行政院農業委員會林務局
捐助國際保育計畫報告
(101年彙整)

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2011 年贊助地球協商報計畫成果摘要

國際永續發展協會為非營利民間組織，總部設於加拿大。IISD 的報導部門(簡稱 IISDRS，即 IISD Reporting Services)於 1997 設立，出版品包括：

- *Earth Negotiations Bulletin* (主要出版品)
- The *Linkages* World Wide Web (包含所有 ENB 編輯群蒐集的資料)
- *Linkages updates* (報導 Linkages 網站最新資訊的雙週刊)
- *Your Meeting Bulletin* (之前的名稱為永續發展 Sustainable Developments)
- *ENB On the Side*、*MEA Bulletin* (多邊環境公約 Multilateral Environmental Agreement 相關刊物)。
- *Climate Policy & Practice* (2008 年起報導氣候變遷相關活動)。
- *SIDS Policy & Practice* (報導開發中小島國家永續發展相關活動)
- *Biodiversity Policy & Practice* (報導生物多樣性相關議題)

ENB 為一頁雙面的出版品，於聯合國相關環境及發展相關會議期間每日出版。除紙本外，也有網路版。每次會議結束後，ENB 編輯群另編纂一份約 10,000-18,000 字的網路版會議摘要及分析。許多需要瞭解環境及永續發展政策的聯合國代表、非政府組織和聯合國工作人員，一致肯定 ENB 是一份重要參考資料。外交官、聯合國工作人員、政府官員、非政府組織、商業界、媒體、學術界也對 ENB 的客觀和完整報導，給予高度評價。ENB 的讀者約有 75,000 人。

ENB 於環境及發展相關協商會議期間，提供平衡、迅速、客觀的報導。並希望能達成下列目標：

- 於會議期間創造一個公平的資訊空間。
- 促使國際協商過程更公開透明。
- 提供實用資訊給決策者和有興趣影響決策過程的人士。
- 於國際會議期間，將各政府機構、非政府組織和聯合國相關活動公告周知。
- 運用新的資訊技術，提供即時的資訊給決策者參考。
- 提供環境相關國際會議資料給學術界運用。
- 維持可信賴的資訊來源，將環境相關協商過程資料提供給決策者參考。

ENB 共有 29 冊，包括聯合國環境及發展會議(United Nations

Conference on Environment and Development, UNCED)、聯合國永續發展委員會(United Nations Commission on Sustainable Development, CSD)、聯合國人口和發展會議(United Nations Conference on Population and Development, CSD)、聯合國跨界魚群與高度洄游魚群會議(UN Conference on Straddling Fish Stocks and Highly Migratory Fish Stocks)、生物多樣性(Biological Diversity)、氣候變遷(Framework Convention on Climate Change, UNFCCC)、森林政策(Forest Policy)、濕地公約(Convention on Wetlands, Ramsar Convention)、遷移性物種公約(Convention on Migratory Species, CMS)、瀕臨絕種野生動植物國際貿易公約(即華盛頓公約 Convention on International Trade in Endangered Species of Wild Fauna and Flora, CITES)、國際熱帶木材委員會(International Tropical Timber Council, ITTC)、聯合國永續發展會議(United Nations Conference on Sustainable Development, CSD)等。

1996 至 2011 年間，ENB 共報導 500 場以上的會議。2011 年報導 45 項會議請參考所附清單。詳細報導內容詳如網站 http://www.iisd.ca/meetings/2011.html。這些會議包括聯合國永續發展相關會議、聯合國第 9 屆森林論壇(UN Forum on Forest)、氣候變遷相關會議、對抗沙漠化公約(Convention to Combat Desertification, CCD)第 10 屆締約國大會、CITES 第 19 屆植物委員會會議、斯德哥爾摩公約(Stockholm Convention on Persistent Organic Pollutants, POPs)第 5 屆締約國大會、生物多樣性公約(Convention on Biological Diversity, CBD)獲取和惠益分享(Access and Benefit Sharing, ABS)相關會議、UNFCCC 第 17 屆締約國大會及其他相關會議、鹿特丹公約第 5 屆締約方大會(Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade, Rotterdam Convention 主要是管制 31 項化學品及農藥)、海洋法(Law of the Sea)相關會議、蒙特婁議定書(Montreal Protocol 主要為關切臭氧層，管制氟氯碳化物)相關會議、CITES 第 24 屆動物委員會會議、CITES 第 61 屆常設委員會會議、巴塞爾公約(Basel Convention 主要管制管有害廢棄物)第 10 屆締約國大會、遷移性物種公約(Convention on Migratory Species, CMS)第 10 屆締約國大會、ITTC 第 47 次會議等。

Meetings covered by the *Earth Negotiations Bulletin* in 2011	Date and Location
First Intersessional Meeting for the UN Conference on Sustainable Development (UNCSD)	10-11 January 2011, New York
Second Session of the INC to Prepare a Global Legally Binding Instrument on Mercury	24-28 January 2011, Chiba, Japan
Ninth session of the UN Forum on Forests (UNFF 9)	24 January - 4 February 2011, New York
FAO Committee on Fisheries, 29th Session (COFI 29)	31 January -4 February 2011, Rome
Ninth session of the Committee for the Review of Implementation of the UNCCD and second special session of the Committee on Science and Technology (CRIC 9 and CST SS-2)	16-25 February 2011, Bonn
26th session of the UNEP Governing Council/Global Ministerial Environment Forum (GC 26/GMEF)	21-24 February 2011, Nairobi
Intergovernmental Preparatory Meeting (IPM) for CSD 19	28 February-4 March 2011, New York
Second PrepCom for the UN Conference on Sustainable Development (UNCSD /Rio+20)	7-8 March 2011, New York
Fourth Session of the Governing Body to the ITPGR	14-18 March 2011, Bali
IRENA: First Session of the IRENA Assembly and the Fifth Preparatory Commission for IRENA	3-5 April 2011, Abu Dhabi
UNFCCC session: AWG-KP 16, AWG-LCA 14	3-8 April 2011, Bangkok
19th meeting of the CITES Plants Committee	18-21 April 2011, Geneva
Fifth Meeting of the Conference of the Parties to the Stockholm Convention	25-29 April 2011, Geneva
Nineteenth session of the Commission on Sustainable Development (CSD19)	2-13 May 2011, New York

33rd Session of the Intergovernmental Panel on Climate Change (IPCC33)	10-13 May, United Arab Emirates
Working Group on marine biodiversity in areas beyond national jurisdiction (UNDOALOS)	31 May - 3 June 2011, New York
UNFCCC Workshop on Technology Needs Assessment	1-2 June 2011, Bonn
Nagoya Protocol ICI: First meeting of Intergovernmental Committee of the Nagoya Protocol on ABS under the CBD	6-10 June 2011, Montreal
UNFCCC Sessional Period	6–17 June 2011, Bonn
UNCSD Subregional Preparatory Meeting for the Caribbean	20 June, Georgetown, Guyana
Fifth meeting of the Conference of the Parties to the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade (PIC COP 5)	20-24 June 2011, Geneva
12th Meeting of the United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea	20-24 June 2011, New York
Thirteenth session of the Commission on Genetic Resources for Food and Agriculture (CGRFA 13)	16-22 July 2011, Rome
25th meeting of the CITES Animals Committee	18-22 July 2011, Geneva
Montreal Protocol OEWG-31	1-5 August 2011, Montreal
61st meeting of the CITES Standing Committee	15-19 August 2011, Geneva
UNCSD (Rio+20) Regional Preparatory Meeting for Latin America and the Caribbean	7-9 September 2011, Santiago Chile
UNFCCC Resumed Sessions of AWG-KP 16 and AWG-LCA 14	1-7 October, Panama City
First Plenary Meeting of IPBES	3-7 October, Nairobi
Seventh Meeting of the Persistent Organic Pollutants (POPs) Review Committee	10-14 October 2011, Geneva

Tenth session of the Conference of the Parties to the UN Convention to Combat Desertification (UNCCD COP 10)	10-21 October 2011, Changwon City, Republic of Korea
UNCSD (Rio+20) Regional Preparatory Meeting in the Arab Region	16/17 October, Cairo
UNFCCC Transitional Committee for the design of the Green Climate Fund	16-18 October, Cape Town
Tenth meeting of the Conference of the Parties to the Basel Convention (Basel COP 10)	17-21 October 2011, Cartagena
UNCSD (Rio+20) Regional Preparatory Meeting for Asia Pacific Region	19-20 October, Seoul
UNCSD (Rio+20) Regional Preparatory Meeting for Africa Region	20-25 October, Addis Ababa
Third INC session to prepare a global legally binding instrument on mercury	31 October - 4 November, Nairobi
Convention on Biological Diversity (CBD) Article 8(j) OEWG 7th Meeting and CBD SBSTTA 15	31 October- 11 November 2011, Montreal
47th session of the International Tropical Timber Council (ITTC 47)	14-19 November, Antigua, Guatemala
34th session of the Intergovernmental Panel on Climate Change (IPCC34) and approval of the Special Report on Extreme Events and Disasters	18-19 November 2011,Kampala
Tenth meeting of the Conference of the Parties to the Convention on Migratory Species (CMS COP 10)	20-25 November 2011, Bergen, Norway

23rd Meeting of the Parties to the Montreal Protocol (MOP 23) and ninth Meeting of the Conference of the Parties to the Vienna Convention (COP 9)	21-25 November, Bali
Seventeenth Conference of the Parties (COP 17) to the United Nations Framework Convention on Climate Change (UNFCCC) and the seventh Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol (COP/MOP 7)	28 November-9 December 2011, South Africa
UNCSD (Rio+20) Regional Preparatory Meeting for ECE Region	1-2 December, Geneva
Second Intersessional Meeting for the UN Conference on Sustainable Development (UNCSD)	15-16 December 2011, New York

陸沙卡協定工作小組計畫報告摘要

陸沙卡協定之全名為合作執法遏阻非法野生動植物貿易陸沙卡協定(The Lusaka Agreement on Co-operative Enforcement Operations Directed at Illegal Trade in Wild Fauna and Flora)。陸沙卡協定於 1994 年 9 月在尚比亞首都陸沙卡，由肯亞、烏干達、南非、坦尚尼亞、史瓦濟蘭及尚比亞共同簽訂，協定原文由聯合國秘書長收存，並於 1996 年生效。Lusaka Agreement 的目標為減少非法野生動植物貿易，並設 Task Force 負責執行任務，工作項目包括蒐集、分析及調查非法野生動植物貿易資料，緝捕中盤商、走私者及犯罪集團等(可越界追捕)。陸沙卡協定目前有七個締約國，包括剛果共和國、肯亞、賴比瑞亞(Liberia)、賴索托、烏干達、坦尚尼亞及尚比亞。南非、衣索匹亞和史瓦濟蘭僅簽署協定，尚未成為會員國。

陸沙卡協定工作小組於 1999 年 6 月 1 日設立，第一任執行長(Director)為 Mr. Adan Dullo，Mr. Dullo 原任肯亞野生動物署(Kenya Wildlife Service, KWS)副署長及野生動物情報部門負責人。1999 年 4 月曾與當時任職以色列自然暨保護區署(Israel National Nature and Parks Authority, INNPA) 之 Dr. Bill Clark 一起來台訪問。Mr. Dullo 於 2002 年 3 月 8 日因車禍喪生後，由坦尚尼亞籍 Mr. Musa Lyimo 代理執行長。2002 年 12 月起新執行長坦尚尼亞籍 Mr. Emily S. Kisamo 上任，2009 年 2 月 28 日任期屆滿，現由剛果籍 Mr. Bonaventure Ebayi 接任。

締約國都已借調人員至 LATF 工作。陸沙卡協定工作小組成立與各締約國 LATF 國家執行機構(LATF National Bureau)共同進行查緝工作或辦理執法訓練班。非締約國部分，和波札那(Republic of Botswana)、喀麥隆、埃及、衣索匹亞、那米比亞(Namibia)、奈及利亞、迦納、南非和史瓦濟蘭等國政府單位和執法人員合作。另外，LATF 與華盛頓公約(Convention on International Trade in Endangered Species of Wild Fauna and Flora, CITES)、非洲野生動物保育組織(Organization for Conservation of African Wildlife, OCFSA)國際刑警組織(Interpol-ICPO, International Criminal Police Organization)和國際海關組織(World Customs Organization, WCO)簽署合作備忘錄，合作查緝非法野生動植物相關活動。LATF 也與其他國際組織建立合作關係，例如聯合國環境總署(United Nations Environment Programme, UNEP)等。

LATF 歷年來提供之成果報告主要成果包括：

2000 年間，LATF 籌設工作已接近完成，預計於 2001 年 4、5 月間，每一會員國指派野生動物執法人員至位於肯亞 Nairobi 的 LATF 總部報到，分配任務。屆時此一國際團隊即可推動查緝工作打擊野生動物犯罪。LATF 2000 年間陸續推動之各項計畫，舉例如下：

- 2000 年 6 及 7 月，LATF 購置兩部公務車(4x4 Toyota Land Cruiser Station Wagon 及 4x4 Saloon car)，由農委會贊助經費支用。
- 2000 年 7 及 8 月，LATF 支援於肯亞 Naivasha 地區舉辦為期 3 週的野生動物執法訓練計畫，課程包括情報蒐集、調查及起訴等基本訓練，有 25 位來至 11 個非洲國家的執法人員參加。
- 2000 年 9 月，美國魚類暨野生動物署(US Fish & Wildlife Service, USFWS)贊助 LATF 購買 i2 情報軟體，並訓練工作人員使用該軟體。目前使用 i2 情報軟體的單位包括國際刑警組織(Interpol)、美國聯邦調查局(Federal Bureau of Investigation, FBI)、US FWS 執法單位(Office of Law Enforcement)等。
- LATF 現有 VHF 通訊系統，預計 5 月能完成安裝 HF 通訊系統。屆時 LATF 與 6 個會員國即擁有迅速安全的現代化通訊，包括語言、傳真、資料、E-mail 等。因為非洲國家的公用通訊系統不太可靠，建立 LATF 專屬通訊系統，就執法工作而言有其必要性。
- LATF 已配備衛星電話及無線電通訊系統，由農委會經費支用。
- LATF 已聘用技術或行政專家負責電腦、會計、行政管理等工作。這些專家都需通曉英文及法文(非洲有 20 國通用語言為英文，22 國通用語言為法文)。
- LATF 籌組的技術團(technical mission)到坦尚尼亞國家公園(Tanapa)評估其野生動物執法能力，並促成坦尚尼亞和肯亞野生動物主管單位簽署備忘錄。
- LATF 參與查緝工作，通常以肯亞-坦尚尼亞、肯亞-衣索匹亞邊界地區為主，並破獲數個野生動物犯罪集團，其中 1 名已因謀殺警察而被起訴。

2001 年，LATF 活動與工作計畫包括：

一、查緝工作：LATF 進行野生動物相關執法工作，包括逮捕盜獵者，查獲非法走私野生動物或產製品等，舉例如下：

1. 野味(Bushmeat)：2001 年 11 月於烏干達查獲 bushmeat，逮捕 12 人，其中 5 人移送法辦，1 人已被判 6 個月有期徒刑，1 人被判罰金，其餘 3 案審理中。2001 年 12 月於同地點再度查獲

