀察與教育、研究之場所。

執行目的

- (1)擬解決問題：加強對哈盆自然保留區之自然資源加以管理及維護，以免遭致破壞，長期留供學術研究之需。
- (2)全程計畫目標：依據保留區周圍環境、地形地物景觀等之特徵，研究並進行細部規劃，如參觀、研究路線、步道之設定、解說、標示牌之設置等，供為日後自然保留區管理維護之參考。

執行情形及成果

- (1)為有效管制遊客進入保留區，將原設管制站內移至保留區北端，並增設南端管制站，以加強護管工作。
- (2)管制站全天派員駐守，登記出入人數及其動態，以管制非法人員入山，並進行宣導工作，勸退狩獵者約 20 人次，捕魚者約 15 人次。
- (3)定期派員至保留區內巡視，以瞭解現場情況，進而防止及取締漁獵等不法行為，全年派出巡山人員約 120 人次，在哈盆溪畔拆除違建獵寮 1 處及在保留區內毀棄獵具，鐵夾 60 個，成效良好。

檢討及建議

本保留區，以往遭遇最大之問題，為保留區南端人員進出無法管制，使登山客及山胞可由南端自由進出，故只能藉加強巡視來管理。目前南端管制站已完成，應可有更完善之管理。

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鴛鴦湖自然保留區管理維護計畫執行報告

陳 章 琳

李 鐘 雄

前 言

鴛鴦湖自然保留區，位於新竹縣東南方尖石鄉大漢溪集水區之上游，亦即在森林開發處棲蘭山林區之大溪事業區，第89、90、91林班內。全區面積約374公頃，湖水面積3.6公頃，湖之四周為沼澤地，沼澤地面積約2.2公頃，沼澤地外圍之山地則為最具經濟價值之檜木林，自然生態相當完整。

該區於民國58年，在國科會經費支助下，由森林開發處與林業試驗所合作進行調查規劃工作，於民國62年完成調查工作後，即設立為「自然保護區」此為本省最早創設者。設立後之管理維護工作，均由森林開發處負責。

民國75年6月27日政府依據文化資產保存法，將鴛鴦湖公告為「自然保留區」，並指定森林開發處為管理機關。由農委會專款支助，及森林開發處籌措配合款，繼續執行管理維護工作。保留區主要保護對象為湖泊、沼澤、紅檜、東亞黑三稜等。其他植物有水生植物羣落，濕生植物羣落及中生森林羣落，共達100餘種。另有鴛鴦及野鴨等珍禽鳥類，已發現者有14種，此外並有山鹿、飛鼠、猴羣等動物出沒。

目 的

1. 由於科技發達及人口增加之壓力，對人類賴以維生之自然資源開發極其迅速，而在人類尚未完全瞭解生育地之環境及自然資源保育重要性之前，自然環境遭受破壞，已處處可見，由此具有代表性生態體系之鴛鴦湖地區，尤有保留其生態完整之必要。
2. 鴛鴦湖自然保留區，可提供學術界對生物、地質科學及自然資源與環境教育等之研究，如：
 - (1) 水生及濕生植物生態與分類之研究。
 - (2) 苔蘚植物生態與分類之研究。
 - (3) 檜木林之發育演替及更新之研究。
 - (4) 水禽類及候鳥生態之研究。
 - (5) 集水區經營及溪流水污染之研究。
 - (6) 高山湖泊形成之研究。
 - (7) 四種新紀錄植物來源之研究。

行政院國軍退除役官兵輔導委員會森林開發處
宜蘭市林森路100號

執行情形與成果

- 1.設置管制站：森林開發處除在100線林道入口處，設有守衛站，以管制人員進出外，並在鴛鴦湖入口處設置管制站，派駐專人嚴格管制人員進出，未持有「進出證」者，不得進入。
- 2.設置公告牌與解說牌：在100線林道入口處及鴛鴦湖入口區，各設置公告牌乙座，使一般民衆能瞭解設立「鴛鴦湖自然保留區」之法律依據及管制內容。另在鴛鴦湖入口處設立解說牌，說明鴛鴦湖自然保留區之位置、地況、湖泊、鳥類、植物羣落及新紀錄植物等資訊，利於教育及學術研究。
- 3.限制人員進出：依據農委會核定之「鴛鴦湖自然保留區管理要點」管制人員之進出及辦理相關業務。依規定學術研究或教育機構始得申請進入鴛鴦湖自然保留區，經森林開發處審查同意後發給「進出證」。入山時應辦理「入山證」及「平安保險」，出區時應將「研究工作報告」交回森林開發處參考。
- 4.統計入區人數：按季將入區人員所屬單位、入區日期、入區人數、入區事由等資料函送農委會備查。
- 5.管理維護工作：雇用工人擔任區內巡邏及維護工作，並將管制情形填報於「週報表」以掌握動態，並作管制作業之參考。
- 6.由於嚴格實施管制及管理維護工作，本保留區繼續維持最完整之自然狀態，並利於學術研究或教育機構，從事自然環境生態研究及教學工作。

檢討與建議

- 1.加強宣導教育與協調警方合作，取締非法入區者；鴛鴦湖隨著知名度提高，慕名而來者與日增多。對未獲同意入區者，管理人員因職責所在予以勸阻，常發生爭執，甚或到處訴求。
- 2.賦予管理人員司法權：該區位於深山中，無通訊設備，離警察單位相當遙遠，故在取締違犯者，常遭遇困難。

大武山自然保留區、緩衝區管理維護計畫

邱 健 介

壹、前言

大武山自然保留區位於中央山脈南端東向坡面，台東縣太麻里、金峰、達仁鄉境內，該區範圍均屬國有林班為台東事業區18~26、35~40、42、43~51林班及大武事業區2~10、12~20、24~30林班，另屏東事業區25林班內之巴油池高山湖泊區域亦包含在該保留區內，面積達四萬七千公頃，包含目前台灣地區所留存面積最大、林相最完整的天然闊葉樹林地，為本省中、低海拔區域最具代表性之原生森林生態系。另於該保留區的西側為屏東事業區24~31林班，潮州事業區4~9、12、13、15林班等面積約二萬一千公頃之林地，其森林被覆除極少部分因道路開發、礦石開採而裸露外，大部分地區尚保有天然狀況，仍深具生態保育之價值，且有周邊緩衝襄輔大武山自然保留區之功能，而將其列為緩衝區。

貳、目的

依據文化資產保存法第52條「自然保留區禁止改變或破壞其原有自然狀態」之規定，及行政院農業委員會自然文化景觀審議小組委員會議所提緩衝區需依林區經營管理計畫，嚴格執行森林經理作業，其土地利用非依法定程序，禁止變更使用方式擴大面積」之結義，嚴格執行上述區域之管理，以達到

- (一)保持大武山地區天然原生的狀態。
- (二)維持自然保留區、緩衝區內生物的多樣性。
- (三)提供高、屏、台東地區集水區上游的水土資源的保護。
- (四)維護並保障台灣東南部區域性生態系統穩定。

參、執行情形與成果

本計畫執行的方法分下述三方面進行：

一、野生動物保育巡邏及違獵器具之拆除

由當地工作站僱用山胞組成「大武山區自然保留保育巡邏隊」赴林野現場巡邏搜查

邱健介：林務局森林育樂組保育課

台北市杭州南路一段2號100

、拆除違獵器具，本巡邏任務在保留區有六條路線，緩衝區也有六條路線，分別進行定期、不定期的巡查，主要的工作內容為：巡護林地、保護森林、勸誡取締違法狩獵、毒、電魚、採摘植被物及拆除林班地內之獵具、陷阱、獵寮等，並嚴加防範森林火災之發生，藉以減低捕獵壓力並維護森林生態之完整，俾具體保護區內的野生動物。執行成效可由該大武山區未公告為保留區前之獵寮、陷阱及毒、電魚活動極為公開，隨時到處可見，迄今各巡邏路線上，已極少發現上述違法行為，且只要到位於該保留區邊緣的比魯溫泉區就可以輕易的見到獼猴及山羊群嬉，而沿溪沙床滿的獸跡，滿河的何氏棘魷，便是四、五年來巡邏保育成果的例證。

二、自然保育教育宣導

在進入該山區之主要入山道路設立大型標示牌，以向進出人員宣告該保留區之範圍及相關之規定；另在捕獵及毒、電魚較常發生的地段位置小型警告牌，隨時提醒在此活動的人知所戒懼而消殘害野生動物的念頭；目前已設置大型標示牌二十餘面，而小型警告牌則有百餘面遍植於該區內。此外，派員參加當地村里民大會及當地居民之大型聚會，以及赴學校、教會等宣傳自然保育、野生動物保護新知及政令，呼籲民眾共同維護天然資源。另提供當地之保育資訊供傳播媒體做為新聞、廣播之素材，以讓全國民眾了解、珍視，進而支持該自然保留區之設立。

三、自然保留區之經營管理

遵循相關規定停止保留區內開發案件，並避免緩衝區內新增開發案件之核准；而該地區除提供科學研究、教育解說外，不開放觀點、登山旅遊以免帶來污染及干擾影響野生動物之棲息。另已將違法捕獵野生動物、毒、電魚，採摘蘭蕙等案件之查緝通報，列入七九年新頒訂的「台灣省政府農林廳林務局森林護管工作要點」內，使野生動物、自然保留工作成為林政管理巡山人員重點工作項目的一環，使得該自然保留區的維護得到更明確的保障。此外由太麻里溪、大行溪、知本溪溪流魚類棲地之調查了解該地區現有魚類資源之分布概況，並結合各學界專家在當地所做調查所得結果，使經營者得以掌握生態核心區之所在而加強保護之。

肆、結語

大武山地區從77年設立自然保留區之初，尚隨處可見獵寮、違獵陷阱、網、電魚、採掘蘭蕙等違法行為，到今天本計畫工作執行的第四年，沿溪路途已不見獵寮，代之而起的是獸跡及滿溪的魚群；雖說該地區的違獵行為仍未絕跡，但四年來的野生動物保育巡邏，確已使非法行徑銷聲匿跡，而使野生動物能放心的在這塊林野間孳養生

息。至於未來在配合文資法有關規定的修正，將能使該大面積的自然保留區得以分級分區加以規劃、經營、管理，並依其性質、等級採嚴格管制或提供民衆做為教育參觀等無害於自然保育之使用，如此使自然保育工作與民衆需求相契，必能更符合該保留區未來的發展。

坪林台灣油杉自然保留區管理維護計畫

黃 忠 和

一、執行目的

台灣油杉 (*Keteleeria formosana Hayata*) 為台灣之固有種，於本省呈不連續分佈於島之南北兩端，南部族群分佈於枋寮山克拉油社附近海拔 900 公尺，大武山之大竹溪台東林區管理處第30林班海拔 500 公尺之向陽地帶。北部則散佈姑婆寮溪、金瓜寮溪之分水嶺，礁溪、石牌之分水嶺及坪林沿高壓稜線上，海拔 300 至 600 公尺之處，部分學者認為此一特殊分佈現象，或是由於台灣與大陸原本相連，直至台灣海峽陷落，地理隔離，遂成為一獨立種，再加上在北美、歐洲及日本本州第三世紀地層中，已發現油杉之化石，因此；台灣油杉極具生態地理學及植物分類學之研究價值。

坪林台灣油杉因本身毬果天然不孕性種子佔多數，且四周環境雜木叢生，天然競爭下幼苗生存不易，再加上分佈低海拔，農業發展的結果使天然林遭受嚴重破壞，僅存孤立木數十餘株，本區設立之目的在於保護台灣油杉，避免遭受人為的干擾破壞，期能循自然演進過程，保護台灣油杉，以為科學、教育研究之用。

二、執行情形

(一)標示牌整理

本保護區分為三小區，78年度依農委會規定之型式，規格製作大型標式牌兩面，設置於文山事業區28、29林班明顯適當處，並分別於三個小區出入口明顯處設置解說牌，提醒民衆不得進入保留區內進行違反文資法規定之行爲。這些解說牌因位處山地，受天候及人為影響而損壞，故加以整理維修，使其充分發揮公告，警告及解說的功能。

(二)現場巡邏保護

巡邏保護為保護區管理維護之基本工作，由於本區租地造林佔大部分 (94.2 %) 且鄰近茶園易受人為干擾，本處派專人巡邏保護，每月至少巡邏 8 次以上，有效制止破壞情事發生。

(三)步道整修

原於區內各母樹間開設步道 9,960 公尺，因山區坡陡且多雨屢有損壞，本年度雇工整修，以利巡視員巡護及生態習性觀察研究。

(四)製作幻燈片、印刷出刊摺頁解說

製作台灣油杉生態幻燈片及摺頁，介紹台灣油杉分布、特性等，提供生態資源解說之軟體服務。

三、結果與建議

羅東林區管理處育樂課課長
宜蘭縣羅東鎮中正北路 118 號

- 一、由於保留區內大部為租地造林，無法制止承租人從事農耕及撫育工作，為維護自然狀態，已由台北水源特定區管理委員會與台北縣政府完成補償費查估辦理租地回收後可維護區內台灣油杉之自然完整。
- 二、台灣油杉現存不多且幼苗不易發生已瀕臨絕滅，是否應於保護區周邊之緩衝地待實行復育工作以延續油杉族群或保持原狀任其自然，應請學者專家研究評估之。
- 三、本區邊臨茶園，人類活動頻繁，仍應加強巡視以避免破壞行為之發生。

淡水河口紅樹自然保留區管理維護計畫

黃忠和

一、執行目的

淡水河口紅樹林分布於淡水至竹圍間淡水河岸，主要構成植物為紅樹科（*Phizophoraceae*）水筆仔屬（*Kandelia*）之水筆仔（*Kandelia candel Drace*）純林。本區最大的價值在其知性的功能，因為水筆仔是少見的胎生植物，紅樹林及其中共同生活的各種生物構成極為特殊的生態系，也是最佳的戶外生態實驗室。

本計畫執行的目的在保護紅樹林供為科學研究及教育對象，使社會大眾認識大自然的奧秘，進而培養愛護自然生物及國家鄉土的優美情操，達到寓教於樂的最高目標。

二、執行情形

(一)環境整理

淡水河口紅樹林屬河川地，入口常年為附近民衆丟棄垃圾及上游堆積廢棄物致環境髒亂不堪，惡臭難忍，對研究人員參觀者造成嚴重的不便與困擾。本處定期僱工整理環境，但限於經費僅能針對局部民衆易到達處進行垃圾清運工作以改善環境衛生，提供較佳的環境品質。

(二)巡視保護

為保持區內紅樹林自然生態體系原始狀態，避免遭受人為干擾破壞，本處不定期經常派員巡視，防範破壞情事發生。

(三)解說服務

80年3月30日與救國團合辦「紅樹林知性之旅」由本處派員分批引導解說，藉自然教育解說灌輸民衆愛護自然保育生態之觀念。

(四)印製解說摺頁

摺頁內容包括淡水紅樹林位置，水筆仔胎生現象，棲息其中之生物世界，宣導愛護自然保育生態之觀念。

(五)環境界圍籬

本區 $\frac{1}{2}$ 周界緊靠台北市捷運淡水線及毗鄰私有土地，為防止人為干擾設置圍籬欄杆2419公尺，護坡擋土牆557公尺，除可預防不法進入保留區，並可作為解說活動及參觀展望平台使用。

三、結果與建議

(一)本區最迫切的問題在於淡水河上的垃圾每逢大雨或颱風過後即堆積於紅樹林下，雖然目前本處定期僱工局部清局，但是無法徹底乾淨，惟有期待淡水河系污染整治間

羅東林區管理處育樂課課長
宜蘭縣羅東鎮中正北路118號

題解決後，居下游的紅樹林保留區再積極配合於外圍設置網柵以攔阻廢物進入，並清撿卡在紅樹林的垃圾，才是維護全區清潔的治本之道。

- (二)淡水河口紅樹林自然保留區位於大台北都會區邊緣，慕名而來的民衆甚多，本處常應中小學校師生及親子團體要求引導參觀並提供解說服務，亟需建立一套完整的解說系統，提供參觀者正確完善的環境解說與自然生態資訊達成本區提供戶外生態教室的目的。
- (三)定期巡視發視取締破壞紅樹林生態環境，行為是保留區管理維護之基本也是最重要的工作，因本區交通方便，為避免附近民衆及遊客之干擾，仍應加強巡視工作。

苗栗三義火炎山自然保留區管理維護計畫

林 阿 杉⁹

前言：

近年來由於社會科技昌明，經濟蓬勃，舟車運輸更加便捷暢通，相形的加速對天然資源的開發與利用，植被頻遭破壞，水質污染，原來優美的天然景觀日漸消失，殊為可惜，令人痛心。為我們後代子孫延續生存的前瞻，自然生態保育乃為維繫人類社會，及其文明發展的一個重要環節。

一、本計畫執行的目的：

苗栗三義火炎山地形外觀山係由許多崩坍壁立的小山峯及無數深窄山谷，卵石河流組合而成的獨特地理景觀，區內蘊育著本省最大林分的原生馬尾松植群，這片原生馬尾松林隨著粗鬆的地質不斷地崩落，但在峭壁上馬尾松又多量天然下種更新，此種具有特殊地形、地貌及生態體系景觀彌足珍貴，有鑑於此，經專家調查審查通過，由行政院農業委員會依據「文化資產保存法」於75年6月27日公告列為自然保留區，期以法律來保護此一淨土，避免遭受人為的破壞，以提供國人對自然科學教育及學術研究。

二、執行情形：

(一)依據省府「加強自然生態保育工作方案」本計畫之執行分五年完成，執行期限自七十七年七月一日起至八十二年六月卅日止，工作內容包括：1.境界勘查範圍測量埋設界標。2.自然保留區管理維護計畫之擬定。3.基本資料之收集和建立。4.管理步道之開設和維修。5.派員常川巡邏以防止盜採砂石、木、竹及狩獵。6.保留區內動、植物生態調查，建立檔案資料。7.大型解說牌、告示牌、警告牌之設立。8.解說摺頁、簡介編印。9.安全設施之設置。10.區內環境清潔維護等。至目前（八十一年四月卅日）執行成果如下：

- 1.完成本區219公頃04之境界測量，西南面崩塌地形景觀區與河川地及原野交界處埋設水泥柱界標計14支。
- 2.完成景觀區內（76公頃83）胸徑8公分以上樹木之每木調查工作，分析本區內植物群相計有松樹、楓香、樟樹、相思樹、烏桕、車桑仔、羅氏鹽膚木等35,869株，立木材積4,354 m^3 87。
- 3.在嚴重崩塌而地勢險峻具有危險性區段施設安全圍欄600公尺。

林務局新竹林區管理處

地址：新竹市中山路二號

郵遞區域：30027

電話：(035)224163～6

- 4.設有大型解說牌四座、公告牌五座、標示、警告牌 15 面、樹木牌 35 支，期以此喚起國人對本區珍貴地形、地貌及生態系的重視，暨勸導民衆勿進入狹谷以免發生意外。
- 5.本區動、植物（含鳥類、昆蟲）之生態調查，並拍攝區內動、植物生態系及地景幻燈片供教育解說。
- 6.管理步道之維修及環境維護，並派專人常川巡視以防範盜伐、盜採、濫墾及森林火災之發生。
- 7.辦理崩場景觀區約八十公頃內租地補償收回。

(二)本期（八十一年七月一日至八十二年六月卅日止）計畫執行之工作：

- 1.解說牌及標示牌製作、維修。
- 2.專人常川巡視防範盜伐、盜採、濫墾及森林火災之發生。
- 3.管理步道之維修及區內環境維護。
- 4.繼續區內租地補償收回。
- 5.拍攝崩場地地形景觀及植物生態變化之資訊資料建立檔案。
- 6.製作幻燈片作為解說教育之教材，及編印自然保育資料，贈送民衆喚起國民對自然保育觀念之共識。

(三)需要繼續進行工作：

為建立此自然保留區的完整永續資料，除依「文化資產保存法」加強其保護措施，以防止外力加予的破壞外，對此地區地理景觀的變動及生態體系的演替，將擬定計畫每二年委託專家辦理一次調查、分析，又每隔 5～10 年或發生重大災變後辦理一次總調查，以瞭解各種生態體系的變化情形作為系統的資訊資料，供科學研究。

三、結果與建議：

(一)結果：

「苗栗三義火災山自然保留區」得以保持其原來面貌，主要有「文化資產保存法」及「台灣地區自然生態保育方案」之法令依據及生態保育區及自然保留區保育措施等，可供主管機關作為經營管理之標準，並且由保育界人士不遺餘力共同致力於保育觀念之宣導及落實自然保育工作的結果。

(二)建議：

- 1.苗栗縣政府負責清除之中苗六線道路及河川地上，淤積高出路面砂石後之空曠地，現被民衆用為傾倒垃圾，有關機關務必寄予重視，加以管理，以免污染環境，

破壞景觀。

2. 本區蘊育著全省較大林分的天然生馬尾松族群，具代表性生態體系，禁止改變或破壞其原有自然狀態，但火炎山自然保留區新中苗六線公路之間，有一塊狹長的河川地，此河床地有砂石廠以蠶食方式拓闢河床地利用，此舉對火炎山之景觀影響甚鉅，應加以遏止，以保護此區自然生態景觀不受人為的破壞，而得以永續。

台東紅葉村台灣蘇鐵自然保留區管理維護計畫執行報告

劉 肯 學

一、前 言：

台灣蘇鐵自然保留區位於本處轄區延平事業區第19、23及40林班，沿鹿野溪兩岸地區，面積290公頃46，東西狹長達7公里之長，台灣蘇鐵北岸分佈較南岸為多，海拔高約300公尺至800公尺，因台灣蘇鐵為雌雄異株，因此呈群落分佈，單株生長較少，且係陽性樹種，喜陽光照射不喜潮濕及遮陰等特性，因此在開曠之山坡上生長較多，甚至峭壁及崩場地亦有其蹤跡，分佈地區甚廣，但以延平19林班接近延平23林班處之「蘇鐵園」數量最多，生長情形最為良好。

台灣蘇鐵(*Cycas taiwaniana*)在植物分類學上係屬於裸子植物、蘇鐵科、蘇鐵屬，係常綠棕櫚狀小喬木，雄穗花成長圓錐形長約60至80公分，雌穗花成卵圓形直徑約2至3公分長約4至5公分，於5至6月份開花，8至9月份結果，樹形甚為優美，係一般民眾所喜愛之庭園植物。

蘇鐵屬之植物共有16種，在台灣常見者為台灣蘇鐵，光果蘇鐵及蘇鐵等三種，原產於台東者為台灣蘇鐵，目前台灣蘇鐵自然生長者除本區及成功事業區第31、32林班外其他地區已非常的少見，本保留區台灣蘇鐵原始生長分佈面積達二百九十多公頃更為珍貴，因此成立「台灣蘇鐵自然保留區」更具有實質的意義。

二、執行目的

本保留區係本省台灣蘇鐵天然生長分佈最廣，數量最多，生長最為良好之地區，為保存本地區台灣蘇鐵永續生長，林務局於民國69年設立「台灣蘇鐵保護區」，農委會於民國75年6月27日依據文化資產保存法正式公告本區為「台灣紅葉村台灣蘇鐵自然保留區」，農委會復於77年9月7日公告台灣蘇鐵為「珍貴稀有植物」而加於保護，因本保留區係屬國有林班地之範圍，故亦受森林法之規定保護之。

本處為保存本地區原始天然生台灣蘇鐵及其生態環境，除保存天然原始森林，不處分主副產物外並派員加強巡護觀察、現況調查及調查台灣蘇鐵三株數，以防止盜取台灣蘇鐵及其種子，使此珍貴稀有之活化石—台灣蘇鐵永續生長，保存物種基因以供科學及教育研究之用。

本保留區主要保護對象為原始生長之台灣蘇鐵及其生態環境，為達成此項目的，本計畫目的可分為長程計畫目的及近程計畫目的等二項。

執 行 單 位：林務局台東林區管理處 地 址：台東市廣東路297號

執 行 人：處 長 劉 肯 學 電 話：(089)324121

(一)長程計畫目的

- 1.定期巡視及不定期督導觀察，以加強保護台灣蘇鐵之安全。
- 2.禁止砍伐區內之林木及採取副產物。
- 3.嚴禁盜伐、濫墾、放牧、狩獵及引火等案件之發生。
- 4.嚴禁採取礦物、土石、設置水權、林地放租及變更地形地物等之行爲發生，以維護生態體系之完整。
- 5.禁止影響台灣蘇鐵生態環境之人爲破壞行爲。
- 6.連繫當地警察及行政機關協助取締不法行爲。
- 7.發現台灣蘇鐵罹患病蟲害及其他自然災害時，應即報告上級機關並迅速做適當之處理。
- 8.本保留區不供遊憩，禁止一般民眾任意進入。
- 9.禁止拋棄垃圾及堆放廢棄物。
- 10.宣導自然保留區之重要性，啓發全民愛護珍貴稀有動植物之觀念。
- 11.提供並協助科學及教育研究之工作。

(二)近程計畫目的

- 1.加強巡視督導觀察及照相等工作，以保護台灣蘇鐵之安全。
- 2.防範盜伐、濫墾、放牧、狩獵及引火等案件發生。
- 3.豎立標示牌、警告牌及警告標語牌，加強宣導本地區之重要性及違禁事項。
- 4.蒐集生態環境及調查台灣蘇鐵株數及生長情形之資料。
- 5.勸導登山遊客勿進入保留區內活動，以免影響台灣蘇鐵之生存。

三、執行情形及成果

本保留區管理維護計畫自民國75年7月1日起開始實施至民國79年6月30止累計具體成果爲在本處桃源林產物檢查站旁及紅葉村內設置大型標示牌各一面，於民國76年12月派員從事現況調查及施行每木調查工作，測定台灣蘇鐵之直徑及樹高並懸掛壓克力號碼牌，共計調查台灣蘇鐵 800株。本處於民國77年6月份在保留區入口處興建一所護管站房，並於79年5月份派員再從事每木調查，結果增加台灣蘇鐵 300株，使調查台灣蘇鐵株數增至1100株。本保留區除每月派員從事督導觀察及照相等工作。

80年度本保留區具體成果爲：

- (一)由關山工作站派員從事巡視工作，一年來合計巡視共28次，經查尚未發現有盜伐盜採及其他不法情事發生。
- (二)本保留區因面積遼闊地形崎嶇不平，惟恐當時調查時有遺落，本年度再度派員從事生育地及漏查木調查，結果增加調查台灣蘇鐵 265株，使台灣蘇鐵目前懸掛號碼牌有案者共計1365株。
- (三)本區台灣蘇鐵懸掛之號碼牌因日曬雨淋有部份損毀，字跡不清楚者或鉛線過緊妨礙生長者，經派員從事更新工作。
- (四)爲督導現場巡視情形，由本處派員至現場抽查巡邏箱並從事觀察及照相等工作，合計共 8 次。
- (五)爲提醒民眾愛護台灣蘇鐵，防範盜取台灣蘇鐵及其種子之情事發生，於紅葉村內及保留區入口處新設立大型警告牌各一面。

四、檢討與建議

- (一)本保留區內台灣蘇鐵結實情形甚爲良好，建議適量的採種，在平地苗圃繁殖，供應一般民眾所需，如此不但可達到保育利用之目的，並且可防止民眾盜取保留區內之台灣蘇鐵。
- (二)台灣蘇鐵保留區係甲種山地管制區，建議警政單位加強管制非法入山檢查工作，違者依法從嚴究辦。
- (三)加強宣傳及教育工作，建議主管單位利用電視大力宣傳自然生態保育之觀念，並列入各級學校課程，教導學生養成愛護野生動植物之觀念。

大武事業區台灣穗花杉自然保留區管理維護計畫執行報告

陳 守 發

一、前 言：

台灣穗花杉自然保留區位於本處轄區大武事業區第39林班之西北部，在中央山脈南段之大漢山東南面山坡，鄰近屏東縣與潮州事業區第19林班相毗鄰，保留區面積為86公頃40，台灣穗花杉分佈於海拔1100公尺至1500公尺左右，本地區林木除台灣穗花杉為裸子植物外，其他皆為被子植物闊葉樹林，林木目前尚保存原始狀態。

台灣穗花杉 (*Amentotaxus formosana*) 在植物分類學上係屬於裸子植物，穗花杉科、穗花杉屬，為常綠小喬木，葉對生呈鐮刀狀披針形，表面深綠色且有光澤，背面有兩條白色氣孔帶甚為明顯為其特徵之一，花雌雄異株，雄花多數懸垂如穗集成柔荑花序（屬名及樹名因此而得名），每穗長約 5 公分，三至五穗生長於小枝頂端，雌雄花三、四月間同時開花，毬果於六、七月間成熟，種子具有長柄，橢圓形，直徑約 1 公分，長約 2 公分，周圍包有紫紅色之假種皮，當年成熟。

台灣穗花杉產於台灣南部之大漢山及姑仔崙山一帶附近，目前因部份原始森林遭到破壞，台灣穗花杉之數量已非常稀少，因此成立台灣穗花杉自然保留區更具有實質之意義。

二、執行目的

本處於民國六十二年間辦理林相變更材積調查時，在大武事業區第39林班發現此稀有樹種，因此未劃入處分區域範圍而加以保留，當時本處為免破壞此稀有樹種之生態環境，將附近近百公頃之林木均未予處分而很完整的保留下來，此項保留在生態保育史上可說是一件很大的貢獻，當時本處除不再處分主副產物外，並派員加強巡護工作，防範盜伐盜取之案件發生。

本區於民國69年由林務局設立「台灣穗花杉保護區」，以保護台灣穗花杉之安全。農委會於民國75年 6 月27日依據文化資產保存法正式公告本區為「大武事業區台灣穗花杉自然保留區」，農委會復於民國77年 9 月 7 日公告台灣穗花杉為「珍貴稀有植物」而加以保護，因本保留區係屬國有林班地之範圍，亦受森林法之規定保護之。

本保留區主要保護對象為原始生長之台灣穗花杉及其生態環境，使台灣穗花杉永續生長，保存物種基因，以供科學及教育研究之用，為達成此項目的，本計畫目的可分為長程計畫目的及近程計畫目的等二項。

執行單位：林務局台東林區管理處

地址：台東市廣東路297號

執 行 人：保育股長陳守發

電話：(089)324121

(一)長程計畫目的

1. 定期巡視及不定期督導觀察，以加強保護台灣穗花杉之安全。
2. 禁止砍伐區內林木及採取副產物。
3. 嚴禁盜伐、濫墾、放牧、狩獵及引火等案件之發生。
4. 嚴禁採取礦物、土石、設置水權、林地放租及變更地形地物等之行爲發生，以維護生態體系之完整。
5. 禁止影響台灣穗花杉生態環境之人爲破壞行爲。
6. 連繫當地警察及行政機關協助取締不法行爲。
7. 發現台灣穗花杉罹患病虫害或其他天然災害，應即報告上級機關並迅速作適當之處理。
8. 本保留區不供遊憩，禁止一般民眾任意進入。
9. 禁止拋棄垃圾，堆放廢棄物。
10. 宣導自然保留區之重要性，啓發全民愛護珍貴稀有動植物之觀念。
11. 提供並協助科學及教育研究之工作。

(二)近程計畫目的

1. 加強巡視、督導、觀察及照相等工作，以確保台灣穗花杉之安全。
2. 加強取締盜伐、濫墾、放牧、狩獵及引火等不法案件發生。
3. 豎立標示牌、警告標語牌及設立自然保育陳列室，以加強宣導保護稀有動植物之重要性。
4. 加強蒐集生態環境資料，調查台灣穗花杉之株數及生長情形。
5. 勸導登山遊客及獵戶勿進入保留區內活動，以免影響台灣穗花杉之生存。
6. 商請學術研究單位從事台灣穗杉各項實驗研究計畫。

三、執行情形及成果

本保留區管理維護計畫自75年7月1日起開始實施至79年6月30日止累計具體成果爲民國76年在大漢林道23公里處及保留區內設立大型標示牌各一面。於民國76年2月份派員從事現況調查及每木調查，測定台灣穗花杉之直徑及樹高並懸掛壓克力號碼牌，共計調查台灣穗花杉 421株，於民國79年2月份再從事調查工作，使台灣穗花杉之株數增

至 460株，本保留區除每月派員加強巡護工作外並派員從事督導觀察及照相等工作。

80年度本保留區具體成果為：

(一)由大武工作站派員從事巡視工作，一年來合計巡視13次，經查尚未發現有盜伐濫墾及其他不法情事發生。

(二)本保留區因面積遼闊地形崎嶇不平，惟恐當時調查時有遺珠之憾，本年度再派員從事生育地及漏查木調查，結果增加調查台灣穗花杉21株，使台穗杉目前懸掛號碼牌有案者共有 481株。

(三)本區台灣穗花杉所懸掛之號碼牌因日曬雨淋有部份損毀、字跡不清楚者或鉛線過緊妨礙生長者，經派員從事更新工作。

(四)為督導現場巡視工作情形，由本處派員至現場抽查巡邏箱並從事觀察及照相等工作，合計 8 次。

(五)為提醒民眾愛護台灣穗花杉，防範盜伐盜取台灣穗花杉之案件發生，於大漢林道 23公里處及保留區內新設立大型警告牌各一面。

(六)為提升科學教育研究之功能，本處本年度委託「國立屏東技術學院森林資源技術系」完成「地理資訊系統應用於台灣穗花杉族群變化之研究」報告。

四、檢討與建議

(一)台灣穗花杉係本保留區外其他地方甚少生長，建議與學術單位進行合作從事區外繁殖工作，並選擇適當地點從事區外小面積造林工作。

(二)台灣穗花杉保留區係甲種山地管制區，建議警政單位加強管制非法入山檢查工作，違者依法從嚴究辦。」

(三)加強宣傳及教育工作，電視係目前效果最佳之大眾傳播媒介，建議主管單位善加利用，並將自然生態保育之重要性，列入各級學校課程，教導學生養成愛護野生動植物之觀念。

南澳湖泊及原始闊葉樹林保護區經營管理計畫

黃 忠 和

一、執行目的

南澳湖泊及原始闊葉樹林保護位於宜蘭縣南澳鄉，屬和平事業區87林班第8小班之一部分，全區以神秘湖為中心，四週稜線為界，海拔高度1000～1500公尺之間，以神秘湖及周圍原始闊葉樹林為保護對象。目前湖泊濕性演替已屆晚期階，整個湖面已充滿水生植物，上下游淤積河床上已有早期森林出現，四週山地為櫟林帶原在台灣佔有最大分佈面積，但因地處過去伐木及造林之主要地帶，大多數林天然已改為單純的人工林，對於此種中海拔天然闊葉樹林，湖泊演替及沼澤植物與森林之消長生態現象極有保存價值此外區內東亞黑三棱，微齒眼子菜、卵葉小丁香、小狸藻、小葉四葉葎及水社柳等稀有植物均需加以保護。故本保護區經營之目的在維護自然原始風貌避免人為干擾破壞，使生態系之功能得以正常運行俾能提供學術研究及自然教育之用。

二、執行情形

(一)森林巡護

本區由於鄰近山地保留地，為避免山胞及慕名而來的登山遊客破壞自然環境，每週至少執行一次集體巡護，防範破壞行為。

(二)解說教育

本區地處山地南澳鄉，為使本計畫所推行之各項保育工作得到當地民衆的支持與配合，特於80年5月25日假南澳國中週會時間舉辦生態保育講座，灌輸生態保育觀念及介紹保護區保育對象及意義，並舉辦有獎徵答，氣氛熱烈。

(三)調查研究

委託台大動物生態研究室調查研究保護區內動物，水生生物資源調查。結果顯示，區內生物種類歧異度高且未有外來種，仍保持自然原始狀態。

(四)林（步）道整修

以挖土機配合人工整理金洋村至保護區入口長約1.3公里因颱風豪雨損壞之林道。又區內步道長約9公里因雜草茂生或受天氣損毀，僱工伐除雜草整理路面以便利森林巡護及調查研究工作。

(五)折頁製作

完成保護區簡介折頁製作，介紹區內動植物生態環境特質，並強調本區保育及學術研究價值，廣為宣導自然生態保育觀念。

三、結果與建議

羅東林區管理處育樂課課長
宜蘭縣羅東鎮中正北路118號

- (一)本保護區由於接近山地保留地，區內山胞活動頻繁，為加強對山胞宣導生態保育觀念本年度在南澳國中實施解說教育結果獲致熱烈迴響，今後仍應經常舉辦類似活動以期自然保育觀念向下紮根，使當地居民了解保護自然環境的重要性，進而能減少破壞行為。
- (二)神秘湖水域及四周沼澤之濕生植物演替及湖泊森林消長現象為研究生態學極佳例證。目前已完成植群生態及動物相調查，此外氣象、水文、地質、水生生物之調查研究及生態變化現象的長期連續觀察研究均亟待研究。
- (三)自然保護區保存完整自然的生態環境，不僅是科學研究，也是國民教育的最佳題材，為充分發揮保護區之功能，應加強宣導解說，以增加民衆的認知，進而愛惜維護自然資源。

澎湖自然保留區保育管理

洪松棟

前 言

澎湖縣群島羅列，其中多數無人島地質風貌殊異，玄武岩、怪石嶙峋，且棲息海鳥種類及數量繁多，形成特殊景觀資源，唯長年來缺乏管理，部份島嶼被國軍充作砲擊靶場，漁民遊客經常至島上檢拾鳥蛋及製造污染，嚴重破壞海島生態環境，亟應全面調查評估，並選擇適當島嶼劃設自然保留區，加強保育管理，以維護無人島自然生態景觀。

計畫目的

選擇碇鈎嶼、雞善嶼劃定為自然保留區，加強保育管理，取締非法侵入保留區內島嶼採捕動植物及其他破壞生態環境行為。

執行成果

本府澎興號巡邏護船及僱船不定期加強巡邏各自然保留區，雖偶有部份觀光客進入觀賞，但未發現有採捕動植物及破壞生態之行為。並製作告示牌設置於保留區，警告遊客、漁民禁止改變或破壞其原有自然狀態及禁止捕獵網釣或破壞指定之珍貴稀有動植之行為，俾免觸法受罰。

檢討與建議

據本縣各級民意代表及漁民反應，國軍部隊經常於雞善嶼、碇鈎嶼等地實施炸射訓練，嚴重破壞自然景觀，請農委會協商國防部飭屬停止於該自然保留區實施炸射，以維自然生態環境。

阿里山台灣一葉蘭自然保留區管理維護計畫

邱 垂 鴻

林 聰 德

阿里山台灣一葉蘭自然保留區管理維護計畫執行報告(81年度報告)

一、前言

台灣一葉蘭(*Taiwan pleione*)屬蘭科，一葉蘭屬之落葉性多年生植物，由於其花姿優雅，廣受園藝愛好者歡迎，而其來源又多以直接採自山區之球莖為主，導致野生族群數量不斷減少。行政院農業委員會自然文化景觀小組第卅五次聯席委員會議選定阿里山事業區第30林班內族群較集中，足堪代表之區域共 51.89公頃劃定為阿里山一葉蘭自然保留區後，本處隨即自民國七十九年七月一日起積極展開該保留區之維護與保育工作，俾能妥善維護其野生族群免於遭受破壞，除加強保護及巡邏外，為徹底了解其植群生態並建立完整之基本資料，本(八十一)年度起已擬訂監測計畫，對其形態變異，生態環境繁殖方式，族群構造，岩生演替等予以長期監視調查，以為日後經營管理研究分析與檢討修訂之參考，避免其經營管理偏離正軌。

二、目的

自然保留(護)區之設置目標，在保持地球上自然生態系之典型完整樣品，俾使人類因改變自然而引起生態系失調時可資對照比較。保留(護)區內之生物及環境資源可維持龐雜之基因庫，並供作科學研究及教育解說之場所，以便了解生態系之功能，啓示人類利用生態資源之際，應採取和諧共存之原則。本處為保存本地區原始台灣一葉蘭及其生態環境，除保持天然植被、不處分主副產物外，並派員加強巡護觀察，俾使此珍貴植物能繼續繁衍。因此主要目的有：

- (一)保護本保留區台灣一葉蘭，以確保其種源。
- (二)加強生態調查研究及偵測建立基本資料庫。
- (三)加強宣導啓發國人愛護自然資源及保護自然資源之觀念，並供作科學研究及教育場所。

三、環境現況

(一)位置範圍

本區位於塔山西北方之阿里山事業區第30林班，屬嘉義縣阿里山鄉中正村行政區阿

作者服務單位：嘉義林區管理處 住址：嘉義市林森西路一號(60017)