100 公斤 bushmeat。

2. 象牙：

(1)2001 年 11 月於坦尚尼亞查獲 22 件象牙，重 45 公斤。逮捕 1 人，案件審理中。後續調查又逮捕 1 人，並繼續追查其餘涉案人。

(2)破獲前案後，坦尚尼亞執法人員陸續查獲 4 件非法盜獵或販賣象牙案，共逮捕 5 人。

(3)於肯亞查獲象牙中盤商 1 人。

(4)於肯亞查獲 34 件象牙雕刻品，逮捕 3 人，沒收運輸象牙產製品汽車 1 部。

3. 斑馬皮：於坦尚尼亞查獲 13 張斑馬皮，逮捕 4 人。後續搜查發現斑馬肉及剝皮工具，並循線追查斑馬來源。

二、訓練

1. 2000 年 8 月，LATF 在肯亞舉辦為期 3 週的野生動物執法訓練計畫，有 26 位來至 11 個非洲國家的執法人員參加，講師來自美國、德國、奧地利和以色列。

2. 2001 年 6 月，LATF 辦理情報蒐集相關訓練，培訓坦尚尼亞國家公園工作人員。

3. 2001 年 6 月，加拿大環境部遴派精通法語工作人員，協助訓練講法語的剛果共和國執法人員。LATF 工作人員在剛果時，巡察幾個伐木區，查獲 bushmeat 販賣集團，逮捕數人，沒收 bushmeat 及槍枝。

三、計畫

1. 持續進行野生動物相關執法工作，優先項目包括：非法買賣象牙案、非法買賣 bushmeat 案及非法買賣野生動物活體(寵物貿易)案。

2. LATF 需要設立一個基金(Trust Fund)，以提供日後穩定的經費來源。

3. LATF 總部現位於肯亞野生動物署內，長程來看，LATF 需要設立一個自己的總部。

4. LATF 已進入實際在 6 個非洲國家查緝野生動物相關案件的階段，有些國家距離很遠，有些查緝地點路況不佳，某些季節還可能無法經由陸路抵達。非洲的飛機班次經常變動，行程不容易掌握。例如由肯亞首都 Nairobi 到坦尚尼亞的 Selous Wildlife Reserve，搭一般飛機要兩天行程，再加上 300 公里路程，若直接開 Cessna 206 六人座小飛機過去，只要 4 小時。因此，LATF 需要購買一部飛機，以增加其查緝任務的機動性。

5. LATF 需要擴大其合作對象，例如與各國執法機構、保育團體或民間人士合作等。LATF 也將設立網站，提供民眾檢舉管道。
6. LATF 工作人員都受過執法訓練，i2 情報分析訓練。LATF 無線通訊網也已建設完成，可與各非洲國家相關機構聯繫。LATF 近期將配置測謊設備，以加強其情報蒐集的能力。未來，LATF 需要發展其鑑定能力，確保查緝現場蒐證方法正確，LATF 需要發展其整體分析能力，運用查緝及訊問得到的資料，強化 LATF 打擊犯罪的能力。

2002 年 LATF 工作情形如下：

- 6 個締約國借調人員至 LATF 工作。LATF 成立迄今已和波札那、喀麥隆、埃及、衣索匹亞、那米比亞、奈及利亞、迦納、南非和史瓦濟蘭的政府單位合作，也與部分國家的執法人員共同進行查緝工作。
- 2001/2002 年度，LATF 和各國及國際相關執法單位合作，在非洲各地逮捕涉及非法野生動物案件的核心份子 25 人，查獲超過 7 公噸象牙(包括在新加坡查獲的 6.5 噸)及其他野生動物個體或產製品。
- LATF 辦理訓練班、其他活動、會計報表以及 LATF 所出版 2002 年 1 至 3 月通訊及摺頁均有提供我國參考。
- LATF 於人員 2002 年 11 月參加第 12 屆華盛頓公約締約國大會時將其摺頁置於會場，該摺頁印有贊助單位，包括 Council of Agriculture of the Republic of China (Taiwan)等文字。

2003 年，LATF 提供 2 份成果報告，分別為 2003 年 5 月至 7 月及 8 月至 10 月之工作情形，主要成果如下：

- 2003 年 6 月逮捕兩人企圖非法販賣三件象牙(45kg)。
- 接獲大象在肯亞與坦尚尼亞邊境 Trans Mara Region 被盜獵情報，經調查肯亞部分係馬賽族人以有毒的箭殺死大象，而坦尚尼亞的大象係被槍殺。另發現有人兜售 50 件象牙。
- 調查發現有人在肯亞的 Laikipia 地區兜售 34 件象牙。
- 與華盛頓公約植物委員會及其他執法機構合作，攔阻由索馬利亞走私多肉植物案。
- 2003 年 6 月 1 日在剛果共和國 Maya Maya 機場沒收 10 件非法走私象牙(57kg)，目的地為貝南(Benin)。
- 肯亞與坦尚尼亞查緝人員，召開會議討論邊境 Trans Mara Region

查緝野生動物相關案件事宜。

- 自泰國政府於機場沒收由坦尚尼亞走私的 510 kg 象牙和 3.8kg 犀牛角後，著手調查相關涉案人及走私路線。
- 與剛果共和國查緝單位合作，查獲兩件非法販賣象牙案(分別為 23 件加工象牙，47 件計 22kg 成品和半成品象牙製品)。

2004 年，LATF 提供成果報告，主要成果如下：

執法訓練部分

- 2004 年 2 月，LATF 針對會員國和 LATF 執法人員辦理講師訓練班(Train the Trainers)課程，有 26 人參加，講師包括華盛頓公約秘書處、國際刑警組織秘書處、肯亞和義大利警政單位。
- Train the Trainers 訓練班結束後，剛果和烏干達分別辦理國內相關訓練。烏干達野生動物署(Uganda Wildlife Authority, UWA)辦理的訓練班有 72 位野生動物執法人員參加。剛果的兩週訓練課程有 16 位剛果野生動物部(Congo Wildlife Department, CWD)的執法人員參加。

會議和公務部分

- 參加華盛頓公約秘書處和美國魚類暨野生物署(USFWS)合辦之執法人員專家會議。
- 參加第六屆非洲東部國家警察主管會議。
- LATF 和非洲野生動物保育組織(OCFSA)簽訂備忘錄，合作查緝非法野生動植物相關活動。

執法部分

- LATF 和剛果執法單位 CWD 合作，逮捕 13 名嫌犯，沒收 746 件未加工和已加工象牙、1 張豹皮、1 根豹尾和 4 台象牙加工機器。
- LATF 和 CWD 合作，逮捕 10 名嫌犯，查獲 1 隻 10 歲的黑猩猩、沒收 55m^3 之非法木材。
- LATF 和肯亞野生動物署合作，逮捕 12 名嫌犯，沒收 26 根象牙。
- LATF 和 KWS 合作，逮捕 1 名嫌犯，沒收 14 張蟒蛇皮、一隻鼓身蛇(puff adder)。
- LATF 和 KWS、檢疫單位合作，於機場查獲 6 隻幼黑猩猩和 4 隻 Guenon monkey。
- LATF 和坦尚尼亞、泰國執法單位合作，逮捕 4 名嫌犯，沒收 2 根犀牛角。
- LATF 和烏干達 UWA 合作，逮捕 4 名嫌犯，沒收 4 張豹皮、3

根象牙、11 公斤河馬牙。

- LATF 和尚比亞野生動物署(Zambia Wildlife Authority, ZAWA)合作，逮捕 3 名嫌犯，沒收 4 對象牙。

國際查緝部分

- 持續調查在新加坡查獲的 6.5 公噸象牙和 42,000 個印材(hanko seals)案。
- LATF 持續調查在中國上海查獲的 3.3 公噸象牙案。

2005 年，LATF 提供之成果報告，主要內容如下：

- 完成「2002 年在中國上海查獲 3.3 公噸象牙案」之後續調查，並將報告交給烏干達參考，以利辦理後續起訴嫌犯事宜。本調查發現這批象牙來源國為剛果民主共和國，但出口紀錄列為烏干達。
- 參加「犀牛和象安全小組(Rhino and Elephant Security Group)」暨「國際刑警組織(Interpol)環境犯罪工作小組」會議。
- 赴衣索匹亞洽商越境執法相關合作事宜，並鼓勵衣索匹亞加入陸沙卡協定。
- 剛果查緝及機構間諮詢會議
  1. 至剛果民主共和國、中非共和國(The Central African Republic)和喀麥隆 3 國邊界地區，以及加彭(Gabonese Republic)和安哥拉(Angola)邊界地區，進行查緝，沒收非法買賣之象牙及木材。並與當地執法人員洽談遏止違法案件事宜。
  2. 召開各國執法單位合作研討會，共有 32 人參加，包括警察、海關、出入境管制、司法界、軍方情報單位、野生動物保育機構等人員。
- 召開烏干達和剛果跨界會議，建立合作機制。
- 持續調查在新加坡查獲的 6.5 公噸象牙案。
- 坦尚尼亞案及越南/香港沒入象牙案之調查
  1. 協助坦尚尼亞野生動物主管單位，調查變造 CITES 出口許可案。
  2. 協助調查「2004 年 10 月越南查獲 800kg 象牙案」，查出象牙來源為坦尚尼亞，逮捕 4 名嫌犯。持續追查潛逃華裔主嫌，後來在古巴逮捕到案。
- 在肯亞調查非法象牙和檀香(sandalwood)案。
- 參加東非警長合作機構會議。
- 參加巨猿存續計畫會議(Great Apes Survival Project Meeting,

GRASP)。

- 參加 CITES 研討會。
- 參加在聯合國環境總署召開的 Green Customs Initiative 會議。

2006 年，LATF 提供之成果報告包括辛巴威、肯亞和烏干達訓練班報告、財務報告、2006 年 7 月至 12 月成果報告等，主要成果包括：

- 2006 年 7 月至 12 月執行 6 次聯合執法行動，逮捕 11 名嫌犯。合作查緝國家包括剛果、肯亞、尚比亞、烏干達等。
- 持續調查 3 件馬尼拉查獲走私象牙案，臺灣查獲象牙案，泰國查獲陸龜案。
- 參加「肯亞和坦尚尼亞跨境野生動物安全會議(The Kenya-Tanzania Cross Border Wildlife Security Meetings)」暨「剛果和剛果民主共和國跨境野生動物安全會議」。
- 人才培訓方面包括發展新的查緝技巧，並於剛果、剛果民主共和國、肯亞、尚比亞等國辦理 7 次訓練班。
- 參加國際會議包括國際刑警組織(Interpol)野生動物工作小組會議和參東非警長合作機構會議(Eastern Africa Police Chiefs Co-operation Organization Annual General Meeting)等。
- 與其他國際組織合作方面，於 2006 年 10 月與 Interpol-ICPO 簽訂備忘錄；完成與國際海關組織(WCO)之備忘錄初稿；與 UNEP 持續合作等。
- 資訊交換與宣傳方面，持續與 CITES 和 Interpol 交換情報資訊，於報刊或雜誌發表文章，活動情形列入網站。

2007 年執行工作包括：

- 2007 年 8 月，LATF 與 Zambia Wildlife Authority 進行聯合查緝行動，調查的地點為尚比亞東部省分之 Luangwa Boma, Luangwa Bridge, Nyimba, Petauke 和 Chipata 等地區。
- 2006 年 7 月，臺灣查獲來自坦尚尼亞的 5.2 噸象牙，LATF 與 Interpol 派員來台蒐集資料後，持續調查坦尚尼亞涉案人。
- 2007 年 8 月 29 至 31 日，參加在蒲隆地(Bujumbura, Burundi)召開之東非警長合作機構會議，共有 11 國派代表參加。
- LATF 與剛果共和國查緝單位暨 LATF 國家執行機構(Congo National Bureau, BNAL)聯合調查布拉柴維爾(Brazzaville)和 Pointe Noire(諾亞港，另譯黑角)兩地區非法走私象牙和其他非法野生物貿易案。

- 2007 年 11 月 29 至 30 日，參加「肯亞和烏干達跨境野生動物安全會議(The Kenya-Uganda Cross Border Wildlife Security Meetings)」。
- LATF 與坦尚尼亞 3 個機關(自然資源暨觀光部野生動物司 Ministry of Natural Resources and Tourism's Wildlife Division，以下簡稱 Tanzania Wildlife Division (TWD)、Tanzania National Parks 和 Ngorongoro Conservation Area Authority)合辦執法訓練班，共有 54 人參訓，分別來自 16 個執法單位。

2008 年，LATF 報告及查緝資料摘要如下：

我國所贊助 US$25,000，截至 2008 年 12 月底，使用 US$6,185.97，其餘經費將分配於 2009 年一般運作和執法行動。2008 年 11 月查緝行動說明如下：

- 經過數月的情報蒐集，2008 年 11 月 15 至 19 日，LATF 會同剛果執法機構 BNAL，查緝 Pointe Noire 非法野生動物貿易市場，逮捕 3 名 DRC 籍嫌犯，查獲 774 件象牙雕刻，計 20 公斤，嫌犯已移送法辦。
- 情報顯示位於剛果和喀麥隆邊境的 Quesso 有非法野生動物貿易活動，例如動物活體(巨猿類)、象肉、象牙、其他 bushmeat 和木材產製品。而 Brazzaville 則為非法野生動物集散地，2008 年 11 月 20 至 27 日展開查緝行動。逮捕 2 名嫌犯(剛果警察人員)企圖販賣大猩猩嬰兒，後續調查發現嫌犯以當地貨幣 FCFA35,000 (US$70)購買，試圖以 FCFA250,000 (US$500)賣出。查獲之幼猩猩立刻被送往大猩猩保護區 Lession Louna Natural Reserve 收容。
- 於 Brazzaville 各處蒐集情報，包括 4 個公有市場、2 個河港和 1 處國際機場。剛果北部 Quesso 和 Ngombe 兩鎮之調查發現，剛果當地野生動物販賣者協助喀麥隆商人將動物活體和象牙運出邊界。將持續蒐集情報，時機成熟時，再規劃查緝行動。
- 2008 年 2 月，於剛果逮捕喀麥隆籍嫌犯 1 人，非法持有象牙、豹皮和其他野生動物製品。
- 剛果政府對聯合執法行動之成果相當滿意，並希望 LATF 未來能繼續合作打擊非法野生動物貿易，以及辦理執法訓練班。

2009 年「支援陸沙卡協定工作小組及締約國執法計畫」，計畫報告摘要如下：

一、剛果

- 2009 年 9 月，LATF 和剛果執法單位進行為期 6 天之 Operation Coton Blanc，追查 195 根象牙走私案來源，逮捕嫌犯 8 人，後被判刑 1-2 年，罰金 CFA 1-2 百萬(US$2,000-4,000)。
- 2009 年 10 月，LATF 協調剛果執法單位於 Mbomo 查緝非法買賣象牙案，逮捕嫌犯 2 人，其中 1 人主要與中國籍人士共涉走私 100 公斤象牙。兩人均移送法辦。
- 2009 年 9 月 4-7 日，於 Kabo/Quesso 召開跨境會議，LATF 及剛果、喀麥隆、中非共和國等 30 位執法人員參加。

二、肯亞

- 2009 年 3 月，LATF 和 KWS 共同策劃情報蒐集行動，反制肯亞和索馬利亞(Somalia)邊境象牙走私集團活動。資料顯示 2008 年 7 月盜獵及武器走私者 5 人非法獵殺 37 頭大象，並將 74 根象牙運至 Wajir 和 Isiolo 掩埋。LATF 和 KWS 研擬策略緝捕嫌犯和找出埋象牙地點。
- 2009 年 4 月，LATF 和 KWS 共同調查由坦尚尼亞載運 703 公斤象牙進入肯亞案，逮捕 2 人(肯亞和坦尚尼亞籍各一人)，均被判 2 年刑期，象牙及車輛沒收。
- 2009 年 6 月，LATF 提供情報給 KWS，因而查獲象牙中盤商非法持有 71.5 公斤象牙。嫌犯移送法辦，被罰 12,000 Shilling (約 US$1,600)。
- 2009 年 8 月，LATF 和 KWS 於肯亞、衣索匹亞和索馬利亞邊界執行 Operation Owl 行動，證實索馬利亞 Bullahawa 有藏匿 1 噸象牙，已持續監測，防止上開象牙流入市場。
- 2009 年 7 月 14 日，肯亞奈洛比機場查獲藏在木箱中的 223.4 公斤象牙和 5 根犀牛角(15.3 公斤)通報為藝品，預定由莫三比克(Mozambique)經由肯亞奈洛比、泰國曼谷運至寮國永珍(Vientiane)。LATF 和 KWS 調查本案並提供資料給 Interpol、CITES 秘書處、莫三比克 CITES 管理機構、國際海關組織(WCO)等單位參考運用。
- 2009 年 9 月 29 日，肯亞奈洛比機場沒入 532 公斤象牙，LATF、KWS 和肯亞警察單位後續調查發現本案和同年 9 月 27 日於衣索匹亞機場查獲由奈洛比運入之 637 公斤象牙目的地都是泰國。被逮捕的嫌犯 2 人均移送法辦。
- 2009 年 7 月 1-4 日，LATF 參加肯亞和坦尚尼亞邊境安全會議。