里山森林鐵路眠月支線貫穿中間而過，鐵路5～10號隧道間之岩壁上有大面積一葉蘭天然族群。該林班之海拔高度自2075公尺至2650公尺，全區面積為51.89公頃(見七、位置圖)。

(二)人文交通及地質土壤

由阿里山搭乘阿里山森林小火車約10～15分鐘到塔山站，然後沿鐵路兩旁之步道步行500公尺可達本地區分布一葉蘭最多之地區，如若純以步行從阿里山地區出發至阿里山區第30林班約需1.5至2小時。

本地區地質岩層屬第三紀之構造，形成於中新世；岩層之性質以砂岩為主，為細粒至中粒的淡青灰色砂岩，間夾深灰色頁岩和少量的礫石帶，台灣一葉蘭即經常生長在垂直的砂岩岩壁上。在土壤方面則以灰壤為主，另在山脊頂上或陡坡之上發育較不完全，一般屬石質土。

(三)氣候

本區雨季從四月至九月，乾季從十月至翌年三月；全年降雨日數約188天，年降雨量約4200公厘，年平均溫度為攝氏11.5～15.9度，平均最高溫度，各月均未超過25℃，平均最低溫度以最冷之月份（一月）亦有1.2℃；四月至九月吹西南季風，十月至翌年三月則吹東北季風。

(四)生育環境及現況情形

台灣一葉蘭係享有國際盛名之野生蘭，其植物體係由一個球莖及一枚葉子所構成。通常球莖具有四個節，無性繁殖的芽由節上產生，在正常情形下，第一個芽及第二個芽在生長季節（每年3～4月）會開花，花後生葉，在基部再度形成角錐形之子球，而在頂上的兩小芽，一般只有一個或偶有兩個發育成長披針形的幼苗。一葉蘭的花係由球莖基部之芽抽成，花序頂生，花1～2朵，呈粉紅色，亦有白色，花凋謝後，子房逐漸膨大，形成果實，花軸亦逐漸伸長，至年底葉落下，果實裂開，其伸長之果柄有助於種子之撒種，種子在適當之發芽地點可發芽生長，經過若干時間又可成長為球莖，加入一葉蘭之族群。

為瞭解本保留區內台灣一葉蘭現況，特委請專家予以調查，發現大小生育地計有30處，皆為天然群落。

台灣一葉蘭屬初級演替之岩生演替序列，因裸岩表面水份不易保存，一般最早期多由耐旱之地衣類植物所生長，隨著土壤之附著及露水之滋潤，即有一葉蘭及蘚苔植物出現。其族群之生長接近幾何生長，尤其側芽的大量繁殖可保證其族群的繁衍。

台灣一葉蘭生育地屬本省盛行雲霧帶中之檜木林及櫟林型，喬木以扁柏、紅檜、鐵杉、森氏櫟、台灣雲葉爲主；林下灌草叢多玉山箭竹、杜鵑類、高山越橘等。

本區的植物除台灣一葉蘭外，尚有阿里山千層塔，台灣檫樹、華參、著生杜鵑、台灣五葉參、阿里山十大功勞、威氏粗榧等，亟應加強保護。

四、工作項目及執行進度

重 工 項 目	工 作 比 重 %	預 定 進 度	80 年		81 年	
			07—09 月	10—12 月	01—03 月	04—06 月
埋 設 保 留 區 界 樁	5	工 作 量 或 內 容	資 料 調 查	資 料 調 查	施 工	施 工
		累 計 百 分 比	20	50	70	100
垃 圾 清 理	15	工 作 量 或 內 容	施 工	施 工	施 工	施 工
		累 計 百 分 比	25	50	75	100
保 留 區 巡 護	20	工 作 量 或 內 容	巡 護	巡 護	巡 護	巡 護
		累 計 百 分 比	25	50	75	100
印 製 摺 說 頁	20	工 作 量 或 內 容	資 料 蒐 集	資 料 蒐 集	資 料 編 寫	印 製
		累 計 百 分 比	20	40	80	100
植 生 調 記	20	工 作 量 或 內 容	資 料 蒐 集	擬 計 訂 畫	調 製 查 表	調 製 查 表
		累 計 百 分 比	20	50	75	100
解 說 活 動	20	工 作 量 或 內 容			籌 備	解 說 活 動
		累 計 百 分 比			30	100
累 計 總 進 度	百 分 比		18	38	67	100

以上均按進度執行

五、執行情形與結果

本計畫全程計畫自79年9月1日至84年6月30日，茲將本年度（80年7月1日至81年6月30日）執行情形分別陳述如次：

(一)埋設界椿：

在森林鐵路眠月支線穿越本保留區之兩端上方200公尺處（亦即第5號隧道入口上方及第11號隧道出口上方），埋設石材（觀音石）界椿各一支，端面為12公分正方形地面部份高度40公分，地下部份埋入20公分，三側面凹刻「台灣一葉蘭保留區」，另一面刻「台灣省林務局立」，並上紅漆。

(二)垃圾清理：

本保護區因森林鐵路眠月線貫穿其中，該路段為溪—阿縱走之必經路徑，常遭行人任意丟棄垃圾，為維護區內環境清潔，均僱用臨時工撿拾清理垃圾。

(三)標示牌維修：

為使本保留區各標示牌，警告標示牌長保鮮明、亮麗與光澤，以發揮及提高解說功能本年度已僱工重新油漆，並加強維護。

(四)現場巡護：

由阿里山工作站派員巡視，平均每月巡邏10人次，並由本處不定期派員或由該站主任前往督導抽查，經查一年來尚未發現有盜採案件。

(五)製作解說資訊：

- (1)更新並印製「阿里山台灣一葉蘭」摺頁解說6000份致贈一般遊客，作為宣傳解說用。
- (2)製作一葉蘭等推行自然生態解說活動用登山小背包，於本（八十一）年四月十六日舉辦之一葉蘭自然生態解說活動，贈送參加解說研習活動人士，以推廣國人對台灣一葉蘭之認知及保育觀念。
- (3)拍攝區內地形、林相及植物生態等一系列幻燈片，供日後彙整資料及提供解說宣傳之用。

(六)台灣一葉蘭監測計劃

為徹底了解其植群生態並建立完整之基本資料，本（八十一）年度起業已擬妥監測計畫，對一葉蘭之形態變異、生態環境、繁殖方式、族群構造，岩生演替等予以監視調查，本件監視調查工作於本（81）年4月上旬一葉蘭盛開時正式設立永久樣區，長期觀測，與資料紀錄建立永久資料庫（4-6月每月觀測紀錄二次；餘每月觀測紀錄1次）

，以爲日後經營管理研析之參考，並監視分析研判保留區內之情況有無偏離正軌。

(七)舉辦解說活動

於81年4月16日舉辦國小自然科老師「台灣一葉蘭生態之旅」生態解說活動，安排乘坐專車至本保留區後，沿鐵路步行實施解說，本期參加對象由本處函請嘉義縣(市)政府教育局各推薦優秀教師20名，合計40名參加，藉以教育下一代對自然生態保育之認識與重視，爲子子孫孫留下美好的樂土及教育研究資料庫。

(八)協助高雄市苓雅區凱旋國小舉辦八十學年度「高雄市少年科學生態保育研習阿里山春令營」。

於81年4月26、27日派本處解說員協助該校科學生態春令營包括一葉蘭生態解說，共計學生80人參加，由本處派員全程講解及解說，據反應成果相當良好。

(九)經營管理計劃之擬訂與實施：

爲求保留區之經營管理能持續有效，防止遭受干擾導致破壞其生育地，業經研訂「阿里山台灣一葉蘭自然保留區經營管理計劃」並依該計劃擬訂目標、方法及原則付諸實施。

六、檢討與建議：

(一)自然保留區之經營管理維護需國民教育與國人認知之配合，因此，自然生態解說活動(台灣一葉蘭生態教育解說)全程計畫(79年7月1日至84年6月30日)僅二次，至本年度(81年6月30日止)已全部實行完畢，參加人員建議應以增加辦理每年一二次，並逐年增加至國中自然科教師，以擴大宣導教育之功能。

(二)本保留區雖經設立，經營原則亦已確定，其基本的長期監測工作現正積極進行，唯專業人才不足，爲免發生日後監測工作品質低落，亟應增加專業人員並不斷訓練與學術界交流，充裕經費與器材，以利監測工作之執行。

七、位置圖

八、圖片：(如附幻燈片)

阿里山事業區

往眠月石猴

31

嘉義縣 阿里山鄉

南投縣 信義鄉

20 大塔山

19

往阿里

23

林班號

鐵路

1:50,000

30	林班號	森林鐵路	保留區範圍	圖例
	林班號碼			

插天山自然保留區經營管理計畫

林 阿 杉¹⁵

前言：

插天山自然保留區位於台北及桃園縣境，行政管轄分屬台北縣的烏來鄉和桃園縣的復興鄉為雪山山脈北支的延伸，整個插天山山系在台北盆地的南方微偏西，山系從美奎西莫山經塔曼山、拉拉山、廬平山、北插天山至魯佩山。本區範圍涵蓋大溪事業區第13～15、24～26，及33林班之一部分，烏來事業區第18、41～45、49～53林班及35林班之一部分，面積共7,759.17公頃。

一、本計畫執行目的：

本處將其規劃設立為自然保留區主要因素在於它大多維持原始狀態，且具有落葉性闊葉林、針闊葉混淆林等代表性生態體系，在台灣與此相類似的生育，環境正日漸縮減中，一些賴以維生的稀有動、植物亦面臨絕滅的威脅，亟待保護使其自然繁衍演替，本區內除「拉拉山」孕育大面積原始檜木群外，南、北插天山稜線兩側下方約50公尺，分布有帶狀台灣山毛櫸又名水青岡純林，綿延九公里之長，均具代表性生態系相當珍貴。同時亦為本省瀕臨絕種保育類野生動物台灣黑熊和大紫蛺蝶之繁衍場所。有鑑於此為保護本區之原始林，於79年經本處調查評估、規劃層報行政院農業委員會審查通過，於81年3月12日經該會會銜經濟部公告為自然保留區，期以法律來保護此一森林資源，使其在無人為干擾下自然繁衍。

二、執行情形：

本區原有步道諸如由桃園縣復興鄉小烏來至南、北插天山及由復興鄉華陵村至台北縣烏來鄉福山間步道予以整修，並開設管理上必要之步道以利巡邏，防止盜伐、濫墾取締獵捕野生動物等違法事件，及拆除獵捕野生動物陷阱使牠免於受害，完成保留區與山地保留地毗連處之境界勘測以利管理，氣象、水文站之設置及建蓋調查站，以瞭解、分析氣象與生態之關係，和調查區內動、植物之消長以釐訂復育計畫，此外在各重要據點豎立大型標示牌及告示牌。禁止打獵、採取樹、蕨、藥草和在森林溪流電魚、毒魚、炸魚等不法行為。印製森林生態、保護宣傳單及海報，每年辦理「愛護森林資源，關懷野生動物」之宣傳，深入山地部落、學校、教會廣為宣傳，喚起民衆對保育觀念之共識，不捕、不殺、不吃野生動物，讓野生動物有生存空間。同時，拍製

林務局新竹林區管理處

地址：新竹市中山路二號

郵遞區域：30027

電話：(035)224163-6

保護（育）野生動、植物之幻燈片作教育解說教材。此外基本資料之收集與區內環境整潔維護亦為重要工作之一環。

依據省府「加強自然生態保育工作方案」本計畫之執行分五年完成，執行期限自七十九年九月一日至八十四年六月卅日止。工作內容包括：1.境界勘查、範圍測量，與山地保留地埋設界標。2.自然保留區管理維護計畫之擬定。3.基本資料之收集和建立。4.管理步道開設和維修。5.派員常川巡邏取締打獵，採取樹、蕨、藥草和在森林溪流電魚、毒魚、炸魚等不法行為。6.保留區內動、植物生態調查，建立檔案資料。7.大型解說牌、告示牌、警告牌之設立。8.解說摺頁、簡介編印。9.安全設施之設置。10.區內環境清潔維護。至目前（八十一年四月卅日）執行完成工作包括：整修達觀山至福山間長17公里及滿月圓至北插天山步道，其他各登山步道沿途環境整理。對於保留區公告範圍、保護對象等大型解說牌設立二座，森林溪流魚類告示牌設一座，其他標示、警告牌計15面、步道里程碑34支。期以此喚起國人對本區珍貴動、植物、生態體系，重視，以及拍攝區內生態系及製作幻燈片供今後教育解說用。

(一)本年度工作目標：

- 1.規劃區內必要之管理步道系統逐年開設，並作必要之安全設施，俾利巡邏。
- 2.達觀山至福山間17公里，及滿月圓至北插天山長15.6公里管理步道之維修及沿途環境清理。
- 3.調查區內動、植物資源以為保育計畫之擬訂。
- 4.解說牌、標示牌及路標之製作與設置。
- 5.氣象資料之收集。
- 6.拆除各種為害野生動物之陷阱，及取締獵捕野生動物之違法勾當。

(二)本期（八十一年七月一日至八十二年六月卅日止）計畫執行之工作項目：

- 1.達觀山至福山間17公里及滿月圓至北插天山長15.6公里管理步道之維修及新設5,000公尺。
- 2.現場巡視全年預定240次，氣象資料紀錄12次。
- 3.環境維護24次。
- 4.解說牌、標示牌大型各一座、路標等40支。
- 5.編印執行報告200本，印製摺頁10,000張。
- 6.生態調查一次。

(三)需要繼續進行工作：

- 1.調查本區內之動、植物資源及其數量與分佈情形。
- 2.調查區內保育類野生動、植物現況及其棲地環境等相關生態資料。
- 3.設置水文、氣象站收集本區之氣象資料。
- 4.調查保育類動物之生殖行為。
- 5.達觀山（原名：拉拉山）孕育大面積原始檜木群，南、北插天山山脈嶺線兩側的100公尺分佈有帶狀，台灣山毛櫸之純林，綿延約九公里，均具代表性生態體系，彌足珍貴，嚴禁盜採。
- 6.本區為本省珍貴稀有動物台灣黑熊與大紫蛺蝶之繁衍場所，亟應禁止打獵與捕捉，讓其自然復育繁衍。
- 7.加強巡邏，拆除各種為害動物之陷阱以保護野生動物。

三、結果與建議：

(一)結果：

插天山自然保留區係依據「文化資產保存法」及「台灣地區自然生態保育方案」暨「野生動物保育法」「生態保育區及自然保留區保育措施」等之法令來管理維護，對觸犯者之懲處嚴重，故可發生嚇阻作用，不法之徒不敢冒然以身試法，區內生態環境在無人為干擾和破壞之情況下可自然繁衍永續。

出雲山自然保留區維護管理計劃執行報告

劉登標¹ 歐陽弘²

一、前言：

出雲山自然保留區位於高雄縣桃源、茂林鄉，面積 6,248.74 公頃，範圍包括荖濃溪事業區第 22～37 林班，以及由馬里山溪向北、西側暨濁口溪向南、東南側之山坡各延伸 100 公尺（屬荖濃溪事業區第 60、62—64 部份林班地），將馬里山溪及濁口溪兩大水系大部分劃入在保留區內，除禁止任何人為設施及改變原有狀態等行為，使珍貴稀有及有瀕臨絕滅危險之動植物得以保護，更兼具保育兩溪流之淡水魚類，使生態體系之保護更為週全。

本保留區原為出雲山自然保護區，於民國六十三年奉准設置，為林務局在國有林內最早規劃，公告設立的自然保護區，由於本區蘊藏豐富的動植物資源，多次與學術機構、專家學者合作調查、研究及規劃經營管理，地位及價值日形重要，乃於民國八十一年三月十二日由行政院農委會與經濟部會銜公告為自然保留區，本處多年建議，於焉實現；今後將在「文化資產保存法」保護下，詳列經營管理計畫，妥善維護動植物棲息、庇護環境，使其生生不息繁衍，提供教育、學術研究調查場所，保存物種演化的基因庫。

二、執行目的：

全已分佈於海拔 400 公尺～2,772 公尺之間，涵蓋亞熱帶、溫帶、涼溫帶等不同氣候帶；天然林中遍佈可供野生動物攝食植物。特有種鳥類有：台灣藍鵲、冠羽畫眉鳥、紫嘯鸛、白頭鸛、白耳畫眉、深山竹雞、金翼白眉等另有瀕臨絕滅及珍貴稀有鳥類：藍腹鵲、黃鸝、朱鸝、赫氏角鷹等。哺乳類有食蟹獐、台灣長鬃山羊、台灣獼猴、大赤鼯鼠、白面鼯鼠、台灣野豬、華南鼯鼠、山羌等野生動物。爬蟲類有百步蛇、以上均列為保護對象，其也林緣附近常出現的蛇類有雨傘節、錦蛇、龜殼花、眼鏡蛇等，另有棲息在溪畔灌叢或低窪潮濕等森林底層的兩棲類有小雨蛙、盤谷蟾蜍、艾氏樹蛙、蜥蜴等。

至於主要保護對象的植物有：

(1)紅豆杉、紅檜、台灣奴草、阿里山山櫻花、無脈木犀等均分佈於 2,300 公尺上下海拔地區之珍稀植物。

(2)樟櫟群叢：分佈於海拔 2,300 公尺以下，為本省西南部最具代表性之森林植被。

1. 林務局屏東林區管理處育樂課長
2. 林務局屏東林區管理處保育股長

(3)紅檜母樹：位於荖濃溪事業區第 22,23,37 林班，海拔 2,350～2,550 公尺。

(4)牛樟母樹：位於荖濃溪事業區第 23,24,30 林班，海拔 1,800～2,100 公尺。

三、執行情形與成果：

(1)擴大保護範圍及對象：出雲山自然保護區原以馬里山溪以東，濁口溪以北之荖濃溪事業區第 22～37 林班為範圍，西積 5,848.74 公頃，近年來因森森溪流淡水魚類之保育工作日益重要，本處乃建議將該兩溪流一併劃入保護範圍，本年農委會及經濟部依文化資產保存法公告為保留區時，已將兩溪流劃入，使森林溪流魚類得以保護。

(2)於出雲山林道與荖濃溪林道叉路口設置出雲山自然保護（留）區大型標示牌，並於保留區界樹立大型之出雲山保護區橫式及直立式標示牌，區內設置十面禁止狩獵、愛護野生動物警示牌，提高過往行人警覺，告示山胞狩獵禁制事宜。並設置管制站，檢查進出出雲山林道人車。

(3)設置鳥類觀測站一處，提供野外調查及研究工作居住場所。

(4)僱用山地青年，加強保留區內巡視工作，維護自然資源，取締及拆除鳥獸陷阱、獸鈎，掃蕩危害野生動物案件。

(5)派員參加村民大會，宣導自然保留區之設置意義，保護自然資源之重要性，及自然保留區內之禁止事項，講解野生動物保育法規定及罰則。

(6)配合縣政府機執行野生動物保育宣傳，掃蕩危害野生動物案件，落實保護本保留區內珍稀動物工作。

四、檢討及建議：

(1)本處目前已全面停止本區及鄰近林班之林木處分管業多年，以資保護野生動、植物資源，爾後更應絕對禁止各種作業，及挖掘礦石，申採副產物等，以保持原有狀態並建請台東林管處停止保留區鄰近林班（延平事業區 30、31 林班）之副產物採取，以免申採人持證借道出入本區。

(2)加強與學術及研究機構合作，調查區內具代表性及珍稀動、植物種類之生態，棲息地資料、建立資料庫，以為監測，提供經營管理改進辦法，並予積極保護、培育。

(3)由於本區鄰近桃源鄉寶山村，藤枝部落、山胞習於狩獵，除加強宣導巡護外，應逐年編列護管經費，加強取締違獵及拆除陷阱、獸鈎等工作，維護野生動物棲息環境不受干擾。

烏山頂泥火山自然保留區保護計畫

高雄縣政府

計畫執行成果

- (一)定期清掃維護美化環境。每月最少 2 次計30次。
- (二)完成本區域之規劃及協調地政單位進行測量複丈（面積4,8911公頃），已提供複丈成果圖給農香會，以提供爲公告成保護區之用。
- (三)經常派員巡視解說，勸阻民衆破壞景觀之行爲。並引導過周易協會、台視文化公司、中視新聞記者等單位進行攝影、採訪、紀錄、研究等工作。
- (四)編印宣導教育手冊 1 萬冊，部份分發轄內各機關、學校、團體。其餘留存提供宣導教育場合之用。
- (五)經常在報章、電視媒體上呼籲民衆“愛鄉愛土”保護此一自然奇景落實保育之觀念。

高雄縣政府 高雄縣鳳山市(830)光復路二段132號

墾丁高位珊瑚礁自然保留區之經營研究

李新鐸 · 王相華 · 詹明勳 *

前 言

墾丁高位珊瑚礁自然保留區，位於林試所恒春分所龜子腳林地，位於東經 $120^{\circ}49'00''$ 北緯 $21^{\circ}58'00''$ ，地處恒春半島中心，熱帶雨林北限，全區面積 137.6 公頃，海拔高 150-320 公尺，恒春石灰岩系以珊瑚為架構，土壤層淺薄，多為紅色磚化土，氣候乾濕季分明年雨量約 2500 mm，年均溫約 22°C ，月溫差不大，乾季冬北季風強盛，每秒 10-17 公尺，生態環境特殊，動植物資源豐富，極具學術及保存價值。

摘 要

墾丁高位珊瑚礁自然保留區，是目前臺灣唯一保存較完整之高位珊瑚礁植物社會，依據本研究調查 43 個 10×25 之長行樣區，經指標植物雙向分析，植物社會可分為相思樹型 (*Acacia confusa* type)、九芎—白雞油型 (*Largestroemia subcostata*-*Fraxinus formosana* type)、紅柴—樹青型 (*Aglaiia formosana*-*pouteria obovata* type)、紅柴—黃心柿型 (*Aglaiia formosana*-*Diospyros maritima*) 及黃心柿—鐵色—毛柿型 (*Diospyros maritima*-*Drypetes littoralis*-*Diospyros discolor*) 等五型，分屬不同環境，本研究共計錄自生維管束植物 86 科，244 屬，308 種，如表 1：

表 1 墾丁高位珊瑚礁自然保留區自生植物之數目統計表 (資料來源：邱文良 1992)

類 別	蕨 類 植 物	雙 子 葉 植 物	單 子 葉 植 物	合 計
科	11	64	12	86
屬	19	193	32	244
種	33	240	35	308

依據國際自然保育聯盟 (IUCN) 之分類標準，本區之稀有植物計有 1. 有滅絕危機種：象牙樹馬兜鈴 (*Aristolochia zollingeriana*) 毛柿 (*Diospyros discolor*) 2. 稀有種：中華雙蓋蕨 (*Diplazium chinese*) 琉球蛇菰 (*Balanoophora fungosa*) 柿

台灣省林業試驗所恒春分所，屏東縣恒春鎮 946 公園路 203 號

葉茶茱萸 (*Gonocaryum calleryanum*) 恒春皂莢 (*Gleditsia rolfei*) 。稀有植物之復育爲本經營管理計畫之首要工作，加強種子採集、樹苗培育、及復舊造林、期能挽救於瀕臨滅絕之危險。本期培育之稀有植物如下表：

表2 稀有植物培育表

植 物 名 稱	開花期 (月)	結果期 (月)	撥種期 (月)	培 育 株 數
象 牙 樹	4 ~ 6	7 ~ 8	處理好現撥	4,500
毛 柿	4 ~ 5	6 ~ 8	"	4,000
柿 葉 茶 茱 萸	3 ~ 5 11 ~ 2	2 ~ 4 8 ~ 10	"	1,000
港 口 馬 兜 鈴	2 ~ 5 9 ~ 11	8 ~ 10 2 ~ 4	也可存放	2,000

港口馬兜鈴除列名爲稀有植物外，是國寶級將瀕臨絕種之昆蟲，黃裳鳳蝶的飼草植物，大量培育及復舊造林乃當前必要策略，確保黃裳鳳族群不會滅絕。

恒春熱帶植物園，每年有數百萬遊客，因而保留區容易受到干擾及影響，固定圍籬設施能防範遊客進入及當地飼養牛隻之誤闖，每星期二、四、六，派有巡山員巡視園區，保護動植物資源，並協助經常性之試驗研究調查，本年度配合文化資產保存法公告爲自然保護區，完成境界測量工作，套繪於中華民國臺灣地區像片基本圖上，供保留區有效經營管。

爲深入瞭解各植群天然更新方式，以提供植群復舊工作的依據，本年度選擇黃心柿—毛柿—鐵色型進行天然更新機制之研究，方法如下：

- 1.採取林地土壤樣本20盆，每隔兩週記錄土壤種子庫內，植物發芽的種類及數量。
- 2.設置永久樣區，調查樹冠層和中層林木的胸經及樹高並探討植物梳受天然干擾的危害情形和更新過程。

上述調查仍在進行中，結果將於下年度提出報告。

自然保育圖書計畫報告

柳 榕¹ 王 穎²

自然保育圖書計畫報告

有鑑於過去國內圖書館收藏有關自然保育之資料有限，因此農委會自75年開始進行“自然保育圖書資料中心”計畫，擬定以五年的時間著手訂購保育相關期刊及圖書，其目的在提供野生動物及自然保育主管機構決策及經營管理時所需之參考資料，並為相關的學術研究提供服務，以提升國內自然資源保育工作績效。

本計畫之執行期限自75年12月1日至80年6月30日，在此五年時間內，前四年的計畫工作著重於與自然保育和野生動物管理有關的期刊之蒐集及購買；第五年的工作則選購這方面的圖書，共計33本。

綜合四年來所蒐集的期刊種類，約在90—100種之間，就其訂購的範圍而言，包括生態、環境、保育、動、植物、行為及演化等學門，其中以與動物相關者最多（40%）；其次為生態、環境及保育之期刊（36—38%）；若就出版時間而言，包括半月刊（15%）雙月刊（12%）及不定期刊物（12%）等次之，就圖書牽涉的範圍而言，和保育有關者最多，共有7本；其次和動物行為以及生態有關的書各有3和4種；有關野生動物管理、哺乳類生活史和景觀生態者各有2種；和環境保護及生物學有關者各有1種。

目前由於其他相關學術單位及研究機構對保育相關資料之逐漸重視，許多期刊已有訂購，然多為新近訂購者，缺乏對許多重要期刊過去出版之刊物，在整體資料之查詢上造成相當不便，建議若有經費或可購買此類期刊之過去出版品，以建立完整之資料。

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2.王 穎 國立台灣師範大學生物研究所

八十年度鴛鴦湖自然生態保育研習營

救國團宜蘭縣團委會

前言

大自然的美，供給我們生存不可或缺的資源。然而，科技的衝擊，人爲的破壞，濫砍、濫墾事件層出不窮，已損害了原始的美景。我們賴以生存的空氣、水、土壤，亦因各種污染日顯惡化。行政院農委會推動自然文化景觀之維護及自然生態保育教育不遺餘力。民國七十七年暑期創辦「鴛鴦湖自然生態保育研習營」，迄今已屆五個寒暑，成效極爲良好。其主要目的，乃藉由這項生態研習活動，期能培養解說教育人才，喚醒全民對自然生態保育的重視。

執行情形與成果

鴛鴦湖自然生態保育研習營，每年分兩次於寒暑假期間遴選各學校相關課程教師及大專學生社團幹部，每梯次五十人，概分兩梯次，本年度活動共計184人參加，男64人，女120人，分別進行各項研習活動。本會承辦活動均抱以認真負責的態度，事前勘查路線及場地，並詳加規劃各項課程及設施，務期讓參加學員均能獲致最大的學習效果。研習課程廣泛力求深入，包括水土保持、治山防洪、自然環境、引進種生態、動物生態、國家公園保育及解說教育、蘭陽溪口鳥類生態、蘭陽風情介紹、國家保育政策執行與檢討。課程安排，靜態與動態並重，理論與實務兼具。指導教授爲國內外知名學者專家，個個皆學有專精，經驗豐富。講授課程時適時提供寶貴的幻燈片及資料折頁。走出戶外，做實物解說介紹。由於講述內容豐富，生動活潑，不落俗套，學員咸稱滿意，教授、講師計有王幸隆、呂光洋、吳輝龍、李玲玲、林宗評、胡蘇澄、姜善鑫、陳禮仁、湯曉虞、楊遠波、潘富俊（依姓氏筆劃順序）。

我們以再生紙編印活動手冊及講義，除善盡一份心力外，亦藉此喚醒國人對生態環境的重視。學員實際踏訪鴛鴦湖自然保留區（新竹縣尖石鄉），由多位教授及解說員隨隊詳細解說，觀察沼澤、湖泊及森林群落各種生態。由水生的線葉眼子草而東亞黑三稜、水毛花—灌木—森林，了解到植物的演替情形，是活生生的教材。分組研討，由分組輔導員帶領，學員發表意見，腦力激盪，集思廣益，將寶貴意見彙整，提供有關單位參考。我們亦在研習活動結束前，做一全面性的問卷調查，針對課程安排及心得，以及行程規劃、食宿、交通安排，彙整分析後針對有關缺失改進。工作人員皆具高度服務熱忱，並有豐富的學養經驗。研究生舉行自強座談，針對學員程度，以輕鬆活潑的方式進行，激發學員自然生態保育觀念，進而產生愛鄉愛國之情操。

救國團宜蘭縣團委會

宜蘭市渭水路100之2號

結 語

研習活動的成功與否，端賴各有關單位是否全力配合支援。在此我們特別感謝行政院農委會李三畏副處長、湯曉虞科長及陳超仁技正以及森林開發處同仁給我們的肯定與支援。讓我們能夠一次比一次成功，一次比一次更有收穫。生態保育教育工作，需要長時期的辛勤耕耘與灌溉，如何有效結合學員，建立人才庫，為社會大眾作更多的播種工作，實乃當務之急。生態保育教育需要持續與全面推廣，方能紮實普及，且讓我們為好的未來更盡一份心力，必將開創更美好的未來。

八十年度自然生態保育技術改進計畫

台灣省政府農林廳

一、前言：

本廳奉省府核示負責本省生態環境保護業務之綜合協調及主辦工作，目前辦理之工作包括文化資產保存法所規定自然文化景觀業務、野生動物保育法、台灣地區自然生態保育方案、台灣沿海地區自然環境保護計畫、加強自然生態保育工作五年計畫、加強珍貴老樹及行道樹保護計畫等各項業務之綜合、協調、推動事宜。

二、八十年度本廳執行自然生態保育技術改進計畫之辦理情形摘要如次：

- (一)綜合協調、推動各相關單位執行「加強自然生態保育工作五年計畫」。
- (二)研訂並協調各縣市政府執行八十年度「加強珍貴老樹及行道樹保護計畫」，完成全省八〇七株老樹及十八段行道樹之調查建檔工作，並逐年辦理規劃保護。
- (三)綜合協調、推動各縣市野生動物保育工作及十一縣市野生動物保育先驅計畫。
- (四)建立全省山產店、山產買賣業者及狩獵人共七百八十八人(戶)名冊資料，分由各縣市供為取締、處理、監控之重點對象另取締非法獵捕、宰殺等違法案件共六十五件。
- (五)編撰「野生動物保育工作手冊」，並印製六千本，廣為分發各單位供為執行保育工作之參考。
- (六)研訂「加強野生動物保育工作四年計畫」，並自八十一年度開始全面執行。
- (七)爭取設置大肚溪口水鳥自然公園二百七十公頃，並協調規劃、設計工作。
- (八)成立「台灣省特有生物研究保育中心籌建辦事處」，進行各項籌建工作。
- (九)培訓保育有關人員，完成五梯次五百人之保育幹部訓練。
- (十)宣導保育觀念及知識，印製七種共三萬一千份野生動物保育有關宣導摺頁、單張，並舉辦生態之旅親子活動及大肚溪口水鳥季等活動，達到全面宣導之目的。另對全省各類公務人員八千人次講授生態保育工作及做法，以謀求共識，擴大保育工作層面。

三、檢討及建議：

- (一)各項生態保育工作日漸蓬勃發展，為期繼續落實，人力、經費及專業知識缺一不可，而有關本年度之各項中、長程自然保育計畫之訂頒、協調、經費籌措、縣市執行人力訓練、執行方法及模式之建立等均有開創性、突破性、全面性之起步，對今後保育工作之落實、紮根及推動已發揮創始性、決定性之影響。
- (二)現階段業務推展上，仍應以充實縣市政府執行人力及灌輸全民之保育觀念為首要工作，各項人力訓練及保育宣導教育將繼續列為以後年度之重點工作，並持續推動。
- (三)為落實推動執行野生動物保育工作，應請各級單位繼續積極爭取於各縣市政府設立「生態保育課」。

農林廳技術室

南投縣中興新村光華路8號

自然文化景觀宣揚工作計劃

葉 承

一、前言

「知性之旅工作小組」首於民國75年接受行政院農業委員會之委託，與中華民國自然生態保育協會協辦「知性之旅」活動，並編輯「保育通訊」。於民國79年7月起與中華民國國家公園學會協辦「知性之旅」活動，並出版自導式活動手冊。

「知性之旅」活動內涵融會自然景觀與人文歷史之闡釋，為整體性環境教育之先聲，今日社會沿用「知性之旅」一詞，即源自於本工作小組。

二、目的

宣揚有關自然文化景觀保育的觀念：

1. 藉舉辦「知性之旅」活動，提供參與人士體驗、瞭解自然的機會。
2. 舉辦環境解說教育研討會，邀請國內政府有關單位、民間團體及學術界有關人士，一同研討有關宣揚自然文化景觀及保育的觀念。

三、執行期限

全年計劃：八十年七月一日至八十一年六月三十日

四、實施地區

台灣地區

五、計劃工作項目

- (一)為推廣自然文化景觀保育知識，利用星期假日，舉辦「知性之旅」，邀請專家、義工等前往選定地點擔任解說，將「知性之旅」的理念推廣至全省。

本年度共舉辦六次，內容分別如下：

1. 東部之旅 時間：80.7.5~80.7.7 參加人數：80人

說明：在台灣島的生成史上，花蓮台東地區包含有菲律賓海板塊和歐亞大陸板塊及沈積物等不同構造的地方，擁有豐富的自然景觀資源，卻又需承受較多的自然災害。花東文化，以原住民的文化最具特色，花東的開發，漢人付出了心血。希望經由東部之旅活動，讓參與者親自體認人文自然環境變遷的種種歷程。

作者：葉承

服務單位：中華民國國家公園學會知性之旅工作小組

住址：台北市郵政第23-101號信箱

2. 沙丘之旅 時間：80.9.22 參加人數：80人

說明：台灣四周環海，綿長的海岸線中孕育了豐富的海岸景觀，除了特殊的海濱植物和活潑可愛的海邊生物外，沙丘也是海岸特殊的景觀。藉這次活動從八里到桃園新竹的西北部沿海，認識沙丘海岸是如何孕育形成，它對自然環境有什麼影響，及人類如何在這惡劣的環境下，利用沙丘地形。

3. 基隆河之旅 時間：80.11.17 參加人數：80人

說明：基隆河是淡水河的重要支流之一，由於附近山區多，雨水帶常來豐沛水量，軟硬交互的岩層及河流的回春作用等因素，形成沿途多采多姿的河流地形景觀。昔日它是台北盆地上人文及經濟發展的動脈，但今日受到家庭、工廠廢水的污染，基隆河已不復當年，下游更成一灘污水。此次活動由上游、中游至下游一起去探訪關心這條和台北人息息相關的河流。

4. 台三號公路之旅 時間：81.1.19 參加人數：80人

說明：台一和台三號公路是台灣兩條主要縱貫道路。台一公路沿海岸而行；由於近年來人口迅速膨脹及經濟快速發展，因此沿著平原和丘陵闢建的台三號公路不得不再積極拓寬，並增建北二高。經由活動明瞭台三號公路北段城鎮早期的土地利用和地理背景的關係；中期城鎮的興衰，及聚落交通動線的演進，並且展望與省思台三號目前正邁入的新發展。

5. 金瓜石之旅 時間：81.3.15 參加人數：85人

說明：清光緒國人在基隆河發現砂金後，九份、金瓜石就享有「亞洲金都」的美譽。然二次大戰後，因金脈枯竭，黃金價格低落，使這兩個繁華一時的黃金小城隨採金業的衰退而沒落，但昔日的繁華景象及獨特的礦區風光，引來一些藝術家的尋找創作靈感。透過活動，體會此區特殊的地理、人文景觀，以及多年採礦、煉礦對當地環境的衝擊，和未來發展的方向。

6. 漁村之旅 時間：81.5.17 預計參加人數：80人

說明：漁村之旅帶大夥循著台灣北部沿海地帶，探訪台灣北部地區的漁港，探考其現況與興衰的背景，同時也深入了解漁村的生活。

(二) 舉辦環境解說教育研討會，預定於81年 5月31日假台大思亮館舉行，報名人數共136人。

青年自強活動生態保育及環境維護研習會實施概況執行報告

蔡中偉、張守任、劉秉申

一、前言：

(一)本團為配合政府生態保育及環境維護政策，培養解說人才，擴大影響層面，承行政院農業委員會鼎力支持，自七十五年起於每年寒暑假共同辦理「生態保育、環境維護研習會」，並以大專院校相關社團幹部及優秀大專學生假期活動服務員為對象，積極培訓宣導幹部。

(二)藉助假期服務員，透過各項自強活動，將生態保育及環境維護的觀念普遍推介給參加活動之青年朋友，大大地發揮了種子作用，有效地擴大了宣傳層面，並已達成本研習計劃的預期教育效果。

二、研習內容與方式：

(一)專業課程：邀請專家學者介紹自然環境保育之知識與現況，並透過研習活動增進學員解說技巧。

(二)共同課程及活動：實施共同課程，建立學員對自然生態保育、環境維護之觀念，激發學員對自然資源的關愛；並透過共同活動，培養學員自動自發，崇法守紀之優良德行，以提昇環保品質。

(三)定點解說：安排專家學者於活動行程中選擇適當地點，實地介紹環境資源特性，增進學員對生態環保之興趣與認識。

(四)機構參觀：配合當次研習主題，安排參觀相關機構，使學員能將課間所學與實際執行單位工作情形相互印證。

(五)遊憩活動：安排適當之遊憩活動，以對照解說內容，進而體認環保教育之意義。

(六)效果評量：以分組討論、問卷調查方式，使學員對整體環境，教育內容產生回饋作用，落實研習效果。

三、研習成果：

(一)自七十五年起至八十一年冬令止，計舉辦本項研習十二次，結訓學員一、三六〇人。參加研習者學習情緒高昂，均認為參加本項研習活動對增進其生態保育與環境維護之觀念及解說技巧，裨益甚大。

(二)研習地區包括有中部橫貫公路、太魯閣、玉山、墾丁國家公園、溪頭、阿里山及東海岸等地。機構參觀則包括台灣電力公司之德基、明潭、核三發電廠、內政部營建救國團總團部青年育樂活動處

臺北市松江路219號

署太魯閣、玉山、墾丁國家公園管理處、自然科學博物館、溪頭台大林區及東海岸風景特定區管理處等單位。

㊦研習結訓學員分派至中橫公路健行隊、天祥太魯閣峽谷健行隊、東海岸健行南北隊、阿里山活動隊、蘇花公路健行隊、日月潭溪頭阿里山活動隊、合歡山寒地活動隊、金門戰鬥營、澎湖戰鬥營及澎湖海洋活動隊等廿個營隊擔任服務解說工作，參加活動青年計有二三〇、七六二人次。

㊧印製優美之自然生態明信片，贈送每一位參加自強活動學員，擴大宣導效果。

四結語：

教育是紮根的工作，教育是國家的事業，教育青年是全社會的責任，感謝行政院農業委員會及相關單位給予本項活動的支援與協助，使活動得以年年順利展開，年年圓滿結束。

六年來，本項活動已培育了一、三六〇位學員，並已透過他們又直接向二十多萬青年作了面對面的生態保育及環境維護宣導工作，現在他們也正在全國各個不同角落，傳播生態保育，環境維護的觀念。我們確信，這項研習的效果是深遠、廣泛而久遠的；我們也確信，本項活動的持續舉辦是前瞻、必要而最具教育意義的，我們更相信，未來，國人在經濟發展，產業升級中，必能同時做好生態保育與環境維護工作。

兒童文學宣導自然保育先驅計畫執行成果報告書

洪 文 瓊

自然保育工作的落實，首重教育宣導。本計畫即在邀請兒童文學作家四十人、保育專家五人，利用墾丁國家公園所提供的環境教育解說系統，從事為期四天的現場參觀、解說、觀念溝通及研討。使兒童文學作家於活動中充分吸收解說員及學者專家的自然生態保育知識與觀念，充實有關自然生態保育寫作的素材；有計畫的撰寫以自然生態保育為主題的兒童文學作品，供兒童閱讀，以達潛移默化兒童心靈的效果。

參加本次活動的兒童文學作家、畫家及兒童讀物編輯在認識自然生態保育觀念後，熔合兒童文學創作技巧撰寫適合兒童閱讀的自然生態保育作品，發表在國語日報、兒童日報、「兒童的」雜誌、「幼獅少年」雜誌、全國兒童週刊等兒童媒體上，廣泛發行於

全國，以達到教育兒童認識自然生態保育觀念的目的。

台灣四十年來因經濟高度發展，精神文化層面未相對提升，國人生活品質日益低落。加以自然生態保育觀念為近年才大力提倡，一般民衆未正視其重要性，觀念多所偏差。要培養全民愛鄉土、愛自然的理念，唯有從兒童做起才是根本之道，兒童文學作家、畫家如能持續創作自然生態保育作品提供兒童閱讀，對未來保育工作的推動及喚起大眾認同確有莫大的意義。

藍鵲飛過

— 16 厘米生態影片的製作

金恆鑑¹ 楊吉雄¹ 張乃航¹ 陳永修¹ 王相華¹

前言

根據一九九〇年的調查報告（金恆鑑等，1990），台灣南部天然闊葉林的扇平與南鳳山地區，有 116 種鳥，分屬 9 綱 31 科，其中有 10 種為台灣固有鳥種。此 10 種固有種中，台灣藍鵲（*Urocissa caerulea*）相當醒目。台灣藍鵲屬鵲科，身長 53 公分，其中有 38 公分為尾長，身披亮藍色羽毛，頸及胸部為黑色。每支尾羽末端為白色，嘴及長細腳則為紅色（謝孝同與柏萊蕭，1976）。為了加強社會大眾明瞭鳥類的行為及其生活的棲息地環境，因此選擇台灣藍鵲為影片的主題，用來呈現扇平及南鳳山地區天然林內的鳥類行為，借以喚起社會大眾愛護台灣的所有野鳥及其生存棲息地環境的意識。

製作過程簡述

一九八八年春，初步調查台灣藍鵲的動物行為及活動範圍。次年春天，於築巢的山黃麻樹附近，開始搭建三座觀察塔。塔頂有木板平台進行觀察，及攝影紀錄其孵蛋與飼育雛鳥行為，包括取食行為、育雛行為、野鳥振翅、乞食與成鳥銜走糞囊等等。並進行室內剪接、配音樂、旁白等工作。

本影片由金恆鑑策劃及執行；劉燕明導演、攝影及剪輯；楊憲宏故事企畫；蔣家語編劇；張乃航、陳永修、王相華與何華仁田野調查；高毓斌及楊吉雄行政支援；楊政川監製；廖大牛製片；由林業試驗所發行。

1. 台灣省林業試驗所，台北市南海路五十三號。

推廣與宣導

一九九一年元月「藍鵲飛過影片」完成推出，並錄製中、英語版本。此影片亦曾入圍「一九九一台北金馬國際影展」的「最佳紀實報導片獎」及「一九九一第三十六屆亞太影展」的「最佳短片」，並於一九九二年四月榮獲美國蒙他拿州舉行的國際野生動物影展的「最佳概念藝術獎」及「榮譽獎」。

本片詳細內容，可自觀賞「藍鵲飛過」中得知。該片有16厘米影片及大帶錄影帶，並有中、英語版本。如欲觀賞本片，請與台灣省林業試驗所林業推廣系洽詢。全片製作費用由行政院農業委員會贊助。

結論與建議

臺灣社會大眾對自然生態保育的意識相當不足，從山產、野鳥販賣及山中鳥網與捕獸器的密度可見一斑。生活教育是根本杜絕這種行為方法，本片的推出及受到中外影展的肯定，提供一個很好的社會生活教育示範材料。因此，建議相關自然生態保育的觀念，宜再深入及擴大宣導。

參考文獻

金恆鑑、何華仁、張乃航 1990 扇平與南鳳山地區的鳥類調查報告。七十七年生態研究，第 019 號。農委會出版。

謝孝同、柏萊蕭 1976 新台灣鳥類指南。美亞出版有限公司。

鳥類保育工作研習會實施計畫

陳明發¹

摘要

野生動物保育法實施至今，野生鳥類的獵捕、販賣及走私進口等現象仍極為普遍，而目前各級單位承辦保育業務者多為兼辦人員，在缺乏鳥類辨識專業知識及經驗之情況下，不論保育業務的推廣甚或查緝取締等工作均發生諸多困擾。

為提昇野生動物保育法執行單位之專業素養以加強其業務處理能力，特針對各縣市政府、鄉鎮公所保育業務承辦單位主管與主辦人員及縣市警察局、分局、派出所等執法人員、林務局各林區管理處保育人員舉辦三梯次研習會，每梯次三天二夜，編印講義資料、安排室內課程並輔以野外實習，訓練學員鳥類鑑定能力及生態保育觀念。每梯次受訓學員 45 名，三梯次共訓練 135 名。

室內課程部份，共安排賞鳥的準備工作、鳥類辨識的方法與原則、保育類野生鳥類之辨識、自然生態保育理念等課程，並邀請學者專家與資深鳥類觀察者與會授課，再配合本土生態錄影帶欣賞、參觀國立自然科學博物館鳥類標本室等觀摩活動，以加深學員印象。

野外實習部份，邀請資深鳥類解說人員擔任實習領隊，引領學員至室外實地觀察野生鳥類，以印證室內課程授與之鳥類辨識要領。

1. 中華民國野鳥學會 台北市復興南路一段295巷13弄6號2樓

台灣自然保留區簡介之編印

楊遠波¹

從民國七十五年開始至今，台灣共建立了淡水河紅樹林、關渡坪林台灣油杉、哈盆、插天山、鴛鴦湖、南澳闊葉樹林、苗栗三義火炎山、澎湖玄武岩、出雲山、台東紅葉村台灣蘇鐵、烏山頂泥火山、大武山、大武事業區台灣穗花杉、台灣一葉蘭等十五個自然保留區。各區中保護特定之動植物或植物社會。為使社會大眾瞭解各自然保留區之特性及建立自然保留區之意義，已前往各自然保留區攝取各類幻燈片及收集資料以製作宣傳小冊。

1. 台灣省林業試驗所森林生物系，台北市 10728 南海路 53 號

環保教育訓練課程簡報

馬 羅 德 ※

本計劃由台灣巴哈伊環保處（BOET）於1991年7月1日至1992年6月30日期間所執行的。

這是第三次此類由農委會及台灣大同教總靈體會共同贊助，而由巴哈伊環保處執行的課程。本課程可分為二部份；一部份為環保教育教師訓練研討會，另一部份為環保教育函授課程。

環保教育方法及理念

此計劃背後所含的動機是透過改變孩童的態度及行為來保護環境。其所關心的，不是要透過此種教育來幫助他們通過考試——雖然這種副作用可能出現，也不是要訓練一小群的環保教育專家。相反地，它的目標是對大群的老師給予有效的環保教育之要義。為了完成此計劃，我們倡導一項很簡單的教育議程。

(a)協助幼童發展個人與自然環境之關係。

(b)協助幼童發展環保道德；讓他們了解他們的行為能對環境造成的影響。

(c)協助讓幼童了解人類的生存要依靠自然，這包括讓他們了解一些地球基本的生命支援系統。

以上這些都是環保教育的重要基礎。不論老師對科學及自然歷史是否有深刻了解，這些東西都非常簡單好用，有效的方法因為簡單容易做而被忽視。

這個計劃中所倡導的方法都在“自然教室”小冊中解釋了。

教師訓練研討會

為幼稚園及國小老師舉辦十五場一系列的研討會，其中八場在台北、七場在高雄。總共有超過450位教育人員參與。每場研討會都在不同的學校舉辦。10場在小學，2場在幼稚園，而3場由幼稚園及國小老師一同參與。

每場研討會歷時三小時，前半場是幻燈片簡介及主題講演。後半場是戶外課程，讓全體學員參與環保教育活動。全部參與者都發給一本小冊子“自然教室”以供未來參考
※台灣巴哈伊教環保處—北市新生南路一段149-13號3F

大部份與會老師皆來自該場地的小學，也有一些從別校來見習的老師。

研習會之成效卓著，有好幾次從別校來的見習老師要求研習會也能在他們的學校舉辦。計劃後期的好幾次研習會是以此種方式預訂的。預訂要求超過本計劃之預定目標。

函 授 課 程

函授課程已經書寫印行了。此課程之設計是要對環保問題及環保教育技巧給予深度了解。它是針對那些沒有這方面知識或只有些許知識者而設計的，已有 500 位教師登記參加此函授課程，並每月收到課程單元。

每個單元都涵概一個不同之環保主題，且每次都要求參加者繳交一些家庭作業，以做為評估。我們要求參加者與孩童做環保教育活動，做為他們部份之家庭作業。此種活動的書面報告，包括一些孩童經歷的評量，每月繳回來評估。而這些評估的結果再寄回給參加者，並附上適當的建議以做為改進。隨著此課程的進行，可以看到此項工作的品質有顯著的改進。

在 500 人報名函授課程額滿後，又有超過 300 人要求排上等候名單，希望此課程再授時，可以加入參加。

參 考 書 目

馬羅德、馬美華 1989 自然教室 主婦聯盟出版

林美玲

八十年度依計畫執行，計舉辦七次親子科學研習活動及出版「親子科學活動輯要」第六輯。

(一)親子科學研習活動

日期	主題	地點	參加人數
79.7./29.31.	墾丁國家公園之認識及其海岸地形、地質之觀察，夜間星象觀察。	屏東恒春、墾丁地區	110 人
79.8./11.13.	"	"	110 人
79.8./18.20.	"	"	110 人
79. 11. 4.	礦石、化石之認識及蜜蜂生態之觀察	苗栗蜜蜂改良場、出礦坑礦場及通霄白沙屯	100 人
79.11./17.18.	植物及昆蟲生態之觀察、夜間星象觀察	南投縣蕙蓀林場	110 人
80. 4. 28.	水土保持及植物認識	苗栗大湖、四分水土保持教室	100 人
80. 5. 19.	飛行原理認識及藥用植物認識	桃園東門國小及龍潭崑崙山藥用植物園	100 人

(二)「親子科學活動輯要」第六輯一本。

台灣省立台中圖書館科學教育中心

台中市精武路 291 之 3 號

澎湖縣自然保育及宣導計畫

林 長 興*

一、前 言

澎湖群島原是一個方山地形的島群，大都由玄武岩流與夾層之沈積岩構成，自然景觀與台灣各地迥異，每年均吸引為數可觀的觀光客前來遊覽。在澎湖追求經濟發展的過程中，自然景觀逐漸受到破壞，海洋自然生態也出現失衡的警訊，為喚起澎湖縣民對生態環境的共識，自然保育宣導實屬刻不容緩之事。

二、執行目的

(一)為維護澎湖自然景觀資源的完整，以宣導宣教育的方式，辦理澎湖地質地形景觀考察之研習活動，並介紹環境保育的重要。

(二)為維護澎湖生態景觀資源的完整，辦理「澎湖的海豚」及「澎湖的鳥類」之生態研習活動，並介紹環境保育的重要。

(三)製作澎湖自然景觀及野生動物之照片、幻燈片，於全縣各中、小學及社區活動中心巡迴展示，並舉行專題演講，以宣導自然保育之重要。

三、執行情形及成果

(一)完成宣導海報30大張，於每次研習活動及巡迴宣導時展示會場，供一般民眾、師生觀賞。

(二)製作「澎湖的海豚」、「澎湖的鳥類」之彩色摺頁，於每次研習、座談及巡迴宣導時分送師生、民眾。

(三)完成海豚保育座談會一次，並邀請縣長、縣議員及海洋動物學者張崑雄博士參與座談討論，會中近百位名村民均踴躍發言。

*澎湖縣立馬公國民中學

澎湖縣（88013）馬公市中華路326號

(四)舉辦「澎湖鳥類」及「澎湖地形景觀」之野外研習活動各一次，介紹澎湖的鳥類相、地形景觀，每位參加民眾、師生均得到一份參考資料。

(五)於全縣三所國中、二所國小及三個鄉村活動中心巡迴宣導，並於活動現場分發宣導資料及摺頁，使一般民眾了解環境保育的重要性。

四、檢討與建議

(一)一年來的自然保育宣導活動在民眾踴躍參與下，雖略有成效，但自然保育是長遠之計，非短時間內可奏效，今後宜繼續舉辦此類宣導活動，使參與人數更多，以培養維護自然景觀與生態環境保育之共識。

(二)巡迴宣導活動以口頭演說為主，配合圖照、幻燈片，雖然吸引部分民眾，但此種方式畢竟不如野外研習活動生動，今後辦理保育宣導，宜多採野外研習之方式，使民眾實際認識自己所處的生態環境，更能達到保育之宣導效果。

金門地區自然保育研習活動計畫執行成果摘要

李廣榮

- 一、邀請辦理國立中興大學教授呂金誠博士及國立科學博物館顏重威等五員來金協助地區植物生態調查及指導自然生態保育研習活動。
- 二、邀請辦理台灣省鳳凰谷鳥園組長劉春田等八位專家來金協助地區鳥禽調查及指導家禽飼養管理規劃設計工作。
- 三、配合地區候鳥季節於80年11月及81年元月，分別假慈湖與金門公園舉辦「冬季候鳥之旅及保育宣導活動」，計二場次，參加人員一四十餘人。
- 四、辦理採購充實教學設備計柯達幻燈機乙台，普騰28吋彩色電視機乙台，hi-Fi型放影機乙台及KONA TSN Z型單筒望眼鏡2部。
- 五、辦理「金門野鳥世界」簡界圖片搜集及文字編審發包印製工作，總計數量壹萬份，將配合地區舉辦研習宣導活動，適時推廣贈送民間社團及機關學校參閱，藉以灌輸正確保育觀念。

服務單位：金門縣政府建科

地 址：金門縣金城鎮89301民生路60號

新豐紅樹林調查保護

劉家樑³⁵

前 言

紅樹林係本省稀有植物，在全省各地遭受濫墾濫伐之陰影下，本縣能保有甚而擴大種植面積，實有很高之保育價值，故省政府於民國七十八年度推動「加強自然生態保育工作五年計畫」時，即將此一計畫列入保育計畫內，由行政院農業委員會補助，本府執行。

內 容

新豐紅樹林位於新竹縣新豐鄉新豐村紅毛溪出海口，面積八．五〇公頃佈於紅毛溪河口之南北兩側，南岸面積六．五公頃，北岸面積約二公頃，北岸以海茄苳為主，零星散生水筆仔，南岸以水筆仔為主，海茄苳較少，紅樹林具有發達的橫走狀呼吸根或板根，可適應水浸所造成的通氣不良，水筆仔且有胎生現象，利於著地繁殖。在水筆仔的葉背附著許多玉黍螺，紅樹林下有各種挖洞習性，以適應環境的螃蟹，蹦跳其間的彈塗魚，孵化的小魚，被豐盛食物吸引而來的鷺鳥群等都是珍貴的生物資源，更能提供國人具有鄉土環境教育、觀光遊憩、賞鳥、河口生態系研究價值的場所。為保護本縣稀有紅樹林資源、維護生態體系平衡與合理利用落實生態保育工作，加強民眾宣導，使其對沿海生物及景觀資源之認識免於遭受破壞，並可增加民眾休憩、旅遊之場所，並印紅樹林摺頁分送各機關、團體學校參考，及擴大宣導以喚醒縣民重視自然生態保育，並於紅樹林內設置觀賞步道，使參觀人員更能深入了解紅樹林之生長情形，使有限資源能得以延綿存續。

新竹縣政府

新竹縣竹北市光明六路十號 (302)

彰化縣八十年度大肚溪口鳥類保護計畫執行報告

彰化縣政府

一、前言：

大肚溪口鳥類保護區位於彰化縣伸港鄉溪底段與和美鎮塗厝段濱臨大肚溪出海口與全興工業區為鄰，全區已完成勘測面積四十七公頃，區內為一長方型之防風林帶，並有一座古廟（張玉姑廟），本區鳥類之種類隻數及度為全省之冠，其中以鷺鷥、班鳩為主，每到冬季時並有西伯利亞之候鳥飛到本區過冬並以附近海域溪流為覓食區或以本區為休息站築巢，為本縣一自然觀光賞鳥區。

二、執行成果：

(1)蒐集整理現有資料，建立完整地籍圖冊：

1. 於79.12.24與王議員及柯代表等八十人協調溝通並獲得解決土地爭議案。
2. 於80. 1.22協調中華工程公司強制拆除保護區內濫墾戶張鍊君、陳典忻君、陳筆捷君、姚湖君等四家並收回占用土地面積0.81公頃。
3. 於80. 2.28上午十時邀請經濟部工業局、中華工程、地政處測量總隊，本府地政科及和美地政事務所研商該保護區，分割幾筆土地，獲得結論，完成地籍整理。

(2)完成區內栽植雀榕 1,500株，蓮霧 500株合計 2,000株，以引進野鳥棲息。

1. 於80.2.6會同伸港警察分駐所取締民眾在區內北鄰河川地整地燃燒雜草恐影響保護區之生態平衡，並經本府以80.3.4彰府農林字第八一七八三號函請和美分局偵查人犯到案。
2. 於80. 3.28取締拆除鳥網五十二公尺，並沒入保管中。
3. 每週至少二次巡視取締以防止不肖民眾傾倒垃圾及捕捉鳥類。

八十年度基隆海蝕地形保護計畫執行工作報告

一、前言：

基隆位於台灣島之北端，三面環山，中間大澳，東北一面臨海形勢天成被稱為全台北門之鎖鑰。由於地殼運動，地質與氣候三項因素的配合之下，使得海岸地區能夠發育成標準的海蝕地形，無論就教育價值或觀光價值而言，都是值得保護的自然景觀資源。如蕈狀石、豆腐岩、海蝕凹壁、海蝕洞、波蝕平台等，局部露出海面，點綴海濱風景，造成良好的海岸地形景觀。

行政院77年12月17日台經34321號函核定「加強自然生態保育工作五年計畫」內，指定本府承辦「基隆海蝕地形保護計畫」，並由台灣省政府農林廳負責督導事宜，在農委會專款支持下進行海蝕地形調查管理維護工作及宣導解說，提高民眾對鄉土資源之認識與愛護。

二、執行目的：

- (1)由於高度經濟發展導致休閒遊憩人口急劇增加，原有遊憩資源無法容納新增遊憩人口，造成自然資源之開發使用速度遠較人類所能瞭解自然，保護自然的速度快；導致有心或無意的嚴重破壞自然環境之情形屢見不鮮。因此對於一具有高度代表性及學術性之地形景觀——海蝕地形尤有宣導保護之必要。
- (2)提供各級學校及社會大眾對地球科學教育及自然資源保育之參觀教學及自然研究活動，諸如：
 - 1、地形發育特徵受地質與氣候兩個基本因子之影響情形。
 - 2、特殊地形所演發之植物群落構造。
 - 3、特殊地形（海蝕地形）所蘊含水生生物（含動、植物）觀察研究。
 - 4、水禽類與候鳥生態。
 - 5、人類活動對於自然環境之干擾程度。
 - 6、遊憩系統中知性之旅發展可行性探討。

三、執行情形與成果：

- (1)利用航空立體照片及像片基本圖對照海岸現場，劃定保護區界，調查瞭解各種海蝕地形規模與問題。
- (2)建立海蝕地形景觀幻燈片解說系統，透過各種集會放映宣導，使學生及一般民眾充分明白保護自然資源之重要，並提供學術研究及參觀教學之用。
- (3)不定期派員擔任區內巡邏及維護調查工作，勸導制止各項不當破壞自然景觀之行爲。
- (4)配合自然生態保育義工，設置解說員制度：

特殊地形景觀之吸引力，由於人們缺乏地球科常識，未能充分瞭解本項資源之獨特性及知識性，宜設置義務員解說制度，讓遊客從感性之旅變為知性之旅。

四、檢討與建議：

加強宣導教育與協調業主協助執形勸導制止工作：

由於和平島公園之經營開放，使得遊客人數急劇增加，亟需加強宣導教育提昇遊憩層次為知性活動。並請經營管理單位加強勸導制止遊客於區內進行烤肉升火活動。

動支經費明細表

計畫名稱：基隆市海蝕地形保護計畫				
預算科目名稱	原列	預算	實際動支數	結
印刷		10,000	4,700	5,300
雜支		24,300	24,300	0
旅費		14,700	10,874	3,826
勞務費		61,000	10,000	51,000
其他材料及用品		90,000	90,000	0
總計		200,000	139,874	60,126

執行單位：基隆市政府

執行人：邱雲儀 職稱：局長

八十年度台中縣鷺鷥鳥調查保護計畫

台中縣政府

一、前言：

台灣地區近年來由於工業迅速發展，土地急遽開發，造成環境污染與破壞，致鷺鷥鳥棲息地及覓食處遭到破壞，使鳥群逐漸減少，據省府調查以往全省共有六十多處鷺鷥鳥營巢處，但目前僅存二十多處，亟待辦理保護工作。

本縣鷺鷥鳥調查保護計畫，乃係省府選定全省五處鷺鷥鳥棲息地做具體保護措施之一，自七十九年度起，依據省訂「加強生態保育工作五年計畫」及「台灣地區自然生態保育方案」擬訂保護計畫，積極辦理保護措施，期藉此維護鷺鷥鳥之生存環境，使其綿延續存。

二、執行目的：

維護鷺鷥鳥生存環境，以避免鷺鷥鳥族群日趨滅絕，並藉以喚起國人重視自然生態保育，使鷺鷥鳥綿延續存，提供學術界之研究及保存優美自然景觀資源，並有助於觀光事業之發展。

三、執行情形與成果：

本年度繼續在本縣大甲鎮建興里鷺鷥鳥棲息地實施保護措施，茲分述如下：

(一)搭築圍籬：

一段總延長450公尺，其搭築方法及所用材料：每2公尺架設水泥柱（ $0.12\text{m} \times 0.12\text{m} \times 2\text{m}$ ）1支，共223支，並於2柱之間，橫向拉綁刺鐵絲四層。

(二)現場巡視：

除由本府經常派各級人員，前往實地巡視外，因本計畫鷺鷥鳥棲息地位於本府大甲苗圃旁邊，該苗圃管理員，每天均至少巡視一次，故每月巡視在30人次以上。

(三)辦理綜合業務：隨到隨辦。

四、檢討與建議：

(一)依照核定計畫，按期執行，圓滿達成預定目標。

(二)原棲於大甲鎮建興里之鷺鷥鳥約有三分之二飛移大安鄉南埔棲息，亟待辦理保護措施，擬列入八十一年度計畫辦理。

(三)請增加年度預算經費，俾辦理其他相關設備，期收最大之保護效果。

八十年度台中縣巨木調查保護計畫

台中縣政府

一、前言：

近年來由於工商發達、人口密集，自然資源開發利用迅速推展造成大量濫墾、濫伐，居住環境劇烈改變及對古老自然文化遺產之漠視。本縣珍貴老樹，即因上述人為及天然災害之破壞，現遺留數量不多，大部份散佈於廟宇、古蹟、學校及巷道住宅，亟待加強規劃保護。

本縣自民國七十九年度起，依據省訂「加強自然生態保育工作五年計畫」及「台灣地區自然生態保育方案」，擬訂調查保護計畫，截至目前，經調查列入保護對象者計79株，已執行保護措施者計三株，其餘擬分年列入計畫辦理，並繼續進行調查巨木資源。

二、執行目的：

老樹乃為珍稀特殊植物，因遭人為及天然災害之破壞，日益減少，亟待調查規劃實施保護措施，以維優美景觀及保存自然文化資源，並有利於發展遊憩觀光事業及提供林業學術研究，同時，亦能藉此喚起吾人保育觀念之共識。

三、執行情形與成果：

(一)調查規劃：調查本縣轄內符合認定標準之老樹，截至目前計有79株，已逐株建立資料卡存檔。

(二)保護工程措施：本年度選擇大里鄉樹王村一株「茄苳」樹為保護對象。

1. 設置解說標示牌：高2.20公尺，寬1.30公尺（結構材料：1.50公分原木屋面板，6×9角材，9×12角材，5公分厚樺木為牌面材，15×15樺木為二柱之材料）牌面105公分×100公分，橫向書寫樹名、學名、胸圍、樹高、樹齡及保護工程內容概述。

2. 築矮護牆：拆除水泥封閉地98.48平方公尺，並築護牆高48公分，寬50公分，總延長36公尺（結構材料：15公分排卵石3.30立方公尺，2,000psi PC9.83立方公尺，3,000psi RC1.42立方公尺，鋼筋0.205噸等材料），護牆上端加設10公分1:2:4RC預鑄板，垂直高度42公分（15度傾斜長度43.50公分），作為倚背供民眾休憩乘涼坐椅，全部表面共77.29平方公尺，均以1:3水泥粉光、磨面處理。

3. 裝設大號避雷針一組，高度1.70公尺。

4. 護牆內填客土（含砂石級配）24.13立方公尺。

(三)綠化工程：護牆內植草皮80.48平方公尺，並在巨木周圍置盆栽（羅漢松、垂榕）31盆，予以綠美化環境。

四、檢討與建議：

(一)老樹保護工程措施，需配合地方之要求，原規劃設計常因此而有變動，影響成效，但本計畫各項工作，均於事前與當地人士溝通後而設計，故其執行尚稱順利，圓滿達成預期目標。

(二)請上級透過大眾傳播工具加強宣導工作，以喚起國人保育觀念之共識及地方耆宿之接納，提高計畫執行成效。

(三)請增加年度預算經算，俾加速完成現存老樹之保護工作。

屏東林區管理處甲仙四德化石區保護工作報告

劉登標¹ 歐陽弘² 羅國文³

一、前言：

甲仙鄉位於高雄縣北側，楠梓仙溪自北向南貫穿本鄉中央，山系有玉山山脈及阿里山山脈，地質為第三世紀中新世之沈積岩。由於地形特殊，地質複雜，各地層所產生的化石，甚為豐富，且種類繁多。此等化石歷經數千萬年，未被風化作用破壞，迄今仍栩栩如生，充分顯示宇宙的進化，地層的形成，環境及氣候的神奇演變過程。

四德化石區位於甲仙鄉北方之和安村四德巷，距甲仙約二公里，屬於旗山事業區第4林班，其山麓、山谷及延伸之楠梓仙溪溪床，均有化石露頭，因平溪斷層影響，造成陡峭山崖之崩塌，而露出大量化石，最負盛名之大滿月蛤及甲仙翁戎螺均產於本區，除鄉民前往檢拾珍藏外，並有商人收購，在商店陳列展售，由於挖掘者眾，造成大量流失，本處有鑑於此，乃編列維護管理計劃，派員加強巡視，妥善保護。

二、執行目的：

由於本區為甲仙最大化石產區，其化石層分別為：1.石灰岩露頭，2.塊狀沙岩及頁岩層，3.淡灰色沙岩塊。化石種類繁多而完整，為維護區內地質景觀、林相、動物相免被破壞及提供研究岩石變化，地層演化過程，將此自然資產留予後代子孫，而劃為特定區加強保護，防止被採掘破壞，另與學術機關合作，委託專家學者調查，對區內目前已發現而採集陳列於甲仙鄉公所化石陳列館之貝類、棘皮動物、蟹類、藤壺及脊椎動物等化石，詳細研究其沈積、結構，使四德化石區成為良好、完整之地質化石教學園區，保存珍貴自然文化資產。

三、執行情形與成果：

- 1.邀請學者專家及有關單位，研擬設置區域範圍，派員周圍測量、設定界址，埋設界樁，其面積為11.332公頃。
- 2.於和安村四德巷沿溪入口處設置標示解說牌。
- 3.本區自山腰延伸至楠梓仙溪溪床處，埋設水泥樁，架設三角刺鐵絲網，防止莠民侵入盜掘，檢拾化石。
- 4.由甲仙分站就近派員每日多次巡視，按月填報執行成果。
- 5.派員參加村民大會及各種集會，並洽請當地警察單位、鄉公所配合加強宣導，使民衆了解維護管理之要要性，使甲仙地區除擁有甲仙芋頭、甲仙竹筍外，更擁有此

- 1.林務局屏東林區管理處育樂課長
- 2.林務局屏東林區管理處保育股長
- 3.林務局屏東林區管理處技術士

一特殊自然文化資產爲榮，吸引更多外來遊客，進而促進甲仙地區經濟繁榮

四、檢討與建議：

本工作推行以來，甚受學術單位地方機關及有志研究之士肯定與歡迎，雖然保護工作進行之初，因勸阻檢拾採集行爲，引起不滿，屢有破壞告示牌情事發生，後經本處加強宣導、巡護，對被破壞告示牌加以修護，已逐漸見到保護措施之成效，因此建議上級逐年編列經費，持續保護工作，加強宣導，印製解說摺頁或製作精美宣傳品，期使民衆愛惜化石，革除任意挖掘，攜回觀賞保存留念之陋習，並期望藉加強宣導，喚起甲仙民衆愛鄉護產，重視自然生態保育，維護天然資源之觀念，共同參與及支持四德化石區之保護工作。

台北市野生動物保育工作計畫

林木根¹ 莊治宗¹ 張媛¹

野生動物乃地球上自然生態體系中不可替代之一部分，保護野生動物已蔚為世界潮流，我國亦於七十八年六月公布野生動物保育法，以積極落實保育措施，維護其永續生存。行政院農業委員會補助台北市政府建設局執行本計畫，全程期限自七十九年七月一日至八十四年六月卅日。本項保育工作全程計畫目標為：

- (1)教育宣導野生動物保育之觀念及知識，激發國民保育野生動物之共識，進而參與野生動物保護工作。
- (2)保育類野生動物及其產製品之登記。
- (3)掌握經營野生動物活體及產製品有關各行業者資料，給予政令宣導及妥善管理。
- (4)查緝取締保育類野生動物騷擾、虐待、獵捕、買賣、交換、非法持有、宰殺、加工之情事，以杜絕對野生動物之危害。

本計畫八十年度執行情形如后：

一、教育宣導

- 1.舉辦「台北市自然保育研討會」乙次，建立民衆正確之保育觀念及增進保育知識。
- 2.與行政院農業委員會、本府教育局等單位合辦「保護野生動物徵文比賽」，加強建立兒童保育觀念。
- 3.派員赴印尼護送紅毛猩猩十隻返回原產地。
- 4.透過旅行業者宣導國人出國觀光旅行時，切勿購買保育類野生動物產製品。
- 5.印製「野生動物保育法規彙編」1,500冊，「保育類野生動物名錄」500冊，分送有關機關及業者參考。

¹ 台北市政府建設局，台北市長安西路39號

6.印製宣導海報 3,000份，強調「不吃、不養、不放生」目標，呼籲市民支持配合。

7.製作保護野生動物宣導胸章 8,000枚，墊板15,000張，贈與參加各項保育活動之人員。

二、登記管理

1.活體登記：至八十年六月底計受理保育類野生動物持有登記 583件，動物種類81種，數量5,316隻。

2.產製品登記：受理象牙登記1,207件，數量4,795支，犀牛角（粉）登記102件，重量454.647公斤。

3.舉辦「八十年保育類野生動物—人猿、長臂猿、鳥類」義診活動，以加強維護人與動物共同健康。

三、資料調查

蒐集台北市經營野生動物活體及其製品相關業者資料，分類整理，作為有關業務之參考。

四、查緝取締

本府成立「台北市野生動物保育聯合執行小組」，至八十年六月底計實行19次，其中 6件移送地檢處偵辦， 4件處以行政罰鍰，對於非法買賣保育類野生動物情形，已廣收遏阻之效。

八十年度加強宜蘭縣野生動物保育計畫

宜蘭縣政府

一、前言：

本省因特殊之地形及氣候，蘊育豐富之野生動物資源，由於棲息環境遭受破壞，進補及食療之觀念，導致野生動物遭受濫捕、電毒等危機，許多野生動物族群銳減，甚至絕滅；本縣位居本省東北部，自三千五百公尺的南湖北山以降，東至太平洋岸，其間高山、縱谷、丘陵、平原、湖泊、沼澤、河口、海岸等各種環境，不同海拔形成針葉林、闊葉林、次生林的相提供野生動物多樣化的棲息環境。野生動物資源亦集中於此，其間不乏保育類野生動物，諸如台灣帝雉、藍腹鵲、台灣獼猴、臺灣藍鵲等，因之，強調生態保育工作之重要性，以喚起縣民保育意識，乃本縣執行野生動物保育工作之重要課題。

二、執行目地：

- (一)加強宣導教育工作，使縣民能瞭解並支持保育工作；保護現存的野生動物資源，以維自然生態之平衡，保持完美之生活環境。
- (二)積極進行查核取締工作，杜絕違法情事，落實野生動物保育法。

三、執行情形及成果：

- (一)進出口保育類野生動物之審核及定期調查追蹤：對中央主管機關核准進口之動物，予以登記列管，定期進行調查追蹤。
 - (二)保育類野生動物之飼養登記及查核：受理保育類野生動物飼養登記30件，象牙登記50件犀牛角17件。
 - (三)違規案件之處理：取締拆除違規鳥網633件計1800公尺；2件移送法辦。
- 四、組織聯合執行小組：由本府農業局、縣警察局及所屬分局、分駐（派出）所暨各鄉鎮市公所相關人員於八十年四月廿二日組成本縣野生動物保育工作聯合執行小組，加強執行危害野生動物案件之抽查取締工作，另設置督導小組，由縣長擔任召集人，隨時督導工作之執行。
- (五)建立基本資料：建立轄內獵捕人、電毒魚人、山產飲食及野生動物買賣業者基本資料19件，主動進行查核監督工作，杜絕違法。

- (六)宣導、座談及人員之培訓：辦理各鄉鎮市公所工作人員之宣導教育視摩訓
- 宜蘭縣政府
宜蘭市舊城南路23號

練，四月三日舉辦本縣野生動物保育工作督導及聯合執行小組工作研討會，並與中華民國野鳥學會合作印製蘭陽溪自然保護區鳥類資源手冊，分發縣轄各國民中學、國民小學及各鄉鎮市公所等，另印製「讓我們共同保護野生動物」「保育類野生動物名錄」10,000張分發民衆，廣為宣導。加印野生動物保育法彙編手冊300本，分發各鄉鎮市公所、警察單位參考。

(七)轄內重要野生動物棲息地保護：於本縣南澳鄉南溪、北溪正視鄉土特色名產「直額絨螯蟹」，喚起鄉民重視保育觀念，以維護其生態，免遭滅絕之命運。

四、檢討與建議：

(一)自然生態保育工作為政府現階段之施政重點，其範圍及專業技術極為廣泛不但工作量繁重，且執行上涉及之權責機關頗多，目前經辦人力在中央及省已成立專責單位，地方政府則仍無專責單位承辦，以致業務推動上產生力不從心，無法彰顯業務之成效。

(二)國人傳統吃食習性，進補觀念及狩獵習慣由來已久，改變不易無法在短時間改正，是推動保育工作一大阻力，即自然生態保育觀念之宣導工作仍有待加強。

(三)現階段業務推展上，仍應以充實縣市政府執行人力及灌輸全民之保育觀念為首要工作各項人力訓練及保育宣導教育將繼續列為以後年度之重點工作，並持續推動。

八十年度自然文化景觀生態保育計劃執行成果

南投縣政府林務課長

許 朝 富

南投市中興路660號

- 一輔導國姓鄉民成立北港溪魚蝦保育會，維護重要水生動植物資源。
- 二印製愛護野生動物宣導海報分發本縣各國小學童，使得保育觀念往下紮根深植幼小心靈。
- 三執行取締山產店販賣宰殺保育類野生動物（附幻燈片）。
- 四執行取締草屯鎮烏溪雙冬橋段非法魚巷，僱用挖土機強行拆除，恢復行水道暢通（附幻燈片）。
- 五多次執行取締拆除中寮鄉山區非法架設烏網，並函請草屯分局偵辦追查人犯（附幻燈片）。

八十年度台灣省加強野生動物保育計畫

台灣省政府農林廳

一、前言：

本廳奉省府核示負責本省生態環境保護業務之綜合協調及主辦工作，目前辦理之工作包括文化資產保存法所規定自然文化景觀業務、野生動物保育法、台灣地區自然生態保育方案、台灣沿海地區自然環境保護計畫、加強自然生態保育工作五年計畫、加強珍貴老樹及行道樹保護計畫等各項業務之綜合、協調、推動事宜。在上述各項保育工作中，野生動物保育問題為現階段之重點工作，亦最受各界所重視。

二、八十年度本省野生動物保育工作執行情形摘要如次：

- (一)綜合協調、推動各縣市野生動物保育工作。
- (二)協調推動十一縣市野生動物保育先驅計畫。
- (三)建立全省山產店、山產買賣業者及狩獵人共七百八十八人(戶)名冊資料，分由各縣市供為取締、處理、監控之重點對象。
- (四)處理取締非法獵捕、宰殺、買賣等違法案件共六十五件。
- (五)編撰「野生動物保育工作手冊」，並印製六千本，廣為分發各單位供為執行保育工作之參考。
- (六)研訂「加強野生動物保育工作四年計畫」，並自八十一年度開始全面執行。
- (七)爭取設置大肚溪口水鳥自然公園二百七十公頃，並協調規劃、設計工作。
- (八)培訓保育有關人員，完成五梯次五百人之保育幹部訓練。
- (九)宣導保育觀念及知識，印製七種共三萬一千份野生動物保育有關宣導摺頁、單張，並舉辦生態之旅親子活動及大肚溪口水鳥季等活動，且配合各類活動及業務主動發布新聞稿，藉由新聞媒體之廣大銷售網路，達到全面宣導之目的。另對全省各類公務人員八千人次講授生態保育工作及做法，以謀求共識，擴大保育工作層面。

三、檢討及建議：

- (一)野生動物保育工作正值起步階段，為期繼續落實，人力、經費及專業知識缺一不可，在各級單位之指導支持及本廳協調推動下，本(八十)年度內在各項中、長程自然保育計畫之訂頒、協調、經費籌措、縣市執行人力之訓練、執行方法及模式之建立等均有開創性、突破性、全面性之起步，對今後保育工作之落實、紮根及推動已發揮創始性、決定性之影響。
- (二)現階段業務推展上，仍應以充實縣市政府執行人力及灌輸全民之保育觀念為首要工作，各項人力訓練及保育宣導教育將繼續列為以後年度之重點工作，並持續推動。
- (三)為落實推動執行野生動物保育工作，應請各級單位繼續積極爭取於各縣市政府設立「生態保育課」。

臺灣省政府農林廳

南投縣中興新村光華路8號

八十年度加強台中縣野生動物保育計畫

台中縣政府

一、前言：

本省因特殊之地形及氣候，蘊有豐富之野生動物資源，由於棲息環境遭受破壞，進補及食療之觀念，導致野生動物遭受濫捕、電毒等危機，許多野生動物族群銳減，甚至絕滅；本縣位居本省中西部，境內山地與平原盆地各佔一半，高山都分佈在和平鄉境內，野生動物資源亦集中於此，其間不乏保育類野生動物，諸如櫻花鉤吻鮭、台灣鬥魚、台灣獼猴、臺灣藍鵲等，因之，強調生態保育工作之重要性，以喚起縣民保育意識，乃本縣執行野生動物保育工作之重要課題。

二、執行目的：

(一)加強宣導教育工作，使縣民能瞭解並支持保育工作；保護現存的野生動物資源，以維自然生態之平衡，保持完美之生活環境。

(二)積極進行查核取締工作，杜絕違法情事，落實野生動物保育法。

三、執行情形及成果：

(一)進出口保育類野生動物之審核及定期調查追蹤：對中央主管機關核准進口之動物，予以登記列管，定期進行調查追蹤。

(二)保育類野生動物之飼養登記及查核：受理保育類野生動物飼養登記45件，象牙登記126件、435支、2478公斤，犀牛角(粉)17支(57)公斤。

(三)違規案件之處理：取締非法電魚27件，行政處分7件。

(四)組織聯合執行小組：由本府農業局、縣警察局及所屬分局、分駐(派出)所暨各鄉鎮市公所相關人員於八十年五月一日組成本縣野生動物保育工作聯合執行小組，加強執行危害野生動物案作之抽查取締工作，另設置督導小組，由縣長擔任召集人，隨時督導工作之執行。