三、坦尚尼亞

- 2009 年 3 月，越南查獲 6.2 噸象牙，LATA、WCO 非洲東南部聯絡辦公室(East and Southern Africa Regional Intelligence

Liaison Offices, RILO-ESA)、Tanzania Wildlife Division (TWD)、Interpol 持續偵察，於坦尚尼亞逮捕嫌犯 4 人並移送法辦。另規劃越南部分之後續調查。

- 2009 年 5 月，LATF 和坦尚尼亞 National Bureau 執行 Operation Track Ivory 任務，逮捕嫌犯 8 人(中國和坦尚尼亞籍各 4 人)，查獲象牙 2 根、加工象牙一批、斑馬皮和貝殼。
- 2009 年 3 月 1 日和 4 日，菲律賓馬尼拉機場分別查獲 3,378 公斤和 1,483 公斤象牙，兩批象牙均由坦尚尼亞出口，標示為塑膠廢棄物。2009 年 6 月，LATF、Interpol 和 TWD 持續追查，於坦尚尼亞逮捕嫌犯 5 人，並移送法辦。規劃 2010 年 3 月至馬尼拉進行後續調查。
- 2009 年 4 月 20 日，荷蘭阿姆斯特丹機場查獲 82 隻豹紋陸龜(Leopard Tortoise)，2009 年 7 月，LATF、TWD 和坦尚尼亞警察單位調查發現這批陸龜由坦尚尼亞機場寄出郵包，目的地為香港，已鎖定一名嫌犯，並持續偵察中。
- 2009 年 6 月，LATF 調查香港沒收 3 件郵包案，包括 120 隻豹紋陸龜、27 隻尼羅巨蜥(Nile lizard, *Varanus niloticus*)、20 隻青蛙和 20 隻螳螂。3 件快遞郵包係由坦尚尼亞機場寄出，已逮捕嫌犯 5 人，並移送法辦。
- 2009 年 8 月，LATF 和和坦尚尼亞執法單位聯合偵辦越南沒入 2 噸(769 件)象牙案，這批象牙由坦尚尼亞運出，標示為貝殼。已鎖定一名嫌犯。
- 2009 年 5 月，參加於坦尚尼亞舉辦之野生動物執法研討會。

四、烏干達

- 2009 年 3-4 月，LATF 與烏干達野生動物署(UWA)、烏干達犀牛基金會 (Rhino Fund Uganda)密切合作，推動 Operation Save Rhino 計畫，成功滲透野生動物犯罪集團，因而攔阻 Ziwa 保護區犀牛盜獵案，逮捕假冒線民的嫌犯 1 人，判刑 18 月。

五、尚比亞

- 2009 年 8 月，LATF 與尚比亞野生動物署(ZAWA)共同執行 Operation Spike 行動，遏止野生動物產製品非法貿易，主要目標為 bushmeat，查獲野味 25 公斤、2 隻豹紋陸龜、1 張麝貓皮、3 張鱷魚皮。逮捕嫌犯 5 人並移送法辦，作案車輛沒收。

六、國際會議

- 2009 年 9 月 21-25 日，LATF 參加 Interpol 野生動物犯罪工作小組於巴西召開之會議，並提出報告。

2010 年「支援陸沙卡協定工作小組及締約國執法計畫」，成果摘要如下：

執法部分

一、剛果

2010 年 6 月展開 4 次查緝行動，查獲 12 根象牙(100kg)，逮捕嫌犯 5 人。

二、肯亞

- 調查衣索匹亞查獲 637kg 象牙案，蒐集到的證據強化於肯亞起訴嫌犯 2 人之證據。
- 調查泰國曼谷查獲 239 根象牙(2,075kg) 案，於肯亞奈洛比逮捕嫌犯 1 人，2010 年 5 月於法院被控非法持有狩獵紀念品。
- 2010 年 1 月，調查線民通報之盜獵案，逮捕嫌犯 11 人，查獲 2 根犀牛角(7.2kg)。
- 調查 2010 年 4 月越南查獲 2,194kg 象牙案，2010 年 6 月於肯亞 Mombasa 逮捕嫌犯 1 人。
- 2010 年 7 月 14 日泰國 Suvarnabhumi 機場查獲 117 根象牙和 9 件小塊象牙，共計 765 kg。LATF 和 KWS 協同調查於肯亞奈洛比逮捕嫌犯 2 人，7 月 18 日移送法辦。
- 調查 2010 年 8 月於肯亞奈洛比機場查獲 317 根象牙(1,467kg)案。
- 2011 年 1 月 17 日，一名中國籍旅客由剛果民主共和國金夏沙經由肯亞奈洛比赴北京，於肯亞機場被查獲攜帶 65 kg 象牙未附合法文件，1 月 18 日移送法辦，1 月 19 日法院判處有期徒刑 3 個月可易科罰金。

三、坦尚尼亞

- 調查 2010 年 10 月由坦尚尼亞非法輸出 1.5 噸至香港案，逮捕嫌犯 3 人(其中 1 人為中國籍)，並移送法辦。
- 2009 年 8 月越南沒入由坦尚尼亞運出之 769 根象牙(2,005.6kg)，LATF 和坦尚尼亞執法單位聯合偵辦此案，於 2011 年 1 月 4 日逮捕一名中國籍嫌犯，並移送法辦。

四、烏干達

2010 年 1 月美國查獲來自烏干達之走私象牙案，美國魚類暨野生動物署(USFWS)提供情報資料給 LATF 及烏干達查緝單位，偵察後於同月份逮捕涉案人，並移送法辦。

五、尚比亞

2011 年 1 月，LATF 與尚比亞野生動物署(ZAWA)共同執行

Operation Western Mansion 行動，查緝 5 天動員 12 人，查獲野味 (bushmeat) 47 公斤、半成品象牙 56 公斤、48 隻豹紋陸龜。逮捕嫌犯 2 人並移送法辦。

跨境會議

2010 年 8 月 31 日至 9 月 5 日，召開肯亞和坦尚尼亞野生動物工作人員跨境會議。

能力訓練

- 2010 年 1 月於剛果共和國召開執法訓練班，受訓者計 20 人。
- 2010 年 2 月於烏干達召開執法訓練班，調訓該國各類查緝單位人員 20 人。

報告附件一為 LATF 收支表，附件二為 LATF 發動之偵察及其他贊助單位支助之活動，包括查緝案 3 件、訓練班 3 次、研討會 3 次、參加國際會議包括世界海關會議等共 3 次。

2011 年「支援陸沙卡協定工作小組及締約國執法計畫」，成果摘要如下：

執法部分

一、剛果

- 持續調查 Maya Maya 國際機場查獲 3 根象牙案。
- 查獲非法盜獵大象案，發現 4 對新鮮象牙，嫌犯逃逸。

二、肯亞

- 2011 年 3 月，協調肯亞和衣索匹亞執法人員 100 餘人，展開查緝行動，查獲 14 根象牙、加工象牙製品一批及槍枝。逮捕 32 名嫌犯。
- 2011 年 1-2 月，與 WCO 合作，發動 23 歐亞國家共同支援之執法行動 Operation GAPIN，查獲 22 噸象牙、13,000 件保育類動物標本、猴屍 2 件、295 件象牙製品(雕像、項鍊、筷子等)、57 公斤象牙原牙、4 根犀牛角、4,726 公斤穿山甲肉、323 隻海馬和 1 件豹皮。
- 2011 年 1 月，與 KWS 合作查獲 91 件象牙塊，逮捕嫌犯 3 人。
- 2011 年 2 月，與 KWS 合作查獲 3 公斤象牙及盜獵工具，逮捕嫌犯 2 人。

三、坦尚尼亞

2011 年 1 月和 3 月，與主管單位共同蒐集情報，追查象牙走私集團行動。

四、國際查緝

- 與 KWS 聯合追查 2011 年 3 月 30 日於泰國曼谷查獲 2,033 公斤(247 根)象牙案，這批貨品虛偽申報為冷凍鯖魚。後續於 5 月在肯亞逮捕嫌犯一人，並移送法辦。
- 與 KWS 聯合追查 2011 年 7 月 8 日於馬來西亞查獲之 405 根(2,974kg)象牙，9 月間已鎖定 3 名嫌犯(出口人、代理商和海關人員)，並繼續移送法辦之準備工作。

跨境會議和其他會議

- 2011 年 3 月，召開肯亞和坦尚尼亞野生動物工作人員跨境會議。
- 2011 年 3 月，召開肯亞和坦尚尼亞野生動物主管論壇。
- 2011 年 5 月，參加在奈洛比召開之 CITES 象牙和犀牛角執法小組會議。
- 2011 年 5 月，參加東南亞野生動物執法聯絡網(Wildlife Enforcement Network，簡稱 ASEAN-WEN)相關會議，並洽談未來合作和簽訂 MOU 事宜。

能力訓練

2011 年 6 月辦理遏止非法野生動物貿易訓練班，來自非洲 4 國 22 人參訓。

其他機構或團體贊助活動

- 2011 年 5 月，野生動物執法監測系統訓練班。
- 非洲象執法日活動，包括執法有功人員頒獎，啟動野生動物執法監測系統，銷毀 6.5 噸 2002 年於新加坡查獲之走私象牙等。
- 於肯亞、尚比亞、烏干達和剛果辦理執法人員訓練班。

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PROGRESS/ACCOUNTABILITY REPORTS ON ACTIVITIES UNDERTAKEN BY THE LUSAKA AGREEMENT TASK FORCE WITH THE FINANCIAL SUPPORT OF THE FOREST BUREAU-COA

FEBRUARY 2012

LUSAKA AGREEMENT ON CO-OPERATIVE ENFORCEMENT OPERATIONS DIRECTED AT ILLEGAL TRADE IN WILD FAUNA AND FLORA

"FOSTERING COOPERATION TO CONSERVE WILD FAUNA AND FLORA"

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I. INTRODUCTION

This report highlights the activities of the Lusaka Agreement Task Force (LATF) for the period **February 2011** to **January 2012** carried out with the financial support of the Forest Bureau-COA. The activities comprised law enforcement activities (including investigations and Intelligence gathering), cross-border law enforcement meetings, Stakeholder Meetings and Capacity building Programmes (training and wildlife law enforcement interagency workshops). The report also outlines other activities undertaken and facilitated by LATF with the support of other collaborating/development partners and donors as contained in ***Annex II***.

LATF together with the National Bureaus of the Parties to the Agreement wish to express their profound gratitude to the Forest Bureau, COA of Taiwan for its invaluable financial support that contributed significantly to the implementation of these activities and indeed our programmes of work.

LATF is also in the process of finalizing review of its ten-year Strategic Plan (2005-2015) whose recommendations will be a basis for development of a more focussed and strategic plans that will continue guiding implementation of its programmes and activities in the future. The annual programmes of work for the years 2012 and 2013 have already been adopted by the Governing Council of the Parties in line with the review process and will constitute a basis for our subsequent proposals for funding to be submitted to the Forestry Bureau COA.

II. ACTIVITIES

1. LAW ENFORCEMENT OPERATIONS

One of the fundamental functions of the Lusaka Agreement Task Force is to facilitate cooperative enforcement operations and/or investigate violations of Parties' national laws as a pragmatic approach towards curtailing illegal trade in wild fauna and flora.

1.1 Congo

1.1.2 Operational Planning Meetings on Joint law enforcement operations August – Sept 2011:

LATF facilitated the Congo National Bureau to the Lusaka Agreement in carrying out intelligence gathering missions on elephant ivory trafficking in and across Brazzaville-Congo and Kinshasa-DRC. The missions established existence of criminal syndicates operating across the two capital cities. Previously, elephant ivory specimens have been illegally acquired in Congo (Brazzaville) and sold at tourists' markets and shops in Kinshasa. Contacts were initiated with wildlife authorities and agents in Kinshasa with a view of facilitating them in conducting enforcement operations to address the domestic illegal ivory markets in Kinshasa and hence curtailing the poaching incidents in Congo (Brazzaville).

LATF also facilitated the National Bureau to travel to the coastal city of Pointe Noire, to follow up prosecution of wildlife cases that was still pending in a local Court that involved an ivory trafficker arrested during LATF's previous operations. Evidence comprising 3 elephant tusks seized from the suspect at Maya Maya International Airport in Brazzaville from Pointe Noire was availed to the Court to enhance the prosecution of the related case.

In pursuit of a recent poaching incident at a forest in northern Congo, the operation team successfully recovered four (4) pairs of fresh elephant tusks that were hidden in the Sangha River. The suspects who escaped arrest are still at large and investigations into the case are ongoing with a view of bringing them before court of law.

New enforcement plans were also finalized and the two institutions agreed to carry out joint enforcement operations especially in the northern region of Congo where field reports and intelligence indicate resurgence of elephant poaching gangs and intensive wildlife trafficking along the common borders of Congo, Cameroun and the Central African Republic (CAR). Trafficking in military fire arms in the area mainly targeted at elephant poaching activities has been of grave concern in the region for the last two years. This requires strengthening of the existing working mechanisms and collaboration with other law enforcement agencies such as the army, the police and the local communities. Holding of multi-sector wildlife enforcement

workshops in the area was identified as a strategy to enlist more support from stakeholders and others.

Consequently the LATF Director initiated the arrangements to convene a multi-agency wildlife law enforcement training workshop. Thereafter, a workshop that brought together law enforcement officers from various agencies was conducted from in November/December 2011 in Ngo and Brazzaville.

1.2 Kenya

1.2.1 Operation AHMED – Kenya and Tanzania - December 2010

LATF co-ordinated and participated in this concurrent operation involving Tanzania Wildlife Officers and Kenya Wildlife Service officers along the Kenya-Tanzania common border from Lungalunga to Sirari including areas of Lungalunga, Murtot, Mt. Kilimanjaro, Namanga and Kehancha.

The main activities during this operation included pursuing of special targets, patrol of the open border areas and inspection of targeted official entry/exit points. Vital intelligence was gathered concerning the existence of ivory stockpiles in the areas. Intelligence was also collected on a six-man gang robbing business persons who travel between Kenya and Tanzania and a gang of poachers from Kuria District operating in Mara Triangle, Maasai Mara and Serengeti including robbing tourists. The intelligence was shared with relevant authorities in Tanzania and Kenya for further follow-up and action that has led to disruption of the criminal syndicates.

1.2.2 Operation AHMED – Kenya and Ethiopia -March 2011

The operation was jointly coordinated and sponsored by LATF and INTERPOL to combat wildlife trafficking across the Kenya-Ethiopia border. It brought together over 100 officers from various law enforcement agencies in Kenya and Ethiopia. During the mission, intelligence was collected and 14 elephant tusks, assorted worked ivory as well as a firearm were recovered. A

total of 32 suspects were arrested and arraigned in courts of law in Kenya (10) and Ethiopia (22). The cases are still ongoing.