(五)建立基本資料：建立轄內獵捕人、電毒魚人、山產飲食店及野生動物買賣業者基本資料，主動進行查核監督工作，杜絕違法。

(六)宣導、座談及人員之培訓：八十年四月廿四日～廿六日於懇丁國家公園辦理各鄉鎮市公所工作人員之宣導教育觀摩訓練，五月一日舉辦本縣野生動物保育工作督導及聯合執行小組工作研討會，並與本縣動物保護協會合作印製野生動物保育宣導月曆，分發縣轄各國民中學、國民小學及各鄉鎮市公所，又設計印發保護河川與魚類資源海報15000張，另印製「讓我們共同保護野生動物」「保育類野生動物名錄」20000張分發民眾，廣為宣導。加印野生動物保育法彙編手冊1000本，分發各鄉鎮市公所、警察單位參考。

(七)轄內重要野生動物棲息地保護：於本縣石岡鄉下坑溪設置警告牌並利用集會作保護魚類資源宣導，俾杜絕電、毒、炸魚情形。

四、檢討與建議：

(一)自然生態保育工作為政府現階段之施政重點，其範圍及專業技術極為廣泛，不但工作量大繁重，且執行上涉及之權責機關頗多，目前經辦人力在中央及省已成立專責單位，地方政府則仍無專責單位承辦，以致業務推動上產生力不從心，無法彰顯業務之成效。

(二)國人傳統吃食習性，進補觀念及狩獵習慣由來已久，改變不易無法在短時間改正，是推動保育工作一大阻力，即自然生態保育觀念之宣導工作仍有待加強。

臺中縣政府

豐原市中興路136號

八十年加強桃園縣野生動物保育計畫

桃園縣政府

一、前言：

本縣經濟快速成長，自然資源過度開發，自然生態遭受嚴重破壞，為確保本縣野生動物棲息地之加強保護及宣導基層民衆對野生動物保育觀念迅速達成共識，使有限資源得以繁殖，生態達到穩定及平衡與合理利用，野生動物保育工作已刻不容緩，唯有全面落實保育工作方能達到野生動物生生不息的積極目的。

二、八十年執行情形摘要如次：

- (一)象牙登記 60 件，156 隻。
- (二)犀牛角登記 4 件，5.6 公斤。
- (三)野生動物登記 123 件 401 隻。
- (四)宣導野生動物保育對生態平衡的重要性。
- (五)建立電毒魚人，狩獵者、山產店、野生動物買賣業者之詳細名冊。

三、未來工作重點：

- (一)對轄內未辦理登記之象牙、犀牛角、野生動物；做不定期取締，對已登記者，每三個月查核乙次。
- (二)定期舉辦野生動物保育觀摩會、宣導會。
- (三)招集轄內工作人員舉辦講習會，加強保育法規之認識及執行取締之技巧。
- (四)聯合執行小組隨時處理相關案件，分組前往山區進行搜索取締工作。
- (五)參加山地復興鄉村民大會，宣導村民不捕、不殺、不食、不養等保育觀念。

四、結語：

希望能在短期內建立保育工作人員法令常識及執行要領，使縣民都有不捕、不殺、不吃、不養之保育觀念並藉由聯合執行小組查核取締，達到嚇止不法之效果，使桃園縣成為野生動物的樂園。

桃園縣政府

桃園縣縣府路1號

八十年度加強高雄縣野生動物保育計畫

高雄縣政府

計畫執行成果

(一)受理審核進口保育類野生動物案件 1 件。

(二)受理保育類野生動物之飼養登記案件 1 3 2 件。

犀牛角登記 1 3 件。

象牙登記 4 6 件。

依法辦理保育類野生動物之飼養登記及查核業務，建立完整資料檔，隨時掌握各類野生動物飼養情形，若有飼養不當或虐待行為即予依法嚴辦。

(三)取締、拆除違規鳥網 5 0 0 公尺。

(四)組成聯合執行小組加強查核取締工作 12 次，由縣政府、警察局、分局、派出所及鄉鎮公所共同組成，除處理各項檢舉案件以，每月定期一次主動出擊，加強對非法行為進行計畫性之積極蒐證、查緝、取締等工作。

(五)違反野生動物保育法送地檢處案件 3 件，與台北市政府合辦違法案件 1 件。由本府辦理行政罰鍰 2 件。

(六)製作宣導標語 7 種，法令手冊 1 種，宣傳單 1 種，告示牌 4 種，海報 1 種。

(七)建立狩獵、採集、山產店、山產業者基本資料 103 件，以明查暗訪方式，以鄉鎮為單位，掌握業者及動物來源，以進行查緝及監督，杜絕違法情事。

(八)重點地區，人員之觀摩、研習座談會 10 次，以這些活動來宣導相關法令及正確保育觀念。

(九)野生動物棲息地的保護，推動、鼓勵狩獵壓力大的鄉鎮，主動提出適合其鄉土民情的野生動物保育計畫，落實保育觀念植入民間，蔚成風氣。由最基本、最重要棲息地保護做起。本年度六龜鄉“荖濃溪魚保護計畫”三民鄉“楠梓仙溪魚類資源保護計畫”下年度將再辦理林園鄉“鷺鶯保護計畫”茂林鄉“濁口溪魚類資源保護計畫”

高雄縣政府

高雄縣鳳山市(830)光復路一段132號

屏東縣八十年度野生動物保育計劃報告內容

屏東縣政府

- 一、本縣八十年度爲一新興計劃，一切屬於摸索階段，最主要是著手調查保育類野生動植物品種、數量，並配合中央、省府指示辦理講習研習會，並請警察局、各鄉、鎮、市公所，本縣林區管理處等各有關單位加強有關保育常識訓練，並和墾丁國家公園管理處共同執行保育計劃，在八十年度內全縣各重要地點及山區，棲息地區等製製作告示牌設立以作爲宣導警示用，並廣發保育宣傳海報，建立山、海商店。
- 二、及獵捕，電、毒魚者之基本資料列冊管理，印製保育類者錄及罰則宣傳海報，透過各鄉、鎮、市公所農業、財經課長及獸醫人員、警察局、各分局及派出所人員大力查檢取締，總之八十年度該計畫著重於宣導，相信保育業務會慢慢進入佳境，但保育法及技術上皆存有相當多煩雜問題，俟慢慢再解決，並建立一個美好生態環境，讓子子孫孫能過著美好生活。

花蓮縣八十年度野生動物保育工作報告

一、前言：

本縣位於台灣東部面積佔全省八分之一，山地面積佔百分之七十二·八〇以上林地蘊有許多動植物，山川河流，自然環境優美誠屬觀光旅遊聖地，本縣為維護自然生態平衡，落實野生動物保育理念，依據野生動物保育法及行政院農業委員會核定八十年野生動物保育計畫方針貫徹執行野生動物保育工作，以期達到永續保育目的。

二、執行情形及成果：

1. 建檔管理縣轄內各鄉鎮市獵捕人45人(戶)，電、毒、炸魚人14人(戶)，山產店及販賣業者26人(戶)計85人戶，並將現行法令規章文宣資料寄送各當事人，勸阻勿從事非法行為，同時舉辦座談會，聽取意見與溝通觀念。
2. 截至(八十年六月)為止辦理保育類野生動物飼養登記36戶，飼養保育類動物有：台灣黑熊、馬來熊、山羌、台灣獼猴、人猿、長臂猿、白鼻心、帝雉、白鵲、黑鵲、鴛鴦、石虎等十二種之多。
3. 整支象牙及犀牛角(粉)登記者計有整支象牙登記17戶99支(包括已加工者)約重133.90公斤，犀牛角(粉)一戶2.20公斤。
4. 依據野生動物保育法規定，本府於七十九年十月十六日成立野生動物聯合取締小組。由縣長親自授旗同時召開取締成員職前研討會，聘請農林廳技正室彭技正國棟做二個小時演講主題：如何宣導野生動物保育工作暨執行取締工作要領。
5. 保育宣導方面：
 - ①本府於七十九年十一月十五日與內政部營建署太魯閣國家公園管理處共同舉辦「野生動物保育」徵文比賽。分為(一)國小組(二)國中組(三)高中組(四)大專及社會組等四組。優勝者分別頒贈獎狀及獎金以資鼓勵。
 - ②與內政部營建署太魯閣國家公園管理處合併印製大型宣傳海報三式計2,400份，分發各機關、學校、村里、社團張貼宣導保育理念。
 - ③為落實野生動物保育觀念，提升民眾認知保護野生動物重要性，本府以製作自然生態保育宣導宣傳車於八十年三月一日起至四月十日止穿梭巡迴各鄉鎮市大街小巷村里社區，廣予宣導為期四十天之久。
 - ④為確實執行野生動物保育法及喚醒民眾勿以身試法，將野生動物保育法令規章

和保育觀念，列入村里民大會重要政令宣導項目。

- 6.截至八十年六月本縣共取締違反野生動物保育案件六件。(玉里警察分局 3 件、新城警察分局 2 件、吉安警察局 1 件)

三、檢討與建議

- 1.本項工作自推展以來深受一般民眾肯定與歡迎，但由於野生動物保育理念在我們國家起步較晚，許多觀念法令規定均仿效西方先進國家，因而產生諸多窒礙難行之處，是否應參考國內民情風俗，列入嗣後重新檢討範疇。
- 2.為維護及落實自然生態平衡，建請上級單位及早責成各縣市政府成立保育課；由專責單位及專業人員負責辦理自然生態保育工作，以達事半功倍效果。
- 3.目前本省並無完整生態保育棲息地資訊，無法掌握野生動物確實生態族群量，做適當合理的利用。

執行單位：花蓮縣政府

執行人：職稱：課長 王 滄 璇

技士： 陳 瑞 明

八十年加強新竹縣野生動物保育計畫

范德顯⁵¹

前言

新竹縣轄內多為山區，蘊藏著豐富之生態資源，正當時代邁向機械化與都市化，及濫殺、濫捕情形嚴重時，那些天然的綠草、森林、清新的空氣、溪流和野生動物都面臨著極大的危機，為了使自然資源之保育與利用間維持平衡，使全體縣民瞭解並支持保育工作，故配合中央訂下「加強新竹縣野生動物保育計畫」。

執行情形

- 一、進口保育類野生動物之定期調查追蹤：本縣進口保育類野生動物執行人員採用定時實地查訪並詳細紀錄追蹤。
- 二、保育類野生動物之飼養登記及查核：本縣執行人員藉由各鄉鎮市公所、警察（分）局之配合做妥資料收集、登記再予以實地查訪，並分發解說法令。
- 三、非法宰殺獵捕進出口買賣陳列加工騷擾野生動物案件之處理：本縣執行人員採實地探訪並拍照存証，對於違法案性，一切遵循法律途徑，移送法辦。
- 四、組成聯合執行小組加強查核取締：除本縣府主辦及相關協辦人員外，並請縣轄各鄉鎮市公所、警察分局挑選執行小組人員，組成聯合執行保育野生動物小組，並由縣長主持研討會，訂定工作目標，本年度進行兩次的取締，以獵具、鳥網拆除為主，並拍照存証。
- 五、建立狩獵、採集、山產店、山產業者基本資料：本縣府逕由各鄉鎮市公所、警察分局、派出所、駐在所之配合，建山產店四家，其餘未發現。
- 六、重點地區人員之宣導、座談：本年度進行二次之座談，針對重點鄉鎮（竹東鎮、峨眉、尖石、五峰鄉及關西鎮）以幻燈片、海報、錄影帶及講解討論，並針對山產店業者、持有保育類野生動物者逐戶、逐人宣導及分發法令。

台東縣八十年度加強野生動物保育計畫執行工作報告

一、前言：

本縣位於台灣之東南部，包括蘭嶼、綠島二離島，東臨太平洋西依中央山脈，地形狹長，屬亞熱帶氣候，四季如春風景秀麗，轄內無重污染工廠，空氣清新，民風淳樸。土地面積三五一、五二五公頃，其中山坡地及高山地區面積達三二八、五九八公頃，雨量豐沛，氣候溫暖，全縣山巒綿互，溪谷縱橫，河川、平原沼澤地、丘陵、台地、高山等地形無不齊備，孕育豐富之野生動植物資源。由於國人長久以來對野生動物之觀念，仍囿於馴養，食補及放生市場需求壓力甚大，致使野外濫捕、濫殺之情形根絕十分不易，近年來更因大量進口國外珍奇保育類野生動物，引發國際保育團體交相指責，凡此種失當現象，亟須有計畫地經營管理謀求改善，配合長期漸進之教育宣導，方能收到疏導匡正之效，使本縣甚至本省野生動物資源得以合理利用，生生不息。

二、執行目的：

依據野生動物保育法及施行細則之規定，建立野生動物保育類持有飼養戶基本資料登記及查核，隨時掌握各類野生動物飼養情形，若有飼養不當或虐待行為即予依法嚴辦。依法組織成立縣聯合執行小組，加強查核取締工作，每月定期、不定期主動出擊加強對非法捕獵、宰殺、電毒魚、販賣野生動物之違法查緝、取締等工作，為掌握目前從事狩獵、電毒魚、山產店、山產業者等對象，建立狩獵戶、電毒魚者、山產店、山產業者基本資料，確實掌握非法業者，隨時進行查緝、監督，以杜絕違法情事。將有關野生動植物保育法規（文化資產保存法、野生動物保育法）透過各種宣導管道往下紮根，建立正確保育觀念，為獲取長期永續之利用而採取的必要手段。「保育」不是完全禁止利用而是合理利用。

三、執行情形及成果：

本縣承蒙行政院農業委員會和臺灣省政府農林廳在經費上支助及行政技術上全力輔導，於八十年度依計畫逐漸完成野生動物保育工作推展之鵲型，在現有警政合作下，更能發揮其功效，以達保育工作最高理想目標，本縣八十年度執行成果如后：建立保育類野生動物飼養戶登記資料案件五十五件、象牙持有者登記十二件、狩獵戶九十七戶、電毒魚戶十九戶、山產買賣業者十六戶、查緝取締違反野生動物保育案件十九件、移送法辦五件、沒入鳥踏仔五、三二六支。成立野生動物保育聯合執行小組，編印保育相關法規五〇〇冊供工作人員及有關人員參閱。複印「讓我們共同保護野生動物」「保育類野生動物名錄國內部份」一五、〇〇〇份，分送各鄉、鎮、市公所於各種集會時宣導說明參閱訪問飼養戶、狩獵戶、山產買賣業者、毒電魚戶等，五二次，告以政府推動保育野生動物法規及決心，請其共同遵行保護。

四、檢討與建議：

自然生態保育為政府現階段之施政重點，唯現今縣、市政府之保育業務欠缺專責單位及人員辦理，由身兼其他多項業務之承辦人員兼辦。在人力、專業、協調推動上產生力不從心，嚴重妨礙業務之成效，致迭遭一般民眾與環保團體之垢病，鑑於自然生態保育問題之嚴重性與必要性，應於縣市政府增設生態保育課，有效解決龐大自然生態保育業務，目前執行上之窘況。

執行單位：台東縣政府

執行人：王吉田 林務課長

林志成 技士

彰化縣八十年度加強野生動物保育計畫執行報告

彰化縣政府

一、前言：

本縣野生動物資源豐富，但近年來因遭受濫捕、濫獵、棲息地及環境品質破壞等影響野生動物數量日減，甚至瀕臨滅絕；目前碩果僅存者，亦祇是在小面積保安林和防風林及農作、果園地帶的野生動物及大肚溪口南遷北返的候鳥、八卦山過境的灰面鵟，為保護野生動物的生存空間以維生態平衡，使全體縣民瞭解並支持保育工作，知法保育工作，知法而不犯法，應加強野生動物之保育工作。

二、執行成果：

(1)登記：78自年 8月至79年11月底，計完成；

- 1.保育類野生動物飼養登記12件， 1,479隻。
- 2.象牙登記，已加工95件，867.95公斤，未加工95件1,140.75公斤。
- 3.犀牛角（粉）40件，13公斤。
- 4.電、毒魚人 2件。

(2)宣導：

80年 4月 3日為加強保護八卦山區過境的灰面鵟派員會同省農林廳、台灣省野鳥協會及本縣警察局，大竹派出所、彰化市公所等有關人員前往彰化市安溪里山區向當地住戶人家挨家挨戶分發「愛護野生動物」海報與灰面鵟簡介資料一〇〇份宣導保護野生動物的重要性和有關罰則，勸導民眾不要捕殺灰面鵟。

(3)取締：

- 1.79年 8月 6日本局派員會同彰化市大竹警察分駐所、彰化地方法院檢查署等人員前往八卦山區取締拆除安放在山區的獵具「鳥仔踏」四件。
- 2.80年 3月22日本局派員會同彰化縣警察局、大竹分駐所、彰化市公所等單位人員前往彰化市安溪里山區取締、拆除威脅灰面鵟「鳥仔踏」四件。
- 3.80年 3月28日本局派員巡視全興工業區旁的防風林帶拆除鳥網二八〇公尺。

(4)成立野生動物保育聯合執行小組：

本府依照野生動物保育法有關規定及實際業務需要經研擬「彰化縣加強野生動物保育工作執行計畫」，並成立「野生動物保育聯合執行小組」報經省農林廳80. 4.22農技字第三五九二六號函「同意備查」。聯合執行小組由本府農業局、教育局、新聞室、彰化縣警察局、各警察分局、各鄉鎮市公所、環保局等單位派員兼任小組成員，並由主任祕書兼任召集人。聯合執行小組於80. 5.25召開第一次研討會。

台灣本土哺乳動物研討會

陳寶忠

摘要

本計畫之重點在切磋台灣本土哺乳動物野外研究的技術，並探討未來發展方向之整合。研討會於80年 4月22日假台北動物園演講廳舉行，邀集王穎教授等五位學者，分別就「動物的捕捉標示與年齡判別」、「野生動物痕跡的記錄與分析」、「野生動物食性研究之方法」、「野生動物行為研究方法簡介」及「圈養動物行為觀察之目的及方法」做專題演講，並進行綜合討論。有關演講內容已出版專輯一冊。研討會與會人員達 155人，包括中、小學教師；動物相關系、所師生；縣、市政府相關人員；各林區管理處相關人員；台北動物園員工等。

臺北市立動物園

臺北市新光路二段30號

中華民國第一屆國際野生動物保育研討會

林曜松¹ 張崑雄¹

摘 要

中華民國第一屆國際野生動物保育研討會於民國八十年三月二十五日至二十九日，假中央研究院國際學術活動中心舉行。參與本次研討會的各界人士達 230 人以上，會中由來自日本、美國及國內多位從事野生動物研究的學者專家發表十七篇論文，此十七篇論文的題目與作者茲分列如下：

（英文部份）

WILDLIFE MANAGEMENT: A Prespective on an International Resuource Necessity. (Jack H. Berryman)

Refuges and Zoning to Control Exploitation of Hunted Wildlife. (Dale R. McCullough)

The Role of a Natural History Museum in Nature Conservation: How to Enhance the Interest to Wildlife and Nature Conservation Through Its Activity. (Yorio Miyatake)

Conservation of Freshwater Fishes with Emphasis on Its Relation to Physical Enviroment and Ecological Diversity. (Hiroya Kawanabe).

Systematics and Biogeography of Terrestrial Reptiles of Taiwan. (Hidetoshi Ota)

Bird Conservation of Japan. (Noritaka Ichida)

Ecological and Physiological Studies on Migration in Japan and the Conservation of Migratory Birds. (Tsukasa Nakamura)

Ditribution, Vegetation, and Social Structure of Taiwan Macaques. (Koshi Norikoshi)

（中文部份）

台灣昆蟲資源之利用與保育（楊平世）

台灣大甲溪上游產陸封性鮭魚的現況（林曜松、張崑雄、詹榮桂）

台灣產兩棲類現況評估（呂光洋、林政彥、莊國碩、賴俊祥）

台灣保育類猛禽現況（林文宏）

紅尾伯勞之遷徙、過冬領域及覓食行爲（劉小如）

梅花鹿的復育現況（王穎）

1 國立台灣大學動物學系

台北市 106 羅斯福路四段 1 號

台灣獼猴的研究現況（李玲玲）

台灣山羌的經營與管理（裴家騏）

穿山甲的生物學及其保育（趙榮台）

八十年度台中縣政府加強野生動物保育推廣計畫

台 中 縣 政 府

一、前言：

本縣蘊藏豐富之野生動物資源，宜加強對民眾宣導，以提高社會大眾對野生動物保育之認識，使稀有動物及景觀資源免遭破壞，維護人類自然美的生活環境，更能確實達到保護自然資源及生態平衡之目標。

二、執行情形及成果：

- (一)賞鳥活動：於八十年五月十九日、廿六日舉辦兩梯次大肚溪口、張玉姑廟賞鳥活動計一二〇人次，經台灣省野鳥協會解說人員的詳細解說，讓初次賞鳥的學生及民眾獲益良多，以培養國人愛鳥賞鳥習慣，而改善國際形象。
- (二)親子生態教育活動：於八十年六月卅日假本縣大甲鎮永信運動公園舉辦親子教育活動（寫生比賽）參加人數計四百五十人，加強宣導自然生態的重要性。
- (三)印製河川溪流護魚海報，分發縣轄各鄉鎮市公所、村里辦公處及分駐（派出）所張貼並廣為宣傳，以保護魚類自然資源。
- (四)製作警告及宣導牌十處設置本縣石岡鄉下坑溪，以作保護魚類資源宣導。
- (五)舉辦野生動物保育工作研討會，以增進保育工作之知識與技能。

三、檢討與建議：

希望利用新聞媒體加強野生動物保育法令宣導，讓民眾瞭解其重要性。

澎湖海豚、海龜保育宣導計畫

洪松棟

前言

往年本縣漁民發現海豚、海龜等海洋野生動物，均視同一般魚類獵捕遭致國際間保育人士譴責，農委會於七十八年八月四日及七十九年八月卅一日指定公告海豚、玳瑁、綠蠵龜、赤蠵龜、革龜等為保育類野生動物，唯本縣漁民眾多，對於野生動物保育法令規定均不瞭解，且漁民海上佈網作業海豚、海龜常誤觸網具傷亡，亟應加強宣導及採取積極措施，以維護海豚、海龜生態平衡。

計畫目的

宣導漁民遵守野生動物保育法令及建立正確保育觀念，以防杜捕殺海豚、海龜行為，維護我國國際形象。

執行成果

本府80.3.與馬公國中聯合於湖西鄉沙港活動心辦理海豚、海龜保育宣導座談會，參加漁民踴躍，並聘請中央研究院張崑雄博士講授海豚生態及保育事項，並放映海豚、鯨魚生態保育錄影帶以達宣導效果。另白沙鄉大倉島部份漁民從事傳統捕龜漁業，本府召集業者，勸導勿捕殺，俾免觸法，並輔導轉業，為加強保育效果，又印製野生動物保育法暨施行細則1,000本，海豚、海龜彩宣摺頁2,000份，分送各鄉市公所、縣警局、區漁會轉發漁戶及有關單位廣為宣導。

檢討與建議

本計畫經由本府、各鄉市公所、縣警局、澎湖區漁會及傳播媒體宣導，已未聽聞捕殺海豚、海龜事件，惟海豚並非面臨絕種之野生動物，希能於野生動物保育法修正時，加列基於發展觀光事業之需要，准予依法申請圍捕一定數量之海豚。另法院判決確定，依法沒收之野生動物交由主管機關處理，請於修法時，明確規定處理方式。

澎湖縣政府農業科

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保育類野生動物圖鑑 —台灣產鳥類部份海報再版計畫

陳明發¹

摘要

本會於七十八年度受農委會委託，印製「保育類野生動物圖鑑—台灣產鳥類部份（上）（下）」海報，並分發予全省各級機關張貼、公告，以令民眾認識、瞭解國內部份之保育類鳥類，進而達到保育觀念之宣導。

然前項海報印製份數有限，無法普及至各級基層單位，海報分發完畢後，陸續有許多鄉鎮公所、執法單位、學校、保育團體反映亟需該海報，以向民眾宣導鳥類保育觀念及提昇執法人員對於保育類鳥類之鑑識能力。

本年度特再版該海報 2 萬套，並函請台北市政府、高雄市政府、全省 21 縣市政府及林務局、林業試驗所、省警務處等單位至本會領取該海報，並代為轉發其各所屬基層單位、各級學校張貼公告。

1. 中華民國野鳥學會 台北市復興南路一段295巷13弄6號2樓

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A List of the nature conservatin projects (FY 1991)
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No.	Chinese title	English title
1	台灣省加強野生動物保育綜合督導計畫	The supervising project on wildlife conservation of Taiwan Province
2	臺北縣野生動物保育計畫	Taipei County wildlife conservation project
3	宜蘭縣野生動物保育計畫	I-lan County wildlife conservation project
4	桃園縣野生動物保育計畫	Taoyuan County wildlife conservation project
5	新竹縣野生動物保育計畫	Hsin Chu County wildlife conservation project
6	苗栗縣野生動物保育	Miaoli County wildlite conservation project
7	台中縣野生動物保育計畫	Taichung County wildlife conservation project
8	南投縣野生動物保育計畫	Nantou County wildlife conservation project
9	彰化縣野生動物保育計畫	Changhua County wildlife conservation project
10	雲林縣野生動物保育計畫	Yunlin County wildlife conservation project
11	嘉義縣野生動物保育計畫	Chiayi County wildlife conservation project
12	台南縣野生動物保育計畫	Tainan County wildlife conservation project
13	高雄縣野生動物保育計畫	Kaohsiung County wildlife conservation project
14	屏東縣野生動物保育計畫	Pingtung County wildlife conservation project
15	台東縣野生動物保育計畫	Taitung Country wildlife conservation project
16	花蓮縣野生動物保育計畫	Hualian County wildlife conservation project

No.	Chinese title	English title
17	澎湖縣野生動物保育計畫	Penghu County wildlife conservation project
18	基隆市野生動物保育計畫	Keelung City wildlife conservation project
19	新竹市野生動物保育計畫	Hsin Chu City wildlife conservation project
20	台中市野生動物保育計畫	Taichung City wild life conservation project
21	嘉義市野生動物保育計畫	Chia-yi City wild-life conservation project
22	台南市野生動物保育計畫	Tainan City wildlife conservation project
23	彰化縣大肚溪口水鳥保護計畫	Waterfowl conservation project of Tadu estuary
24	澎湖縣貓嶼鳥類保護區保護計畫	Penghu County Mao-yu islandbird conservation project
25	八十一年度台北市野生動物保育工作計畫	Project for strengthening promotion of wildlife conservation in Taipei Municipal City
26	苗栗三義火炎山自然保留區管理維護計畫	The management and preservation of the Hoyenshan nature preserve in Mioli
27	自然文化景觀宣揚工作計畫	The publicizing program of natural and cultural heritage
28	台灣鼬獾(<i>Meilogale moschata subaurantiaca</i>)族群生態學之研究	A study on the population ecology of the Taiwan ferret badger (<i>Meilogale moschata subaurantiaca</i>)
29	穿山甲之繁殖保存研究 (IV)	Studies on the conservation of Chinese pangolin <i>Manis pentadactyla pentadactyla</i>
30	臺灣黑熊之生態調查及其經營管理策略 (三)	Study and management of Formosan black bear (III) (<i>Selenarctos thibetanus formosanus</i>)
31	宜蘭仁澤台灣獼猴猴羣生態之研究 (一)	Study of population ecology of formosan macaque in Jentse, Iilan (I)
32	關渡水鳥、中興橋華江橋候鳥生態保育區解說教育工作計畫	
33	臺灣地區山地鄉對野生動物資源利用的調查 (三)	An investigations on the consumption of the wildlife resource by the aborigines in Taiwan (III)

No-	Chinese title	English title
34	臺灣長鬃山羊之生態研究 (5) --由食物與排泄中的能量及營養變化探討臺灣長鬃山羊在食物網中的生態區位	The ecological study of formosan serow (<i>Capricornis crispus swinhoei</i>) -- Energy and nutrient dynamics in its food and pellet
35	台灣越冬型蝴蝶谷之生態研究	Ecology on the overwintering aggregation of butterflies ("butterfly valleys") in Taiwan
36	花東海岸山脈地景調查	Landscape study of the coastal range, eastern Taiwan
37	泥火山地區植物調查 (第二年)	Investigation of plant communities at muddy volcanic areas in Taiwan (2nd. year)
38	本省原生闊葉樹林植物社會資料庫之建立	Establishment of database of the virgin broad-leaves forest in Taiwan
39	翡翠樹蛙之研究	The study of emerald green tree frog (<i>Rhacophorus smaragdinus</i>)
40	台灣一葉蘭保留區管理維護計畫	The management and preservation of Taiwan pleione nature reserve
41	大武山自然保留區哺乳動物相調查 (二)	Study of the mammalian fauna of Tawu Mountain nature reserve (II)
42	關渡自然保留區管理維護計畫	Project for management and preservation in Kuan-tu nature reserve
43	國內圈養瀕臨絕種哺乳動物之調查與血統書建立計畫	The project of establishing an inventory system for endangered mammals in captivity of Taiwan
44	樟天山自然保留區管理維護計畫	The management of Cha-tian nature preserve
45	礁溪台灣油杉自然保護區管理維護計畫	The management and preservation of Chiachsi Taiwan keteleeria nature reserve
46	大肚溪口鳥類保護計畫	Wildbird conservation project of Tadu estuary
47	宜蘭縣南澳鄉直額絨螯蟹生態保育之研究	Studies on the conservation of <i>Eriocheir rectus</i> (Crustacea, Decapoda, Grapsidae) in Nanao
48	澎湖縣湖西鄉海豚資源之保育利用規畫	The planning on the conservation and utilization of dolphine resource at Hushi, Peng-hu County

No.	Chinese title	English title
49	澎湖縣自然文化景觀調查 (二)	Research on natural and cultural singhts in Penghu: II
50	臺灣中西部海岸小燕鷗繁殖族群之初步調查	A preliminary survey on the breeding population of the little tern (<i>Sterna abifrons</i>) along the central west coast of Taiwan
51	櫻花鉤吻鮭族群生態與復育研究 (3)	Study on polulation ecology and restoration of formosan landlocked salmon (3)
52	關渡自然保留區植羣演替與底棲動物組成關係之研究	Study on the relationship between macrobenthos and succession of vegetation at Kwandu nature preserve
53	大甲溪流域粗首蠟生態學之研究	Study on the ecology of <i>Zacco pachycephalus</i> in Tachai Stream
54	櫻花鉤吻鮭及其他大甲溪魚類寄生蟲之研究	Studies on parasites of the formosan landlocked salmon and other fishes in Tachia River
55	屏東縣青山溪生態調查及保育研究	Ecological survey and conservation study of Ching-shan Stream, Pingtung County
56	秀姑巒溪流域農業生態調查暨雁鴨為害防治技術研究	The investigation of agricultural ecology on the Hsiukuluon River and prevention studies on the damage from wild ducks
57	台灣溪流環境保育活動之推廣	Promotion on the stream environmental protection of Taiwan
58	八十一年度自然生態保育技術改進計畫	Technical improvement on natural conservation project of FY 1991
59	八十一年度青年自強活動中橫生態保育研習營	
60	芝山岩自然步道解說員訓練營	Seminar of Chi-shan-yan natural walk's guide training
61	自然環境保護教育	A nature awareness education project
62	自然生態保育兒童讀物寫作培育計畫	
63	現階段執行野生動物保育法之問題及衝突分析	Conflict assessment and problem forecasting on the execution of current wildlife conservation law
64	廣播節目「彩虹天地-大自然的聲音單元」	Radio program: 「The Beautiful World-Sounds of Nature」

No.	Chinese title	English title
65	屏東縣隘寮溪、青山溪溪流保育宣導教育	A conservational education guidance of Ay-liau and Ching-shan Stream, Pingtung County
66	親子科學研習營	Parent-child scientific study workshop
67	台灣自然保留區簡介之編印	Prints of pamphlet for nature preserves of Taiwan
68	澎湖縣自然保育及宣導計畫	Propagation project of education on natural environmental conservation in
69	墾丁高位珊瑚礁自然保留區之經營研究	The studies and management of Kenting natural areas on high coral reefs
70	南澳湖泊及原始闊葉樹林保護區經營管理計畫	The management of Nanao pond hardwood nature reserve
71	哈盆自然保留區管理及規劃	Planning and management of Ha-pen nature reserve
72	台東台灣蘇鐵自然保留區管理維護計畫	Management and preservation of cycas natural reserve in Tai-tung
73	大武壠台灣穗花杉自然保留區管理維護計畫	Management and preservation of anentotaxus nature reserve in Ta-wu
74	淡水紅樹林自然保留區管理維護計畫	The manangement and preservation of Tan-sui mangrove nature reserve
75	坪林台灣油杉自然保留區管理維護計畫	The management and preservation of Pin-lin Taiwan keteleeria nature reserve
76	台灣地區猛禽調查計劃	Raptors census project of Taiwan
77	圈養野生動物所需空間之探討	Space and furniture requirement of wild animal in confinement
78	蘭嶼角鴞之社會行為及棲地利用	The social behavior and habitat utilization of Lanyu scops owl
79	台灣地區鳥類繫放計劃	Bird banding project of Taiwan
80	臺南縣境內六甲鄉水流東地區密集化石地質景觀之調查 (二)	Investigation on concentrated fossil geological landscapes in Liu-chia, Shiu-liu-tung, Tainan Hsian (II)
81	蓮華池地區自然資源保育計劃	The conservation plan of natural renewable resources in Lien-hau-chin area
82	出雲山自然保留區管理維護計畫	

No.	Chinese title	English title
83	鴛鴦湖自然保留區管理維護計畫	Yuen-yang lake natural area reserve protection and maintenance project
84	澎湖玄武岩自然保留區管理維護計畫	Penghu natural basalt reserve management project
85	高雄縣四德化石區保護	The protection plan of Syh-der fossil area
86	六龜十八羅漢山地景保護	The landscape protection program of Mt. Eighteen Buddhas in Liow-guei
87	烏山頂泥火山自然保留區保護計畫	The management and preservation of Wu-san-din mud volcano nature reserve
88	大武山自然保留區緩衝區管理維護計畫 (II)	The management and preservation of Mt. Ta-wu nature reserve and buffer area (II)
89	大武山自然保留區、緩衝區管理維護計畫 (壹)	The management and preservation of Mt. Ta-wu nature reserve and buffer area (I)
90	茶茶牙賴山台灣穗花杉自然保護區管理維護計畫	
91	台灣特有飛蜥種類之調查研究與復育試驗 (三)	Translocation test and field survey of endemic species of agamid lizards in Taiwan area (III)
92	櫻花鉤吻鮭棲息地巡迴保護	The protection of land-locked samon (<i>Oncorhynchus masou</i>) habitats
93	清水溪溪魚保護計畫	
94	森林溪流淡水魚類保育工作計畫	The conservation planning of fish in the forest area
95	八十一年度青年自強活動鴛鴦湖自然生態保育研習營	
96	八十一年寒暑假青年自強活動生態保育環境維護研習會 (七)	F.Y. 1991 nature conservation and environment protection work shop (VII)
97	鳥類保育工作研習會實施計劃	
98	全民「自然保育」錄音專訪	
99	臺灣野生動物清查和資料庫建檔之規劃及執行	Wildlife inventory and its data base (databank)

No.	Chinese title	English title
100	高雄市壽山地區台灣獼猴(<i>Macaca cyclopis</i>) 族群繁殖、食性之調查,及維護保育之規劃	<i>A study of the breeding and feeding habituation and the protecting organization of Macaca cyclopis in Kaoshiung Sou-shan Mountain zone</i>
101	金門自然生態保育計畫	
102	台中縣鸞鴛鳥調查保護計畫	
103	新豐紅樹林調查保護計畫	
104	台中縣巨木調查保護計畫	
105	基隆海蝕地形保護	<i>The protection of Keelung abrasion coast</i>
106	保護野生動物宣導及徵文比賽	<i>Wildlife protection propaganda and composition contest</i>
107	"台灣蛾類圖說 (5)"編印及出版品分配計畫	<i>Publication and distribution of "Illustrated moths of Taiwan (5)"</i>
108	八十一年度高雄市野生動物保育工作計畫	<i>Project for strengthening promotion of wildlife conservation in Kaohsiung Municipal City</i>
109	保育鳥類查核與環誌計畫	<i>Checking and banding project for caged conserved birds</i>
110	七家灣溪櫻花鉤吻鮭棲地改善計畫	<i>A project of improving habitate for land-locked salmon</i>
111	保護區野生動物調查、經營保育技術訓練講習 會	<i>Field technique training for the study, management and conservation of wildlife in nature reserve</i>
112	台灣地區野生鳥獸養殖成功現況調查計畫	<i>Feeding and breeding success records of captive wildlife in Taiwan</i>
113	台灣省特有生物研究保育中心籌建規劃	<i>Planning on the establishment of Taiwan Endemic Species Research Institute</i>
114	野生動物保育國小兒童徵文內容分析	<i>Content analysis of elementary school children's writing about wildlife conservation</i>
115	犀牛角管理研討會	<i>Workshop on a programme to control Taiwan's trade in rhino horn</i>

Fiscal Year 1992 Nature Conservation Events

Council of Agriculture (COA)

(July 1991 ~ June 1992)

Date	Events
1990	
July	Approval of FY1992 Nature/Culture, Landscapes Conservation Projects, about 120 projects in total.
July.09	The 1st preparatory meeting of the establishment of Taiwan Endemic Species Research Institute was convened by the Agriculture & Forestry Department of Taiwan Provincial Government.
July.16	The 3rd meeting of discussing the Export and/or Import Regulation Rules of the Wild Fauna and Flora was convened by the Bureau of International Trade.
August	Chairman Yu of COA accompanied by Mr. Dai, the ROC Delegate in UK, , visited the Headquarters of the WWF.
August.01	The 4th meeting of discussing the Export and/or Import Regulation Rules of the Wild Fauna and Flora was convened by the Bureau of International Trade.
August.13	The 2nd preparatory meeting of the establishment of Taiwan Endemic Species Research Institute was convened by the Agriculture & Forestry Department of Taiwan Provincial Government.
August.16	The 5th meeting of compiling the handbook of wildlife

- conservation was convened by the Agriculture & Forestry Department of Taiwan Provincial Government.
- September Protecting Wildlife Composition Competition sponsored by COA, Children Newspaper and the Foundation of International Esthetic and Natural Ecology.
- September Mr. San-Wei Lee, The Deputy-Director of Dept. Forestry, COA, and Dr. Ping-Shih Yang attended the 1991 Annual Meeting of IAFWA in Arkansas, U.S.A.
- Sep.03 The 5th meeting of discussing the Export and/or Import Regulation Rules of the Wild Fauna and Flora was convened by the Bureau of International Trade.
- Sep.11 The meeting of discussing for the reforestation on the boundry of Taiwan Trout Nature Reserve was convened by COA.
- Sep.17 The COA cooperated with Environmental Protection Administration(EPA), and the Education Ministry to produce the children TV programs of pollution control, nature ecology, outside school education.
- Sep.19 The 6th meeting of compiling the handbook of wildlife conservation was convened by the Agriculture & Forestry Department of Taiwan Provincial Government.
- Sep.24 The 3rd meeting of formulating wildlife quarantine measures was convened by the COA.
- Sep.27 The Symposium of Strategy in Nature Ecology Conservation was held in the Agriculture and Forestry Department of Taiwan Provincial Government.

- Sep.28 The 39th joint meeting of the Nature Conservation Committee and the Technical Committee of COA was held.
- Oct.01 The meeting to execute the wildlife conservation action projects of FY1992 was held by the Agriculture and Forestry Department of Taiwan Provincial Government.
- Oct.05 The rhino horns, fur products of animal, ivory and its products, more than 2000 kilograms in total which was smuggled and confiscated by custom were burned at Taiwan Provincial Research Institute for Animal Health, Taipei County.
- The ceremony of awarding writings of protecting wildlife was held before the burning in the same place.
- Oct.06 The TRAFFIC Taipei was established in Taipei.
- Oct.16 The 7th meeting of compiling the handbook of wildlife conservation was convened by the Agriculture & Forestry Department of Taiwan Provincial Government.
- Oct.28 The 40th joint meeting of the Nature Conservation Committee and the Technical Committee of COA was held.
- Oct.29 The meeting for the effective enactment of Wildlife Conservation Law was held by the COA.
- Nov.05 Mr. Tang, Chief of Resources Conservation Division, reported the natural conservation work for the team of Environment Protection Commission, Executive Yuan.
- Nov.14 The 1st meeting for the amendment of the Wildlife Conservation Law was held by the COA.
- Nov.26 The BCT and some conservation people from abroad

- interviewed the Water Police.
- Dec.09 The Rules of Wildlife Quarantine (Draft) was examined by the Executive Yuan.
- Dec.15 Dr. Ling-Ling Lee and Mr. Marcus attended the International Meeting of Orangutans in Indonesia on Dec. 15 - 20.
- December The film of 『The Formosan Blue Magpies 』 produced by the Taiwan Forestry Research Insitute, and sponsored by the COA, was chosen as the candidates of the Best Record Film of the Golden Horse Award.
- December The COA compiled the book, 『 Cases against the Wildlife Consevation Law』 , and it was sent to related adiministration for reference.
- Dec.30 The Agriculture and Forestry Department of Taiwan Provincial Government and four County Governments, convened a series of workshops of the effective enactment of Wildlife Conservation Law.
- 1991
- January The Assembly Show of Taiwanese Forestry Resources was held at the Post Museum of the Gereral Bureau of Post. The COA was the major sponsor.
- Jan.10 The meeting of preparing measures for the Establishment of the Identification Technique Committee of the Wild Fauna & Flora , COA, was convened by this Council.
- Jan.11 The inspectious of the Wildlife Conservation Law enactment were executed island wide on Jan. 11 - 20 . And the

authorities found there were 125 illegal cases , 24 of them were sent to the court, 49 of them were fined by the local governments, and the other 52 were the actions of clearing up the traps,...etc.

- Jan.16 Mr. Ling Shiang-Nung, Vice-Chairman of COA, conducted the executive team of Wildlife Conservation to examine the wildlife stores on Washi St, in Taipei.
- Jan.21 The 41th joint meeting of the Nature Conservation Committee and the Technical Committee of COA was held.
- Jan.26 The establishment of the Committee of Planning Biological Resources' Inventory , COA, was apporved by this Yuan.
- Jan.30 The 3rd preparatory meeting of the establishment of Taiwan Endemic Species Research Institute was convened by the Agriculture & Forestry Department of Taiwan Provincial Government.
- Feb.08 Vice-Chairman Ling accompany by the Chief Tang visited the Buddhistic Master, Shing Yung, to ask the Buddhists stopping the activities of life releasing, and help the government enforce the nature conservation work.
- Feb.10 Mr. San-Wei Lee, Deputy-Director of Dept. Forestry, COA, and Dr. Shin Wang attended the IV Word Congress on National Parks and Protected Areas of IUCN, at Caracas, Venezuela.
- Feb.10 The workshop of children literature writing of nature ecology conservation sponsored by the COA, was held by the Academic of Children Literature and Foudation of Shing-I.

- Feb.22 The 3rd workshop of Ecology and Animal Behavior was held at Taiwan Normal University.
- Feb.25 The 6th meeting of discussing the Export and/or Import Regulation Rules of the Wild Fauna and Flora was convened by the Bureau of International Trade.
- Feb.28 The rhino horns, fur products of animal, ivory and its products, more than 600 kilograms in total which was smuggled and confiscated by custom were burned at Wangshou-shan Scenery Administration of Kaohsiung Municipal Government.
- Feb.28 This Council sent VACRS to stop the project of releasing and observation of Madarian ducks.
- Feb.29 The establishment of the Foundation of Orangutans Protection
- Mar.02 Dispatching Chief Tang and Dr. Ying Wang as the representatives of TRAFFIC Taipei attended the Eighth Meeting of the Conference of the Parties, CITES, held in Japan.
- Mar.09 The Foundation of International Esthetic and Natural Ecology was officially established.
- Mar.11 The Sino American Workshop on Information Management of Flora Geology and Inventory in Taiwan was convened by the Biology Research Promotion Center, National Science Council(NRC), Institute of Botany, Academia Sinica, and the National Committee for CODATA - Academia Sinica.
- Mar.12 COA and the Ministry of Economy announced jointly together

- 6 new Nature Reseervers : Penghu Columnar Basalt, Alishan Taiwan Pleione, Chuyunshan, Chatienshan, Nanao Hardwood Forest, Wushanting Mud Volcano.
- Mar.16 The 42th joint meeting of the Nature Conservation Committee and the Technical Committee of COA was held.
- Mar.17 The workshop for reviewing the execution of Wildlife Conservation Law and the jeep sending ceremony to 11 county governments and related agencies by the COA were held at the Agriculture & Forestry Department of Taiwan Provincial Government.
- Mar.17 The meeting for the amendament of the Rules of Wildlife Quarantine was held in COA.
- Mar.24 A series of 3 times of workshops of Ave's Indentification and Conservation was convened by the Agriculture & Forestry Department of Taiwan in Anmashan Recreation Area.
- Apr.13 This Council, Taiwan University, and Taiwan Forestry Research Institute invited Dr. Alan Rabinowitz and Dr. Elizabeth L. Bennett to convene a Training Course in Wildlife Research and Management Techniques at Shanping, Kaohsiung County.
- Apr.14 The meeting of the amendament of the Nature, Culture and Landscape Part of the Implementing Regulations of the Culture Heritage Preservation Law was convened by the COA.
- Apr.16 Vice-Chairman Ling accompanied by Chief Tang visited the Funkuangshan ,and met the Buddhists, to introduce the nature conservation trend in the world , and report the

- executive condition & the related laws in Taiwan.
- Apr.19 The reforestation of Wulin farm on the buffer zone of the Taiwan trout's habitat was held to match the activities of Saving the Water Resources by Planting 20 millions trees.
- Apr.20 The Symposium of Wildlife Disease Clinic was convened by the Taiwan Pig Research Institute at Chunan.
- Apr.23 The Establishment of Taiwan Endemic Species Research Institute was approved by this Yuan.
- Apr.27 The Workshop on Information Management of Zoo-resources in Taiwan was convened by the Biology Research Promotion Center, National Science Council(NRC), Institute of Zoology, Academia Sinica, and the National Committee for CODATA - Academia Sinica.
- Apr.30 The meeting of formulation of the application procedures and related regulations for the Collection License was conveyed by the COA.
- May.02 This Council invited 30 assistants the Parliament to visit the Kuantu and Tanshui River Mangrove Nature Reserves, to show the accomplishments of the nature conservation projects, COA.
- May.08 The planning meeting for the water birds natural park in Kingmong was convened by the COA.
- May.10 Dispatching Dr. Liang-Shiang Chou to attend the XXIII Annual Meeting of IAAAM , 1992,in Hongkong.
- May.11 Dispatching Dr. Licia Liu Severinghaus to attend the IV Annual Meeting of the Conservation and Research of Prey

Birds, 1992, in Berlin.

- May.11 The COA convened the meeting with delegates from Ministries of Transport and Interior, EPA, CEP, to discuss the Duck Stamps.
- May.11 The meeting of the Activities for Finding Elder Trees was conveyed by the COA.
- May.13 The 4th preparatory meeting of the establishment of Taiwan Endemic Species Research Institute was convened by the Agriculture & Forestry Department of Taiwan Provincial Government.
- May.15 The forum on the impacts of coastal nature environment by the construction of the coast lands was convened by the EPA.
- May.19 The COA sent the Council of Culture Construction the draft of amendment of the Nature, Culture and Landscape Part of the Implementing Regulations of the Culture Heritage Preservation Law.
- May.22 The 42th joint meeting of the Nature Conservation Committee and the Technical Committee of COA was held.
- May.27 The meeting for enforcement of the inventory work of the biological resources was convened by the COA.
- May.27 The Symposium of the Wildlife Disease Clinic Techniques was held in the Pingtung Institute of Technology.
- May.29 The Symposium of the Culture Heritage Protection and Preservation was convened by the Council of Culture Construction and the General Assembly of the Chinese Culture Revival Motion.

- May.31 The Symposium of the Environment Interpretation Education was convened by the Environment Education Unit of Academy of the Chineses National Parks society at Taiwan University.
- Jun.01 Dispatching Chief Tang and Dr. Ming-I Chen with other Administrators to attended the meetings of the '92 gloal forum series held accompanied with the Summit Meeting of UNCED in Brazil.
- Jun.01 The 1992 meeting of environment education, Ministry of Education, was held at the Central Library.
- Jun.17 The workshop of the identification of wildlife fur was convened by the COA and the Taiwan Normal University.
- Jun.19 Reviewing the results of research, investigation and management of nature conservation projects of FY 1992 was held by COA.

Study on Population Ecology of Formosan Landlocked Salmon(2)

Yao-Sung Lin¹ kun-Hsiung Chang¹ Yeone-Tyi Day¹

Abstract

Population abundance of Formosan landlocked salmon (*Oncorhynchus masou formosanus*) was estimated visually by snorkeling in Chichiawan Stream from September 1987 to January 1991. The salmon population decreased, and the stream habitat was deteriorated. Yearly fluctuation in salmon abundance was larger in the young than that in the old. The young abundance in summer was greater than that in winter. In the area close to the sand-retention dam, salmon abundance decreased downstream, while the temporal variability of abundance increased. The stream became wider, shallower, and slower during the study period. The decrease of stream depth was the major factor affecting the old salmon in term of habitat quality, while it was not significant for the young. Type I sections with good habitat quality had greater tendency of the salmon reduction. Typhoon Lynn, occurred in the breeding season of the salmon, destroyed the cohort born in 1987. Natural disturbance interacting with anthropogenic factors controlled the spatial and temporal variability of salmon, and decreased its abundance with habitat degradation.

The distribution of the juvenile and the adult were similar in July 1989, but were different in January and July 1990, and January 1991. The distributions of the salmon along the stream were similar between the two summers, but not the two winters. In general, the intensity of aggregation of the adult was greater than that of the juvenile, except the juvenile exhibited high aggregation in January 1990. The salmon selected different stream structures in different seasons at different sizes. The juvenile preferred stream sections with greater width, heavier cover, cascades, and lateral scour pools in summer; glides, cascades, and lateral scour pools in winter. In summer, stream sections with plunge pools, more diverse structure, and farther to sand-retention dams upstream supported more adults; in winter, the adult preferred sections with lateral scour pools. The typhoon occurred in September 1989 increased the variability of the average width and the relative composition of habituate types of the stream. furthermore, the typhoon might directly cause mortality and downstream shift of the salmon, and increased the intensity of aggregation for the juvenile indirectly through habitat deterioration.

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Planning of the Education Center of Landlocked Salmon at Wu-lin Farm

Yao-Sung Lin¹, Kun-Hsiung Chang¹, Chiung-Wen Chang¹, Ling-Chuang Jaung²

Abstract

The goal of this project was to collect data and literatures of fish ecology at Tachia River. It constants natural environment, animal fauna (especially fish species), course of artificial exploitations, and effects of artificial exploitations. Depending on these data, we designed the educational subjects and matters.

There are 52 fish species which include 38 species are pure freshwater fish in Tachia River. These 38 species include 8 endemic species, 1 endemic subspecies, 19 native species of Taiwan, and 11 introduced species. Amphibians include 2 family 3 species, Birds include 5 family 6 species, and 2 species of small mammals. There are 6 order 34 families of aquatic insect.

This plan has four targets as fallow: 1. improving the function of guiding, 2. strengthening the relationships with school education and social education, 3. helping traveler to appreciate the beauty of nature and to understand the relationships of human and nature, 4. providing to travelers a good educational environment and opportunity of outdoor education.

Besides the setup educational matters, above habitat managements, it should control travelers' number and protect habitat in order to light the pressure of people. The education works in this area should be periodic explaining.

In addition, the dustbins should be located at suitable sites. The Education Center should setup management unit and staff on operation. The travel guides are necessary. Training workshops and short time educational activities could be held. To establish a volunteer system is also important.

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Population Ecology of Formosan Macaque

Yao-Sung Lin¹ Hai-Yin Wu¹

I. INTRODUCTION

Formosan macaque, the largest edemic mammal species in Taiwan, is widely distributed in the mountainous area of the island. The monkey population has been threatened by illegal hunting and habitat destruction for a long time. In recent years, however, due to the success in conservation education and the establishment of protected areas, some local populations of the macaque increased gradually. Here we present the result of our study on the population ecology of Formosan macaques in the Hengchun Nature Preserve. Since the study lasted for 5.5 years and all the macaques could be identified individually, we can analyze the population dynamics in detail.

II. METHODS

The study was conducted in the Hengchun Nature Preserve (120° 40'E, 21° 58'N) within Kenting National Park on the southern tip of Taiwan. The study period extends from March 1985 to August 1990. The macaque population was censused and observed on a monthly basis with a total of 276 days (2,579 hrs) of field work. Binoculars and telescope were used in field observations. The monkeys were identified and given codes. Demographic events occurring in the monkey troop were monitored. Newborns were sexed and their birthdates were estimated with an accuracy of no more than half-month's discrepancy. One monkey troop (S troop) was monitored at the beginning of the study. It split into two troops (S1 & S2 troops) in mid-1987. After the fission, S1 troop remained the main focus of the study while observations on S2 troop were also made whenever possible.

III. RESULTS

Total number of monkeys in the study troops increased from 10 to 29 over the 5.5 years. Annual growth rate of the local population varied from -5% to 50% with an average of 25.2%. The sizes of S troop and of the two troops after fission ranged from 9 to 16. Each troop contained only one adult male most of the time, except during the period between December 1988 and June 1989 when two adult males coexisted in S1 troop. Adult male to female sex ratio in each troop ranged from 2:3 to 1:4, or from 2:4 to 1:6 if nulliparous females older than 3 years were included as potential mates for males. The proportion of juveniles less than three years old was 0.3 in 1985, and increased to 0.5 in 1986. The ratios in S1 and S2 troops ranged from 0.3 to 0.58 in the three years after fission.

Formosan macaques are seasonal breeders. a total of 304 copulations were observed in S1 troop between October 1987 and April 1990, 90% of which were concentrated in the period between November and January. A total of 28 infants were born during the study period. Births occurred from February to August, 75% took place between April and June. Male to female sex ratio of the 26

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infants of known sex is 12:14 which is not significantly different from the 1:1 ratio. Birth rate over the six birth seasons was 0.8 infant per female per year. Annual birth rates of S and S1 troops were higher than that of S2 troop.

Young female macaques give their first birth at the age of 4 or 5 years. They undergo changes in sexual skin for the first time at 30-33 months of age. In the next mating season, they exhibit extensive swelling in the skin of anogenital area and copulate with adult males frequently. Interbirth intervals for parous females ranged from 10.5 to 24.0 months with an average of 15.4 months.

Hunting was the major cause of mortality in the study area. Seven animals (five juveniles and two adult females) were considered dead, and hunting was related to five cases. Survival rate for juveniles before 5 years old was 0.8. In fact mortality of juveniles only occurred before 1.5 years old.

During the 5.5 years of study, 4 adult males and one adult females entered the study area and joined the macaque troops, and two adult males left the area. Troop-male has changed several times as a result of frequent immigration and emmigration of adult males, and most of the change occurred in the mating season.

Study on Population Distribution of *Acrossocheilus paradoxus* in Tachia River

Yao-Sung Lin¹ Ming-Hsiung Chang¹

Introduction

Acrossocheilus paradoxus is endemic in Taiwan Island. It is distributed through out west Taiwan and in part of east Taiwan. This fish is typically found in the midstream and downstream of rivers. It is widely extended from the lower sea level to 1500 m above sea level. Most of published informations on the species in the early time deals with its distribution and taxonomic status. Recently, the ecology and reproductive biology of this species has been studied. The aim of this research is to study the range of distribution, relative abundance and population structure of *A. paradoxus* in the Tachia River, which can offer some principals for fish conservations.

Method and Meterial

The survey area included the section of Tachia River from Kukuan dam to river mouth, and five tributaries (Shihwen Stream, Lileeng S., Tungmao S., Hengliou S., and Shalian s.). 22 collecting sites were selected. As the survaied riversection is so long as 70 Km, sampling were made seasonally from September 1989 to February 1991.

Fish were collected by electrofishing for 40 min. each sampling to compare the abundances of every collection sites. The number of specimens was counted, and measurements of total length (T.L.) were made to the nearest millimeter. Except some specimens were brought back to the laboratory by fixed in 10% formalin, all collected fish were released to the collecting sites. Analys the seasonal data to compare the catching amounts and the seasonal changes of length distribution. And analys the distribution status and population by the results of collecting data.

Results

A. paradoxus can be found in all the four sections in mainstem river of the Tachai River. It also can be collected in Shalian S. and downstream of Lileeng S., Tungmao S., and Hengliou S., The number of fish captured in mainstem river is far greater than those in tributaries. Among these four sections, *A. paradoxus* was mainly concentrated between Tianluen dam and Shikang dam. Among the four tributaries, the number of fish collected in Tungmao S. and Henglious S. was more abuntant than those in Lileeng S. and Shalian S..

There were differences in numbers of fish captured in the Tachai River both between years and among seasons. In 1989, the number of fish captured in mainstem river shows no difference among the four seasons, while the number of fish captured in tributaries in autumn was greater than that in

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winter. In 1990, there was no difference in the number of fish captured in mainstem river among spring, summer and autumn, while more fish could be collected in winter. It was the same situation in tributaries. Comparing the data between these two years, it is clear to find out there was an increasing trend in number of fish in consecutive two years.

The fish larger than 50mm and smaller than 150mm were predominated over the population captured in mainstem river every season, but fish smaller or larger than this range still could be captured even every season, while the dominate size of fish captured in tributaries was between 50-100mm. In mainstem river the proportions of juvenile fish (TL<50mm) were higher in summer and autumn, while that in tributaries were higher during autumn to winter.

Discussion

1. The absence of *A. paradoxus* in Shihwen S. and the upstreams of Lileeng S., Tungmao S., and Hengliou S. could be explained by the presences of sand dams.
2. The fish captured from the mainstem river between Tianlun dam and Shikuan dam are more than those from the river sections above Tianlun dam and behind Shikuan dam. The population structures of these populations are different, too. It could be realized by the presences of Tianlun dam and Shikuan dam.
3. The long term appearance of juvenile fish shows that *A. paradoxus* has a long reproductive season from early spring to late autumn.
4. The juvenile fish could be captured in the mainstem river all around the year. But in tributaries, they can't be found in some seasons. It's clear that tributaries are better habitats for adult fish, and maybe function as reproductive ground.
5. The differences on both fish number and distribution data could be explained by the different durations of typhoon season between two year studies.

Table 1. Locations and names. of sampling site in the Tachai Stream from 1989 to 1990.

section	Mainstream and name of sampling site	Tributary and name of sapling site
A	From Kukuan dam to Tianlun dam (A1, A2)	Shausheue Stream (none) Anman Stream (none)
B	From Tianlun dam to Tianlun power plant (B1, B3, B4, B7)	Shaolai Stream (none) Shihwen Stream (B2-1, B2-2) Lileeng Stream (B5-1, B5-2) Tungmao Stream (B6-1, B6-2)
C	From Tianlung power plant to Shikang dam (C2)	Hengliou Stream (C1-1, C1-2) Stream (C3-1, C3-2)
D	From Shikuan dam to None river mouth (D1, D2, D3, D4, D5)	

Preservation of Wild Tea Germplasm and its Application in Taiwan (III)

C.H.Hon*, L.C.Wang, M.L.Lin, I.Z.Chen, C.K.Chang and T.F.Chiu

Introduction

In 1697, there already had Chinese people baking the tea leaves of Taiwan wild tea plants in the aboriginal land of Sui-Sa-Lian. In that time, the wild tea plants had the record of 3.3 meters in height. A paragraph in the Chik-Kan Notes of the year 1723 reads: "The tea bushes in Shui-Sha-Lien are all green in color with leaves being able to be used as cooling medicine to effectively cure fever". People in the old days had known the ways of producing wild tea and engaged in tea trade already. Several Japanese botanists started the survey and taxonomic studies on wild tea in Taiwan when the island was occupied by the Japanese. Wu et al. (1970, 1972) and Su et al. (1972) made some investigation on wild tea plants.

Yang and Lu (1987) concluded that there was a quite difference in taxonomy between the Taiwanese wild tea and cultivated tea. A scientific name for Wu-Wei mountain tea was also given by them as *Camellia sinensis* (L.) O.Ktze, subsp. *buisanensis* (Sasaki) Lu & Yang. Reported wild tea distributions in Taiwan were found in Mt. Mei-Yuan, Mt. Feng-Huang, Mt. Nan-Feng, Mt. Yun-Kung and Mt. Ali. Recent investigation on the wild tea in afore-mentioned areas except Mt. Yun-Kung had been completed by Wang et al. (1990). The objective of this 3rd-year study was to do ecological investigation on the wild tea plants in eastern Taiwan in order to provide the information for protection of the plants and to use the plants as the breeding materials for varietal improvement.

Materials and Methods

The location of investigation is in Mt. Yun-Kung, Yu-Kung Village, Lu-Yeh, Taitung Hsien, Taiwan, with elevations from 850 to 1060m. It belongs to No. 14 experimental forestry land of Kuan Sun Station, Forestry Bureau of

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PDAF. The surveying crew entered into the mountain through Tai Pin Checking point on September 21, 1990. Wild tea plants with base trunk circumference above 20 cm were selected for labelling using aluminum tags. Sampling included leaves, buds, flowers and seeds, etc. Seedlings were collected for propagation in Taitung Substation of the TTES. Video tapes and slides were taken for record.

Results and Discussion

Most wild tea plants in Mt. Yun Kung are distributed in native and secondary forestry. According to the survey the number of wild tea plants in the area is decreasing. There are only 24 plants with base trunk greater than 20 cm.

Since the existence of the plants are in wild forestry the tea trees found in the area can be considered as indigenous mountain tea. The characters of the plants are similar to these Wuwei mountain tea reported by Yang and Lu (1987). This means that these wild tea plants have spread to the eastern side of Central Mountain of Taiwan.

Most tea plants have suckers emerged from roots. This is a pecticular character as compared to traditional tea cultivars, including small-leaf and large-leaf cultivars in which sucker have never been found. Elongated shoots were found around the base of tea plants. Most chopped plants produced adventitious buds. Generally, plants of broad-leafy varieties dieback soon if main trunk was chopped down.

The ratio of blade length to blade width of the wild tea plant was greater than that of commercial variety. Leaf area ranged from 21 cm² to 34 cm². Very few seedlings emerged from seeds were found in the surveyed area. Most were suckers produced from underground roots. This is an unique way of rejuvenation in wild tea plants.

In order to widen our germplasm collection, many wild tea seedlings have been collected from the area and multiplied in the Taitung Substation of the Taiwan Tea Experiment Station. The wild tea plants will be used as a precious parent materials in tea breeding program.

Regional Landscape Evaluation in the Coastal Range: Central Area

Shin Wang* J. H., Ferng** L.Y., Sheu** and K. F., Huang***

Abstract

The Coastal Range of Eastern Taiwan is characterized by active tectonic movement with rapid uplifting, longitudinal buckling and strike slip movement. The mountain range is part of the Phillipine sea plate which separates from the Central Backbone Range of Taiwan by a rift zone entitled the Longitudinal Valley.

Rapid uplifting and river cutting create high relief, rugged topography which are barely accessible and hence, most of its primitive landscape preserved. In this study, the central section of the Coastal Rangess is studied. Firstly, land classification based on geology and topography was done. The study area was divided to different landscape units characterized by their uniformity in visual experience and their topographic enclosure. Each landscape unit was evaluated by considering their aesthetic criteria, namely unity (or harmony and continuity), vividness (or diversity and richness), scarcity and intachness.

The study was maded by using aerial photographs, contour maps, and supplemented by field mapping techniques.

It is clear from the study, that lithological and structural control are dominating.

Resistant rocks, such as the volcanic breccia, almost always form ridges. Whereas the shales form rolling lowland. Faults which cut through stratigraphic sequence and bring together rocks of different competency are clearlyt reflected by topographic discontinuity.

The result of this study is presented on a landscape unit map and a series of tables which evaluate and describe its landscape esthetics.

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Planning Education Programs for Nature Conservation(1)

Shin Wang*

Chen-Shen Ju**

ABSTRACT

This report reviews the basic theories of learning and communication. Such a review may help the planners in preparing education programs for nature conservation.

Followed are analyses of subjects to teach and channels for communication. Also discussed are the strategies for nature conservation education. A review of Environmental education programs of other government agencies revealed the opportunities to cooperate.

Finally, suggestions in terms of how to teach and what to teach are proposed. Which can be used as guidelines to prepare education programs.

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The Feeding Ecology of Formosan serow, *Capricornis crispus swinhoei* (IV) -
food plants and nutrient analysis

Lue, Kuang Yang, Huang, Yu-Wren
Chang, Wei-Sa, Cheng, Ding-Queen, Chao, Je-Zu

Formosan serow (*Capricornis crispus swinhoei*) feed mostly on herbaceous plants, except *Juniperus squamata* var. *morrisonicola* and *Berberis morrisonensis* in middle elevation range of Taiwan.

Among those herbaceous plants, *Cirsium kawakamii* and *Potentilla Leuconota* var. *morrisonicola* were the most favorite food plant species in study site near Yu-Shan. Formosan serow were found to take young buds, young leaves, old leaves and flowers. The highest frequency of feeding marks were on buds of young leaves. We analyzed the calory, nitrogen and coarse fiber of food plants. Results indicated the nutrient content varies with seasons. Nitrogen and caloric content decreased in winter, while fiber content increased: It is evident that the quality of food plants were not good in winter season. Statistical analysis indicated that there is no strong correlation between the quality of food plants and the amount of feeding marks. It seems that Formosan serow is a generalist on feeding habits. The relationships among home range, food plants of feeding habits were discussed.

Wildlife Data Bank of Taiwan

(3) Lizards(I)

Lue Kuang-Yang Lai June-Shiang

This is a project trying to use the Amphibian Wildlife Data Bank as a model and apply to lizards. Lizard field data collected from 1985-1991 by the Ecology Laboratory of NTNU were fed into PC and stored.

The processing hardware of data bank is 640K RAM PC AT with peripherals of monitor, printer, and hard disk etc. Functions of Data Bank are accomplished by program modules of dBase III language under MS-DOS and Pan Asia Chinese System circumstances. Geographical coordinates were standarlized by referring to Taiwan photo-based map of Forest Bureau. Field records were formalized and coded, then keyed in the Data Bank.

By priliminary programing, Data Bank can perform 4 categories of data managements--coordinates consulting, data consulting, data input, and data edit; and 2 categories of data analysis including geographical, and altitudal distributions. The outcome of 1690 records from Data Bank indicates that geographical distribution pattern of Taiwanese lizards maybe categorized into 4 types, i.e., pan-distribution pattern (7 species), widely-ditribution pattern (3 species), regional-distribution pattern (7 species), and restricted-distribution pattern (12 species). From altitudal aspect, there are 18 species distributed in the low, 6 in the middle, 3 in the high altitude, and 2 are widely ditribution.

From the priliminary results, the model of Data Bank is transformable.

Guidelines For Developing Dadu Waterfowl Refuge

Rachel Lee *

ABSTRACT

The estuary area of the Dadu River is one of the twelve most important wetlands in Taiwan. It is noted for its remarkably wide tidal flat and the beautiful scenery of the marsh. Each year, more than 400 thousand of wild birds rest and feed in this area. Unfortunately, surrounding this bird site there are six immense governmental development projects to be implemented within two years. All these constructions will destroy this tidal flat and threaten its ecosystem to a certain degree.

The purposes of this study are: to examine the major problems that this bird site will be confronted; to propose strategies of minimizing negative impacts; and to set up planning guidelines for this bird site to be further developed as a nature park. Habitat improvement may be the main strategy to save the environment for the bird and wildlife here. 90% of the bird park land is offered for the purpose of biological habitat reconstruction, and the rest 10% will be developed for a nature center, a research center, entrance area, greenhouses, nursery , a small windmill station, staff dorm, green turfs, sanitary & waste treatment, as well as circulation system . This bird park are planned not only to attract the bird and wildlife, but also to offer the best opportunity for the local communities and schools to do their outdoor nature study.

Key Words: Dadu estuary, waterfowl, wetland protection, wildlife habitat reconstruction.

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CRITERIA AND MEASURE FOR ASSESSING RARE AND THREATENED

PLANT SPECIES IN TAIWAN

Ming-Jou Lai

*

ABSTRACT

Rarity and danger degree are the two major factors to be considered for identifying the rare and threatened plant species.

Criteria for assessing the rarity could be exemplified by :

- 1) Relics, remnants or disjuncts
- 2) Narrow endemics
- 3) Species on the edge of their range
- 4) Small population species

Criteria for measuring the danger degree could be categorized as :

- 1) Development such as logging, destruction of grassland, destruction of wetland, mining, construction of dam for electric and water supply, construction of road.
- 2) Collecting such as for horticulture or for pharmacy.
- 3) Others, such as succession, herbivory by naturalized animals, or unknown.

The IUCN Red Data Book categories Ex, E, V, R and I are used for designating the protection index of the rare and threatened plant species. About 12 % of the Taiwanese vascular flora, 502 species in all, seem to be rare and threatened. They are assessed as in the following:

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	Ferns and fern allies	Conifers	Dicots	Monocots	Total
Extinct (Ex)	0	0	3	0	3
Endangered (E)	1	4	7	2	14
Vulnerable (V)	5	13	30	14	62
Rare (R)	50	1	251	121	423
Total	56	18	291	137	502

A Study of Provisioning to Formosan Macaque

(*Macaca cyclopis*) (III)

Ling-Ling Lee¹

Introduction

Formosan macaque (*Macaca cyclopis*) is the largest endemic wildlife species in Taiwan, and is also a protected species. To enhance the field study on this species, and to help speed up the process of collecting their basic biological information, a provisioning project was recommended by senior Japanese primatologists Drs. S. Kawamura and K. Norikoshi to attract more macaques to the areas around the bait stations established at Jentse, Yilan County, and to facilitate field observation and data collection.

Materials and Methods

Between December 1988 and June 1990, employees from Luotung Forestry District Office of the Taiwan Forestry Bureau visited the bait stations at Jentse 2 to 4 times a week, and provided food, such as apple, banana, sweet potato, peanut, bamboo shoot, passion fruit, kiwi fruit and beans. Each time of provisioning, the amount of food provided and the amount consumed were recorded. Researchers from Department of Zoology, National Taiwan University, visited Jentse at least once a month, and stayed for 2 to 5 days to conduct field observation. We surveyed along roads, trails and stream to locate macaques. Once a macaque troop or individual was located, it was observed and followed until it was out of sight or when it was too dark to see the activity of the animal(s). During each observation, information, such as the number of animals sighted, sex and age composition, behavior and activity, Time and location of sighting, and the direction of movement, was recorded. If the animals were feeding, we also recorded the type of food consumed; and if the animals were eating a plant, we recorded the type and part of the plant consumed. Macaque feces were also collected each month along survey routes and brought back to lab for further analysis.

Results

The results indicated that the size and range of the five troops found in the previous year have changed. JR troop used to have 22 to 31 members split into two troops. The size of JL troop increased from 26

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to 31 members. A troop with more than 20 individuals occupied the range which had been used by DS troop. Since sighting on DS troop was very scarce in the previous year. It was difficult to tell whether the two troops were actually the same one. Based on the record of direct observation, the macaques at Jentse consumed at least the following plant species: *Broussonetia papyrifera*, *Persea japonica*, *Rubus pinfaennsis*, *Miscanthus floridulus*, *Musa formosana*. However, the diet recorded from direct observation was quite different from the results of fecal analysis.

Conclusion and Suggestions

Due to bait consumption by the tree squirrel and other animals, the bait actually consumed by the macaque was severely reduced, which greatly affected the effectiveness of provisioning program. Disturbance by human activity at Jentse also had negative effect on the reaction of the macaques to the bait and the bait station. We, therefore, suggested that the provisioning program should be stopped temporarily until we have a better understanding of the activity and diet of the Formosan macaque in this area.

Study and Management of Formosan Black Bear (*Selenarctos thibetanus formosanus*) (II)

Ying Wang¹

Tian-Shi Chen²

Study and Management of Formosan Black Bear (*Selenarctos thibetanus formosanus*) (II)

The distribution, behavior, food habit and bear farming of Formosan black bear (*Selenarctos thibetanus formosanus*) were studied from Aug. 1990 to Jul. 1991. The preliminary result showed that 16 sightings and 30 signs were reported. Most of them were in the central mountain range along the boundary between different watersheds. Sightings were recorded in the following habitat: mixed forest (36.96%), broad leaf forest (34.78%), coniferous forest (26.09%) and grassland (2.17%). They varied between 500 and 3600 meters in altitude. Sightings occurred most frequently in Dec., then in the period from Mar. to May.

The behavior of a captive female bear was observed for 10 days before she was released into the wild. A MOD-500S9 collar was placed onto her to monitor her activity. Pulse rate changed between 3 and 4 transitions within 5 minute period was found to have the least error (5.3%) to separate inactive and active mode, as a result from the comparison with actual observation. The daily activity pattern of this bear showed two peaks (05-09 hr.; 14-19 hr.). During the day light hours (0400-2000 hr.) the bear was active from 70 to 100% of the time; while during the night hours (2000-0400 hr.) the bear was mostly in rest.

Fifty-one plant species from 28 genera were collected to feed the bear. Among those plants 16 were used rather frequently (31.7%). They belong to the following 8 families: Fagaceae, Moraceae, Rosaceae, Araceae, Campanulaceae, Polygonaceae, Schisandraceae and Gramineae.

The result of bear farming survey showed that 179 bears were kept in farms islandwide. Among them 16 were Formosan black bear, 25 were Asiatic black bears, 102 were sun bears, 19 were American

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black bears, 15 were brown bears and 2 were polar bears. Ages of Formosan black bears were reported between 3 and 10 years old. Their weights were between 60-180 Kg. .

Survey on Natural and Cultural Sight in the Penghu Islands : II

Kuo Chin-lung and Hung Kuo-shiung

Purposes

This study is conducted according to the project of the second year. This study includes plants in the Penghu Islands, together with geological and geomorphological sights in this area, excluding Penghu Proper, Pai-sha islets. The main purposes are as follows.

1. To supplement and build up basic data about geological and geomorphological sights, except columnar basalt.
2. To investigate the types and distribution of wild plants so to establish data, which will be offered for the reference of academic study teaching resources.
3. To investigate original types and rare types of wild plants for the reference of plant preservation.
4. To investigate the plant properties against salt and drought for the reference of afforestation in Penghu.

Method

1. This study is conducted by fieldwork according to documents and fieldwork in the past.
2. Standards of evaluation are set to know the advantages and disadvantages of various terrains.
3. The difference between summer physiognomy and winter physiognomy is investigated.
4. We investigate the abundance and density to find out dominance type. The plants in this area are divided into three types, that is, shrub community, coral reef community, and beach community.

Kuo Chin-lung and Hung Kuo-shiung

Results

A. Geological and geomorphological sights :

Columnar basalt remains around Tsu-hsi of Fisherman Islet, northwestern area and Tai-su scenic spot of Chih-mei. The other discoveries are listed as follows.

1. Beaches at Wang-an, especially the beaches between Tung-yen, Hsi-yen, and southeast East Yu-pin.
2. Geological sights at Tien-tai Hill, Chung-hung Yu, and the area close to Don-chi Harbor.
3. Landscapes around the west part of Hsiao-mei Yu, and Chih-mei lighthouse.
4. Geological sights at Cat Yu, Scarf Yu, and Eastern Yu-pin, as well as the fold at Lon-tseng of Chih-mei.

B. Plants :

Plants in the Penghu Islands are very monotonous because of the restriction of special terrain, monsoon and rainfall. 140 species, 50 families of plants have been surveyed up to the end of this March.

1. Only a little pteridophytes are found at Chih-mei, Hsi-yu, Hu-chien.

Gymnospermae is mostly grown by man, not naturally. Angiospermae grows all over the islands and several plants are found as dominant type.

2. Original types : *Glycine clandestina*, *Cassia*, *Sophora* L. Var *Penghuana*. Y.C.Liu are scattered everywhere.

Rare types : *Avicennia marina*, *Phusalis angulata*, and *Blechnum pyramidatum*.

3. Winter Physiognomy:

- 1) evolution of roots.
- 2) evolution of stems.
- 3) evolution of leaves.

Conclusion and Suggestions

Besides columnar basalt sights, there are plenty of marine erosion terrain, and other geological sights, which should be well protected. Ecological surroundings are rather particular so the popularization of original plants and afforestation should be carefully planned. Suggestions are listed as follows.

- 1.The evaluation of ecology must be made before project - making so as to reduce the destruction by some projects.
- 2.Because of bad weather in the Penghu Islands, plants of original and rare types are scarce. They are hard to become dominance types, too. Destruction by human beings also endanges their existence. We had better first cultivate them in nurseries and then have them moved to the Cultural Center, and parks.
- 3.Some particular plants, such as *Aloe vera*(L) Webb var *Chinensis* Haw, *Opuntia dillenii*, *Euphorbia tirucalli*, *Agave americana*, and *Gaillardia pulchella* had better be cultivated in tourist spots and educational centers. Sides of highways are also suitable places. It may have a great effect on afforestation and tourism.
- 4.Afforestation projects had better be adjusted. Afforestation has not been very good or efficient due to two factors - the wrong choice of plants and the of places growing tress, during the past forty years.

Ecological effects of Introduced Birds and Mammals in Taiwan

Edgar Lin

There were 1559 cases of introduced species, related to 330 species of birds and mammals (788 cases of mammals and 771 cases of birds), 40% of cases of introduced species in mammals caused ecological impact of various degree, and so did 50% of introduced species in birds. Ecological impact usually occurred in mammals of predatory nature. Although competition between the introduced species and native species was difficult to detect, yet records showed that competitive impact did exist. The most serious threat to the native species was the introduction of diseases and parasites, especially from birds.

Ecological impact that occurred in islands was more serious than that in the continent, especially in herbivore and carnivores. Although some general patterns of ecological impact could be derived from this study, yet they depended on the dynamics of population changes. The impact was difficult to predict. The best policy was not to have any introduced species.

Ecological niches for mammals and birds were considered saturated in the natural system in Taiwan. Any introduced species of birds and mammals appeared difficult to survive the competition of the native species. In the last 40 years, Taiwan's natural systems had been destroyed to a large extent. As yet there was not any sign of ecological impact from the introduced species of mammals, but the wide-spread successes of introduced species of birds were obvious. Mostly they occurred in the low-land areas, causing damages to crops and disappearance of local genetic diversity by hybridization with closely related species. It was also possible that in the future they might further colonize upland areas causing further damages to upland agriculture.

Releasing exotic species for religious purpose and the escapes of pets would change natural distribution patterns of bird species in Taiwan.

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A Study of the Mammal Fauna of Tawu Mountain Nature Reserve

Ling-Ling Lee¹, and Hsi-Chi Cheng¹

Introduction

Between December 1986 and June 1990, the Tawu Mountain survey team conducted a series of studies on the fauna, flora and geology of Tanan, Chipen, Tamali, Chinlun and Tachu watersheds, and those of the Little Ghost Lake, North and South Tawu Mountain areas within the Tawu Mountain Nature Reserve, as well as the northern and western buffer zones. The culture of local people and the effect of their activity to the protection of the Reserve were also studied. This series of studies helped provide the preliminary information of the resources and the potential threat in the Reserve. The survey team had also compiled the information and written up a management and conservation strategy for the protection and management of the Tawu Mountain Nature Reserve. The purpose of this project is to study altitudinal and seasonal changes of the mammal community along the Tamali river, to provide more detailed information about the mammalian fauna in the area, and to help gradually establish the monitoring system and the data base for the long term protection and management of the Reserve.

Material and Methods

This study was conducted at an area below 1063 meter in elevation at the Tamali watershed. Between July 1990 and June 1991, a team of one to four researchers and one guide would survey the fauna of the study area once every month for five to seven days. Surveys were conducted along the Tamali river from the west boundary of the Reserve to a camp site six and a half kilometers away. Several transect lines were selected near the camp site. Sightings, tracks, scats, and other signs of animals were recorded and small mammals were trapped along the river and the transect lines. Bats were occasionally collected with mist net. However, several attempts of field trips were stopped due to typhoons and heavy rain in summer, and only the results of six survey were analyzed.

Results

The results of the study indicated that the Formosan macaques, giant red flying squirrel, white-faced flying squirrel, crab-eating mongoose, wild boar, muntjac, and serow were the species most often found in the study area. They occurred throughout the study area, and there was no significant altitudinal or seasonal changes in their relative abundance and distribution. The number of bats sighted

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and the the number of spiny country rats caught appeared to vary at different months. However, their abundance was too low to reflect significant seasonal variation. Other species, such as the pangolin, sambar deer and gem-faced civet occurred in very low number and limited areas. They were heavily hunted and their protection is utmost important. Therefore, any change in their distribution and abundance should be carefully monitored.

In terms of the disturbance occurring in the Reserve, there remained to have a few professional hunters who would travel deep into the Reserve to hunt, although the number of such hunter seemed to have dropped. However, there are still many amateur hunters who hunt around the border of the Reserve, and there seemed to be an increase in the number of people fishing illegally in the Reserve. And the pressure from tourism and road construction continues to threaten the integrity of the Reserve.