1.2.3 Operation GAPIN–Jan-Feb 2011

The Task Force together with the World Customs Organization (WCO) - Regional Intelligence Liaison Office (RILO) participated in the planning and co-ordination of this operation which was organized by the WCO General Secretariat and carried out in 14 African countries. It was supported by 25 countries in Asia and Europe as well as the CITES Secretariat, the ASEAN Wildlife Enforcement Network (ASEAN-WEN), the Pan African Sanctuary Alliance (PASA), and national CITES management authorities, wildlife enforcement agencies and the police.

Operation GAPIN was planned during a one-week specialized capacity building training session for frontline Customs officials held in December 2010 in Mombasa, Kenya where a LATF officer participated as a resource person.

The operation resulted in the seizure of more than 22 tonnes and 13,000 specimens of protected wildlife species including one live Barbary Macaque *Macaca sylvanus*, two dead macaques, 295 pieces of ivory (statues, jewelry, chopsticks, etc), 57 kg of raw ivory, four rhino horns, 4,726 kg of pangolin meat, 323 seahorses and one leopard skin. In Africa most of the seizures were made in Kenya, Mozambique, Rwanda and South Africa. The rest were made in Belgium, China, the Czech Republic, France, Hong Kong SAR, Israel, Japan, the Netherlands, Romania, Spain, the United Kingdom and Vietnam. Several arrests of suspects were made in the participating countries where wildlife criminal cases are being prosecuted.

1.2.4 Kenya/Tanzania - Mwakijembe Operation

In January 2011, LATF jointly with Tanzania Wildlife Division (TWD) and the Kenya Wildlife Service (KWS) conducted an operation in Mwakijembe, along the Kenya/Tanzania border. This operation was a follow-up of the intelligence gathered during operation Ahmed regarding illegal trafficking in elephant ivory. The operation identified key suspects and master minds as well as

brokers of smuggling in elephant ivory along the Kenya - Tanzania border. This intelligence was used in planning further operations in the region.

1.2.5 Kenya/Somalia Operation

Following the poaching of four elephants at Mata Arba (Boni Forest) along the Kenya/Somalia border on 20th Jan 2011, KWS and LATF carried out an operation codenamed " **Help**" to recover elephant tusks and arrest the suspects. With the help of local Hulugho (Kenya) and Kolbio (Somalia) elders, two elephant tusks and an AK47 rifle were recovered and one (1) suspect was arrested.

1.2.6 Operation at Ntugi Market in Kenya

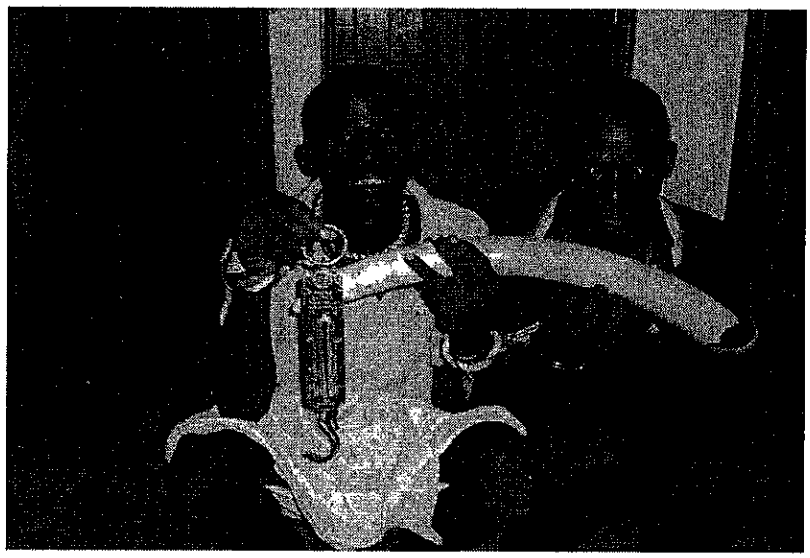
In January 2011, LATF and KWS carried out an operation at Ntugi area, Meru (Central Kenya) where three (3) suspects were arrested and 91 pieces of elephant tusks were recovered. Intelligence gathered on poaching gangs, ivory/rhino horn brokers and Chinese dealers was used for planning a subsequent operation in Isiolo (Eastern Kenya).



Recovered elephant tusks during Ntugi market operation January 2011

1.2.7 Operation in Isiolo - Eastern Kenya

In February 2011, LATF and KWS carried out a follow up operation in Isiolo which resulted in arrest of two (2) suspects and recovery of 3kg of elephant ivory and various poaching gears. Several poaching gangs and ivory dealers/ brokers were also identified. The investigation team also learnt about the intricate illegal business in wildlife specimens in the area and accordingly informed the relevant authorities for further action.



Arrested suspects with the ivory recovered from the during Isiolo operation February 2011

The suspects were convicted and fined kshs 3,000 (USD 37) each.

1.2.8 "Operation Bangale" in Kenya

In June 2011, two (2) suspects were arrested in Garissa (Northern Kenya) and Bangale (Coast Province - Kenya) by KWS. Following these arrests, LATF officers participated in the interrogation of the suspects. Further information regarding the criminal network was obtained and used to plan for further action.

1.3 Tanzania

1.3.1 Operation in Tanga-Tanzania

In March 2011, a follow up operation of the Mwakijembe operation (*see 1.2.4*) was carried out in Tanga, Tanzania that aimed at recovery of elephant ivory and arrest of suspects. During the operation no recovery of ivory or arrests was made. However, the operation team gained insights into the modus operandi of the criminal syndicates and the intelligence gathered during the operation is being used for follow-ups.

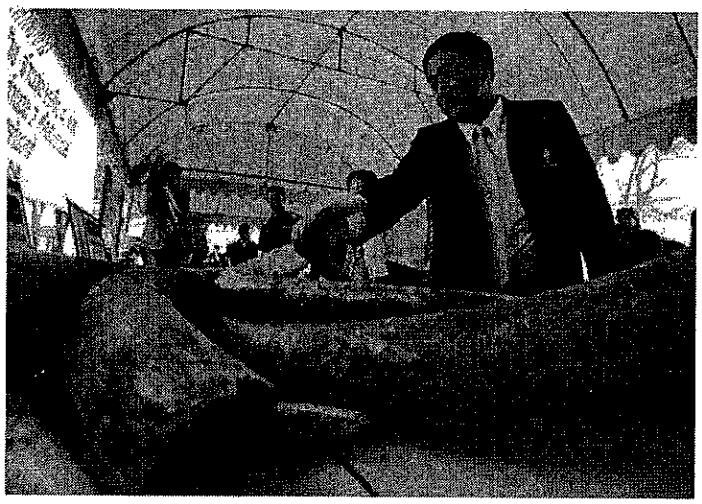
2. INTERNATIONAL INVESTIGATIONS

During the period, LATF continued to receive reports of wildlife contraband seizures from National Bureaus and Partners. It also coordinated and participated in investigations into the seizures with National Bureaus and other partners in the seizing authorities in Asia and those in origin/export countries in Africa. The investigations resulted in the arrest of suspects including two (2) Chinese nationals who were kingpins of ivory smuggling.

2.1 Investigations into 2 tonnes of elephant ivory seized in Bangkok, Thailand

LATF jointly with the Kenya Wildlife Service (KWS) and other law enforcement agencies carried out investigations into seizure of a consignment of raw elephant ivory weighing 2,033kgs (247 pieces) made by the Royal Thai customs officials at the Bangkok seaport on 30th March 2011. This contraband which had been mis-declared as frozen mackerel fish had originated in Mombasa, Kenya.

Subsequently in May 2011 an official of a clearing agency that facilitated the shipment of the contraband was arrested and charged in a Mombasa court. He was later released on a KShs. 2million (USD 24,000) bond and the case is ongoing.



Mr. Poontaneat, Director-General of the Thai Customs Department, displays The confiscated elephant tusks during a news conference at the customs department in Bangkok, (Source: FREELAND Foundation)

2.2 Investigations into seizure of 405 pieces of elephant ivory in Malaysia – Sept 2011

In September 2011, LATF and the investigation office of the Kenya Revenue Authority (KRA) - Southern Region received information from WCO-Regional Intelligence Office (RILO-ESA) (KRA) that a seizure of 405 elephant tusks weighing 2,974kgs had been made by the Royal Malaysian Customs Authority on 8th July 2011 at Pasir Gudang port, Johore Bahru Malaysia. The information was corroborated by a CITES report filed by Department of Wildlife and National Parks Peninsular, Malaysia. The elephant ivory which originated in Mombasa, Kenya was found wrapped in gunny bags inside a 20-foot container and concealed under timber plywood.

LATF together with the KWS carried out the investigations into the seizure in September 2011, assisted by KRA Officers - Mombasa Investigation team in consultation with Senior Deputy Commissioner (SDC) Southern Region to identify the offenders and bring them to book. Three (3) suspects i.e. a Clearing & Forwarding Agent, the exporter and a customs Officer have since been identified and further investigations, especially in the country of seizure – Malaysia, are on-going before prosecution commences.



Ivory seized at Pasir Gudang Port, Johor, Malaysia on 8 July 2011. The ivory was concealed with timber plywood in a container



The ivory wrapped with plastics

2.3 Key Achievements in the investigations

LATF made every effort to coordinate and support Lusaka Agreement member states' law enforcement agencies and its partners in preventing and combating illegal trade in wild fauna and flora. It provided relevant information of strategic, operational and technical nature. In the process of acquiring and processing the information, LATF identified and disrupted international criminal networks resulting in the arrest of kingpins of wildlife smuggling. Joint investigations

with national bureaus and other enforcement agencies contributed to continuous team building and enhanced networking as well as and enhancement of the sustainability of our conservation efforts in the region.

2.3.1 General observation on the investigations

i. The results of the investigations illustrate the importance of cooperative law enforcement in addressing challenges related to effective wildlife conservation;
ii. Ivory found in bulk is more often shipped via sea containers or air freight consignments to countries in Asia, in particular, China, Hong Kong S.A.R, Malaysia, the Philippines, Thailand and Vietnam.
iii. Investigators should be more exposed to the uses of scientific knowledge and sound technologies in wildlife contraband detection, analysis as well as enhance capacities to identify basic corrupt practices associated with wildlife crime and how to better deal with them alongside other crimes. This requires executing specialized training workshops and advance investigations courses for the law enforcement officers.

3. CROSS BORDER MEETINGS

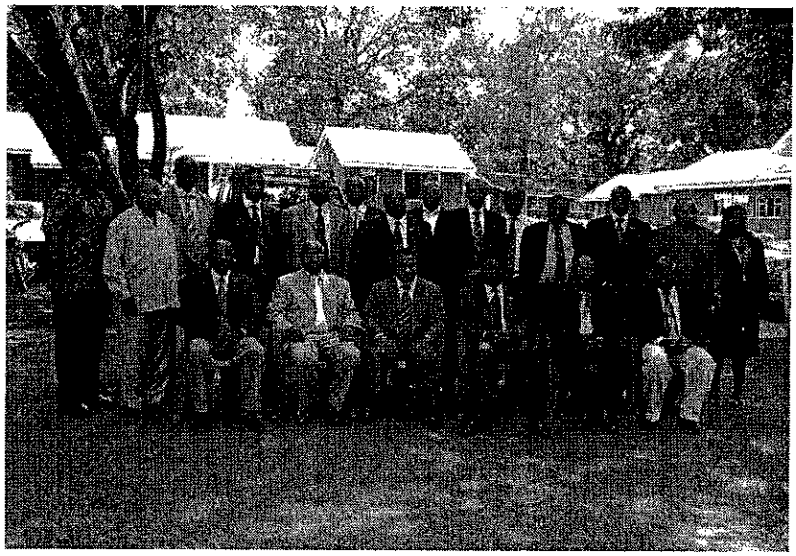
Cross border meetings are primarily convened for purposes of sharing intelligence, enhance cooperation and networking among agencies particular on cross border wildlife crime and illegal wildlife trade.

3.1 Wildlife Law Enforcement Cross border meetings

LATF participated in the 22nd cross border meeting involving officers from Kenya and Tanzania. The meeting formulated among others strategies on how best to combat cross border wildlife crime in the region. This meeting was immediately followed by the Wildlife Director's forum meeting.

3.2 Wildlife Directors' Forum

LATF spearheaded the initiation of the Kenya – Tanzania Wildlife Directors' forum. The inaugural meeting was held in March 2011 in Moshi, Tanzania. This was another important milestone in enhancing collaboration among wildlife institutions in the two states. It was resolved that the Chief Executives of the wildlife authorities will be meeting regularly to discuss matters of common interest to enhance bilateral co-operation in wildlife conservation. The initiative of the Directors' Forum will be expanded to cover all Lusaka Agreement member states in due course.



Group photo – Kenya/Tanzania Wildlife Directors Meeting, Moshi, Tanzania April 2011

4. OTHER MEETINGS AND CONFERENCES

4.1 CITES Ivory and Rhinoceros Enforcement Task Force Meeting in Gigiri, Nairobi – May 2011

The meeting was convened to share and exchange intelligence regarding smuggling of ivory and rhinoceros specimens and develop strategies for combating illegal wildlife trade. The participating countries included China, Ethiopia, Kenya, Mozambique, Nepal, The Philippines, South Africa, Thailand, Tanzania, Vietnam and Zimbabwe. Also present were representatives from UK-NWCU, LATF, INTERPOL, CITES and UNODC. The LATF Director made a

presentation and reiterated the need for enhanced collaboration and coordination in fighting illegal trade.



Group photo - CITES Ivory and Rhinoceros Enforcement Task Force meeting, Nairobi, May 2011 (Seated second right is the LATF Director Mr. Bonaventure EBAYI)

5. CAPACITY BUILDING PROGRAMMES

Capacity building programs are designed to enhance the competences, knowledge, skills and networking of officers from member states as well as the Task Force to effectively combat illegal trade in wild fauna and flora and hence implement the Lusaka Agreement. The capacity development programs entail specialized training courses, awareness workshops, seminars/conferences, acquisition of equipment, LATF staff and infrastructural development.

During the period, the Task Force undertook the following programs jointly with Partners and partly funded by Forest Bureau-COA.

5.1 Training

5.1.1 Regional Training Workshop on Combating Illegal Wildlife Trade Djibouti (June 2011)

LATF provided a resource person at this training workshop organized by IFAW that was aimed at enhancing the skills and expertise of customs officers, law enforcement officers and CITES management authorities to effectively combat illegal wildlife trade.

Twenty two (22) Participants from Djibouti, Ethiopia, Kenya, Somalia and South Sudan attended the training. Other resource persons were drawn from IFAW and INTERPOL.

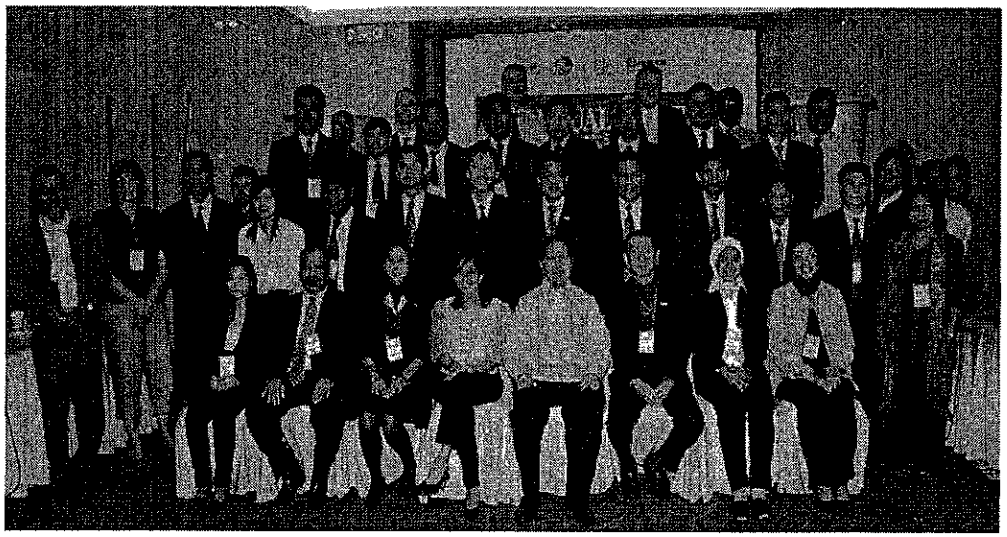
6. PARTNERSHIP DEVELOPMENT AND INTERNATIONAL COLLABORATION

6.1 6th ASEAN WEN Meeting in Manila, The Philippines May 2011

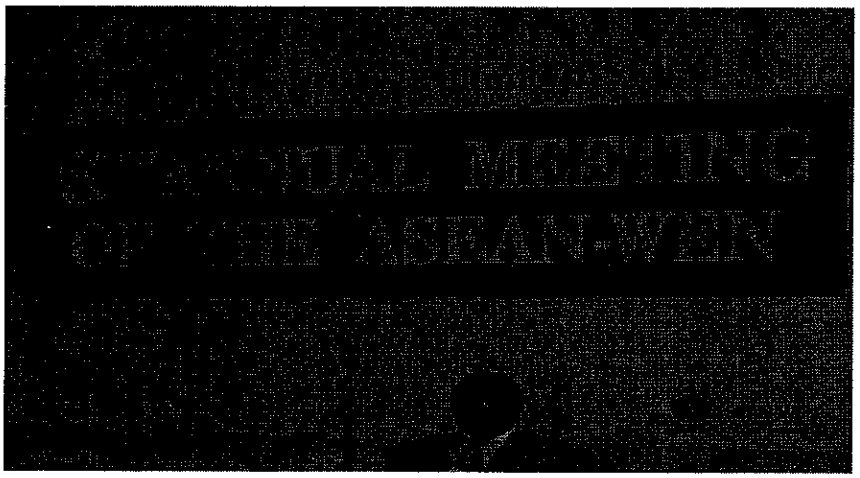
Background

The Lusaka Agreement Task Force (LATF) was represented at the Regional Investigations Training Course (RITC) held at the International Law Enforcement Academy (ILEA) Bangkok, Thailand during November 2010. Together with three Kenya Wildlife Service officers, he participated at a subsequent meeting with Thai and ASEAN-WEN PCU officials on co-operation in investigations concerning smuggling of elephant ivory between Africa and South East Asia.

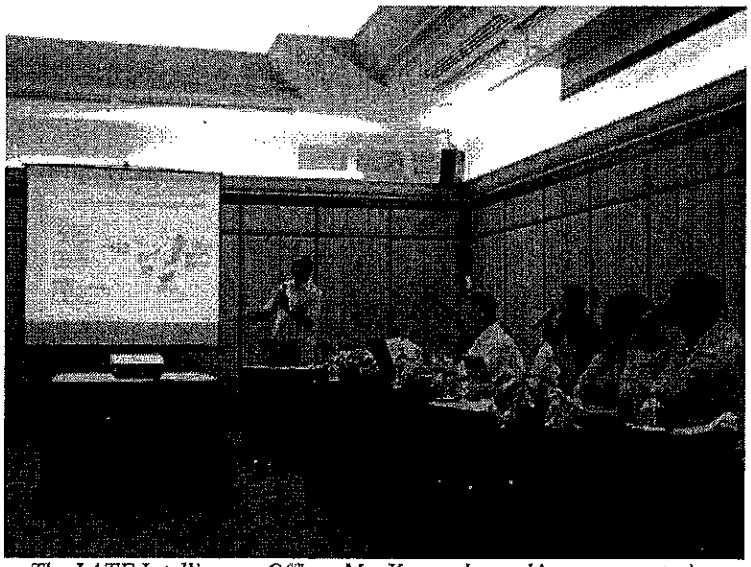
One of the outputs of this meeting was a set of recommendations including (1) expanding the level of co-operation between LATF and ASEAN-WEN to an MoU and (2) Both Parties ASEAN-WEN and LATF to reciprocally invite and attend each other's Annual meetings and Governing Council meetings respectively. In this regard ASEAN-WEN in conjunction with the Philippines Protected Areas and Wildlife Bureau (PAWB) invited LATF to attend the 6th Annual Meeting. The meeting at which the Task Force was represented by its Intelligence Officer took place at Holiday Inn Manila Galleria, Ortigas Center Pasig City Philippines from 25th to 27th May 2011.



ASEAN-WEN delegates & partners at the 6th Annual meeting (3rd on back row (right to left) is LATF's representative to the meeting Mr. Karugaba)



The LATF Representative posing before the banner for ASEAN-WEN's 6th Annual meeting



The LATF Intelligence Officer Mr. Karugaba making a presentation During the November 2010 Meeting

Participants

In attendance at the conference, including the LATF Officer, were representatives from the ten ASEAN-WEN member states (Brunei, Cambodia, Philippines, Malaysia, Singapore, Lao PDR, Myanmar, Indonesia, Vietnam and Thailand), India, FREELAND Foundation, TRAFFIC South East Asia, and a representative of the USA Department of the Interior.

The LATF Intelligence officer delivered a presentation titled *'Lusaka Agreement Task Force-Linkages with ASEAN -WEN'* which was followed by questions and discussions.

LATF Benefits from the Meeting

- Enhanced networking between LATF and ASEAN-WEN as well as other agencies
- Discussion on implementation of law enforcement plans between LATF,ASEAN-WEN FREELAND Foundation and other agencies
- Sharing of experience in wildlife law enforcement and training
- Comparing notes on how ASEAN-WEN and LATF conduct their business

Indeed following these meetings there have been positive outcomes arising from the joint enforcement initiatives resulting in the seizure of 2tonnes of elephant ivory by the Royal Thai Customs Authorities in March 2011 as indicated elsewhere in this report. The following are excerpts from the FREELAND Foundation's press release:

*"**April 1, 2011:** Royal Thai Customs Investigators uncovered more than two metric tons of ivory in a shipping container at Bangkok's seaport on Wednesday. A member of Royal Thai Customs investigation and suppression bureau searched a shipping container that was labeled frozen Mackerel. Upon inspection, the officer found 247 elephant tusks and one ivory piece, weighing 2,033 kg, hidden behind 800 boxes of Mackerel. This represents the first time that Royal Thai customs has seized ivory from a shipment by boat. The evidence is being transferred to Thailand's Department of National Park, Wildlife and Plant Conservation for use in ongoing investigations into the illegal trade in elephant ivory.*

The seizure came one day after the Commander of Thailand's Nature Crime Police stated that the criminals behind the illegal ivory trade were changing their tactics to get around increasing seizures by Thai and African law enforcement. It is another sign that steady collaboration by Thai and African law enforcement is foiling ivory traffickers who are losing huge amounts of money, and that's where you have to hit them to stop them in the pocket, said Steven Galster, Director of FREELAND.

The seizure is the ninth major enforcement action by authorities in Kenya and Thailand since November 2010 when Thai and African authorities met and agreed to work together to investigate transcontinental ivory trafficking. Since then, they have confiscated more than 4 metric tons of ivory, and have arrested seven individuals involved in the illegal trade in ivory.

Customs policy on social protection refers to animal protection as well, said Prasong Poolthanet, Director of Royal Thai Customs, Customs is now cooperating with African officials, and is committed to working with police to combat illegal smuggling of wildlife.

Royal Thai Customs, Royal Thai Police, and the Department of National Park, Wildlife and Plant Conservation Division, as well as members of the African Lusaka Agreement Task Force are collaborating on an ongoing effort to stop the illegal trade of African Elephant ivory into Thailand. Organized by FREELAND and sponsored by the United

States Fish and Wildlife Service (USFWS), and U.S. Agency for International Development (USAID), Thai authorities joined their African counterparts last November at the International Law Enforcement Academy (ILEA) in Bangkok to share intelligence on ivory trafficking. There are plans for follow up meetings in Africa this coming year to continue the progress made toward bringing down the criminal syndicates behind ivory trafficking.'

(Source: FREELAND Foundation website www.freeland.org)

The meeting was very beneficial to LATF in forging closer ties with ASEAN-WEN countries which are major consumers or transit zone of smuggled wildlife products from Africa. In this regard, it is encouraging to note that the meeting discussed and favorably considered a draft MoU between ASEAN-WEN and LATF which has since been approved by the Governing Council Meeting at its 10th Session held in Dar-es-Salaam, Tanzania in November 2011.

III. FINANCIAL ACCOUNTABILITY REPORT

The summary of the accountability showing how the funds were disbursed to support the above activities is attached to this report as **ANNEX I.**

IV. CONCLUSION

LATF jointly with Law Enforcement Agencies in and out of the Lusaka Agreement Member States is stepping up its cooperative Law Enforcement undertakings to address the ever increasing challenge of wildlife crime and trafficking of specimens from the region. In this regard, LATF calls for continued support from all the collaborating agencies, individuals and development partners to join hands in these endeavors.

We wish once again to profoundly recognize and thank sincerely the Forest Bureau-COA of Taiwan for the continued support and cordial working relationship without which we could not have achieved so much during this reporting period.

ANNEX I

LUSAKA AGREEMENT TASK FORCE
FOREST BUREAU, COA
FUND ACCOUNTABILITY STATEMENT: FEBRUARY 2012

SUMMARY		**US$**
Balance B/F	1st February 2011	-
Amount of Grant: *Receipt no. '000459 of 1st September 2011*		**30,000.00**
Expended Amount to Date:		
	Amount Expended as Below	**(32,514.62)**
Excess of expenditure over funds received (covered by LATF)		**(2,514.62)**

ANALYSIS OF EXPENDITURE

PV No.	V. Date	Description of Expenditure	Amount Foreign currency	Exchange rate	Amount US$
LAW ENFORCEMENT OPERATIONS					
CONGO (BRAZZAVILLE)			**FCFA**	**1USD=FCFA**	**US$**
Operations planning in Pointe Noire and Brazzaville- Congo: August-September 2011					
09099	24-Aug-11	Air ticket for LATF Officer : Nairobi Brazzaville-Nairobi (paid to African Tropical Safaris)			**1,049.00**
08790	30-Sep-11	Food & Accommodation for LATF Officer and Operation team			**4,461.00**
08790	30-Sep-11	Hire of vehicles	390,000	460	**847.83**
08790	30-Sep-11	Taxi fare	535,000	460	**1,163.04**
08790	30-Sep-11	Hire of speedboat	100,000	460	**217.39**
08790	30-Sep-11	Air ticket : Brazzaville for Pointe Noire	67,000	460	**145.65**
08790	30-Sep-11	Fuel for hired motor vehicles	109,300	460	**237.61**
08790	30-Sep-11	Air ticket reservation changes - Kenya Airways	50,200	460	**109.13**
08790	30-Sep-11	Informant expenses	300,000	460	**652.17**
08790	30-Sep-11	Cell phone airtime		460	**206.52**

			95,000		
08790	30-Sep-11	Road taxes - government levies	5,500	460	**11.96**
08790	30-Sep-11	Food & refreshments : Consultative law enforcement meetings	364,800	460	**793.04**
08790	30-Sep-11	Follow up expenses in Pointe Noire and Kinshasa			**700.00**
SUB-TOTAL					**10,594**
KENYA			**KShs**	**1USD=KShs**	**US$**
"Operation Ahmed" Investigations in Northern Kenya (Hulugo, Isiolo, Kenya/Ethiopia Border Operations)- 2operations					
08562	29-Mar-11	Food and Accommodation for LATF Officers & Investigation teams	324,858	82	**3,961.68**
08562	29-Mar-11	Fuel for motor vehicles used in the operations - LATF and KWS vehicles	30,750	82	**375.00**
08562	29-Mar-11	Taxi hire during the operations	2,300	82	**28.05**
08562	29-Mar-11	Communication - Cell phone airtime expenses	17,700	82	**215.85**
08562	29-Mar-11	Informant rewards and Intelligence gathering expenses	118,850	82	**1,449.39**
08565	01-Apr-11	General Parts and repairs for LATF motor vehicle - KX37A05	6,050	82	**73.78**
Investigations into seizure of 247 elephant tusks (2033kg) seized in Bangkok, Thailand originating in Mombasa, Kenya			**KShs**	**1USD=KShs**	**US$**
08621	30-May-11	Food & Accommodation for LATF Field Officer in Mombasa: 11days @ USD 200			**2,200**
08621	30-May-11	Expenses for 2 investigation officers and support team	12,000	83	**144.58**
08621	30-May-11	Fuel for official vehicle used in investigations (KWS vehicle) - Safari Plaza Ltd-Total service stn	8,600	83	**103.61**
08621	30-May-11	Photocopying of documents in Mombasa	215	83	**2.59**
Investigations in Mombasa, Kenya into 405 pieces of ivory seized at Pasir Gudang Port in Malaysia			**KShs**	**1USD=KShs**	**US$**
08786	30-Sep-11	Food & Accommodation for LATF officer & back up investigation team			**1,262.80**
08786	30-Sep-11	Taxi fare	3,900	97	**40.21**
08786	30-Sep-11	Fuel for vehicle used during the investigations : KBL 330G	9,132	97	**94.14**
08786	30-Sep-11	Cell phone airtime for coordination	1,500	97	**15.46**
Intelligence Gathering Expenses			**KShs**	**1USD=KShs**	**US$**
08617	29-May-11	Expenses of Informant Hussein Jide on elephant poaching & firearms/ammo smuggling-Northern			**48.78**

		Kenya	4,000	82	
08652	30-Jun-11	Investigation expenses of a suspect in Bangale area -	4,100	82	**50.00**
05098/'0 5137	30-Jun-11	Informant reward for assisting in arrest of a notorious elephant poacher in Meru/Kora National Park	100,000	85	**1,176.47**
08675	02-Jul-11	Intel expenses (Informant Eagle Eye) on smuggling of sandalwood from Uganda to Kenya	3,000	82	**36.59**
08758	29-Aug-11	Intel expenses (Informant Eagle Eye) on smuggling of sandalwood from Uganda to Kenya	2,500	82	**30.49**
08758	29-Aug-11	intel expenses - Informant Eagle Eyes -	2,500	82	**30.49**
08778	20-Sep-11	Transport for informant : Nairobi to NE Kenya (Garissa) to gather intel on illegal ivory trade- Hassan Sheikh	3,000	82	**36.59**
08820	18-Oct-11	Informant expenses - gathering intelligence on rhino syndicate in Nairobi in Oct 2011	6,300	97	**64.95**
08821	18-Oct-11	Informant expenses - gathering intelligence on rhino syndicate in Nairobi in Oct 2011	4,200	97	**43.30**
SUB-TOTAL					**11,485**
TANZANIA			**TShs**	**1USD=TShs**	**US$**
Follow up Investigations in Dar-es-Salaam into the 2005.6 kg ivory seized in Vietnam in August 2009					
08648	28-Feb-11	Return air ticket: Nairobi-Dar-Nairobi			**300.00**
08648	28-Feb-11	Food & Accommodation for LATF Officer			**600.00**
08648	28-Feb-11	Taxi fare in Nairobi : Kshs 3,000	3,000	80	**37.50**
08648	28-Feb-11	Taxi fare in Dar-es-Salaam: TShs 40,000	40,000	1,500	**26.67**
08648	28-Feb-11	Cell phone airtime: Kshs 2,000	2,000	80	**25.00**
Operations in Tanga, Tanzania - March 2011					
08555	25-Mar-11	Food & Accommodation for LATF officer & back up investigation team			**2,925.00**
08555	25-Mar-11	Communication (airtime): KShs 1,000	1,000	80	**12.50**
08555	25-Mar-11	Intelligence expenses/informant KShs 12,000	12,000	80	**150.00**
08555	25-Mar-11	Fuel for LATF vehicles: KShs 6,643	6,643	80	**83.04**
08555	25-Mar-11	Fuel for Tanzania Wildlife Division vehicles : TShs 505,000	505,000	1,400	**360.71**
08555	25-Mar-11	Vehicle repair and maintenance costs -in Kenya enroute to Tanzania: KShs 300	300	80	**3.75**
08555	25-Mar-11	Vehicle repair and maintenance costs -while in Tanzania: TShs 22,000	22,000	1,400	**15.71**
08555	25-Mar-11	Ferry charges: KShs 165	165	80	**2.06**