Conclusion and Suggestions

Please follow the recommendation listed in "A management and conservation strategy for the Tawu Mountain Nature Reserve";

1. Establish a check station at the entrance of Tamali river to control the people coming in and out of the reserve, and to strengthen the patrol and law enforcement in the reserve.

2. Management authority should keep close contact with the principle authority to report any major illegal threat and disturbance to the reserve, and ask for assistance from the central and local officials and police to enforce the law.

3. Management authority should join local school and conservation groups to conduct conservation education and increase communication with local communities to help the protection and management of the reserve.

Studies on the Conservation of the Formosan Pangolin (*Manis pentadactyla pentadactyla*)

Jung-Tai Chao¹

Abstract

In order to understand the general biology and current status of the Formosan pangolin (*Manis pentadactyla pentadactyla*), the habitat of the Formosan pangolin was investigated, attempts were made to breed the pangolin in captivity, and interviews were conducted with 56 hunters, 10 pangolin traders, and five people in charge of pangolin leather products factories.

The results of the study indicated that the Formosan pangolin is distributed in the following areas of Taiwan Island proper: the periphery of the Central Mountain Range; the Western Foothill Range; the Taoyuan Tableland; the Ouluanpi Tableland; the East Coast Mountain Range; the Tatun Volcano Group; Taipei Basin; Puli Basin; and the Pingtung Plain. The modal altitude inhabited by the Formosan pangolin was 500m. above sea level, and the upper limit of its occurrence was about 2,000m. The model body weight of the Formosan pangolin was between 4.2kg. and 4.8kg., and the upper weight limit was around 8.5kg. The male pangolin was heavier than the female. Captive pangolins fluctuated in body weight.

The habitat of the Formosan pangolin included 14 different well-lit and dry environments such as primary and secondary forests, miscanthus grassy areas, etc. Termites and ants were their main food. Their burrows fell into two categories: living burrows and feeding burrows. The living burrow was deeper, used for a longer period, and thus was more or less a fixed abode. The feeding burrow was shallower, freshly dug and used only for a short period. The burrows were located in 14 different environments such as slopes, ridge crests, miscanthus grassy areas, etc. The general characteristics of these environments were dry, well-lit, and with deep soil. The entrance of the burrow was not closed off. The depth of the living burrow varied but was generally between 3-5m. The living burrow consisted of a tunnel and one or more chambers. The diameter of the chamber was 30-60cm., and there was a layer of leaves and/or grasses.

The pangolin moved about by walking, climbing trees, and swimming. The courtship and mating season lasted from June to August, and off spring were born from March to May. Single births were typical, and twins were found only occasionally. The Formosan pangolin was nocturnal and its home range was about 300m-2km. However, it was said that during the mating season, the home range might increase to several tens of kilometers.

The commercial uses of the Formosan pangolin were as follows: the skin was used to make leather products; its scales were collected for Chinese medicinal use and cultural purposes (used to ward off evil spirits); the whole animal was killed to make stuffed pangolin for sale; and pangolin meat is a popular dish in wildlife product restaurants. The commercial value, especially in the leather processing industry, created strong hunting pressures on the Formosan pangolin. It is estimated that from the 1950s to the 1970s, at least 60,000 Formosan pangolins per year were killed to supply the leather industry alone. The Formosan pangolin leather processing industry came to an end around 1980. However, commercial hunting for the meat, for medicinal uses, and for the stuffed animal market continued. The strong hunting pressure and the destruction of habitats, especially by insecticide spraying, have made the Formosan pangolin an endangered and almost extinct valuable wildlife resource.

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Barking Behavior and Habitat Study on Formosan Muntjac

Ying Wang¹

Yi-chun Chen²

Barking Behavior and Habitat Study on Formosan Muntjac

The habitat and barking behavior of Formosan muntjac (*Muntiacus reevesi micrurus*) were studied at Walami area, Yushan National Park, Taiwan from Jul. 1990 to Jul. 1991. The predominant tree species were *Alangium chinense* (Lour.) Rehder, *Juglans cathayensis* Dode, *Zelkova serrata* (Thunb.) Makino var. *serrata*, *Liquidambar formosana* Hance, *Cunninghamia konishii* Hayata, and *Cryptomeria japonica* (L.f.) D. Don. Seven types of vegetation could be identified as follows from the most abundant to the least: Artificial broad leaf and coniferous mixed forest, Artificial coniferous and secondary broad leaf mixed forest, Artificial broad leaf forest, Secondary broad leaf forest, Artificial and secondary broad leaf mixed forest, *Miscanthus* and semiopen broad leaf forest, and Artificial coniferous forest.

The degree of vegetation cover, trail width and slope, substrate composition, ground cover, and aspect of the trail were measured in sampling grids where muntjac trails were found. Herbaceous plant cover varied between 50 to 95% in the sampling grid; the average trail slope and width were 34.2% and 33.7 cm; the trail substrate was composed of soil and gravel. The ground cover and plant cover within 1m above the trail were between 5 and 25% in most grids. Muntjac showed no preference to the aspect of the grid. However, that when the slope of the sampling grid increased the difference between the aspect of sampling grid and trail increased significantly ($p < 0.05$) indicates muntjac selected its trail.

The duration of a barking bout varied from 1 to 16 minutes; number of barks per bout varied between 1 and 105; the average barking frequency (numbers per minute) was 6.5 ranging from 1 to 14.

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There was a tendency that the barking frequency decreased when a bout progressed. Within 24 hr cycle barking could be found most frequently at dusk (2.40 ± 2.30 bout/hr) and least frequently during the day (0.23 ± 0.51 bout/hr). Among different vegetation types, barking bouts were recorded proportionally more in *Miscanthus* and semiopen broad leaf forest and less in Artificial coniferous forest.

Muntjac density was estimated between 0.96 and 1.70 per km trail length when the sound transmitting distance of the barking was assumed to be between 500 and 250 m. The number of muntjac along the trail estimated was between 13 and 23.

The effect of various confinements on the behavior of macaca monkeys. L.C. Hsia* and Y.L. Lee, Pig Research Institute, Taiwan, Republic of China.

The purpose of this experiment was to understand the macaca monkeys (*M. Cyclopis*) under confinement. Behavior observations were conducted for 5 days in winter (February) and 5 days in summer (August and September) in 1991 under the following 5 conditions:

1. Big confinement area with grass land 99m X 80m and a water pool 15m X 5.8m.
2. Middle confinement area (240m²) with grass land (138.5m²) and rock. The shape of this area was irregular and surrounded by water.
3. Cage with 3.2m³ space.
4. Pen with 20.2m³ space.
5. Pen with 17.2m³ space.

The observed animals were 14, 9, 4, 2, and 4, respectively, for the above 5 confinement conditions. Observations started at 8:00 a.m. and ended at 5:00 p.m. everyday. There was less lying time for monkeys in condition 3, significantly more walking time in conditions 1 and 2 compared with the other conditions ($p < 0.01$), and significantly more shouting in treatment 3. Observing behavior was found more in conditions 3, 4, and 5. Masturbation and self-mutilation happened most frequently in condition 3. Stereotyped movements happened more frequently ($p < 0.01$) in conditions 3, 4, and 5. The results show that the smaller the space, the higher the frequency of abnormal behavior.

The Social Behavior and Habitat Use of Lanyu Scops Owl

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The first five-year study of the behavior and ecology of Lanyu scops owl focused on finding the limiting factors for the population of this species. At the end of the fifth year, new evidence showed that Lanyu scops owls might be territorial, in spite of the fact that individual pairs' activity ranges overlapped greatly even during the breeding season. Also, their territoriality might directly influence their habitat use and breeding success.

The territoriality of Lanyu scops owls differ both in nature and in expression from other species of birds. Under natural conditions, no aggression was observed among these owls even during the breeding season. When taperecording playback was used to conduct a population census, two males occupying neighboring areas were stimulated into a vigorous fight. Thus, 1990 to 1991 was spent learning the territoriality of this species and the influence of this behavior on their habitat use and on their breeding success.

Monthly playback experiments at 60 stations along the highway from July 1990 through June 1991 found that the reaction of owls to taped owl calls varied seasonally and sexually. Both sexes responded with vocalizations; the males called back year round while the females rarely responded between May and September. Perhaps at this time females were hiding in tree holes incubating eggs or rearing young.

Owl territories were probably maintained by males. Territories in peripheral habitat were large in size, with definite boundaries and no overlap between pairs. In prime habitat, owls did not maintain obvious territories with clear boundaries. There were large amounts of overlap in the activity areas of males. Nevertheless, there were core areas in each male's activity area which were not shared. When the movement of owls were followed with radio transmitters, it seems owls rarely appeared together in their overlapping areas, unless they were members of a pair. Thus, although the activity area of different owls overlapped when several day's activity ranges were combined, they may in fact be maintaining dynamic territory boundaries in the overlapping region, through announcing each other's location by counter calling.

Territories were not strictly maintained. Many owls visited and used other owls' territories without inciting aggression. These individuals could be of either sex. But owls found in another owl's territory were usually silent. As stated earlier, aggression among owls were rarely seen under natural conditions. Some individuals seem to show aggression more readily. Most of the 27 aggressive events seen in six years happened in the early part of the breeding season. Both sexes could be the aggressor, and both sexes could be

attacked. No female was ever seen fighting another female though.

Owls that bred in prime habitat remained near their nest cavities more months than non-breeders. This was especially true for individuals occupying high quality tree holes, who rarely left the vicinity of the nest trees. If this was because these males did not want to lose ownership of their nest holes, it suggests an "occupancy priority" rule, ie. once a cavity is occupied, its owners are not challenged. We have witnessed two males calling against each other during the fall when a prime nest site became available. The older of the two eventually bred in that cavity the following season. Another cavity was shared peacefully by two pairs of owls, with one pair breeding more successfully than the other.

Some tree holes were occupied by the same pair of birds for years. Some holes were occupied by the same female while the male changed several times. Or, some holes had the same male for years while the female changed several times. The female of one pair left with her mate to breed in a new location when his old nest hole was lost to another pair.

It is unknown whether mate change was caused by voluntary departure of the old mate, by the arrival of a new bird which forced the old bird out, or caused by the death of a mate. Regardless, because the number of usable tree cavities was limited in prime habitat, Lanyu scops owls frequently visited various tree cavities even when these were already occupied.

Owls leave their parental site about one month after fledging. They start breeding when they reach two years of age. Some females did not breed until they were three years old. When they return to breed, they do not necessarily return to their natal sites.

The Investigation of *Macaca cyclopis* population distribution and
in Kaohsiung's Sou Shan Mountain Zone

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This program was conducted from July 1990 to June 1991 at Sou Shan mountain zone in Kaohsiung City. During this time, investigators spent several times in the mountain surveying Taiwan macaque habitats and attempting troop and population censuses. Other time spent interviewing climbers, collecting polls, and discussing with government officials and others in an effort to win support from city citizen for preservation of the remaining macaque population. After 17 times of preliminary observation and recheck-out, it was estimated that there were about 76 Taiwan macaques distributed in 3 main parts of Sou Shan, in which 5 subgroups had been confirmed. Four infant and juvenile macaques were found among these groups during Spring April, 1991. Distribution density of macaques is 34.61 animals/km².

Macaques live in multiple adult male and multiple adult female groups. The sociometric sex ratio is about 2.44 males to 1 female, while the numbers of immature macaques stand 52% of the total population. Troop sizes seem to vary between 6-20 animals and contain more adult males than adult females. The values of distribution density in the present study are higher than those of other reports in Taiwan. This is because of unable to localize the population zone in mountain. However, the mainly reason probably be come from the uneven and the concentrated distribution of animals after feeding by climbers. Sex tendency in social structure belongs to male group. This situation is quite different from the results observed by other investigators in Taiwan, in which is female dominant. The reason remains to be investigated.

The major habitats of macaques appear to be tropical hardwood forests in rocky cliff. Taiwan macaques fed mainly upon seeds, fruits, cones, berries, and delicate leaf, although their dietary intake varied seasonally. The life environmental zone of macaque is getting bad and narrow situation threatened by climbers along their home ranges. Thus, notes that a protection area for Taiwan macaque in Sou Shan mountain should be arranged in near future by local government to keep macaques from advancing threatened by climbers.

Studies on Parasites of Fish from the Tachia River (I)

K.E. Su, C.K. Fan, K.W. Lam

The Tachia River measures 124Km long and its rich water resource is used for municipal water supply, hydroelectricity, irrigation, and industrial usages. Fish resource in this river is also very rich. However, fish are subjected to parasitic infections. And parasitic disease is one of the factors that affect the survival rate of fish. Besides acting as host of fish parasites, fish may also serve as the intermediate host for human parasites which is related to the health of man. This study was conducted to investigate parasitic infections of fish from the Tachia River so as to provide reference informations for conservation and management of fish in the Tachia River.

During July 1990 through April 1991, fish were taken from the Tachia River at intervals and examined for parasites by the pressing method and digestion method. Eleven species of fish including Carassius auratus, Acrossocheliu parasoxus, Varicorhinus barbatulus, Zacco spp. (Z. pachycephalus & Z. platypus), Crossostoma lacustre, Hemimyzon formosanus, Cobitis taenia, Rhinogobius brunneus, Leiocassis adiposalis and Oncorhynchus masou formosanus were examined during the study. Because O. m. formosanus is an endangered species and under strict protection, only 2 fixed specimens that died of natural course were examined.

Among the 181 fish examined by the pressign method, only 15 of them (8.3%) harbored adult stage parasites. No parasite was found in the Homalopteridae (10) and R. brunneus (17). The highest infection rate was observed in O. m. formosanus (1/2, 50%), then followed in sequence by L. adiposalis (1/8, 12.5%), Zacco spp. (7/65, 10.8%), C. auratus (2/19, 10.5%), A. paradoxus (3/37, 8.1%) and V. barbatulus (1/23, 4.3%). With a few exceptions, most of the fish harbored only 1-3 worms. The exceptions were: (1) more than 10 Monogenea were found in one L. adiposalis on Feb. 25, 1991, (2) an average of 6.7 Acanthocephala were found in Zacco spp. on Apr. 5, 1991.

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Parasites belonging to 4 categories-Trematoda, Nematoda, Acanthocephala and Arthropoda were found in fish from the Tachia River. These parasites inhabit mainly the gills and intestine of the host. Two species of Monogenea and one kind of parasitic copepod were found on the gills, whereas 3 species of Digenea, one kind of nematode and 4 species of Acanthocephala were found in the intestinal lumen. Among the fish species, Zacco spp. from Tungshih harbored the most numerous types of parasites. A total of 3 different Digenea and 3 Acanthocephala species were observed. Most of the fish harbored only one kind of parasite at a time. The highest record of a single fish harboring 3 species of parasites (2 species of Digenea and 1 Acanthocephala species) was observed in a Zacco fish from Tungshih, followed by another Zacco from Liyang that carried 2 kinds of parasites (1 species each of Digenea and Acanthocephala).

Results of the digestion method showed that A. paradoxus, C. auratus and Zacco spp. harbored metacercariae of Haplorchis taichui and H. pumilio. The former is more common than the latter species. An unidentified metacercaria was also found in C. taenia.

Although light infection of parasites may be harmless to the health of the fish, heavy infection may cause serious damages. For instance, heavy infection of Monogenea on the gills may irritate the epithelial tissue, cause blood loss, secondary infection or even death of the host. The proboscis of Acanthocephala is covered with numerous hooklets that may irritate the intestinal wall and causing perforation or even death of the host. Therefore the influence of parasitic diseases on health of the fish is worth noticing.

The Monitoring of Pesticide Residues in the Water Samples
from the Masu Trout Protection Area Of Chi-Chia Wan Stream

Gwo-Chen Li, Sue-Sun Wong, Yi-Hwar Lee and Sue-Ping Hu

ABSTRACT

Chi-Chia-Wan stream has been the major inhabitancy of masu trout which is recognized as one of the national treasures in Taiwan. In order to monitoring the water quality in this stream, 177 samples were taken and analyzed in 1991 at 5 sites along the stream. All 177 samples were not found the residues of the 30 analyzed pesticides commonly used in Li-San area.

Wu-Ling Farm kept good record of pesticides have being used in their farm. According to the record, 90.4% of pesticides used in this area in 1990 were fungicides, insecticides counted for only 6.6%. However, the usage of insecticides in this area is increased gradually in the recent years. From February 1986 to June 1991, a total of 1102 water samples were taken along Chi-Chia-Wan stream and were analyzed. Two samples were detected to contain methamidophos and mevinphos with concentration less than 3 ppb. These two samples were taken in October 1988 at Breeding Farm and Fruit District III, respectively.

Since Masu trout is the specially protected species in Chi-Chia-Wan stream area, monitoring on pesticide residues in the stream water becomes very important and should be carried out continuously. This research proposal includes extensive investigation of pesticide usage in the Li-San area and pesticide residues in Chi-Chia-Wan stream. From the research results, the influence of pesticide application and farm management on water quality will be assessed.

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Establishment of Database of the Virgin Broad-leaves Forest in Taiwan

Tzer-Tong Lin¹, Wen-liang Chiou¹

There are abundant flora and considerable diversity of plant communities in Taiwan. It is difficult to compare the difference between those communities from the published papers, because the researchers usually used different methods and parameters. It should be designed a friendly personal computer program of database to record, exchange and accumulate the investigation data. This database would be a complete database of broad-leaf forestry communities in Taiwan, and could provide references of researches as well as the conservative policies.

A convenient system of the checklist of vascular plants in Taiwan has been built this year. This system includes the indigenous vascular plants' scientific names which could be added, deleted, checked, modified and recovered easily.

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Plant communities at mud volcanic areas in Taiwan (1st. year)

Ming-Yih Chen* Hsiu-Fin Liao

[Abstract]

Mud volcanoes distribute in Tainan, Kaohsiung, Pingtung, Taitung and Hualien Hsiens in Taiwan. Unique saline microenvironments at mud volcanic areas create special plant communities. Both landscape and vegetation of mud volcanoes are important resources for environmental education. Vegetation of mud volcanoes were studied. Study areas included Wusantin, Kunsweipin, Sunswai, Losan and Paupau. Items studied included site environments, mud characteristics, floral composition and morphological characteristics.

Saline environment, formed through long-term mud eruption, affected plant composition and distribution. Electric conductivity of mudflow reached 66.5 mmhos/cm . The pH value of mudflow ranged 7.3-9.1. Totally 256 species, belonging to 77 families, were found at mud volcanic areas. Plant communities types based on dominant species could be classified as follows:

1. Miscanthus floridulus type
2. Acrostichum aureum-Fimbristylis sieboldii-Pluchea indica type
3. Phragmites communis type
4. Imperata cylindrica type
5. Panicum repens type

Vegetation at Paupau mud volcano is still well preserved. Paupau mud volcano can be set up as natural reserve for educational uses.

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The bibliography of data base on the conservation
research of Taiwanese butterflies

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Taiwan has been called "Butterfly Kingdom " for a long time. There are 400 species of butterflies were described & recorded in Taiwan now. According to the literature , the 1st scientific description of Taiwanese butterflies in 1866. At least 1200 papers of Taiwanese butterflies were collected and remanaged in the 1st year this paper, estimately about other 600 to 800 papers were continually collected in the 2nd year. Now all of these papers were reviewed and systematically managed by taxonomy, morphology ,physiology ,distribution ,life history, habit and behavior etc..Then a bibliography of Taiwanese butterflies will be compiled.

Among these papers , most of them were collected from Japanese journals. And some of more important books concerned about Taiwanese butterflies were mentioned and reviewed too. The specialists who made a great contribution of research of Taiwanese butterflies were mentioned in this paper.

RELOCATION TEST AND CONSERVATION EXERCISE
ON ENDEMIC AGAMIDS IN TAIWAN

Hsien Yu Cheng* and Zuea-Chi Chang*

This study investigated the present status and distribution of three taxa of endemic agamids, living in low elevation areas of Taiwan. One artificial greenland was chosen to be used for a relocation test. This is the abstract of the results from the second phase of the study.

The study preiod of this second phase started from April 1990 through October 1991. There are a total of 95 individuals of agamids which were released in the chosen greenland and in seven different times. Among these 95 individuals, female J. swinhonis had 8 and males had 5; female J. m. formosensis had 10 and males had 21; and female J. m. mitsukurii had 17 and males had 34. Sixty-one individuals released in 1991 will be followed up and analyses in the coming phase. Among the thirty-four of the 95 individuals released before the fall of 1990, eleven males and five females were recorded to be living in the greenland for more than a year. The longest records for the males and the females are 586 days and 530 days respectively. Among them, male J. swinhonis had 3 (5 released) and females had 1 (8 released); male J. m. formosensis had 1 (2 released) and females had 1 (1 released); and male J. mitsukurii had 6 (13 released), females had 3 (5 released). The results revealed that all the three taxa could live in this greenland. However, further relocation tests and the improvements and maintenance of habitats have to proceed in order to have a stable population, at least one of the three agamids, in this field.

The locations for the survey and the collections of the living specimens of the different agamids included five sites in Northern Taiwan, five sites in Central Taiwan, and one site in Eastern Taiwan. Besides these sites, there are three additional sites which above the elevation of 1,000 meters for the collections of the other two endemic agamids (not used in the relocation test). Comparisons between the records in the past Japanese occupied period and the records of the recent ten years, the distribution and population sizes of the three endemic agamids living in the low elevation of Taiwan declined dramatically in the recent years. The dispersed relic greenlands left under the intensified progressive development were the last habitats for these endemic agamids. Besides the relocation excercises, in situ conservation on these endemic agamids had to be practised as soon as possible. Among those fourteen survey sites, two (Sa-Mou Shan and Tiger-Head Shan) in the Northern Taiwan could be chosed for the first two in situ conservation areas. Abundance in numbers

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and high morphological variations make Sa-Mou Shan be the good gene pool and specimen resource of J. swinhonis. The Park of Tiger-Head Shan is one of the good areas to study the different habitat selections between J. swinhonis and J. mitsukurii. Appropriate management plus administration will make these two areas be a good model of the in situ conservation of endemic lizards.

Bird Banding Project of Taiwan

Yuan-Hong Chuang¹

Abstract

Bird banding project during 1990-7-1 to 1991-6-30 was performed by local banders by mist nets throughout Taiwan. The nests are checked regularly and caught birds are banded and recorded. The records include bill length, total head length, greatest wing length, tarsal length, tail length and body weight. Adult or juvenile status is also judged when possible. The birds are released alive. Nets are removed when banders stop working.

148 field work-days at 11 different localities yielded 3254 banded birds. The best result came from Puli, namely, 1334 birds including 50 recaptures. Puli is at the center of Taiwan and surrounded by mountains, which makes she a good place to band land birds. Puli is also endowed with large flocks of Barn Swallow, African Sand Martin and Yellow Wagtail roosting at sugar cane field in Spring. These 3 birds are the main species banded there.

In this year there were 151 recaptures, 7 Taiwan-banded oversea-recoveries including 3 from east Siberia (1 Red Knot, 1 Green-winged Teal and 1 Garganey), 4 from Shanghai (2 Redshanks, 1 Whimbrel and 1 Dunlin). These are the first recoveries from Russia and mainland China.

All banding results are collected to the Banding Center and processed by PC-286 with dBase, Lotus and PE2. The imported data include field diaries, bird biometry records, bander list, foreign associations, bird ring stock, equipment list, table forms and

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letters.

Bander qualification has begun and 3 classes are separated--senior, junior and trainee. The latter two are supervised by senior banders during field work. Committee board includes president of Wild Bird Society, director of Banding Center and some senior banders. They hold conference every half year and discuss on administration, technique, etc.

Contacted foreign associations include mainland China, Japan, Hongkong, Malaysia, Singapore, Australia, New Zealand and a friend in Denmark as mid-man to Russia. We collected bander's manuals from United Kindom, Janpan and Australia. These will be of great help to our future work.

Ecology and resources of aquatic insects
in Tung-Hou Stream

Ping-Shih Yang , Kwok-Ching Wong

Department of Plant Pathology and Entomology,
National Taiwan University

Ecology and resources of aquatic insects were investigated in Tung-Hou Stream. The results indicated the resource of aquatic insects was abundant, 86 species of aquatic insects belonged to 8 orders, 41 families were collected and identified. Among them 21 species--Ephemeroptera, 19 species--Trichoptera, 12 species--Plecoptera, 15 species--Diptera, 9 species--Coleoptera, 7 species--Odonata, 2 species--Megaloptera, 1 species--Lepidoptera were identified and described respectively. And the predominant species of mayflies (Ephemeroptera) were Choroterpes sp.TCA., Baetis sp.TBA., Ephemerella sp.TEA., and Rhithrogena sp.TRA. The other were Stenopsyche marmorata (Trichoptera) , Neoperla sp. TNA., and Neoperla sp. TNB. (Plecoptera) ., Chironomus sp.TCA. (Diptera) ., Eubrianax sp. PEA. (Coleoptera) ., Euphaea sp. TEA (Odonata) and Protohermes grandis (Megaloptera).

Not only mean density, but also numbers of taxa by season, winter was the most abundant season at all 4 sampling sites. In this paper, the hydrological factors including the width, depth, velocity, temperature, pH , conductivity and the dissolved oxygen of the Stream were surveyed too. And the results revealed the Stream was still oligosaprobic.

Health Monitoring and Disease Surveillance in Exotic Animals of Taiwan

Chiou, Huey-Ing¹; Liang, Chung-Tiang¹; Chang, Woon-Fa¹; Weng, Chung-Nan¹

Report on disease diagnosis of 109 exotic animal cases from July 1990 to June 1991 in Taiwan

The goals of this program are to provide training for pathologists in diseases of zoo animals and to collect basic information on diseases, nutrition and behavior of zoo animals in order to lower mortality rates and improve the quality and quantity of zoo animals in Taiwan.

Over the past year we have performed post mortem examinations on 109 animals and identified a variety of causes of mortality several problems have been identified as a result:

1. The potential danger of zoonotic disease.

Mycobacterium spp. infection has been diagnosed in one monkey, one elephant and three deers. In order to safeguard public hygiene and animal health. It is recommended that direct contact between animals and visitors be avoided.

2. Management problems. Eight cases of vitamin E deficiency and 5 cases of calcium phosphate toxicity in Emus indicate the need for continued management supervision.

3. Insufficient application of clinical diagnosis and lack of treatment equipment: Currently, except for the Taipei Zoo, the other zoos in Taiwan lack veterinarians and equipment and therefore, cannot provide adequate veterinary care. Thus, increasing purchases of clinical medical equipment and increasing the short/middle-term advanced training of veterinarians in diagnostic technology will promote medical treatment in zoos.

4. Insufficient reproduction job: Due to lack of specialists and professional technology, except for a few animals such as sika deer, formosa bear, and tiger, the task of reproduction for other animals has not been promoted effectively. Therefore, future work should include dispatching professional staff to study related research abroad.

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The Project of Establishing an Inventory System for Endangered
Mammals in Captivity on Taiwan CHEN, PAO-CHUNG CHEN, YAI-AI

CHEN, PAO-CHUNG CHEN, YAI-AI

The Project of Establishing an Inventory System for Endangered
Mammals in Captivity on Taiwan CHEN, PAO-CHUNG CHEN, YAI-AI

The most endangered mammals in Captivity on Taiwan mostly keep in the zoo and amusement parks. Few species are kept as pets for general publics. After the execution of the Wildlife Conservation Law, those pet owners should fill out certain forms and report to the local government for reference; however, the reported data need further justification. Furthermore, there are no complete and systematic management as well as effective control about the transfer of those animals in Taiwan. This project is designed for the conservation and management for those animals.

This Project's basic unit of the endangered mammals is speices. We used the reference from the local government and visited zoos, amusement parks and pet owners to investigate the animals' speices, numbers, ages, sex, origins and bloods in order to set up the studbook management system which also keep the records of reproduction, death and transfer.

This project lasts 2 years. This year is the first year. We investigate 15 places including the public and private zoos and amusement parks. The justified endangered mammals are Gorilla, Orang-utan, Chimpanzee, Siamang, White-handed Gibbon, Ring-tailed Lemur, Brown Lemur, Mongoose Lemur, Ruffed Lemur, Hairy-eared Dwarf Lemur, Cotton-top Marmoset, Hoolock Gibbon, Bush dog, Malayan Sun Bear, Asiatic Black Bear, Eurasian Otter, Brown Hyena, Puma, Ocelot, Temminck's Golden Cat, Clouded Leopard, Jaguar, Leopard, Bengal Tiger, Cheetah, Asiatic Elephant, African Elephant, Grevys Zebra, Prezewalski,s Horse, Cape Mountain Zebra, Malayan Tapir, White Rhinoceros, Black Rhinoceros, Scimitar-horned Oryx, Addax, Arabian Oryx 37 species 471 specimen. Private captive animals are mainly Orang-utan and Gibbon; however, the other species will also be investigated. The total investigated records from 23 cities are Orang-utan, Gibbon, Chimpanzee, Mandrill, Tiger, Asiatic Black Bear, Malayan Sun Bear, Clouded Leopard, Juguar, Temminck's Golden Cat, Puma 18 speices 232 specimen. The top five are 150 orang-utans, 74 tigers, 65 Malayan Sun Bears, 56 White-handed Gibbons and 49 Agile Gibbons respectively. The second years' investigation will certainly change the catagories of the speices and amounts of the animals.

This is the first time to investigate the conserved Wildlife in Taiwan. The problems after the investigation are:

- 1.The owner does not own the registered animals.
- 2.The owner owns the animal but reports to the local government with other's name.
- 3.The owner keep the animals but go to other governed area to register.
- 4.The owner does not change the registration of the animals when the data is changed.
- 5.The owner does not cooperate with the investigation.
- 6.Most reported names are not correct.
- 7.The sanitation and safety are generally not good.
- 8.Some endangered species are released.

In order to enhance the conservation and management about the conserved wildlife, it is necessary to assist the owners to have correct concept on the Conservation Law and ways of keeping the animals.

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Investigation on Raptors in Taiwan

Wen-Horn Lin¹

Abstract

Raptors play an important role in an ecosystem. However, they are prone to diminish in population and even to become endangered. In addition to their naturally small numbers and slow breeding rate, raptors often suffer from human persecution.

This project focuses on 6 species of resident raptors in Taiwan. The main goals of the project are: to build a database, to survey their distribution and population, to examine population trends, and to evaluate the current conservation status.

Our method was to develop a standardized procedure for record-taking, collect data, then input data into computer database. The data was collected from current research as well as from previously written research papers, birdwatchers' personal notebooks, etc.

To record distribution and population information, we use Transverse Mercator Grids to divide Taiwan into 261 geographical sections. Before the end of 1991, the raptor database contained 5,146 records covering 187 grids sections, or 72 percent of Taiwan.

After compiling the database, we found that the distribution rate of 6 resident raptors was as follows: Crested Serpent Eagle were found in 56% of the surveyed sections, Crested Goshawk were in 45%, Besra Sparrowhawk were in 34%, Hodgson's Hawk-eagle were in 16%, Indian Black Eagle and Black Kite were in 11%. Among them, Crested Goshawk, Besra Sparrowhawk, and Crested Serpent Eagle are

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widely distributed in Taiwan island, the other 3 species are locally distributed. Only Black Kite was found in offshore isle.

Minimum population estimates are: 1,900 for Crested Serpent Eagle, 1,000 for Crested Goshawk, 400 for Besra Sparrowhawk, 175 for Black Kite, and 100 for both Indian Black Eagle and Hodgson's Hawk-eagle, but the outlook for Indian Black Eagle is more promising than that for Hodgson's Hawk-eagle.

The current conservation status is also discussed in the text. In this section, it is suggested that Black Kite be added to the 'precious and rare' species list under Wildlife Conservation Law.

Study on Parasite of Wild Fish Collected from Feitsui Reservoir and Related Water System

Chung Hsu-Yun

Abstract

A total number of 498 fishes belong to 15 species were collected for parasites examination. Among the 498 fishes, 463 were captured from Feitsui reservoir, 15 ayu and 20 rainbow trout were obtained from a fish farm in Fu Sun, which is located in the catchment area of the reservoir. The Taiwan spade-head fish (Varicorhinus barlatudus) were also caught from the brooks in Fu Sun area.

The 23 kinds of parasites founded in these fishes included eight species of protozoa : Myxobolus koi., Ichthyophthirius multifiliis, Myxidium sp. (M.matsui ?), Glugea plecoglossi, Trichodina sp., Chilodonella sp., Hemiophrys sp., and one unidentified peritricha ciliate. Four species of monogenic flukes : Gyrodactylus nipponensis, Pseudodactylogyrus bini, P. anguillae and Dactylogyrus sp.. One species of Cestoda : Bothriocephalus sp.. One species of Acanthocephalus : Neoechinorhynchus sp.. Three species of nematoda : Anguillicola crassa, Capillaria sp. and one unidentified species. Six species of copepodic parasites : Lerneae cyprinaceae, L.polymorpha, Ergasilus sp., Sinergasilus sp. (S.major ?) and two unidentified species.

The prevalence of all parasites infectivity were not greatly variant in different month or season. The number of parasites species in common carp, Chinese catfish and large eye sinibrama were evidently higher than other fish kinds.

Intensity of infection were quite low in general, except in two cases there were more than hundred thousands of dactylogyrid worms found on the gills of common carps, but even in that case no evidently detrimental effect on the host were noted.

Quite similar parasite fauna were found in the eel and ayu obtained from both the reservoir and culture condition, this phenonum is supposed to be caused by artificial activities.

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Investigations on concentrated fossil geological landscapes
in Liu-Chia, Shiu-Lin-Tung, Taiwan Hsian

Chung, Kuang-Jyi

Abstracts

The formations outcropping in this area are the Liushuang-Formation, the Erh-Chung-Chi Formation and the Kanhsiaoliao Fomations. The Liushuang Formation is of incompart thick sandstone, with north-southern stike and distributed on the western part of this ares. The Erh-Chung-Chi Formation is of sandstone and muddy sandstone alternation with more variation of stricke, from north-east in western part ot east-west, north west in sourth westem park. The Kanhsiaoliao Formation is of thick sandstone with interbedding thin muddy sand-stone, and with last-West strike.

There is a syncline structure locating the eastern part. The sedimentary structures such as the cross-bedding, scour and filling are very common and are of important grological phenomena.

From the above statements, we know that the Kanhsiaoliao Formation is of thick sandstone interbedding with thin muddy sandstone. The boundary part from thick sandstone to thin muddy sandstone is distributed concentrates pecten fossils. This condition is the sedimentury enviromental changes from thick sandstone conditcons which fit to pecten living to the muddy sandstone condition, which unfits to pecten living. Under this condition many pectens are dead and have formed concentrate fossil bed. Here can conclude some characters of this concentrate fossil bed:

1. Only one main kind of fossils: The main fossils which can be observed with the naked eye in the fossil bed are the pecten, nearly only pecten and not easy to find other kind fossils. If others are observed, they are only several individueds in unorder distribution. In fact, like this kind of concentrate fossil bed is not many.

2. It is very concentrated: The pecten fossils in fossil bed are all in overlapping concentrate state. It is very dense. The horizontal direction is also one by one in contact state. It is like a corpse heap to form a fossil bed.
3. The thickness of the fossil bed is 30-50 cm. This fossil bed is extended southward and of very hard calcareous formation.
4. The distributing area is very wide: The horizontal distributing area of this fossil bed is very wide. But the fossil bed does not gather together to only one place, and there are three places. The north place is near the people houses and very expansive. There are two places in the southern side of this area and all in stream valley. The western one is not only in larger scale but also in larger quantity and it has holopreservation and to be concealed. It fits to be a protected area.
5. They are preserved very well: For the pecten fossils of concentrate fossil bed, most of them are preserved very well especially those in western area of southern part. The fossils in this special outcrop are preserved very well but every two valves of pecten are apart each other, and every one is preserved well. Sometime very small quantity of valves are to be fragments.
6. More or less possessing some orientation: These concentrate fossils are only in some orientation partially or locally. The whole Shiu-Liu-Tung area does not possess the same orientation.
7. For the same occurrence such as this area in southern Taiwan, the Shiu-Liu-Tung area is the only one.

The pecten concentrate fossil bed possessing the above 7 characters is the very special cultural properties. Near areas such as Kuang-Tze-Ling and Tsen-Wen-Wate Reservoir have other landscapes for sightseeing. This area is just the middle station. The sightseeing of feeling character is combined with the sightseeing of learning character is a very valuable sightseeing and important natural cultural properties.

For the kinds of landscapes, this concentrate fossil formation is classified as followings:

- (1).Detail landscape: Every single fossil would be a detail landscape ,because of its independent characters. In this area,every small place, small style and small scale place or point constructs a detail landscape. Every detail landscape possesses it independent character and can offer some enjoying properties. They possess the character of detail landscapes.
- (2).Characteristic landscape: For the whole or vevry smaller part. All can offer very obvious objective to our sight-seeing. The fossils,concentrate fossils and fossil bed are all of very concrete substance,and would be of characteristic landscapes. This condition also shows that in enjoying the landscapes here,only one objective,no other topics or goals to be selected or to replace.
- (3).Close landscape:The place western of southern side of this area is very concealing. It is surrounded for four sides by thorn bambooes to form a close and whole smaller area and to be classified as close landscape,But this condition is not of a very lng time. Oneday the all thorn bamboo must be cut,and like to lost their fences. Today it is already a close landseapeystate.
- (4).Parorama landscapes: The north place is a spacious area. The field of vision can extend more distance. If we enjoy the landscape from south to north, the field of the landscape is not in a smaller style,and can extend to it near area,to form a parorama landscapes.

The factors to construct variorus landscapes here are as followrings:

- (1).Shapes:The shapes such as a whole landform,a whole fossil are all factors of landseapes. The state of shapes can lead sightseeing man to combine to form various compound form to be enjoyed.
- (2).Lines: Lines to form the landscapes here are straight lines,curve lines,irregular lines. The straright lines includ long straight lines,short straight lines. The curve line may be monotonous or complex. The irregulay lines are more complex. The factors of these lines are comprised various shapes and possessing vavious value for enjoying.

For the natural cultural properties,this concentrate fossil bed plays the scholar and teaching functions. They must be combined the sightseeing to form a sightseeing zoone.

Investigations on the Sedimentological Landscapes in the Hengchun Peninsula

Quocheng Sung¹

Spectacular geological features of the continental slope were relatively well preserved in the Neogene series of the Hengchun Peninsula. These sedimentary features include submarine channels and canyon, deep-sea fan, subaqueous slumping, subaqueous debris flow, and turbiditic structures. These geological landscapes are deserving of protection.

The present study is to propose a rational planning for these geological landscape in terms of specific geological features, their areal distributions and the associated transportation network. The feasibility of being classified as conservation sites is also recommended.

The study was made by using aerial photographs, topographic maps, and outcrop mapping. Various kinds of data were integrated by the geographic information system for the planning decision.

The following landscapes are recommended to be protected for educational and scientific purposes:

- (1) Landscape of submarine channel and subaqueous slumping along the Fang-Shan Hsi;
- (2) Landscape of submarine channel and deformational structures at Shi-Tzu-Tou;
- (3) Landscape of submarine canyon at Tzu-Keng;
- (4) Landscape of submarine channel and large-scale subaqueous slumping along Shun-Chun-Hsi and Shij-Hai.
- (5) Landscape of subaqueous debris flow and badland at Don-Men Hsi;
- (6) Landscape of exotic blocks and turbiditic structures at Kenting;
- (7) Landscape of deep-sea fan at Chia-Lo-Shui.

A few specific sites are recommended to be classified as conservational areas. They include an outcrop of a submarine channel along the Fang-Shan-Hsi; an outcrop of large-scale recumbent folding at Shi-Men-Pu; the Shi-Men gorge, and a sea cliff at Shij-Hain.

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Ecological Survey on Ay-liau and Ching-shan Streams, Pingtung County, Taiwan

Ching-Ming Wang¹、Shinn-pyng Yeh²、Cheng-hsiou Chen²

[Abstract]

Ay-liau and Ching-shan streams, located in Pingtung County of southern Taiwan, are headwaters of the Upper Kao-Ping River Drainage Basin. Featuring with scenic beauty and good fish habitat, Ching-shan Stream was announced as "Fish Protect Area" of Taiwan. This study, conducted July 1990 to June 1991, was to survey the hydrology, water quality, and fish community of these streams. These environmental data could support some stream management programs by the government and local conservation associations.