SUB-TOTAL					**4,542**
UGANDA			**Ushs**	**1USD=UShs**	**US$**
Operational Planning meeting in Uganda - September 2011					
08787	30-Sep-11	Food and accommodation expenses - LATF Intelligence Officer: 5days@USD250			**1,250**
08787	30-Sep-11	Cell phone airtime (In Kenya) - Kshs 3,500			**38**
08787	30-Sep-11	Cell phone airtime (In Uganda) - MTN Uganda	70,000	2,760	**25**
08787	30-Sep-11	Taxi (In Kenya KShs 3900)			**42**
08787	30-Sep-11	Taxi (In Uganda)	610,000	2,760	**221**
08787	30-Sep-11	Internet usage and printing	14,500	2,760	**5**
08787	30-Sep-11	Intelligence gathering expenses - informants	60,000	2,760	**22**
08787	30-Sep-11	Investigation expenses - support to prosecution			**100**
09110	16-Sep-11	Air ticket : Nairobi - Entebbe - Nairobi			**373**
SUB-TOTAL					**2,077**
MEETINGS			**TShs**	**1USD=TShs**	**US$**
22nd Kenya/ Tanzania Cross Border Wildlife Officers Meeting' and Directors Forum - April 2011					
08659	18-Apr-11	Food & Accommodation for LATF Officers: 3 pax (Intelligence Officer, Field Officer & Driver)			**1,025**
08659	18-Apr-11	Fuel for LATF Motor vehicle KX37A05	270,000	1,505	**179**
08659	18-Apr-11	Insurance cover for LATF vehicle KX 37A05: KShs 2,500			**31**
08659	18-Apr-11	Shuttle and taxi expenses: KShs 2300			**29**
08659	18-Apr-11	Cell phone airtime	35,000	1,505	**23**
08659	18-Apr-11	miscellaneous expenses - medical	20,000	1,505	**13**
6TH ASEAN-WEN ANNUAL MEETING - Manila, The Philippines: 25th - 27th May 2011					
09051/09 062	20-May-11	Food & Accommodation for LATF Intel Officer in Manila, The Philippines			**1,540**
CITES Rhinoceros & Elephant Enforcement Meeting held in Gigiri, Nairobi in May 2011			**KShs**	**1USD=KShs**	**US$**
08599	19-May-11	Taxi charges	7,700	82	**94**
SUB-TOTAL					**2,935**

INTER-AGENCY TRAINING/WORKSHOPS					
Multiagency wildlife law enforcement Officers consultative training workshop in Djibouti -August 2011					**US$**
08753	19-Aug-11	Food & Accommodation for LATF Officer –as a Resource person at a wildlife law enforcement workshop in Djibouti :			**800**
08753	19-Aug-11	Taxi: airport transfers			**47**
08753	19-Aug-11	cell phone airtime			**35**
SUB-TOTAL					**882**
GRAND TOTAL					**32,515**

ANNEX II

ACTIVITIES UNDERTAKEN WITH THE SUPPORT OF OTHER LATF PARTNERS

1. CAPACITY BUILDING PROGRAMMES

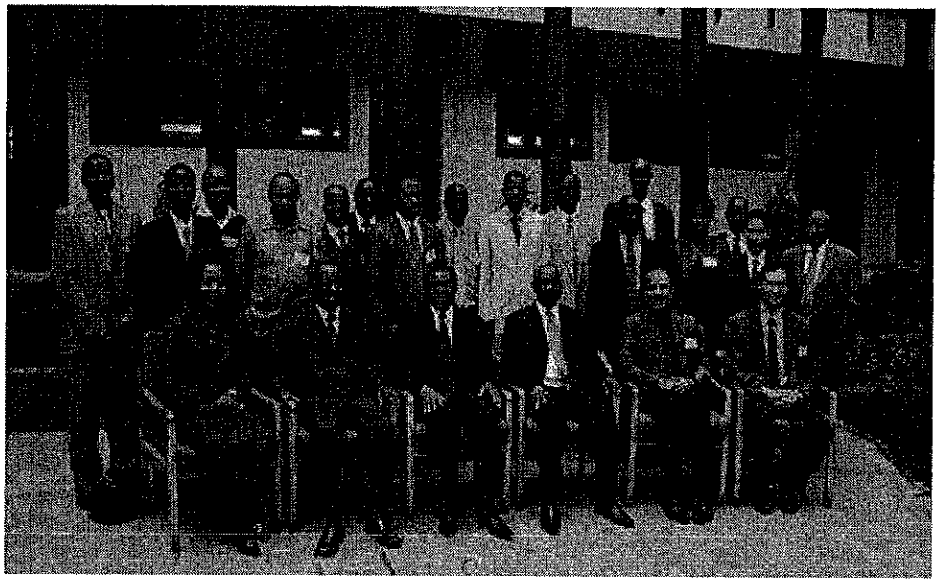
1.1. `Training on the Wildlife Enforcement Monitoring System (WEMS) – May 2011

This Regional Training was the first of its kind in the implementation of WEMS in Africa. WEMS is a web based software which brings together various national institutions to a common information sharing platform and thereby builds the capacity of the institutions to manage knowledge on wildlife crime trends and threat assessments.

The training was opened on 23rd May 2011 at 1045hrs by Mr. Mohamed Wa - Mwamchai, Permanent Secretary Ministry of Forestry and Wildlife at the KWS Headquarters in Nairobi, Kenya. Others who graced the occasion were Mr. Bonaventure Ebayi (Director LATF), Mr. James Isiche (Regional Director IFAW East Africa), Dr. Margaret Oduk(UNEP- DELC), Mr. Elema Halake(Representing Director KWS) and Mr. Remi Chandran(ITC-University of Twente).

The training attracted eleven participants from four Lusaka Agreement Parties namely Congo, Kenya, Uganda and The United republic of Tanzania. Two staff of LATF also participated in the training. The session ended on 25th May 2011. The resource persons were Mr. Remi Chandran (ITC- University of Twente, The Netherlands), Dr. Ng Chong (UN University-Japan) and Mr. Nguyen Khoi (WEMS Software Engineer).

The training was facilitated/sponsored by IFAW.



Group photo -regional training workshop on WEMS - Nairobi Kenya, May 2011

2. AFRICAN ELEPHANT LAW ENFORCEMENT DAY CELEBRATIONS

The African Elephant Law Enforcement Day held on 20th July 2011 was a significant occasion set aside to celebrate the importance of the African elephant, appreciating the challenges faced and create awareness for its effective conservation. The event also focussed on recognizing and demonstrating our solidarity with the wildlife law enforcement fraternity as it strives to curtail elephant poaching and illegal trade in elephant ivory as well as other wildlife products, thereby conserving our wildlife heritage for posterity. The main theme for the event is ***'Fostering co-operation to combat elephant poaching and ivory trafficking in Africa'***. The following activities were carried out during the celebrations:

2.1 Awarding of Wildlife Law Enforcement Heroes

One of the key activities in the African Elephant Law Enforcement Day Celebrations was the award of wildlife law enforcement heroes recognized for their pivotal role in conservation as they work tirelessly and often risk their lives in the fight against wildlife crime and in particular the conservation of the African elephant.

The African Elephant Law Enforcement Award was designed to recognize outstanding achievement, commitment and/or leadership by law enforcement officers to the conservation and protection of the African elephant. Candidates for the award will be nominated from Parties to the Lusaka Agreement namely Congo, Kenya, Lesotho, Tanzania, Uganda and Zambia.

The candidates were specifically awarded for:

(i) Outstanding achievement in an operation or activity that has contributed noticeably to the efforts aimed at reducing elephant ivory smuggling in each member state to the Lusaka Agreement;

(ii) Demonstrated commitment to elephant law enforcement activities in a member state; and/or

(iii) Proven leadership in a law enforcement organization or project which has increased the public's awareness and understanding of the adverse effects of elephant ivory smuggling.

In this regard the Lusaka Agreement member states nominated their best candidates for this award and forwarded five names to the Lusaka Agreement Task Force. The Chief guest His Excellency Mwai Kibaki conferred the heroes with a certificate of honour , bronze statuette and a medal, at the main African Elephant Law Enforcement celebrations held at the KWS Training School Manyani, Kenya on 20th July 2011 . The heroes awarded (whose citations attached as ***Annex II***) were as follows:

Mr. Paco Bockandza	(Congo Brazzaville)
Mr. Daniel Yiankere	(Kenya)
The Late Mr. Kassim Mtambo	(Tanzania) - awarded posthumously - *received on behalf by a LATF officer*
Mr. Lulu Itipa	(Uganda)
Mr. Philemon Kapeshi	(Zambia)



Proud wildlife law enforcement heroes pose with His Excellency Mwai Kibaki (fifth from left) President of the Republic of Kenya flanked by Prof. Ephraim Kamuntu (front row right) and the LATF Director (far right) and the KWS Director (far left).

The holding of the African Elephant Law Enforcement Day celebrations was approved by the Governing Council meeting at its 10th Session held in November 2011 in Dar-es-Salaam, Tanzania.

2.2 Launching of the Wildlife Enforcement Monitoring System (WEMS)

LATF has entered into a tripartite Agreement with United Nations University - Japan and ITC University of Twente in Netherlands to implement the Wildlife Enforcement Monitoring System (WEMS) in Africa. WEMS is an environmental governance model defined in accordance with the Bali Strategic Plan for Technology Support and Capacity Development and assists in monitoring the effectiveness of enforcement and compliance of wildlife law at a national level.

The Wildlife Enforcement Monitoring System (WEMS), developed by the United Nations University (UNU), is the culmination of seven years of interdisciplinary field research involving policy makers, enforcement officials, computer scientists and civil society groups to address the challenges relating to documenting illegal wildlife exploitation and to provide a clear picture of trends regarding trans-boundary illegal wildlife trade. The main goal of WEMS in Africa is to strengthen information and

reporting processes as well as analysis capabilities pertaining to the monitoring of illegal wildlife trade at both the national and regional levels. The system will also affirm the obligation of Parties to the Lusaka Agreement and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) to collaborate closely in the application of the Convention as defined in the resolution on enforcement and compliance of CITES (Conf. 11.3 [Rev. CoP15]).

Mr. Bonaventure Ebayi, Director of LATF, stresses that "*information sharing is a key component to combating wildlife crime in Africa. The effective implementation of WEMS in Africa will impact positively on information sharing and analysis at a global level as well as facilitate good understanding of our challenges by our partners and enhance our efficiencies in wildlife conservation*". He adds, "*this is an important milestone towards achieving the ultimate objective to create an information centre of wildlife crime in Africa by pooling data on illegal trade from various national agencies in the region*".

"*UNU-IAS is pleased to be a partner in this important research and capacity building project in Africa using the WEMS platform in partnership with LATF and ITC Netherlands*", says UNU Vice-Rector and UNU-IAS Director, Prof. Govindan Parayil. He adds "*This is amongst several initiatives that UNU is undertaking to enhance our engagement with our partners and other stakeholders in Africa*".

It is also aimed at providing timely national data and analysis on illegal trade of endangered species of wild fauna and flora. It is a database that will monitor enforcement effort against trafficking and illegal trade in wild fauna and flora through a joint efforts carried out by United Nations bodies, national governments, private industries, civil society and research institutions, by building a common data collection and reporting mechanism at regional and national levels.

The project will bring together various national institutions to a common information sharing platform and thereby build the capacity of the states to manage knowledge on wildlife crime trends and threat assessments. The compiled data will then be analyzed and selected non-nominal information will be made available online through the WEMS website. WEMS will also be helpful in providing analyzed information electronically to all the national enforcement agencies i.e. Customs, Police, Wildlife and Forestry and international policy makers including

INTERPOL and the CITES Secretariat. Selected information will be shared with the public for creating awareness on wildlife Crime. The WEMS initiative works by bringing together these agencies to a common information sharing platform within the national governments and this will improve inter agency cooperation in tackling environmental crime.

The implementation of WEMS in Africa will take place in phases through the establishment of a regional environmental governance framework for research and development co-operation between LATF, UNU-IAS and ITC. The pilot implementation of the project in Africa will involve three member states to the Lusaka Agreement, namely, Kenya, Tanzania and Uganda. A second phase will involve all the Lusaka Agreement member states and thereafter other interested African States.

The Task Force has commenced implementation on pilot basis in four member states namely Congo, Kenya, Tanzania, and Uganda and will soon be expanded to cover other member states and the rest of Africa. The WEMS implementation commenced with the successful completion of the regional training workshop from 23 to 25 May 2011 in Nairobi, Kenya, organized by LATF in collaboration with the UNU and ITC, which drew participants from Congo, Kenya, Tanzania and Uganda.

This important milestone in the implementation of WEMS in Africa is being made possible with financial support by the International Fund for Animal Welfare (IFAW), ESRI Corporation and the Parties to the Lusaka Agreement.

On 18th July 2011 the WEMS programme was launched at the Laico Regency Hotel in Nairobi by Hon Minister Noah Wekesa as part of the activities culminating to the African Elephant Law Enforcement Day Celebrations. The launching ceremony was also graced by Prof. Govindan Parayil the Vice-Rector of the United Nations University - Japan and Dr. Paul van Dijk as well as Dr Remi Chandran of ITC-University of Twente who gave presentations during the event.

2.3 Disposal of 6.5tonnes of contraband elephant Ivory seized in Singapore in June 2002

This activity was undertaken in fulfilment of Decision IX/6 of the 9th Governing Council meeting held in October 2008, on disposal of the contraband in accordance with the CITES

provisions and other relevant internationally agreed standards. In carrying out the disposal, LATF consulted with key stakeholders such as the Secretariats of CITES and INTERPOL and thereafter constituted an Implementation Committee to oversee the disposal in accordance with resolution of the Ministerial Meeting. Consequently in July 2011, the Task Force in collaboration with the Kenya Wildlife Service and other stakeholders convened the first ever African Elephant Law Enforcement Day celebrations. The activities of the celebrations included creation of awareness, launch of the African Law Enforcement Special Account (AELESA) and the Wildlife Enforcement Monitoring System (WEMS), Donation of assorted books to the Kenya Wildlife Service Field Training School – Manyani and awarding of wildlife law enforcement heroes.

The celebrations climaxed in the launch of the African Elephant Law Enforcement Day on 20th July 2011 at the Manyani KWS Field Training School-Voi, Coast Province by His Excellency Mwai Kibaki President of the Republic of Kenya during which about 5 tonnes of the contraband ivory comprising 335 elephant tusks and 41,553 ivory hankos were burned. The event was witnessed by representatives from Lusaka Agreement Member States led by Hon. Professor Ephraim Kamuntu Minister for Tourism, Wildlife and Heritage of the Republic of Uganda representing the President of the 9th Governing Council and Hon. Dr. Noah Wekesa Minister for Forestry and Wildlife of the Republic of Kenya, Ambassadors, High Commissioners and other Members of the Diplomatic corps, UN entities, Inter-governmental organizations, Conservation NGOs, Local as well as International media and the public. Subsequently, in August 2011, elephant tusks and ivory hankos were repatriated to Zambia and Malawi for non-commercial purposes as per the resolutions.



His Excellency Mwai Kibaki the President of Kenya sets the contraband ivory ablaze. He is flanked by Prof. Ephraim Kamuntu, Representative of the President of the Lusaka Agreement Governing Council

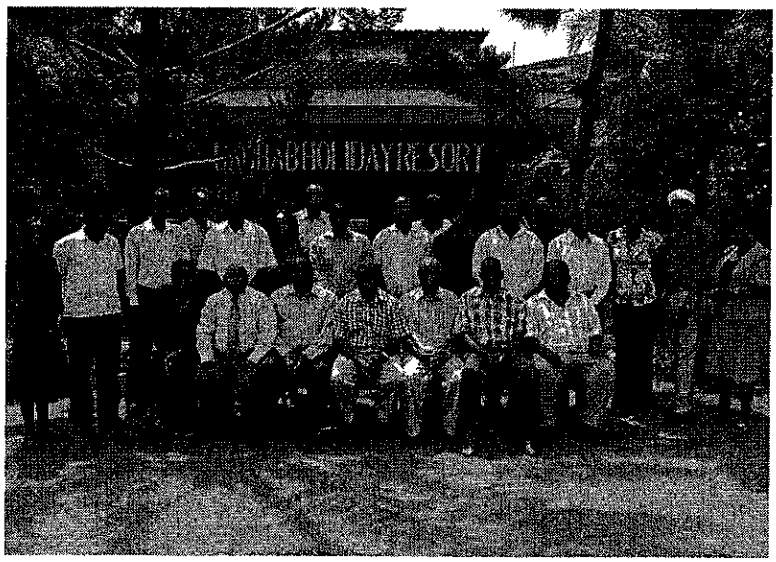
3.0 CAPACITY BUILDING PROGRAMMES

The Task Force conducted the following wildlife law enforcement inter-agency workshops with the support of the United Nations Environment Programme (UNEP). The objectives of these workshops was to share experiences in wildlife law enforcement, review wildlife crime trends, enhance cooperation and networking among the agencies as well as formulate strategies for combating illegal trade in the respective countries. The workshops were held against the background of rampant illicit wildlife trade in the region evident in the large wildlife contraband originating in Africa seized overseas and the need to stem this vice.

3.1 Inter-agency Workshop – Mombasa, Kenya

LATF jointly with the Kenya Wildlife Service (KWS) convened a two-day interagency awareness workshop from 24th to 25th November 2011 at the Baobab Resort Hotel, Mombasa for law enforcement officers from Customs, Kenya Airports Authority, Kenya Ports Authority, Port Police and Kenya Wildlife Service. Twenty two (22) participants drawn from these institutions attended the workshop. Resource persons were drawn from the KWS, LATF, KRA Customs -

Regional Intelligence Liaison Office Eastern & Southern Africa Office (RILO-ESA), Interpol Regional Bureau-Kenya and Ethics & Anti-Corruption Commission (EACC)-Kenya. The workshop was officially opened by the Assistant Director for the Tsavo Conservation Area Mr. Wilson Korir.



Participants of the Inter-agency awareness workshop at the Baobab Resort Hotel, Mombasa-Kenya

3.2 Lusaka-Zambia Inter-agency Workshop

This two-day inter-agency workshop was facilitated by LATF and organized jointly with Zambia Wildlife Authority (ZAWA) to sensitize other LEAs especially those manning entry/exit points. It was held from 28th to 29th November 2011 at the Garden House Hotel, Mumbwa Road, Lusaka for twenty four (24) law enforcement officers drawn from the Zambia Revenue Authority (ZRA)-Customs, National Airport Corporation, Police, Anti-Corruption Commission, Drug Enforcement Commission, Plant/Phytosanitary Unit, Airport Cargo Handling and Zambia Wildlife Authority. The Resource persons were drawn from ZAWA, LATF, Zambia Revenue Authority (ZRA), INTERPOL, Directorate of Public Prosecutions and Anti Corruption Commission. The Workshop was officially opened by Hon. Wylbur Simuusa (MP), Minister for Mines and Natural Resources of the Republic of Zambia.



Participants of the Inter-agency awareness workshop at the Garden House Hotel, Lusaka-Zambia. (Seated second from left is the Minister for Mines and Natural Resources, Hon. Wylbur Simuusa MP)

3.3 Inter-agency workshop – Mbarara, Uganda

The Lusaka Agreement Task Force (LATF) jointly with the Uganda Wildlife Authority (UWA) organized and convened a two-day interagency wildlife awareness workshop at the Acacia Hotel in Mbarara, Western Uganda from 1st to 2nd December 2011.

The objective of the workshop was to raise awareness among various law enforcement partners on the need to share information and have concerted efforts to conserve wildlife resources of Uganda. The workshop was attended by 30 participants drawn from the Uganda Judiciary, Directorate of Public Prosecutions, Uganda Police, Uganda Revenue Authority (URA), UWA and the Internal Security Organization.

Resource persons were drawn from the Uganda Revenue Authority, Uganda Police, Directorate of Public Prosecutions, Judiciary, Uganda Wildlife Authority and the Lusaka Agreement Task Force.

The workshop was opened by Mr. Edgar Buhanga, Senior Planning and EIA Coordinator who represented the Executive Director of Uganda Wildlife Authority.

On 2nd December 2011, the participants were taken on a guided tour of Lake Mburo National Park to appreciate the values of wildlife conservation.



Participants of the Inter-agency awareness workshop held at the Acacia Hotel, Mbarara-Uganda

3.4 Inter-agency workshop – Brazzaville, Congo

This inter-agency workshop was held in Brazzaville on Wednesday 14th, December 2011, in the conference hall of the Ministry of Sustainable Development Forest Economy and Environment. It was attended by 20 participants from various law enforcement agencies responsible for conservation of wild fauna and flora from the ministry in charge of forests and wildlife namely:

- The Office of the Minister
- The Lusaka Agreement National Bureau
- The Congolese Agency for Wildlife and Protected Areas
- The Wildlife and Protected Areas Directorate
- The Support Project for the Implementation of the Wildlife Act (PALF)
- The Departmental Directorate of Forestry Economy of Brazzaville

Present also were representatives of the Congolese Customs Service and the Brazzaville High Court Prosecutor. Inter-agency workshops are part of the priority activities in the implementation of the Lusaka Agreement.



Participants closely follow proceedings of the inter-agency workshop in Brazzaville

Benefits of the workshops

The workshops are important avenues for exchanging experiences and identification of appropriate solutions to help combat environmental crimes. Such sessions allow officers of different departments and agencies to gain useful insights into the intricacies of illegal wildlife trade and become better acquainted thus further enhance cooperation and collaboration/networking among themselves to effectively undertake law enforcement in the conservation of wild fauna and flora.

國際野生物貿易研究委員會計畫報告

TRAFFIC 於 1976 年由世界自然基金會(World Wide Fund for Nature, WWF)和國際自然保育聯盟(The International Union for Conservation of Nature, IUCN)共同設立。TRAFFIC Network 於全球將近 30 國，8 個地區約有 30 個分部辦公室，100 餘位工作人員。TRAFFIC 主要任務為監測國際間野生動植物貿易現況。TRAFFIC 為世界公認主要的野生物貿易監測組織及對華盛頓公約(Convention on International Trade in Endangered Species of Wild Fauna and Flora, CITES)運作有深入瞭解的國際民間團體(Non-Governmental Organization, NGO)。TRAFFIC 與 CITES 秘書處有簽訂合作備忘錄(MOU)，與世界海關組織(World Customs Organization)也有密切合作關係。TRAFFIC 也與數個國家政府機構(尤其是查緝單位)簽訂 MOU。

依據數年計畫資料 TRAFFIC 工作案例舉例如下：

- 英國犯罪情報署(National Criminal Intelligence Service, NCIS)於 2002 年設立時，TRAFFIC 與該署的野生動物犯罪情報小組(National Wildlife Crime Intelligence Unit, NWCIU)合作，TRAFFIC 並於 2003 年支援一名人員至 NWCIU 工作。2006 年 10 月，國家野生動物犯罪小組(National Wildlife Crime Unit, NWCU)設立。之後與 TRAFFIC 持續合作，協助查獲多起違法案件。
- 持續調查象牙貿易現況為 TRAFFIC 重點工作。大象貿易資訊系統(Elephant Trade Information System, ETIS)截至 2008 年 12 月 31 日止，已有 13,220 筆資料。CITES 常設委員會討論象牙案時，TRAFFIC 提供近期查獲大量非法象牙案等相關資料，供與會者參考。例如 TRAFFIC 於 CITES 第 15 屆締約國大會提出 ETIS 報告(CoP15 Doc. 44.1 Annex)，說明 1992 至 2009 年非法象牙貿易之趨勢，供各締約國參考。
- 支援 CITES 運作為 TRAFFIC 工作項目之一，例如針對 CITES 第 12.5 號決議，TRAFFIC 調查發現亞洲大型貓科動物原產國相關法令之缺失，成功移送法辦案例稀少，刑罰太輕無法遏阻犯罪行為，庫存品管理情況不明，欠缺執法能力等問題。TRAFFIC 與其他團體於第 58 屆 CITES 常設委員會期間，建議原產國每年向常設委員會報告，執行 CITES 第 12.5 號決議相關措施，此提案並於 CITES 第 15 屆締約國大會討論。
- TRAFFIC 長期蒐集老虎、犀牛、大象、海龜等情報資料，協助各

國查緝單位查獲非法貿易案件。例如印度逮捕盜獵者和中國查獲象牙案等。

- 與東南亞國協(Association of South East Asian Nations, ASEAN)會員國合作，設立東南亞野生動物執法聯絡網(Wildlife Enforcement Network，簡稱 ASEAN-WEN)，並持續辦理訓練班。
- 持續提供南亞環境合作計畫(South Asia Co-operative Environment Programme, SACEP)成員諮詢服務，並協助設立南亞野生動物執法聯絡網(South Asia Wildlife Enforcement Network，簡稱 SAWEN)，共同合作打擊非法野生物貿易。參與國家包括阿富汗、孟加拉、不丹、印度、馬爾地夫、尼泊爾、巴基斯坦和斯里蘭卡。
- 參加生物多樣性公約(Convention on Biological Diversity, CBD)締約方大會(Conference of Parties)和科諮機構會議(Subsidiary Body on Scientific, Technical and Technological Advice, SBSTTA)。TRAFFIC 重點議題包括野生動物貿易、永續利用、野生動物作為肉類來源、減少非法和非永續野生物貿易之方法、藥用植物貿易和保護區議題等。TRAFFIC 網站為 CBD 大會和 SBSTTA 會議所設 update 也獲得許多迴響。
- TRAFFIC 參加漁業和貿易管理相關會議，例如區域性漁業管理機構會議。討論以貿易措施永續性管理魚類資源之可行性、鮪魚管理和誤捕議題。
- 參加國際熱帶木材組織(International Tropical Timber Organization, ITTO)相關會議，檢討 ITTO 指南和永續森林經營管理。
- 2010 年 11 月，參加於俄羅斯聖彼得堡召開之國際老虎論壇。13 個原產國同意合作推動全球老虎拯救計畫(Global Tiger Recovery Programme, GTRP)。
- TRAFFIC 各地工作人員努力將議題聚焦於盜獵和貿易面向，提高媒體曝光率，促使決策者重視此議題。包括出版泰國和緬甸大型貓科動物非法貿易議題之報告，以及製作影片 Closing a Deadly Gateway 描述緬甸邊界非法貿易情形等。
- TRAFFIC 網頁內之 CITES 專頁，廣受歡迎。例如 2010 年 1 月設立之 CITES 第 15 屆締約國大會專頁，3 月間吸引創紀錄 31,800 人閱覽 91,000 網頁資料。讀者下載報告在大會召開期間也高達每週 3,600 個檔案，IUCN 和 TRAFFIC 合作出版的「CITES 第 15 屆締約國大會附錄物種提案分析及建議報告」點閱率很高。

TRAFFIC 發佈之新聞稿，經常被國際媒體引用。例如：

- 2009 年 11 月，TRAFFIC 發佈新聞，描述深海刺網對非目標物種

的危害，而南太平洋地區漁業管理機構(South Pacific Regional Fisheries Management Organization, SPRFMO)可能允許刺網之使用。此報導成為澳洲公共電視台暨廣播電台(Australian Broadcast Corporation)最多人點閱的新聞。數天後，SPRFMO 決定於該管區域內禁止使用刺網。

- 2010 年 8 月間，TRAFFIC 報導曼谷機場發現由泰國前往伊朗旅客行李中有被麻醉幼虎，之後數天 850 個網站轉述此新聞。

TRAFFIC International 計畫執行情形，以及 2011 年主要成果如下：

壹、支援全球執法行動

一、調查國際主要非法貿易案

- 蒐集情報、查緝沒入、貿易路線和走私方法等資料。
- 確認非法國際野生物貿易重大案件資料。
- 經由 TRAFFIC 聯絡網調查需優先處理案例。
- 提供調查資料，以利相關單位採取行動遏止非法貿易。

建立資料監測網，蒐集野生物貿易資料供分析和研議後續行動之用。彙集全球查緝沒入資料，大宗資料來自東南亞、東亞、南亞和非洲。資料分析可協助確認野生動物犯罪行為之熱點(hotspots)。TRAFFIC 調查發現近年來馬達加斯加 Critically Endangered 陸龜運往東南亞之數量遽增，經與 IUCN/SSC 淡水龜和陸龜專家小組合作，因而於中國、印尼、馬來西亞、泰國查獲相關非法貿易案。

經由分析 2009 年至 2010 年資料，發現走私象牙新路線，越南成為非洲國家象牙走私至中國之轉運站。調查發現新的走私手法，例如將非法象牙製品藏於椰子形狀之木雕中，或將 74 個鸚鵡蛋藏在椰子殼雕刻成之猴子中等。

2011 年提供 100 餘則情報資料，供各國查緝單位運用。相關案件包括馬達加斯加沒收近 200 隻稀有陸龜，印尼攔截 18 隻非法走私針鼴，馬來西亞查獲 100 餘隻印度星龜，印度逮捕盜獵者 15 人，沒收 4 張豹皮、15 水獺皮、3 隻犀牛角、1 張虎皮、大型陷阱和槍支。

TRAFFIC 持續發表貿易調查報告，2011 年工作包括：

- 出版亞洲熊膽貿易報告 Pills, Powders, Vials & Flakes: The bear bile trade in Asia。
- 修訂埃及象牙產製品貿易報告。
- 進行網路象牙製品貿易調查。

二、蒐集、分析及傳送非法貿易情報資料

- 持續更新資料至情報分析資訊管理系統。
- 支援 EU TWIX。
- 傳遞情報資料給各國執法機構，以決定後續調查和行動。
- 及時提供情報資料協助查緝違禁品和走私者。
- 研發情報分析和傳遞技術。

TRAFFIC 負責設立及維護的歐盟野生物貿易資料交換系統(EU Trade in Wildlife Information eXchange, EU-TWIX)持續運作，參與此計畫者包括 27 個歐盟國家、Croatia、Montenegro、挪威、Serbia、瑞士和烏克蘭，550 餘位執法人員使用此系統，目前資料庫中已建立 31,000 筆沒入資料(seizures records)。

2010 年發出 7 次 EU-TWIX Enforcement Alerts (查緝警報)，主要是陸龜走私方法、非法貿易路線、人工繁殖之情形、鑑定資料等。結果包括：