In the Ay-liau Stream, the study results showed that its mean annual discharge ranged from 0.03 to 0.94 m³/sec (\bar{X} =0.49, CV=60%), with water temperature 15.0 to 23.5 (\bar{X} =19.3, CV=13%), DO value 8.0 to 13.5 mg/L, pH value 7.7 to 9.9, conductivity 0.06 to 0.16 ms/cm (\bar{X} =0.11, CV=27%), nitrate concentration 1.3 to 1.9 mg/L (\bar{X} =1.6, CV=13%), soluble phosphate 0.01 to 0.07 mg/L (\bar{X} =0.04, CV=51%), and turbidity 0.4 to 8.1 NTU (\bar{X} =4.3, CV=52%). The fish survey found only one Cyprinid species (Acrossocheilus formosanus) currently inhabited this stream.

In the Chin-shan Stream, the study results showed that its mean annual discharge ranged from 0.02 to 3.51 m³/sec (\bar{X} =1.77, CV=59%), with water temperature 17.5 to 28.0 C

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to 9.8, conductivity 0.17 to 0.32 ms/cm (\bar{X} =0.25, CV=22%), nitrate 1.2 to 2.1 mg/L (\bar{X} =1.7, CV=17%), soluble phosphate 0.01 to 0.47 mg/L (\bar{X} =0.24, CV=53%), and turbidity 1.1 to 7.0 NTU (\bar{X} =4.1, CV=42%). Compared with the Ay-liau Stream, this stream was found to have more fishes, including 5 species of 3 families Anguillidae (*Anguilla maemorata*), Cyprinidae (*Acrossocheilus formosanus*, *Candidia barbata*, *Zacco pachycephalus*) and Gobiidae (*Rhinogobius brunneus*).

Ecological analysis demonstrated that Ay-liau Stream (elevation ca. 680 m) and Ching-shan Stream (ca. 250 m) both have natural beauty of water and rock scene famous for most forested streams of Taiwan. These two representatives of southern Taiwan streams have relatively low discharge but still show great fluctuation between dry (October to March) and wet (April to September) seasons. They with low elevation have cool-warm water temperature, but have clear water and suitable habitat for fishes, like most other forested streams of Taiwan. All fishes found here are native to Taiwan. Among them, the *Acrossocheilus*, *Candidia*, and *Zacco* species are endemic to the island, and the *Anguilla* species was recently announced as a conservation species by the government. Relatively, the *Candidia* and *Rhinogobius* species are dominant in the Ching-shan Stream, while the *Acrossocheilus* in the Ay-liau Stream.

The summary of reasearch record of natural ecologic erv-
iorment protection and developing program in 1991

Subject : The Conservation Plan of Natural Renewble Resources in

Lien-Hwa-Tsi Area

Writer : 漆 陞 忠 Sheng-Chung Chi

Heading :

As more and more demands of human activities and environm-
ental development in Taiwan, natural resources and ecologic en-
viorment are increasingly distroyed and polluted , Year after
year, they are getting decreased and even extincted possibly.

In recent years , the consciousness of environmental protec-
tion rises and the reason mentioned above , the government att-
aches much importance to it.

Summary : Therefore , selecting a natural forest area first and
setting up a complete systemed program secondly are necessary
now. This systemed program must include making files of rela-
ted documents and records , programming resources environment,
setting up specimen yards , develaping special natural resour-
ces and restoring ecologic environment , Especially , the prot-
ecting and breeding concept in all kinds of natural resources ,
introduction of normal knowledge , found the buildings for ex-
hibition and demonstration which supply the related members ,
including teachers and the college students in the related apa-
rtment , the skillful training , researching and praticing occ-
asion.

Summary :

We collected 160 articles about natural resources for Lien-
hwa district and put them in careful filing We set new nature
keeping area and protect the original ones , plant specimem ya-
rds , expemental water-collecting areas and water-soil menta-
ining settings.

We also eccomplished 9 parts of plant-protecting hills and
300 meters of " L " diches beside the roads , We collected and

made 180 kinds of insects and butterfly specimens , and authorized to investigate 54 kinds of birds. We programmed and established specimen yard of one area , nature protecting distr , for 100 hectares , amending stone-paved stairs for 200 meters in the protection distr. , accomplishing wooden pavement for 300 meters, and proceeding thorough programming on the road and watching station establishment , We amended a watching and breeding house for the wild bird , building a large green house , and changed the old green house into a house with temperature and moisture automatic controlling system , so as to cultivate rare plant and medicine plant , Also , we builded display rooms to show all kinds of sources and specimens for teaching and observation , We as well changed plant 120 specimens , and continue to collect and making them , Rebuilding one plant specimen yard for 1.2 hectares , and completing watering and drainage systems , visiting placements and other related initial steps , Also we cultivated 100 kinds of medicine plants , Besides , the catalogs of " Lien Hwa Tsi forest birds " , plant kinds of " Lien Hwa Tsi trial forest " and " Lien Hwa Tsi nature protecting distr , " were also printed and made.

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Ecological Study of Beech Forest of Taiwan

Yuen-po Yang¹ and Sheng-you Lu²

The Taiwan beech, which belongs to the family Fagaceae and is endemic to this island, is a deciduous tree species. Currently, this species is distributed at the northern part of Taiwan, and dominates the forests within 100 meters of both sides of the main ridges from Ta-man-shan to La-la-shan, northwestward to Pei-chia-tien-shan, and the northeastward to Chu-lu-shan. The Taiwan beech forests consist of about 200 vascular plant species and are generally in a three-layered structure. The first layer, tree layer, is around 15 meters in height; the second layer, shrub layer, from two to five meters; and the third layer is herbaceous layer. The age of many plants of Taiwan beech is from 70 to 100, and seldom plants are less than 70 years old. Seedlings and saplings of Taiwan beech are scarcely found in the Taiwan beech forests. It is likely that this fact may attribute its shade-intolerance. The soils are usually well-drained and acidic. The Taiwan beech blooms from the end of March to mid-April, and fruit ripens in September and October of the year.

1,2) Taiwan forestry Research institute.

Stream and Fish Conservation Program in National Forest

Jien - Jay Choue

Introduce:

There are 105 streams in Taiwan. Almost all of these streams' up countries are located in National Forest where combined with a tall range of mountains , supports a diverse flora and various forest type. The highly diversified vegetative enviroments in turn supports a rich fauna. Speak of the fish , there are 70 out of 140 species of fresh water fishs living in forest strean. Now the conservation program of forest stream and fish are more and more inportant when almost all of the down streams are severely poluted.

Purpose:

- A:Survey the fish distribution of National Forest and current condition of fish habitat.
- B:Protect the researched stream from being destroyed.
- C:Ban illegal fishing at any stream of Taiwan.
- D:Training the forester to be the expert of fish resource conservation.

Achievements of Execution:

We have each of the forest work-station , which 34 stations distributed in Taiwan , choose a representative stream to parctice fish habitat survey, and have completed 63 reports in the past 2 years.

Speak of the important achievements whick we got can be devide into 6 aspects:

Jien-Jay Choue: FOREST CONSERVATION-RECRZATION DEPT. T.F.B.

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A:Habitat Location

The stream we choosed to survey are the most represetive in its importance of the work station, All of researched streams are Labeled into the Forest Map to aply for advancing study of land management sach as G.I.S.

B:Channel type classification:

We are Rosgans channel type Classicfication methord to classify the stream pattern into 19 kinds and study their distrubtion. According to the reports we have all 19 types in Taiwan and B2, B3, C3, types are the most often happened.

C:Dominate vegetations by the stream:

Record the 4 most easily found plant species to analysis the relationship between aquatic ecoton and riparian vegetation. According to the reports , there are 40 kinds of plant are easily to be found by stream , and Taiwan. Acacis (*Acassia confusa*) and Taiwan Red Pine (*Pinus taiwanesis*) are the 2 most often appearing woods.

D:Fish distributios:

Resord the 4 most easily got fish species to analysis the fish distribution in National Forest.

According to the reports , we record more than 40 kinds of fish, which of then are rare species sach as Taiwan Trout (*Oncorhynchus masou formosanum*), high-backed minor (*Varicorhinus alticorpas*), Loach goby (*Rhyacichtys aspro*) etc., and minor (*Varicorhinus barbatulus*) is the broadest spread fish.

E:Impacts of fish habitet:

Record the factors that threaten fish producation.

According to the reports we classfied the factors into 25 kinds in which of them , the most aften happened impact is Poisoring and electing fish , and the other often impacts are resarvation in the stream , culture at the slope land , road custructure by stream and

check dam in the stream.

Except of the forest worker execute the fish conservation affairs in National Forest ,we appeal the whole people of the country together attain this fish project. We hold the consultant oftenly to invite fish and nature conservation experts to urge people what they can do? What they should do? and How to do it? In order to help this program success.

Conclition:

Except of protecting fish resource , the stream fish conservation project also protect the water resovrce and quolity which we rely on. Fish habitat improvements are one of sediment control and hill slope stabligned methored , they can be synthetic with soil and water conservation engineer. As a matter of fact , we establish a new policy that we should consider of the fish migration and built fish ladder when the cheek dam to be built. What we need to do in the near futuer is having more inventory of stream to know more knowledge of aquatic enviroment , to supply a safe planning for the stream recreation which becomes more and more popular in Taiwan.

Transplanting Experiment of Endangered Aquatic Plants Around Taoyuan Area

Yuen-po Yang¹.

In Taoyuan County, numerous ponds with many aquatic plants were existing in past decades. Due to the increased demand of land, many ponds associated with many plants have been decreased, and some species became extinct, such as *Aponogeton taiwanensis* Masamune and *Alisma canaliculata* A. Braun & Bouche. In 1987, Chen pointed out that two species, *Nuphar shimadai* Hay. and *Rotala hippuris* Makino, were in endangered condition and needed to be protected. This project concerning the restoration of the two species was therefore proposed.

The results of this investigation indicate that current distribution range of *Nuphar shimadai* is only at Pa-chang-li and that of *Rotala hippuris* is not existed because the pond which it was found was filled up with soil.

The propagation of the two species is easy. They can be transplanted successfully from cuttings and rhizomes. After transplanting experiments, both species can only grow in the northern part of Taiwan including Taoyuan, Taipei, and Ilan Counties. Many plants of the two species have been cultivated in some ponds of the area, such as in Taipei and Fushan botanical gardens.

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Preliminary studies on the angle area planning of Taiwan

CHANG KUN-HSIUNG¹ TZEN VIN-NAN²
HWANG I³ LIN YAO-SUNG⁴

ABSTRACT

About 20% of angling population is moving in the rivers, lakes and dams all over the island, and 100,000 anglers of them are frequently angling in the rivers. The fish resources become exhausted day after day due to great changes of riverain environment and excessive or improper catch, so the pleasure for angling in the rivers has been greatly reduced for the numerous anglers. For the purpose of protection or conservation of river resources as well as to the satisfaction of so many anglers, this research serves to analyze and review the relative laws in force and make the right regulations for governing the angling activity in the rivers. On the other hand, we have taken an investigation as to some rivers which environments are being properly protected or conserved in order to choose the suitable ones for angling purpose.

The actual laws or regulations related to the angling activity include Fishery Law, Enforcement Rules for Fishery Law, Regulations for Governing Fishery in Taiwan Province, Wild Animals Conservation Law, Enforcement Rules for Wild Animals Conservation Law and Regulations for Governing Rivers in Taiwan Province. As for 1) Planning for the control of angling activity itself; and 2) Orders or bans connected with angling activity in the light of protection or conservation, we found as follows:

1. No any stipulation or requirement about angling activity in the inland waters is provided in the Fishery Law.
2. According to the Wild Animals Conservation Law, angling activity shall not be allowed provided that the fishes under protection or conservation are listed in the prohibitive scope, and the fishes under protection or conservation which can be caught or angled shall be controlled by the following way:
 - a) County/City government shall delimit angling areas and enact the relevant rules or regula-

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 2. SOCIETY OF STREAMS, REPUBLIC OF CHINA.
 3. INSTITUTE OF ADVANCE MARITIME LAW STUDY, NATIONAL TAIWAN OCEAN UNIVERSITY.
 4. DEPARTMENT OF ZOOLOGY, NATIONAL TAIWAN UNIVERSITY.

tions; and

- b) The angler shall apply a angling license, and only the licensee is entitled to angle at the angling areas.
3. There is no any control for the angling of ordinary fishes. In order to solve this problem, we hereby make the following two suggestions:
- a) The angling of ordinary fishes shall be controlled by amending the Wild Animals Conservation Law; or
 - b) The regulations governing the angling of ordinary fishes will be made by the local competent authorities.

In our opinion, the Suggestion a) involves the amendment of law, so this end shall be accomplished by taking longer time. In consideration of the status quo of control or management of rivers, lakes and dams throughout the island, we consider the Suggestion b) ought to be more feasible, because the local competent authorities may provide the appropriate rules or regulations for governing the angling activity according to the practical conditions.

When making such rules or regulations, the following seven principles may be taken into account by the local competent authorities:

- a) The regulations governing the angling activity shall be made by each county/city or special municipality independently, but if necessary, such regulations may be made by the county/city or special municipality jointly;
- b) Basically, the competent authorities shall aggressively plan and delimit the angling areas, and the angling seasons, angling methods and angling fishes shall be also announced to the public;
- c) The angler shall apply an angling license to the competent authorities, and such license shall be released only after the applicant has taken part in the seminar concerned;
- d) When angling, the angling license shall be taken at all times;
- e) In case of deficiency of labor, the competent authorities may entrust the private community to handle and manage various angling activities;
- f) Only the personal angling activity shall be allowed, and the angling at the profit-seeking boat shall not be considered at this moment; and
- g) Any matter which is not specified in the regulations governing the angling activity shall be handled in compliance with the other relevant laws.

The rivers incestigated by us are Chia Li River, Pei Kang River, Ta Chia River, Ching Shui Kou River, Nan Tze Hsien River and North Nan Shih River. Analyzing the following factors, i.e., location, hydrology (water temperature, flow and average depth), natural condition, cultural environment (life condition, population, education, public security, religion and traffic), fish resources (fish class and fish production), local fish protection community and involvement of local government, we consider that Nan Tze Hsien River at San Ming Village, Kaohsiung County and Pei Kang River at Pei Kang Hamlet, Kuo Hsing Village, Nantou County are more suitable for

the angling purpose.

In addition to limpid water and good geographic location for Nan Tze Hsien River and Pei Kang River, the local residents are also highly enthusiastic in protection or conservation of the river. Since there are many kinds of fishes in two rivers, some fishes such as *Zacco Pachycephalus*, *Varicorhinus Barbatulus*, *Leiocassis Adiposalis* and *Acrossocheilus Paradoxus* can be designated as the main fishes for angling activity. Moreover, the investigation of basic ecologic data and the protection or conservation of river and fishes have been systematically made by the government on a longterm basis for the above two rivers. For the sake of protection or conservation of the riverain environment and the rational utilization, we suggest to plan and arrange the exemplary angling areas at the above two rivers.

1991 Formosa Land-Locked Salmon Habitat Patrol and Protection Plan
(80 Agriforestry-Public Affairs-Ecology-1.6) Implementation Report

I. Foreword

The Formosa Land-Locked Salmon is a creature from the Glacial Period and now lives only in Korea, Japan, Europe, the Manchuria of China, and upstream Tachia Stream on Taiwan. The fact that all these areas belong to frigid zones with the only exception of Taiwan, where the Formosa Land-Locked Salmon lives in the sub-tropical zone, serves as an evidence that Taiwan had its freezing days and that Taiwan and Mainland China were once a connected continental block. The Formosa Land-Locked Salmon had originally been a catadromous migratory fish which turned into a land-locked fish because of geological cataclysm and is now an endangered species. Therefore, people from the academic circles and those having such consciousness have taken the initiative to actively launch a protection movement.

Both the Agricultural Council and Wuling Farm of the Vocational Assistance Commission for Retired Servicemen under the Executive Yuan were in charge of the plan. Through various promotional campaigns via the media, the general public was to be made aware of and understand the importance of ecological preservation, and to be so cultivated as to join in the effort to promote and implement natural conservation. It was because of these efforts that the fish were given the opportunity to reproduce and abound in the rivers and streams as they do today.

II. Purpose

- (1) To continue and strengthen the effort in promoting the importance of Formosa Land-Locked Salmon and reinforce the patrol and protection thereof.
- (2) To prevent man-made changes in the natural environment along the banks of Chichiawan Stream in order to keep the salmons growing and maintain and beautify the environment within the reserve.

III. Implementation and Results

For implementation purposes, the plan was divided into the "Patrol Protection" and "Promotion Protection" phases. Described below are the implementation taking place in year 1991 (from July 1, 1980 to June 30, 1991) and the results achieved:

(1) Implementation:

1. Shortly after promulgation by the Executive Yuan on February 16, 1984 of a preliminary plan entailing the inclusion of Formosa Land-Locked Salmon in ecological preservation, the Farm announced on February 26, 1984, the Implementation Measures for Patrol and Protection, dividing Chichiawan Stream into ten accountability areas for patrol and protection purposes. In addition, a Protection Center was established in September 1984, which was later on renamed the Preservation Center in January 1987 to take exclusive charge of the patrol protection. Regular and random patrols were also performed by designated persons on a full-time basis.

2. Promotional purposes were accomplished by the Farm through showing of documentary films, use of posters, and explanations provided by the presentation personnel. No recreation or rest near the water area was permitted, neither was fishing by catching, poisoning, electrifying, or netting allowed. Littering within the area was strictly prohibited, the refuse being cleaned and taken away by wagons on a regular basis, and the farmers growing fruits and vegetables were talked into applying agricultural chemicals of low toxic nature to prevent the stream from being polluted. As for farm land in the vicinity, counseling services were provided to assist in the completion of platform structuring, hillside ditch development, and covering of slope by growing grass in order to reinforce soil conservation measures and prevent sand and soil from flowing onto the riverbed.

3. In June 1990, the Agricultural Council proposed to include the area 30-meter wide along the river banks in the "Formosa Land-Locked Salmon Nature Reserve". Thereafter, with the exception of part of the Farm land which was incorporated in the reserve for forestation cooperation, platform structuring and soil conservation measures were also taken for the 15 acre of fruit and vegetable areas along the stream to mitigate pollution resulted from sand and soil flowing onto the riverbed.

4. To cooperate with the defining of reserve boundaries, a topographic survey was commissioned for the land along Chichiawan Stream. Phase 1 and Phase 2 topographic map drawing were completed on January 30, 1991, the maps being submitted as reference for launching various operations concerning the definition of Formosa Land-Locked Salmon Reserve boundaries.

(2) Results Achieved:

1. Through introduction and promotion via mass media and the presentation personnel, knowledge of the general public of this rare and invaluable salmon was enhanced and tourists attracted by the famed fish grew increasingly.

2. A huge monitoring network was formed within the nature reserve by its division into accountability areas and by patrol performed by designated full-time personnel, which helped prevent tourists from entering for illegal catching, poisoning, electrifying and netting of the fish, and marked results were also accomplished in terms of pollution prevention.

3. The 200 plus fish at the initial stage of the protection has now increased to over 2000. In October of each year, the propagation season, in particular, the fish may be seen almost everywhere in the stream - an evidence of the thoroughly-implemented protective work.

IV. Review and Suggestions

- (1) Upstream Chichiawan Stream (Wuling Suspension Bridge and up), the frequent forestry landfall due to heavy rainfall often caused large amount of stones to flow into the river and deposit on the riverbed, resulting in change of the river courses and seriously affecting and altering the original habitat features. Strengthening of forest soil conservation measures upstream is therefore suggested in order to reduce the large amount of stones flowing into the river.
- (2) Annual budget under Formosa Land-Locked Salmon Habitat Patrol and Protection has been decreased year after after, thereby affecting the results achieved from the implementation of the plan. Provision of more generous budget is therefore suggested to facilitate the plan implementation.
- (3) Electric power of the Preservation Center comes from the Fruit area and the insufficient voltage often affects power supply stability, resulting in poor functional performance of electrical equipment. It is therefore suggested that a special fund be appropriated or budgeted under the plan for next year for the sake of improvement pursuits.
- (4) Both software and hardware facilities of the Preservation Center be improved so the Center may serve as a presentation or education center for Formosa Land-Locked Salmon.
- (5) Proceed with the artificial propagation and fry seeding plans to increase the fish in the river.

The Study of Provisioning to Taiwan Macaque — Administration

Jong-Her Hwang

1. Purpose

Taiwan Macaque is the native species of Taiwan. Because of the destruction of habitation and over-hunting, the population of Taiwan Macaque is decreasing. We choose two places in Jentse to provision and attract the Macaque periodically. It will be more convenient for the researcher of Taiwan University to study the Macaque's behavior. Hoping that the Macaque will appear frequently thus can provide as a subject of education and visiting.

2. Execution

We set two provision station in Jentse where the Macaque will appear more often. A staff is assigned to provide food into a rectangular wooden box in each area. The amount of provision is 50 apples and 5kg bananas every week.

3. Result and suggestion

- (1) provisioning must be done for many years thus can get better result, so it is necessary to provide Taiwan Macaque continuously to let them appear frequently.
- (2) The food we provide is the favorite of mouse and squirrel, too. Sometimes the food had been eaten before the Macaque appeared. so the more proper food must be found.

Luo-Dong Forest Distinction
118 Jong-Jeng North Rd. Luodong, Yilan

Project of Management and Preservation in Kuan-Tu Nature Preserve

Mu-Ken Lin¹ Chih-Chung Chaung¹ Yuan Chang¹

ABSTRACT

The Kuan-Yu Marsh is situated at the confluence of Tanshui and Keelung Rivers. The marsh has an unique ecological environment, dominated by *Phragmites communis*, *Cyperus malaccensis* and *Kandelia candel*. In the winter, a lot of migratory birds always stay in this marsh to enjoy the sufficient nature resources.

To protect the marsh and the creatures living there, and to serve multiple purposes such as conservation, education, recreation and research, the Council of Agriculture and Bureau of Business Management, Taipei City Government, designated the marsh land as a nature, preserve and nature park, respectively.

The executive period of this program is from July 1st, 1990 to June 30th, 1993. The main objects are : (1) Improving the management and preservation of Nature Preserve. (2) Promoting the concepts and knowledge of conservation about natural ecology. (3) Planning the Kuan- Tu Nature park.

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The executive report of managing and planning
of Ha-Pan Natural Preservation area
Song-Yuan Ueng, Yuan-Po Yang, Jung-Tai Chao¹

Forward

Ha-Pan Natural Preservation area, located in the national forest in the intersection between Fu-Shan village, Wu-Lai Hsiang, Taipei Hsien and Fu-Shi village, Yuan-Shan Hsiang, I-Lan Hsien, is part of northern end of Sheue-Shan mountains, and has an area of 332.7 hectare. According to a primary investigation, there are 123 family, 472 species of original vascular bundle plants, and 176 family, 650 species of wildlife within this area.

This area was established according to the "Cultural Resources Protection Regulation" postulated in 1986. The objective is to protect the eco-system of northern mountain area in Taiwan. The major protege are natural hardwood forest and the wildlife within. This area can provide a place for gene preservation, permanent observation, education, and research.

Executive Objective

- (1) Problem to be solved: To enhance the management and maintainance of the natural resources within Ha-Pan Natural Preservation area, and to protect this area from damage and facilitate the long term academical research.
- (2) Overall objective: According to the characteristics of environment and landscape of this area, to research and proceed with detailed planning, such as tours, research routes, foot trails, demonstration placards, and indicators, and to provide a reference for future management and maintainance of this natural preservation area.

Status Quo and Result of Execution

- (1) The original check point was moved to the northern end of this area, and a check point in the southern end was completed.
- (2) Guardians are posted in check points 24 hours a day to record the number of entrant, to control illegal entrant, and to proceed with demonstration work. The result is repulsion of 20 hunters and 15 fishmen.
- (3) Patrolmen are sent within this area to get familiar with the environment in order to prohibit illegal conduct, and 120 patrolling are conducted per year. The results include detructing 1 hunting hut, and approximately 60 hunting equipments. A good result has been achieved.

Discussion and Recommendation

The major problem encountered in this area was that the controlling of the tourist entrance from the southern end is not effective. A temporary solution is to enhance the patrolling number. However, a check point in the southern end has been completed and a better management can be predicted.

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Report on the Project of the management
of the Yuan-yang Lake Nature Reserve

CHEN CHANG LIN

LEE CHUNG HSIUNG

FOREWORD

The Yuan-yang Lake Nature Reserve is located at the 89, 90, and 91 compartments of Ta-hsi working circle of the Forest Development Administration, Hualien. Geographically, it is at the Ta-han stream's upper reaches which resides at the Chien-shih Village, Hsin-chu county. With a total area of about 374 hectares, in which the lake occupies 3.6 hectares and the swamp 2.2 hectares, this area is abundant in valuable Cypress forest and still maintains a perfect natural ecological system.

To cooperate with the Taiwan Forest Research Institute and being subsidized by the National Science Council, this administration had carried out a series of research in this area since 1969, and then in 1973, it was established as a "Nature Protection Area", the first one in Taiwan. Afterward the management work has been undertaken by this administration.

On June 27, 1986, the area was declared as a "Nature Reserve" by the government under the "Cultural Property Protection Law" and this administration was assigned as the administrator. With the support of a special fund offered by the Council of Agriculture and supplementary fund raised by this administration, the reserve has been managed as required since then. The protection subjects of the reserve include alpine lake & swamp, Cypress forest and more than 100 species of Hydrophytes, Hygrophytes and Mesophytes, among them, *Sparganium fallax* has been identified as a new recorded specie in Taiwan. In addition, more than 14 species of rare fowls, including Mandarin duck, and wild life like deer, monkey and squirrel are being found.

PURPOSES

1. Due to the advancement and rapid growth of population in recent years, the deterioration of natural resources speed up. The natural environment has been

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serious damaged before human being fully realize it's importance. Thus to protect Yuan-yang Lake with such a prefect ecological system becomes a necessity.

2.To provide a ideal environment for acadamic research on biological and geological science, natural resources reservation and environmental education such as:

- (1)Ecological and taxonomic study on Hydrophytes and Hygrophytes.
- (2)Ecological and taxonomic study on Liverworts and Mosses.
- (3)Ecological study on Cypress forest and it's succession and regeneration.
- (4)Ecological study on water fowls both permanent and winter residents.
- (5)Watershed management and water pollution studies.
- (6)Study on the formation of alpine lake.
- (7)Study on the migration of 4 recorded plants.

EXECUTION & CONSEQUENCE

1.Establishment of check stations: one is located at the entrance of # 100 forest road, the other is set up at the entrance of the lake. Visitors without the permit given by this administration will not be allowed to enter the reserve.

2.Erection of bulletins and interpretation boards:

Both at the entrance of 100# forest road and Yuan-yang Lake, there is a bulletins thus to enable the visitors to understand the basis of law in establishing the reserve and the content of restrictions. In addition, at the entrance of the lake there are also interpretation boards to describe the position, topography, lake, fowl, vegetation and new recorded plants of the reserve to faciliate academic study.

3.Restriction on the entrance of visitors: In compliance with the "Yuan-yang Lake Nature Reserve Management Regulations" approved by the Council of Agriculture, visitors are limited to those who engage in academic research or are from education intitutions. At first, they must submit their application. If approved, a permit will be given. Then at the check station, "Mountain Entrance Permit" and "Travel Safety Insurance Policy" are also

required. After the journey a "Research Report" must be submitted to this administration for reference.

4. Statistics of visitors: All the information are sent to the Council of Agriculture for further analysis.
5. Maintenance: Two rangers are responsible for the routine maintenance and patrol work. Weekly report must be submitted to this administration for consideration.
6. Due to strict restriction and well-done maintenance work, the reserve always keeps it's best condition for academic research or enviromental education.

SUGGESTIONS

1. To enforce demonstration and education, and to cooperate with the police in preventing illegal entrance: More and more tourists apply for the entrance permit and usually are not approved by this administration, which sometimes leads to a dispute between the rangers and the tourists.
2. To bestow jurisdiction on the rangers: Without jurisdiction, the rangers are difficult to execute their missions at such a isolated reserve.

The Management and Preservation of Mt. Ta-Wu Nature Reserve and Buffer Area.

Jien-Jay Choue

Introduction:

Mt. Ta-Wu Nature Reserve is the largest wildlife sanctuary currently existing in Taiwan. It is located in the south-east part of the Central Mountain Range ; ie in the 18-26th , 35-40th , 42-43-51th compartments , Ta-Wu working circle and the 25th compartment for a part of Pa-yu Lake, Pingtung working circle. The total area of this region is 47,000 hectares , elevation from 200~300 meters.

Most of the region is covered with hard-wood primary forest and it is the most representative natural forest in the middle and low elevation zone of Taiwan.

The buffer zone of this Nature Reserve is located on the other side of the central Mountain Range ; ie in the 24-31th compartments , Pingtung working circle , the 4~9 , 12,13-15th compartments , Chouzhou working circle. The total area of this zone is 21,000 hectares. Except some mining place and road building activities , the buffer zone maintains its pristine condition yet now. It stands by the Nature Reserve , takes the place of assistance to make the local ecosystem functions well.

Purpose:

1. Protect the Mt. Ta-Wu area will be maintained in the relatively pristine condition that exist at the present time.
2. Maintain the biodiversity of this Nature Reserve and its buffer zone.

Jien-Jay Choue: FOREST CONSERVATION-RECREATION DEPT. T.F.B.

2. sec 1, HANG-CHOU S. RD. TAIPEI , TAIWAN 100

3. Conserve the soil and water resource on the upper part watershed of Kaoshine, Ping-tung and Taitung.

4. Protect the regional ecosystem of south-east Taiwan.

Achievements of Execution:

In the execution we divide it into 3 aspects.

I. Protection and patrol:

The forest work station organized the patrol teams to protect the wildlife in this area. They establish 6 routes for patrol. The major works of these teams are:

A. Ban illegal hunting, poaching, fishing and vegetation collecting.

B. Protect the forest and wildlife habitat, destroy illegal construction.

Comparing with three years before, we could find hunting, and electric fishing easily at that time, but almost all of these illegal activities is gone now, and what the most presentative achievement is: plenty of wildlife trail appearing along the stream bank, fish in the stream, and loss of Formosa Rock Monkey and serow appearing in the Bee-Lu hot spring site where just located in the rim of this nature reserve.

II. Public notice and natural education:

A. We have posted more than 20 sets of large sign which tell people what's the purpose the government establish the reserve; what's the solid territory; What are the laws we according to and should obey.

B. We also posted hundreds of warning sign in the place where the illegal activities are offently happened, to tell people no hunting, fishing, poaching, vegetation collecting in this area.

C. We also deleted forestry official attain in every kind of party hold by local people in order to keep tight relationships with local people and urge them help government make the reserve well.

D. Offently, we send the newly conservation informations to broadcast

sets and news agencies to tell people what the treasure the Nature Reserve is , and what supports we need.

III. Management

- A. Forbid any kind of developement in the area of Ta-Wu Nature Reserve, according to the Cultural Assots Preservation Act.
- B. Except for scientific research and eduecation study , forbid tour this area to decrease the hummur impact of wildlife habitat.
- C. Made the fish and wildlife protecting as the rutine of forest protection patroal , according to the Forest Protct Work Rule made by 1990. Let the Nature Reserve get more confirmation.
- D. The fish habitat inventory of Ta-Ma-Li St. Da-Za St , Ze-Ban st. let us know the fish distribution in these area. Combining with others aspects inventories completed acadamic scholores we know where are the ecologic core areas of which should take more care.

Conclution:

At the begin of the reserve was established in 1988. lots of illegal activities , such as hunters shacks traps electric fishings in TaiMa-Li St. Now we can seldom find shacks and fishings. but plenty of wildlife trails and fishes along the stream. This change means , the project we do are good for loosing the stress of wildlife and let the wildlife population come up again. What we need to do in the future are: Devide the large scale Nature Reserve into classfied parts with which some of them are managable. In order to make some place open for education trip and wildlife management. This will promote this project meet with local peoples' benefit and make then as the voluntary guards of the Nature Reserve let this sanatury become the real paradize of wildlife.

The Management and Preservation of Pin-Lin Tawiwan Keteleeria Natrue Reserve

Jong-Her Hwang

1. Purpose

Taiwan Keteleeria is the native species of Taiwan. It shows an unsuccessful distribution both at the northern and southern part of Taiwan. Since Taiwan was connected with mainland long time ago, when the Taiwan Strait had sunk, Taiwan keteleeria becomes an independent species. Some of the scholars though the special phenomenon may be a result of geographic isolation. Moreover, Taiwan Keteleeria is worth researching in ecological geography and systematics as the fossil has been found in Northamerica, Europ and Japan.

There are only few populations of Taiwan Keteleeria at Pin-Lin because (1) the most seeds in cone can't sprout, (2) the site is occupied by shrub and weed so it is hard for the descendence of Keteleeria to compete against, (3) the development of agriculture cause the area of forest decrease. The purpose for establishing this reserve is to protect Taiwan Keteleeria from being disturbed by people, so it will survive and be used as the subject for education and scientific research.

2. Excution

(1) Repairing the trail

The trail is injured by the steep slope and frequent rain, laborers have been engaged to repair it. So that it is convenient for visitor and researchers.

(2) Patrol

Patrol is the basic work for management and preservation of the reserve. The reserve is disturbed by people easily because the most part of reserve has been rented and is near the tea plantation. A staff has been assigned to see over periodically.

(3) Renew of the indicative board

The indicative board have been damaged. It is necessary to renew these boards. Announcement, warning and explanation can be clearly provided.

(4) Publishing the brochure

Publishing the brochure of Taiwan Keteleeria to introduce its distribution and characters. These can provide a service for the explanation of nature resource.

3. Result and suggestion

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- (1)The reserve is difficult to maintain the original state since the rent area for cultivation can't be prohibited. Now, the work of with-drawing the land by compensating for the loss have been doing. And it is helpful for the conservation of Taiwan Keteleeria.
- (2)Taiwan Keteleeria is on the verge of extinctions because there is only a small quantity left and its decendance is difficult to survive. So it is necessary to evaluate wheather come restorative work on the buffer strip in order to continue the population of Tawian Keteleeria, or let it be in natural tendency.
- (3)As this reserve is near the tea plantations, the acticity of people near there is frequently. So the patrol must be strengthened to avoid the agitation.

The Management and Preservation of Tan-Sui Mangrove Nature Reserve

Jong-Her Hwang

1. Purpose

The distribution of Tan-Sui Mangrove is along the riverside of Tan-sui River from Tan-Sui to Chu-Wei, and the mainly plant communication is the pure forest of the *Kandelia* (*Kandelia candel* Durce) of *Kandelia* of Rhizophoraceae

The greatest value of this reserve is the function of knowledge. As the *Kandelia* is one of vivipary plant which is rare, the mangrove and the creature which live in constituting a special ecosystem, and is the best outdoor laboratory of Ecology, too.

In order to let people know the profound of nature, cultivate kind protection of nature creatures and country, and reach the superlative target to try to educate by amusement, the purpose of this reserve is to protect the mangrove as the subject of education and science research.

2. Execution

(1) Cleaning

As the Tan-Sui Mangrove is situated in the riverbed, in front of it, the garbage which rejected by people nearby and living upstream, thus dirty and foul surroundings seriously bothers visitors and research workers. Owing to the limitation of budget, we can only arrange environment partly by engaging laborers to provide a higher quality of surroundings.

(2) Patrol

In order to maintain the original situation of mangrove, we have assigned staff to see over and protect this area periodically.

(3) Interpretation

The activity of Mangrove of knowledge was hold on 30th March 1991, and the interpretation has done by our staff to teach the participators about the concept of taking kind care of nature resources.

(4) Publishing the brochure

The content of this brochure conclude the location of Tan-Sui Mangrove, the vivipary of *Kandelia* and the other creature living in this area.

(5) Fence and Embankment

2419 meters fence and 557 meters embankment have been constructed to avoid agi-

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tation from neighbours and as an outlooking platform.

3.Result and suggestion

- (1)The urgent problem for this area is the waste barred in lower part of mangrove from upstream of Tan-Sui River when typhoon or storm rain is over. Though engaged laborers are arranged to clean the reserve periodically, but it still can't be clear. Only when the treatment of Tan-Sui River is done, and a fence is set outside the reserve to intercept the waste and pick up the garbage squeezed in, then the reserve will be maintained clean completely.
- (2)As Tan-Sui Mangrove Reserve is near the Taipei city, many people is attracted to there by its reputation. Explanation service is always requested by schools and groups. So it is necessary to establish a complete system of explanation to serve visitors for a satisfactory data natural environment and ecosystem, then an outdoor ecological classroom will be provided.
- (3)The most important and basic work for reserve management and preservation is patrol periodically to finding out and prohibiting the behaviours that damaging the ecological environment of mangrove. As it is easy for people to enter the reserve. The patrol must be strengthened to avoid the agitation from neighbours and visitors.

The Management Planning of San-Yi Huoyeanshan Natural
Reserve Region in Miaoli County

By A. S. LIN⁹

I. INTRODUCTION

While recent technology has made great contribution to the economy and communication in Taiwan, modern civilization has, unfortunately caused significant damage to the natural resources on the island. It is a heartbreaking sight to see plants disappearing and rivers being polluted; the natural beauty has being ruthlessly destroyed. To save an agreeable environment for our future generation we must therefore devote ourselves to environmental conservation, a duty modern people are not exempt from.

II. PURPOSE

Being composed of many gravel brooks, cliffs, little peaks, and numerous deep valleys, San-Yi Houyenshan offers us a unique landscape where grows the most endemic *Pinus massoniana* (Chinese red pine) in Taiwan. Along with the erosion in the area, these *Pinus massoniana* (Chinese red pine), while inevitably diminishing at their original location, have succeeded with natural regeneration by themselves on the cliffs. According to the Law of Cultural Properties the Agriculture Commission of the Executive Yuan declared in June 27, 1986, that Huoyenshan should be protected for ecological purposes.

III. EXECUTION

A. OBJECTIVES

At the base of the Project of enforcing preserve for Natural Ecology Taiwan Provincial Government has assigned five years (July 1, 1988, to June 30, 1993) for the execution of the Huoyenxhan Conservation Project. Which objectives as following:

- 1) To measure natural reserve region and set up its border stakes.
- 2) To formulate conservation management of this region.
- 3) To collect and establish base data.
- 4) To set up and maintenance of managing trails in the region.
- 5) In order to prevent illegal gravel, wood, bamboo and hunting, the regular patrol is necessary.
- 6) To investigate and make files with animals and plants in the region.

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- 7) To set up large interpretive plates, bulletin boards, and warning signs .
- 8) To compile and publish pamphlets of related materials.
- 9) To establish security system.
- 10) And sanitize in the natural reserve region etc .

B. Achievements

(July 1, 1988 to April 30, 1992)

Up to April 30, 1992, the project has been succeeded in:

- 1) Measured the 219.04 ha of the natural reserve region and burying 14 cementation stakes at the southwest scenery area of collapsed terrain, around river banks and at field borders.
- 2) In the scenery area (76.83 ha) every tree that is a diameter over 8 cm, has been investigated and analyzed 35,869 trees in the area, including Pine, Liquidambar formosana, Cinnamomum camphora, Acacia cofusa, Sapium sebiferum, Dodonaea viscosa, Rhus semialata, etc. Its total volume is 4,354.87 m³.
- 3) Built safety fences of 600 meters long around dangerous , steep sections on collapsed terrain.
- 4) Set up 4 large interpretive plates, 5 bulletin boards, 15 warning signs, 35 tree labels, in order to remind the public to take care for the precious ecological records in the Natural reserve region and to prevent tourists from entering narrow valleys and therefore running into dangers.
- 5) Investigated and took pictures of animals (birds, insects etc) and plants in the entire natural reserve region for interpretation.
- 6) Not only set up and maintained managing trails , but also dispatched patrol on the region to prevent forest fire, illegal logging etc. from occurring.
- 7) Handled tenantry's applications for compensation of land acquisition in scenery area which is about 80 ha.

C. Carry into effect in future

(July 1, 1992 to June 30, 1993)

From July 1, 1992 to June 30, 1993 , the project aims to:

- 1) Continuous set up more interpretive plates, bulletin boards , and warning signs, and maintain them all.
- 2) Dispatch patrols on the region to prevent forest fire, illegal logging etc. from occurring.
- 3) Reinforce management trail and sanitation in the entire region.
- 4) Continue to accept tenantry compensation applications.
- 5) Take photograph and record the ecological changes of the animals and plants in the region.
- 6) Produce slides and compile ecological publications to educate our public for environmental preservation.

D. The items of continuous work

With the aim to establish a complete record of the Natural Reserve region, it is necessary not only 1) to enforce the protection way at the base of the Law of Cultural Properties and 2) every two years invite experts who investigate and analyze the geographical and ecological development in the area, but also 3) to conduct a thorough ecological research which of great scientific value in every 5 to 10 years or any time when serious damage is occurred.

IV. RESULT

On the basis of The Law Of Cultural Properties and The Act of Natural Ecology Preservation in Taiwan, Huoyenshan natural reserve region has been able to preserve its unique ecological society. Whatever has been achieved is also due to other environmental policies made by the government and to the campaigns led by those devoted civil environmentalists as well.

V. SUGGESTIONS

- 1) The government of Miaoli County has cleared away the sand and stones piling over Chung-Miao Route No. 6 and the river banks. Unfortunately, residents in the neighborhood have been dumping garbage there. We'd like to arise those departments concerned its importance and take action immediately.
- 2) As the most representative location of the *Pinus massoniana* (Chinese red pine) in Taiwan, Huoyenshan Natural Reserve region proves to be ecologically significant and worth preserving. However, businessmen have been digging stones along the narrow riverbed between the natural reserve region and Hsin-Chung-Miao Route No. 6. It is definitely a shame to make Huoyenshan as a neighbor of a quarry. We therefore insist that stone digging near Huoyenshan Conservation Area should be forbidden by all means.

The Management of Nanao Poud and Hardwood Nature Reserve

Jong-Her Hwang

1. Purpose

Nanao nature reserve is a small watershed located in northern Taiwan. The whole watershed is with elevations ranging from 1000-1500 meters. Lying in the valley is a small poud called Shenmihu (Mystery Lake). Now the submerged aquatic plant community know as *Potamogeton maackianus* - *Ceratophyllum demersum* type has flourished throughout the whole water, which represent the late stage of hydrosere. In a few site the elevated beds and marsh has been invaded by pioneer trees. The upland forest is represented by *Cyclobalanopsis longinus* ---- *Castanopsis carlesii* type corresponding to evergreen broad-leaved forest (warm temperate rain forest) of lower Quercus Zone in the mountain forest belts of Taiwan. This reserve highlights the sere of hydrarch succession. The principle focus of conservation is on the aquatic plants and seral trees which are of rare occurrence in Taiwan. Rare species evaluated include *Sparganium fallax*, *Potamogeton maackianus*, *Utricularia minor*, *Ludwigia ovalis*, *Galium trifidum* and *Salix kusanoi*. The purpose of management is to maintain the original state, avoid the agitation form people and provide as a subject of research and education.

2. Excution

(1)Patrol

In order to protect this reserve, we have assigned a staff to patrol at least once a week.

(2)Interpretation

For the sake of getting the support and cooperation of the aboriginal, a speach of ecology conservation had been held on 25th May 1991 in Nanao middle school.

(3)Research

Study on the fauna of this area had been done by Taiwan University. The conclusion shows that the diverity of species of aminal is plentiful, and this area is still in the primitive form.

(4)Repairing the road and trail

Repairing the road (13km) which connect the outside and the trail (9km) inside are damaged by the heavy rain. So that it is covenient for patrol and study.

Luo-Dong Forest Distinction

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(5) Publishing the brochure

Publishing the brochure to introduce the Nanao nature reserve.

3. Result and suggestion

- (1) The speech we held in Nanao middle school was very successful. We should have such kind of speech more often.
- (2) The series of hydrarch and forest succession are distinguished in the study of Ecology. At present, the study of Vegetation Ecology and Fauna had done, the other research such as Meteorology, Geology and continuous observation for the development of this area is necessary.
- (3) The original state of the reserve is the best subject for the research and education. It is important to teach people to know and to protect the nature resource.

THE MANAGEMENT PROSPECTUS ABOUT *PLEIONE FORMOSANA HAY*
IN
MT. ALL (ALI-SHAN) NATURAL PRESERVATORY REGION

CHIOU, Chwei-horng. LIN, Tsong-te
WRITTEN REPORT OF EXECUTION, 1992

1. PREFACE:

Taiwan Pleione formosana Hay belongs in the Orchidaceae classification, a deciduous perennial plant. It is popular for its graceful bearing among the horticultural enthusiasts. The source of it comes from the corms in the mountain mainly, so that the wild plant community are getting less and less. The 30th Forest Land of Mt. Ali, elected by the 35th Joint Commission Meeting of The Natural Culture Scenery Force of The Council for Agricultural Planning & Development of Executive Yuan, has a better plant community. Its areas of the typical are 51.89 ha. to be delimited a boundary for the *Pleione formosana Hay*. We made positive work for protection & growth of sufficiency in this region from July 1, 1990 on. Except the tight protection and patrol around the region, we have established an integrated elementary informations of their habits and modes. In 1992, a new overseeing project has been set on foot. That purpose is to oversee & investigate their variation in snapes, natural environment, reproductive condition, structure, and replacement on rocks... etc. in the protracted nature. All of which will result in excellent references of management, study, and self-criticism in the future

2. PURPOSE:

The objective of Natural Preservatory (Protective) Region is to preserve the typical intact sample of the natural ecologic system on earth to facilitate the contrast and comparison with the imbalance of ecologic system to be incurred by the change of nature of human being. The living things and the environmental resources within the Preservatory (protective) Region may maintain numerous and jumbled genomes providing the place for scientific research and educational explanation in order to understand the function of the ecologic system and reveal the principle of harmonious coexistence which should be adopted on the utilizing of the ecologic resources. For the purpose of preserving the primitive *Pleione Formosana Hay* and its ecologic environment in the region, except disregarding main produce and secondary produce in the preserving of natural vegetation, this department has enhanced to dispatch personnel to cruise the region for observation and protection in order that this precious plant may continue to multiply.

Service Department: Chiayi Forest District Office, Taiwan Forestry Administration

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Therefore, the PURPOSE are:

- (1) protecting the *Pleione formosana* Hay in this region as well as the seed.
- (2) Tighten up the study of ecologic habits & modes and investigation for the elementary data.
- (3) Publicize and instruct the people to have a correct sense of ownership mentality to the natural resources.

3. THE STATUS QUO OF ENVIRONMENT:

- (1) The location limits:

The region, the 30th Forest Land of Mt. Ali (Ali-Shan) Enterprise Region in the Northwest of Tashan, belongs to the Chung-Jeng Village Administrative District, Ali-Shan Hsiang, Chia-I Hsien. The Mien-Yuch Railway (the branch of Ali-Shan Forest Railway) passes through the centre. The steep wall of rocks among the no. 5-10 of tunnels has a great areas of the *Pleione formosana* Hay community. The sea level of this 30th Forest Land is from 2075-2650 metres. Its whole areas are 51.89 ha. (Shown in the diagram of 7).

- (2) The social liaison and geological soil structure:

It takes only 10-15 minutes on the Alishan Forest Train from Alishan station to the Tashan. Walk about 500 feet along the path, you will be in the great widely distributed of *Pleione formosana* Hay in this region there. Yet it must take about 1.5-2 hours when you start on foot from Alishan to this 30th Forest Land.

The geologic structure of this region belongs to the Tertiary rock stratum forming in Miocene Period, the property of the rock stratum is constructed chiefly by sandstone, small to medium sized particle light gray sandstone sandwiching with deep gray shale and small amount of gravel belt. *Pleione Formosana* Hay always grows on the wall of vertical sandstone. On the aspect of soil, it is mainly Podzol, and incompletely developed general lithosol exists on the top of ridges or steep slopes.

- (3) The meteorological phenomenon:

The rainy season of this region is from April to September. And the dry weather is from October to the next March; it rains about 188 days in a year, the annual rainfall is 4200 mm or so; the annual temperature is 11.5-15.9°C. the highest of per month at an average is never over 25°C, and its lowest (the coldest January) is 12°C; From April to September, it blows, the monsoon from the Southwest, and it blows from the Northeast from October till the next March.

(4) The growth environment and the status quo:

The *Taiwan Pleione formosana* Hay, a wild orchid, is illustrious throughout the world. Its body consists of a corm and simple leaf. The corm has 4 joints in general. The bud of asexual reproduction is from the joint on. Under normal conditions, the bud of 1st and 2nd will come into bloom in the growing season (March to April). After the blossomed, the leaves atc out. A spore of pyramid will be formed at the taproot, and the 2 tiny buds at the top (one of the two in general/both of them by chance) will grow to be the scgling in *Osmanthus lanceolatus*. The flower of *Pleione formosana* Hay is budded from the taproot of corm and getting the growth of the inflorescence, its colour (may be 1-2 flowers) is pink or white. After the flower(s) have withered away, the ovary is getting expanded to develop a fruit, and the rachises are lengthening, also. The leaves are completely off it and the fruit is to spilt asunder. Its fruit stem is effective for the scatter seed. Such of the seeds will bud at the proper point and be growing fine, Some time later, it is growing up to be a corm and a member of the *Pleione formosana* Hay's community.

For quite familiar with local conditions of *Pleione formosana* Hay, we have engaged specialists to make an inquiry about it and borne results that there are 30 sites of the growing to the natural community of all concerned.

Pleione Formosana Hay belongs to the rock evolving series of the primary evolution, on account of water is not easy to be preserved in the surface of bare rock, it was grown in general by drought-enduring lichenous plants at the earliest period, with the adhesion of soil and the moistening of dew, the *Pleione Formosana* Hay and mossy plants appeared gradually. The growth of the family of *Pleione Formosana* Hay is nearly in geometric progression, especially the enormously multiplying of the sidebuds assures the survival of its family.

The growing sites of *Taiwan Pleione formosana* Hay belong to the juniper and oak trees type in the full clouds and mists. The essential parts of arbores are *Ch. obtusa* var. *formosana* Rehd, *Chamaecyparis formosensis* Matsum, *Tsuga chinensis* Pritz, Cy. *morii*(Hay) Schottky, and *Trochodendron aralioides* S. & Z ; *Yushania niitakayamensis* Keny, *Ericaceae*, and *V. randaiense* Hay ... etc. are down the thick growth of weeds.

Except the *Taiwan Pleione formosana* Hay in this region, there are *L. serratum* var. *myriophyllifolium* Hay, *Taiwan Sassafras randaiense* Rehd, *Pinus armandii* Franchet, *Rhododendron kawakamii* Hay, *P. morrisonicola* Hay, *Mahonia oiwakensis* Hay, and *As. wilfordii* Mett. ex Kuhn ... etc, all of which must be protected lightly.

4. ITEMS AND PROGRESS CHART:

Subject	%	Planned rate of progress	1991		1992	
			Mon. 7 - 9	Mon. 10-12	Mon. 1 - 2	Mon. 4 - 6
Set the boundary line	5	Contents	Data investigation	Data investigation	construction	construction
		Total %	20	50	70	100
Sweep away rubbish	10	Contents	construction	construction	construction	construction
		Total %	25	50	75	100
Patrol & protect	20	Contents	Patrol	Patrol	Patrol	Patrol
		Total %	25	50	75	100
Print the caption	20	Contents	Data collection	Data collection	Data edition	printing
		Total %	20	40	80	100
Investigation & record of the growth	20	Contents	Data collection	Project	Inspect & List	Inspect & List
		Total %	20	50	75	100
Illustrative	20	Contents			Arrangement	Illustyrative activity
		Total %			30	100
Total Rate of Progress		Percent proporting	18	38	67	100

The above are executed in accordance with the rate of progress.

5. EXECUTION AND PRODUCT:

The project in full is from September 1, 1990 to June 30, 1995.

The annual report of this year(July 1, 1991- June 30, 1992) is as follows:

(1) Boundary buried:

Bury separately one stone-material made(Stone like Guan Inn) at the side of the upper(about 200 m) of protective region where is been throughout by the Mien-Yueh Branch of Alishan Forest Railway.(Located the entrance's upper of 5th & 11th tunnel). The size of end is 12 cm in square. Its height above the ground is 40 cm, and 20 cm buried under the ground. The 3 sides are cut an inscription of "*Taiwan pleione formosana Hay*" Protective Region", the 4th side inscribed words of " Taiwan Provincial Forestry Administration marked " printed with red colour.

(2) Sweep away rubbish:

This Natural Preservatory Region, throughout by the forest railway Mien-Yueh Line, is the only road from Hsitou to Alishan. Therefore, man often throws something to the ground at will. We employee some temporary workers to pick them up and sweep away the rubbish for the clear environment in this region.

(3) Maintance of the Marks:

For keeping the various kinds of indications and warning remarks in good condition and making them yield well, we have had the workers print them bright in this year, and the maintance is lightened.

(4) Patrol on field:

The staffs dispatched by the Alishan official section go on patrol 10 men-times monthly. We have sent the staff or chief of that section to inspect and supervise at any date. It is gratified with the results that there is not any case of state property stolen in this year.

(5) Making the informations illustrative:

- a.) Revise the leaflet illustrative of "*Alishan Taiwan Pleione formosana Hay*" and reprint 6000 pieces of it for the references of tourists.
- b.) Produced many mountaineering small packsacks for pushing the work of natural habits & modes of life forwards. We have given free by the publisher to the fellows those who took part in the pursuit held by us on April 16, 1992.
- c.) Be on location of the terrain & its features, forest landscape, and plants habits & modes of life...etc. Such of thses kits of filmstrips will be offer the regular data for references and give publicity to the people in the future.

(6) A project of investigation on *Taiwan Pleione formosana Hay*.

For known well to the habits and modes of life of plants community and setting a completed reference room, we have projected a good system of inspecting and supervising in this year. This system

will take effect to the variety in shapes, living environment, reproducing style, family construction, replace of rocks and so on of the *Pleione formosana* Hay. This work has been carried out to establish a perpetual example district on the first ten days of April, 1992. Except the perpetual observation, it is necessary to have a reference room. (April - June, 2 times of observing and record per month; only 1 time the other months)

(7) Hold the activities of illustration:

" A trip of *Taiwan Pleione formosana* Hay " for the natural science teachers of primary schools was held on April 16, 1992 by us. After taking the special train to the Natural Preservatory Region, they walked along the railway on field visit and listened to our actual illustration. The whole members of this trip are 40 fellows, we have had a communication to the Chia-I Hsien/City Government for the citation. We place high hopes on the teachers to educate the future generations to have and know the importance of the natural habits and modes of life.

(8) We assisted the "KAI-SHIUANG Primary School, Lingyah District, Kaohsiung City" to hold a Alishan spring trip of " Study Camp of Organisms of Habits and Modes of Life " on April 26-27, 1992. We had also sent a staff to help the young persons advance in knowledge of the natural plants including the *Taiwan Pleione formosana* Hay. Those students are total 80 fellows. As a result of this trip, it proved successful.

(9) A project of business management and execution:

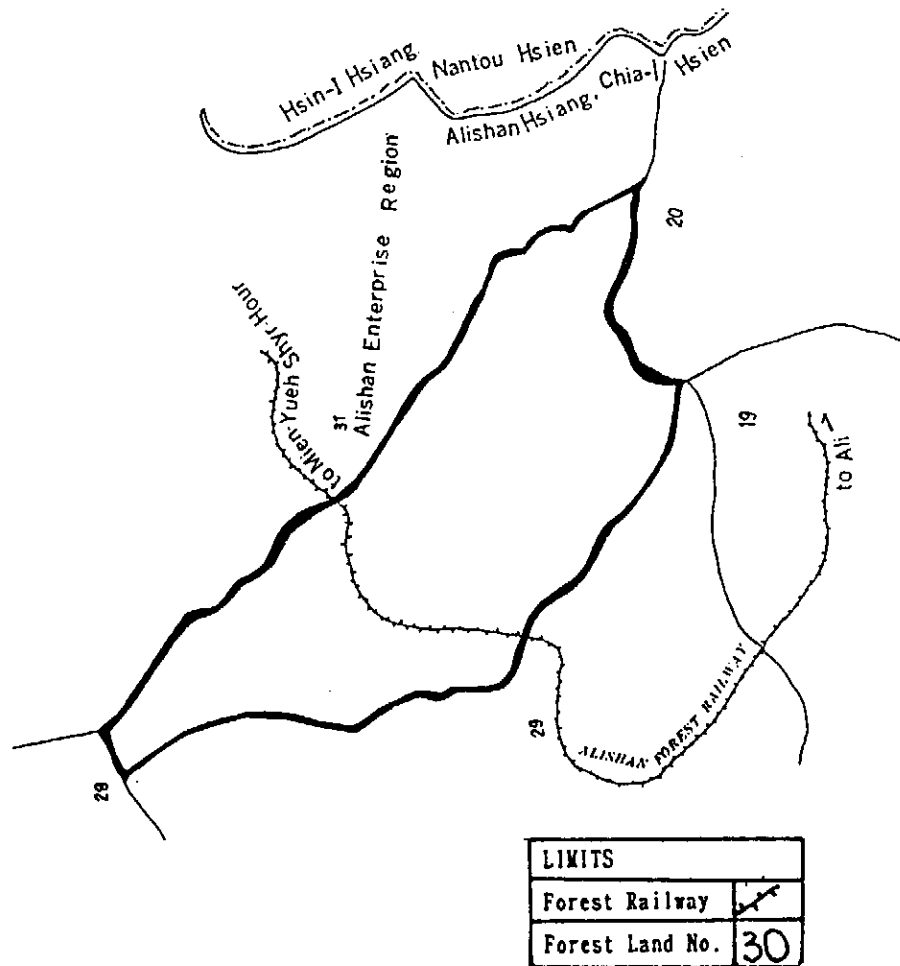
For the continuous efficiency of management in this region, we have projected the "Management Planning of the *Taiwan Pleione formosana* Hay in the Natural Preservatory Region" to keep the growing land away from the destruction. And this planning has being put into execution.

6. SELF-CRITICISM AND SUGGESTION:

- (1) The management of Natural Preservatory Region needs to play a supporting role of natural Organisms Habits and Modes of Life (*Taiwan Pleione formosana* Hay) are 2 times only (July 1, 1990 - June 30, 1995). And we have held the 2 times in this year (till June 30, 1992). We suggest hereby that the activities had better increase 1-2 times each year even to the natural science-teachers of the Junior Middle School.
- (2) As regards the Natural Preservatory Region, management rules, and perpetual inspecting system, they are established in favourable circumstances. Yet we need more the people with professional skill for promoting the quality of working.

7. LOCATION MAP

Location Map of Alishan Taiwan Pleione formosana Hay Preservatory Region



The Management Planning of CHATIANSHAN Natural

Reserve Region

BY A. S. LIN¹⁵

I. INTRODUCTION

Located between Wulai, Taipei County, and Fushin, Taoyuan County, Chatianshan natural reserve region stems from the north branch of Shiueshan (the Snow Mountain), south (or westsouth, to be precise) to the Taipei Basin. Ranging from Meikueishimuoshan through Tamanshan, Lalashan, Lupingshan, and Beichatianshan to Lupeishan, the region covers 13th-15th, 24th-26th & 33th compartments of Tashi Working circle and 18th, 41th-45th, 49th-53th and part of 35th etc compartment of Wuly Working circle, with total area is 7,759.17 ha.

II. PURPOSE

The Department insists that Chatianshan should be managed as a Natural Reserve region on the ground of the fact that that the region still preserves a precious mixture of deciduous and coniferous broad-leaved trees and that the ecological state in the area has remained rather primitive while in Taiwan many ecological spots of the kind have disappeared where rare animals and plants

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have been threatened with extinction. The Chatianshan natural region therefore offers these animals and plants not only needed protection but also opportunity for reproduction. Here, in Lalashan grows a mass of primitive Chinese cypresses and along the land 50 meters down the ridges of both North and South Chataishan lies a 9 km belt of *Fagus hayata* (Taiwan beech). This proposed natural reserve region is also the very place where the Taiwanese Black Bears and the big Purple Butterflies, both species almost extinct now, may reproduce. To protect the primitive forests in the area, in 1980 the Department made a through investigation and then proposed a conservation management project. With the consent from the Executive Yuan, on March 12 , 1992 the Ecology Ministry decreed that the area should remain a conserved area so so that the natural resources may be protected by the law.

III. EXECUTION

The Conservation Management Project proposed the following objectives:

- 1) To maintain the pathways already available from Shiauwulai (Fushin, Taoyuan County) to North and South Chatianshan and those from Hualin Village (Fushin, Taoyuan County) to Wulai (Taipei County).
- 2) To build new pathways necessary for patrolling and guarding against illegal logging, plantation and hunting.

- 3) To measure the border between the Conservation Area and the aborigines Reservation Area so that meteorological observatories and hydrological stations may be established to record and analyze the local ecology, to investigate the vicissitude of the animals and plants, and finally to make the reproduction project.
- 4) To set up large interpretive plates and warning signs at the important spot in the region.
- 5) To ban illegal hunting, logging, bracken & herb-picking, and fishing with electricity, poison, or dynamite.
- 6) To work on the publication of environmental handbills and posters.
- 7) To visit all schools, churches, and the aboriginal tribes every year and educate the public not to hunt, slaughter, or eat the wildlife but to "Preserve the Forestry Resources and save the Wildlife .
- 8) To produce slides for educational uses about the conservation and reproduction of the wildlife.
- 9) To collect related information and secure sanitation in the area.

In accordance with Enforcement of Ecological Conservation Plans, the management project will last for five years, i.e. from September 1, 1990 to June 30, 1995. The projects sets out to 1) measure the conserved area and establish stakes along the borderline between the area and the Aborigines reservation area, 2) formulate the conservation management strategies, 3) collect related data,

- 4) build and maintain pathways, 5) guard against illegal hunting, logging, bracken & herb-picking, and fishing with electricity, poison, or dynamite, 6) investigate the ecological state of the wild life in the area assemble the files, 7) set up large interpreting plates, bulletin boards, and warning signs, 8) compile and publish introductory pamphlets, 9) establish the security system, and 10) promote sanitation in the area.

Up to April 30, 1992, the project has managed to 1) rebuild a 17 km pathway from Daguanshan to Fushan and also the one from Manyueyuan to North Chatianshan, 2) clean up the environment along the two pathways, and 3) set up 2 large interpretive plates telling the coverage of the area and the objects to be protected 1 species plate informing the public of the fish in the forest streams, 15 warning signs and signs for other purposes, and 34 mileposts. All these have been made to educate the public to cherish the wildlife in the region and to prepare for the filming and slide-producing of the ecology in the region as well.

Objectives of the year

- 1) To start out planning for an adequate pathway system a security system as well.
- 2) To maintain and clean up the 17 km pathway from Daguanshan to Fushan and the 15.6 km pathway from Manyueyuanshan to North Chatianshan.
- 3) To investigate the natural resources and formulate a reproduction plan for the wildlife in the area.
- 4) To set up more interpreting plates, warning signs, and signposts.

- 5) To collect meteorological data.
- 6) To ban illegal hunting and destroy all traps.

Strategies (July 1, 1992 to June 30, 1993)

- 1) To maintain the 17 km pathway from Daguanshan to Fushan and the 15.6 km pathway from Manyueyuanshan to North Chatianshan, and to build a pathway of 5,000 m.
- 2) To dispatch a year-round schedule of 240 patrols and 12 meteorological records.
- 3) To assign 24 sanitary missions.
- 4) To set up 1 large interpretive plate, 1 bulletin board, and 40 signposts.
- 5) To compile and print 200 copies of the execution reports and 10,000 pamphlets.
- 6) To work on ecological investigation during the period.

Futher Objectives

- 1) To report on the natural resources of the wildlife in the region and on the distribution of these animals and plants.
- 2) To work on the ecological investigation of the conserved animals and plants and their living environment.
- 3) To establish hydrological stations and meteorological observatories to collect more related data.
- 4) To report on the reproduction of the conserved animals.

- 5) To ban any illegal logging in Daguanshan (originally called Lalashan, where there is a mass of Chinese cypresses) or in the area 100 m down the both sides of North and South Chatianshan (where there is a 9 km belt of Fagus hayata (Taiwan beech).
- 6) To forbid hunting the Taiwanese Black Bear and the Big Purple Butterfly, both of which are almost extinct and should be protected.
- 7) To dispatch more patrols and destroy all dangerous traps.

IV. RESULT

In accordance with the law of culture properities and The Act of natural Ecology preserve Strategies in Taiwan , Wildlife Laws Conservation and the laws of Ecological Conservation Areas and Natural Reserve region, those who violate the laws will be sentenced to severe penalty. Consequently, the wildlife in the area will be able to reproduce according to its natural order.

Management Research of Kenting High Coral Reef Nature Reserve

Hsin-Tao Lee, Hsian-Hwa Wang, Ming-shion Jane *

Introduction

Positioned in the central of Hengchuan Peninsula and the northern limit of tropical rainforest, Kenting high coral nature reserve is located in the forest stand of Guay-tsu-chiao (N 120° 49' 00", E 21° 58' 00"), Taiwan Forest Research Institute, Hengchuan Branch. With area up to 137.6 ha, latitude ranging from 150m to 320m and thin soil layer of lithozal from Hengchuan lime stone series skeletoned with coral residue, the Reserve is endowed with unique ecological conditions and abundant animal and plant resource most worthy of research and preservation

Summary

Kenting High Coral Reef Nature Reserve is the only better preserved high coral reef plant community in Taiwan. According to the 43 rectangular plot (10*25m) investigated and analyzed with TWINSpan (Two Indicator Species Analysis) the reserve can be classified into 5 types, *Acacia confusa* type, *Largastroemia subcostata*-*Fraxinus formosana* type, *Aglaia formosana*-*Diospyros maritima* type, *Aglaia formosana*-*Pouteria obovata* type, and *Diospyros maritima*-*Drypetes littoralis*-*Diospyros discolor* type, distributed to different environments respectively. the research recorded endemic vascular plants of 308 species, 244 genera, 86 family (table 1).

Table 1. Number of endemic species in Kenting High

Coral Reef Nature Reserve (after Chiou 1992)

Taxa	Fern	Dicotyledones	Monocotyledones	Total
Family	11	64	12	86
Genera	19	193	32	244
Species	33	240	35	308

By the species vulnerability criteria of IUCN, rare species in the Reserve can be further categorized to 1. endangered species, *Maba boxifolia*; 2. vulnerable species, *Aristolochia zollingeriana*, *Diospyrus discolor*; and 3. *Diplazium chinese*, *Balanocophora fungosa*, *Gonocaryum calleryanum* and *Gleditsia rolfei*. the management plan regards rehabilitation of rare species as the first priority, scoping from seed collection, seedling nursing and restorational reforestry to prevent extinction. Table 2 contains species rehabilitated in this period.

Table 2. Rare species rehabilitation working schedule

Species name	Blooming period	Fruiting period	Dissemination period	Stems
<i>Maba boxifolia</i>	4-6	7-8	now	4500
<i>Diospyrus discolor</i>	4-5	6-8	now	4000
<i>Gonocaryum calleryanum</i>	3-5	2-4	now	1000
<i>Aristolochia</i>	11-2	8-10		

Not only enlisted as rare species, *Aristolochia zollingeriana* is also bait plant for the endangered national treasure butterfly *Troides aeacus kaguya*. Meanwhile, mass plantation and rehabilitation is strategical urgent to ensure the existense of *Troides aeacus kaguya*.

Henchuan Botanical Garden is visited by millions annually, and the reserve is boomed to be disturbed and influenced. Certain procedures are taken such as fixed fencing to stop visitors and local livestock and regular patrol on each Tuesday, Thursday and Saturday to protect natural resources and assist regular investigation. This year, the Reserve is proclaimed as nature reserve according to , The Act of Culture and Heritage Preservation, completed with boundary survey to overlap on the Taiwan Areal Picture Basic Map for efficient management of the Reserve.

Natural regeneration patterns , guard of reforestation in Nature Reserve, have been studied in *Deospyros maritima*-*Drypetes littoralis*-*Diospyros discolor* tupe forest as following method:

1. Seeds bank investigation : Record the seedling of species each two week of twenty soil samples.
2. Forever-stands investation : Record the DBH and HT of each canopy and medium tree (alive or disturbed) eluirdate the damages of natural disturbance and the process of natural regeneration.

The studies were still in process , and result will contribute next year

Natural Conservation Library

Valiant Tsing Liu¹

Ying Wang²

Natural Conservation Library

During past years, library collection of periodicals and books about natural conservation was very limited. Thus, the Council of Agriculture launch a five-year plan to establish a library collection on natural conservation publications. The aim of this plan is to provide information and reference on natural conservation for both governmental and academic use.

The five-year plan started on 1st Dec. 1986 and will end on 30th Jun. 1991. During the first four-year period periodicals were the collection item, purchased through the subscribed agent (EBSCO) to facilitate the working process; books were the fifth year's purchased ones.

The number of periodicals subscribed varied between 90 and 109. The field of subject included journals from ecology, environment, conservation, zoology, botany, animal behavior, and evolution. Among them, journals of Zoology were the most common one, which varied around 40% of the total journals subscribed during different years. Those in relation to ecology, environment, and conservation were next, which varied between 36-38%.

The numbers of issues published from journals varied from biweekly to annual publication. Among them, the quarterly publications were the most common one(47%) next to it were monthly(15%), bimonthly(12%) and irregular publication(12%). For books, there were 31 copies purchased, of which seven copies were conservation-related; four and three associated with ecology and animal behavior each; two related to wildlife management, natural history of mammals, and landscape ecology, respectively; one related to environmental protection and biology each.

By now, many periodicals from natural conservation are subscribed by different research and academic institutions as the importance

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of natural conservation are recognized by the public. However, due to limited subscription time, the collection of these periodicals especially the back issues are severely limited. It is suggested that the collection of back issues be very important and needs to be carried out promptly if funding is available.

Introduction of Natural and Cultural Landscape of Taiwan

Yeh, Chen*

The main purpose of this project is to introduce the natural and cultural landscape of Taiwan to the public from a geological, geographical, historical and archaeological approach.

The members of the working group are from different fields with specific skills in interpreting the natural landscape, having both historical and humanity backgrounds.

Five field trips and one symposium have been held and one more will be held in way. They are:-

- (1) **Trip to East Coast of Taiwan** Date: 5th-7th July 1991.

Purpose: To introduce and explain the characteristics of tectonic movements of the Coastal Range to group of 80. The attendees were also taken to several archaeological sites.

- (2) **Trip to Taoyuan Sand Dune** Date: 22nd September 1991

Purpose: To explain how and why the Sand Dune was formed, and to examine the relationship between the coastal environment and human activities.

- (3) **Trip to the upper reaches of the Keelung River**

Date: 17th November 1991

Purpose: To explain what the role of the Keelung River in the development of northern Taiwan is. The water pollution in the Keelung River was also introduced.

- (4) **Trip to northern section of Provincial Road No.3**

Date: 19th January 1992

Purpose: To explain the development of Road No.3 in different stages, on particular attention in the land use change and economic growth since 19th Century in the northern Taiwan.

- (5) **Trip to Chin-Gua-Shi** Date: 15th March 1992

Purpose: Chin-Gua-Shi area is the main area where gold in Taiwan was excavated at one time. The historical rise and fall of this small town in the north-east coast area with geological background was introduced.

- (6) **Trip to Taoyuan Fish Harbour** Date: 17th May 1992

Purpose: To introduce different types of fish harbours in northern Taiwan. The historical and geographical background tells us why these harbours exist and why they do not play a major role in Taiwan now.

A symposium will be held at the end of May, which will be for government members of employees, various public associations, and university academics to discuss the ideal and reality of environmental education. 136 people will attend.

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Prints of the Pamphlet for Nature Preserves of Taiwan

1.
Yuen-po Yang

Since 1986, fifteen Nature Preserves have been established. They are Tanshui River Mangrove, Kuantu, Pinlin Taiwan Keteleeria, Hahpen, Chatianshan, Yuanyang Lake, Nanao Hard-wood Forests, Miaoli Sanyi Houyenshan, Penhu Columnar Basalt, Alishan Taiwan Pleione, Chuyunshan, Taitung Honyeh Village Taiwan cycas, Wushanting Mud Volcano, Tawushan, Tawu Taiwan Amentotaxus Nature Preserves. In order to publicize the nature conseration and the purposes of the establishment of the nature Preserves, a pamphlet is to be editted in the near future. Many slide films have been taken and information of the preserves have been collected.

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Brief report of an Environmental Education Training Programme

Roderic Maude*

A project carried out by the Baha'i Office of the Environment for Taiwan (BOET) between July 1st 1991 and June 30th 1992.

This programme was the third such project to be carried out by BOET under co-sponsorship from the Council of Agriculture and the National Spiritual Assmby of the Baha'is of Taiwan. The Programme is in two separate parts; environmental education teacher training workshops and an environmental education correspondence course.

Environmental Education Methods and Philosophy

The motive behind this project is to protect the environment by effecting a change in children's attitudes and behavior. It is not primarily concerned with helping them pass exams, though this may prove to be a side effect. Nor is this project concerned with training of a small number of environmental education experts. Rather, its aim is to give the basics of effective environmental education to a large number of teachers. In order to achieve this the project promotes a very simple teaching agenda.

- a) Help children to develop a personal relationship with the natural environment.
- b) Help children to develop an environmental ethic; to understand that their actions can effect the environment in either good or bad ways.
- c) Help the children to understand that mankind depends on nature for its survival. This includes an understanding of some of the Earth's basic life support systems.

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These things are an essential foundation for education aimed at protecting the environment. They are also simple enough to be used by any teacher, whether or not they have a deep understanding of science and natural history. Too often, effective methods are overlooked merely because they are simple and easy to do.

The methods promoted by this project are described in the booklet 'Nature Classroom'.

Teacher Training Workshops

A series of fifteen workshops were given to Kindergarten and elementary school teachers. Eight were held in Taipei, seven in Kaohsiung. In total, more than 450 educators participated. Each workshop was held in a different school, 10 in elementary schools, 2 in kindergartens and 3 in premises with both elementary and kindergarten teachers together.

The workshops were each of three hours duration. The first half was a slide presentation and talk introducing the subject. The second half was an outdoor practical session in which the participants took part in environmental education activities. All participants were given a copy of the booklet 'Nature Classroom' for future reference.

The bulk of the teachers present were from the schools in which the events were being held, though observers from other schools often attended.

The workshops were very well received. On several occasions, observers from other schools requested that the workshop also be put on in their school. Several of the later workshops were booked in this way. More requests were received than could be booked into the programme.

Correspondence Course

A correspondence course was written and produced. It is designed to give a more in-depth understanding of environmental questions and environmental education techniques. It is aimed at people with little or no previous knowledge

of the subject. Five hundred educators have been enrolled on the course and are receiving the monthly course modules.

Each module covers a different environmental topic and each requires that the participants return soe homework for assessment. The participants are required to do environmental education activities with children as part of their assignment. A written description of the activity, including some evaluation of the children's experience, is returned fr assessment each month. The assessed work is then returned to the participants with advice on how it could be improved wherever appropriate. A marked improvement in the quality of the work has been observed as the course has progressed.

After the five hundred places on the course were filled, more than three hundred further people requested to be put on the waiting list in case the project is run again.

Reference

Maude R. Maude S. 1989 Nature Classroom. Published by the Homemakers Union and Foundation.

Science Education Activities for Children and Parents

80—農林—公務—生態—4.13

LIN MEI-LING

Based on the annual plan, in 1991 completed 7 "science education activities for children and parents", and compiled the 6th volume of "Record of science education activities for children and parents".

(1). Science education activities for children and parents :

Date	Contents	Location	Total
1990,7,29-31	Knowledge of (i) the Nat'l Ken-ting	Ping-tung	110
1990,8,11-13	Tropical Forest Park seashore terrains	Heng-chun,	110
1990,8,18-20	and geologic characteristic (ii) viewing the night sky, observing the stars.	Ken-ting area	110
1990,11,4	(i) Introduction of mineral & fossil (ii) Observing the lifecycle of honey-bee and silkworm	Miao-li api-cultural and sericultural experiment station, Chu-hung Keng Gas field, Tung-hsiao Pai-sha Tun	100
1990,11,17-18	(i) Observing the ecology of plants and insects (ii) Viewing the night sky, observing the stars	Nan-tou hsieh, NCHU Hui-sun Forest Recreation area	110
1991,4,28	Concept of soil conservation and cover vegetation introduction	Miao-li Ta-hu Ssu-fen Soil Conservation Orchard	110
1991,5,19	Introduction to the theory of aviation and the medical plants	Tao-yuan Tung-men Primary school and Lung-tan Kun-lun-shan arboretum of medicinal herbs	100

(2). "Record of science education activities for children and parents", vol.6.

Taiwan Provincial Taichung Library Science Education Service Center
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Propagtion project of education on natural environmental conserration in Penghu

Lin chang-Hsing*

—Preface

Penghu is an island of square-mountain topography originally, most of it was made of columnar basalts. Natural scenery is different from everywhere in Taiwan. It is very popular with a lot of tourists of Taiwan. During the process of chasing econmic development, natural scenery was destroyed by the people gradually. Natural livings of the ocean lost their balance little by little,too. It is important and necessary to wake up the people in Penghu to pay much attention to the environment of ecology.

二、Purpose of Executing

(1)In order to protect the whole recources of scenery, used the way of education, to hold research and study activities of topography and geology scenery in Penghu. To introduce the importance of environment raising.

(2)In order to protect the whole recourse of ecology scenery, holding "Dolphin in Penghu" and "Birds in Penghu",to introduce the importance of environment raising and to research and study the ecology checking.

(3)Making the pictures and lantern slides of Penghu natural scenery. Holding the circulating shaws in every junior high schools and elementary schools, and activity centers of social areas. To sponsor the special topic speech and to guide and publicize the importance of natural raising.

三、Executing situation and Results

(1)To accomplish thirty promotion theater posters. To show in every research and study activities in every circulating shows, so that every teacher and

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student, and the people have the chance to see and enjoy.

(2) Making "Dolphin in Penghu" and "Birds in Penghu" To sent every teacher and student and the people in every research and study activity and discussion meetings.

(3) To accomplish a discussion meeting of dophin raising. To invite the county magistrate, councilors and the scholar of ocean animals - Dr. Chang Kun-hsiung to enjoy the meeting. In the meeting, about one hundred villagers to put forth their opinions.

(4) To hold a activity of "Birds in Penghu" and "Geology scenery in Penghu" outdoor research and study. To introduce the birds in Penghu and the geology scenery, every attending person, teachers and students get a reference materials.

(5) To hold circulating promotions in three junior high school and two elementary schools and three country activity centers. To send promotion materials and pleated pages. Let the people understand the importance of environment raising.

四 Review and Suggestion

(1) During one year, although many people enjoy the activities of natural conservation and publicity, but the work must continue a long time, it is not succeseful in a short time. Ln the future, we must go on to hold the same kind of publicity activity, Let more and more people enjoy it, to develop the generally recognition of protection and conservation extension the natural scenery and ecology environment.

(2) Ln the circulating shows, the major work is oral speech, to match with pictures and lantern slides. Though the activity can attract a part of peopel, but it is not more attractive than outdoor research and study. Ln the future, we will hold the conservation and extension. It is much better to take the way of outdoosr activities. Let the people recognize his ecology environment, can accomplish the best publicity effect.

Project for Strengthening Promotion of Wildlife Conservation in Taipei Municipal City

Mu-Ken Lin¹ Chih-Chung Chaung¹ Yuan Chang¹

ABSTRACT

Recognizing that wildlife in their many beautiful and varied forms are an irreplaceable part of the nature systems of the earth. They are a part of the common heritage of mankind, and must be protected. In order to promote the cause of wildlife conservation, a Wildlife Conservation Law was born in Taiwan, Republic of China, on June 23, 1989.

The executive period of this project is from July 1st, 1990 to June 30th, 1995. The project was executed by the Bureau of Business Management, Taipei City Government, and was sponsored by the Council of Agriculture. The project includes the following tasks:

- (1) wildlife conservation and public education ;
- (2) registering conservation wildlife and then products ;
- (3) building the companies' data base which includes wildlife and their products, information, and announcing the wildlife conservation law for these companies ;
- (4) reporting and halting any activities declared illegal under the terms of the wildlife conservation law, including illegal disturbance, abuse, trapping, trade, exchange, possession, killing or processing of wildlife.

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The Symposium of Ednemic Mammalian Species in Taiwan

Chen, Pao-Chung

Abstract

The main point of this symposium is to discuss the research technique for wild local mammals and to explore the direction of integral development. The symposium occurred on 22 April, 1991 at lecture hall, Taipei City Zoo. Five researchers including Dr. Wang, Y. were invited to speak respectively these titles --"Animal capture, animal mark and age determination", "The record and analysis of the grawing tracks of the wildlife", "The method to the food study of the wildlife" , "The introduction to the method for observing the behavior of captive animals". There is a discussion following these lectures. A book on these monographs had been published for this symposium. 155 people joined the symposium, including the teachers from primary and middle school, the students and teachers from zoology and related department and graduate, the staff from the city and county government, many forest district office, and Taipei City Zoo.