- 世界海關組織徵詢分享使用 EU-TWIX Alerts，尤其是由馬達加斯加非法輸出之訊息。
- 法國海關設立 EU-TWIX 看板，並與 EU-TWIX 成員分享訓練資料。
- 經由 TRAFFIC Japan 協助，提供日本海關非法陸龜貿易訓練資料。
- 經由 EU-TWIX 系統，找到非法貿易運作地點。

TRAFFIC 協助印度政府監測和更新老虎保育和野生動物死亡率資料庫(National Tiger Conservation Authority for Tigers and Wildlife Mortality, www.tigernet.nic.in)。網站設立後已吸引 300,000 讀者。

三、決定執法問題需優先改善項目，並提出改進方案

- 研究及登錄執法成效不佳之問題。
- 與各國政府、CITES 秘書處、國際刑警組織、UNODC 和世界海關組織合作，提倡補救措施。

- 增加各界對非法貿易議題之瞭解，包括各國政府、執法機構、CITES 常設委員會、議題相關團體如貿易公會和民間團體等。
- 繼續充實 TRAFFIC 能力訓練計畫，訓練對象包括政府執法機構和野生動物執法聯絡網之熱點。

主要成果包括：

- TRAFFIC 提供金屬探測器給印度 13 個老虎保護區，用以偵測捕獸夾，並另提供 7 隻偵測犬。
- 2010 年南非有 320 頭犀牛被盜獵，為數十年來最嚴重之損失。而越南非法貿易犀牛角情形增加，為此 TRAFFIC 居間聯繫，促成兩國查緝單位之合作。2011 年 TRAFFIC 協助籌畫越南和南非雙邊會議，洽談非法犀牛角貿易議題，兩國協議於未來簽訂執法備忘錄。
- 與義大利執法機構商討遏止東南亞爬蟲類動物非法走私至歐洲，及「洗野生動物」相關議題。
- 2011 年辦理訓練班，參訓者約 1,900 位執法人員，包括郵政單位、運輸業者、CITES 管理人員、海關人員、司法單位等。
- TRAFFIC 協助印度辦理 3 次查緝訓練班，共計 470 人受訓。
- 為東南亞 4 個國家辦理野生動物貿易法規、鑑定和非法案件調查訓練班，共 150 人參加。
- 協助越南辦理法規訓練班。
- 提供技術協助泰國打擊非法野生動物貿易，並為 500 位第一線人員辦理訓練班，獲 2 個泰國政府機構頒發獎座。
- 2011 年 1 月於馬來西亞辦理查緝訓練班。同年 7 月馬來西亞海關查獲自 2004 年以來第一宗象牙走私案，沒入 405 根非洲象象牙。8 月再截獲由阿拉伯聯合大公國走私之 664 根象牙。9 月又查獲來至坦尚尼亞 695 根象牙。

貳、推動修改野生動物貿易政策

一、支援華盛頓公約

- TRAFFIC 和其他保育團體合作，提供相關參考資料供 CITES 第 19 屆植物委員會和第 25 屆動物委員會討論。
- 2011 年記錄到 13 件大規模象牙走私案，沒收 23.7 噸象牙，相當於 2,500 頭大象，此為第一次一年內查獲 20 多噸象牙，且為前一年的兩倍。TRAFFIC 於 2011 年 8 月 CITES 常設委員會期間，將此議題提出討論。

- 犀牛和老虎議題也是 TRAFFEC 重點議題，協助推動 CITES 相關決議之執行，並協助召開反野生動物非法貿易聯合會議 (Coalition Against Wildlife Trafficking, CAWT)。
- 於 CITES 相關會議中，TRAFFIC 與 IUCN 共同提出大宗貿易物種評估和物種納入 CITES 附錄物種標準之評估等報告資料，供會議參考及討論。

二、支援多邊合作，鼓勵合法和永續性野生動物貿易

- TRAFFIC 與 Pew Environment Group 共同發表鯊魚報告 The Future of Sharks: A Review of Action and Inaction。報告重點為檢視全球 20 大捕鯊國家，執行聯合國世界糧農組織(FAO)國際鯊魚行動計畫(International Plan of Action for sharks, IPOA)情形。TRAFFIC 於 FAO 漁業委員會(Committee on Fisheries, COFI)辦理 side event 中發表此報告。
- 2011 年 1 月協助不丹召開會議，正式啟動南亞野生動物執法聯絡網(South Asia Wildlife Enforcement Network，簡稱 SAWEN)之運作。
- 2011 年 1 月協助斯里蘭卡設立野生動物執法聯絡網(Sri Lanka Wildlife Enforcement Network, SLaWEN)
- 為促進非洲中部國家加強野生動物貿易管理之合作，2011 年 3 月與非洲中部森林委員會(Commission of Central African Forests, COMIFAC)簽訂備忘錄。2011 年 11 月提供技術協助予中非八國，擬定加強野生動物法令執行區域行動計畫 (COMIFAC Regional Action Plan for Strengthening National Wildlife Law Implementation 2012-2017)。參與國家包括蒲隆地、克麥隆、中非共和國、查德、剛果、剛果民主共和國、熱帶幾內亞和加彭。

參、宣導成果和影響抉擇

一、以網際網路宣導永續性野生動物貿易之觀念

- 持續擴充 TRAFFIC 網站，2011 年有 117 項主要新聞和 1,200 件野生動物貿易相關報導。並有 1,800 讀者訂閱每週電子通訊(weekly e-newsletter)。
- 2011 年於網頁中加入 50 份出版品檔案，包括報告、小冊、摺頁、影片、海報等。目前網站共有 20,000 頁 PDF 資料檔案可供下載。
- 持續擴充 TRAFFIC 網站內容，提升資訊交換速度，例如於 2010 年間，有來自 216 國共 145,000 人至 TRAFFIC 網站查閱

507,000 餘頁的資料，並下載 100,000 件 TRAFFIC 報告。

- 農委會林務局贊助經費文字列在網站蒐尋出版品那一頁，以及每週通訊中。

二、運用國際媒體宣導，提升民眾對野生動物貿易問題及解決方法之瞭解

- 以發佈新聞稿、召開記者會、與記者聯繫或投稿至其他刊物等方式，提升民眾對野生動物貿易議題之瞭解。
- TRAFFIC 網站或 TRAFFIC 所發佈之新聞稿，經常被國際媒體引用。例如 2011 年 12 月間，籲請各界注意該年大規模象牙走私案件，之後數天 Google 新聞中列出 480 個網站包括 Taipei Times 轉述此新聞。

三、增進政府機構、學術單位及利益相關人士對野生動物貿易之瞭解

- 1979 年開始出版 TRAFFIC Bulletin，原來僅有 200 人訂閱。目前寄贈約 4,500 人(150 餘國)，包括 100 餘個圖書館，讀者群眾多。2008 年 2 月起，除 pdf 檔外，TRAFFIC Bulletin 也可下載 html 格式。農委會林務局贊助經費的文字列在 TRAFFIC Bulletin 全球查緝相關資訊(Seizures and Prosecutions)最上端。本項主題原有 6 頁，因廣受讀者歡迎，已增至 8 頁。
- 2011 年主題包括馬來西亞狩獵和野生動物貿易；大守宮藥用和寵物貿易；歐洲鰻 CITES 和 EU 野生動物規範；6 種藥用芳香植物 FairWild Standard 波士尼亞 (Bosnia)、赫塞哥維那(Herzegovina)、印度和尼泊爾現況；中國大陸傳統醫藥使用之天門冬(wild asparagus)貿易現況等。

TRAFFIC: CHANGING WILDLIFE TRADE FOR GOOD – PHASE 7

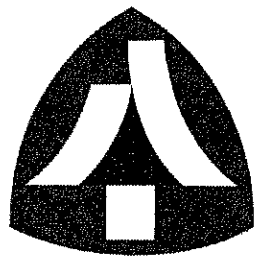
WILDLIFE TRADE LAW ENFORCEMENT SUPPORT, POLICY ADVOCACY, MEDIA AND COMMUNICATIONS

2011 Annual Project Activities Report

With support from the

Forestry Bureau of the Council of Agriculture

Executive Yuan
Republic of China



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INTRODUCTION

TRAFFIC, the wildlife trade monitoring network, is the leading non-governmental organization working globally on trade in wild animals and plants. This distinctive niche addresses the critical challenges and opportunities that arise in the context of both biodiversity conservation and sustainable development. TRAFFIC was established in 1976 in what remains a unique role as a global specialist, leading and supporting efforts to identify conservation challenges and support solutions linked to trade in wild animals and plants.

Assisting and encouraging the development of CITES as a focus for international efforts to prevent unsustainable wildlife trade is a central component of TRAFFIC's work, which underpins a strong and recognized role in addressing wider wildlife trade issues. These include those with an emphasis on major natural resource sectors such as forestry and fisheries.

TRAFFIC's considerable reputation, credibility and influence are built on its development of carefully researched, reliable knowledge, its sound and impartial analysis of wildlife trade issues, its awareness of the wider socio-economic setting, its strategic approach to catalysing change and its wide experience of assisting the practical application of solutions.

Once again during 2011, this work was made possible through a generous grant from the Forestry Bureau of the Council of Agriculture. This report summarises highlights of TRAFFIC's work to "Change Wildlife Trade for Good" with support from the Forestry Bureau of the Council of Agriculture in 2011.

AIM

To continue to contribute to efforts to 'Change Wildlife Trade for Good' through the activities of the TRAFFIC network. These include supporting CITES policy development and implementation through monitoring the impact of the CITES Standing Committee, Animals and Plants Committees, support for global enforcement efforts to stop illegal trade, helping build capacity and improve responses to support their efforts to implement CITES, establishing an international network for the Southeast Asian Wildlife Enforcement Network (ASEAN-WEN) including detailed work programme and strategic lessons from ASEAN-WEN, and further development of the network's communication tools, including plans for an e-newsletter and annual report.

Objectives

- To assist governments and intergovernmental organizations in the development of measures to enforce the provisions of CITES and other wildlife trade regulations in order to improve the effectiveness of CITES and regulatory approaches to managing wildlife trade.
- To identify areas of illegal wildlife trade, and encourage and assist remedial action by government authorities through provision of intelligence, facilitation, tools and training.
- To research and promote effective policy approaches and campaign for change toward ensuring that the wildlife trade is legal, sustainable and generates income for communities in developing countries in particular.
- To promote, communicate and raise awareness of the current challenges and solutions to ensuring that the wildlife trade is sustainable and legal.

Executants

Work to achieve these objectives is led by TRAFFIC International, the headquarters of the world-wide TRAFFIC network, working with TRAFFIC staff in 25 countries around the world. TRAFFIC International directs and manages the network's activities, and provides particular expertise with regard to enforcement, wildlife trade policy and advocacy, communications and media relations. TRAFFIC International also produces the *TRAFFIC Bulletin* and the global website.

To strengthen its ability to support enforcement efforts, TRAFFIC maintains a proactive team of representatives from within its network to act as regional enforcement co-ordinators. This team

oversees the intelligence handling and analysis and many of TRAFFIC's enforcement-related activities. TRAFFIC International's Global Enforcement Co-ordinator manages this work.

TRAFFIC undertakes many of the activities described in this report in concert with government agencies and intergovernmental organizations worldwide, including the CITES Secretariat, with whom TRAFFIC has a Memorandum of Understanding (MOU) that formalises this working arrangement. TRAFFIC also has a number of national level MOUs with governments and their enforcement agencies in particular.

2011 PROJECT ACTIVITIES

1. Global Enforcement Support

- **Investigation of illegal international trade in wildlife**

- Collection and analysis of intelligence information, seizures data, information on trade routes and smuggling methods
- Timely dissemination of intelligence information to assist national enforcements agencies in carrying out enforcement actions
- Identification of significant cases of illegal international trade in wildlife
- Investigation of priority cases and provision of results to government enforcement agencies, assisting with taking action if required

Collection and analysis of information

TRAFFIC offices around the world routinely gather information and intelligence related to illegal trade in wildlife, including information on seizures, trade routes and smuggling methods. This information is compiled and analyzed and used to help advise government enforcement officials of emerging trade trends, changes in the modus operandi of illegal traders and other aspects. Wherever information is complete enough to be of immediate use to law enforcement, it is provided to the appropriate agency for follow up action.

The illegal trade in ivory remained a key issue during the year, and TRAFFIC has been monitoring a variety of aspects closely, working to help governments identify and intersect smuggled ivory in Africa and Asia. This includes identifying new trade routes. For example, analysis of seizure information for Viet Nam indicated that far larger quantities of ivory were seized there in 2009 and 2010 than would be indicated by that country's small carving industry. At the same time, shipments from certain African ports were routinely being checked for illegal ivory on arrival in China using x-rays, making smuggling via that route more difficult. TRAFFIC suspected Viet Nam might therefore be being used as a transit point for smuggling ivory into China. This suspicion was confirmed with the first ever seizure of a large ivory shipment in a remote part of Giangxi Province just inside the Chinese border with Viet Nam.



As well as identifying shifting trade routes, TRAFFIC documented how smugglers of ivory and other products are shifting tactics to conceal illegal products. Customs at Amsterdam's Schiphol Airport found 34 ivory figurines hidden within a coconut-shaped wooden statue carried by a woman en route from Uganda to Germany.

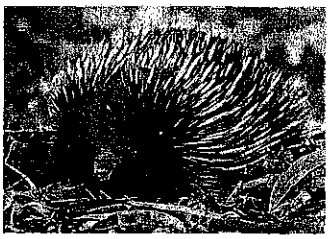
An actual coconut shell, carved in the shape of a monkey, was used by smugglers from Slovakia to hide parrot eggs being smuggled from Jamaica, as were several cake boxes. A total of 74 parrot eggs were found, with a black market value of EUR4000-15 000 each.

Dissemination of intelligence information to assist law enforcement action

Intelligence information obtained through TRAFFIC investigations and surveys, and from informants, is provided to government enforcement authorities in the form of intelligence reports. During 2011, more

than 100 such reports were provided to government authorities around the world with some notable successes.

Following receipt of information from TRAFFIC, authorities in Madagascar arrested two men and seized nearly 200 of some of the world's rarest tortoises, which they were trying to smuggle to Jakarta, Indonesia. The tortoises were found in a box and three bags that were being transported directly to a plane, bypassing security scanners. Authorities found 26 Ploughshare Tortoises, a species so decimated by trade that only 500 are believed to be left in the wild today. In addition, there were 169 Radiated Tortoises and a Spider Tortoise.



Information provided by TRAFFIC also led to an Indonesian wildlife trader being caught attempting to smuggle 18 protected echidnas, unique egg-laying mammals, out of their native Papua province. The animals were packed in cloth sacks and hidden in modified compartments in two suitcases, to be checked on to a flight to Jakarta. The shipment also contained pythons and lizards.

Intelligence reports provided to the relevant authorities resulted in the arrest of a trader with illegal possession of pangolins in the Malaysian state of Kelantan, and more than 100 Indian Star Tortoises being seized from a dealer in Malacca.

TRAFFIC continues to gather information in and around Malaysia's Belum-Temengor Forest Complex, which provides critical habitat for Tigers, Asian Elephants and other species. The northern edge of Belum-Temengor is along the border with Thailand, with poachers and smugglers making use of the international border to avoid detection and prosecution. TRAFFIC estimates that at least 26 tigers were poached since 2008, including two cubs. In all, since 2008 over 400 wild animals have been poached, including Asian Elephants, Sambar deer (*rusa*), gaur (*seladang*) and other species; an estimated 70 animals were killed in 2011 alone. TRAFFIC and WWF teams have uncovered and deactivated more than 150 snares, saving many more animals from being killed. Some of these snares, based on the design and size, were clearly intended for Tigers. In addition, over 50 access points frequented by poachers into the forest have been identified. Six multi-agency Belum-Temengor Joint Enforcement Taskforce patrols, as well as regular roadblocks, were carried out in Malaysia In 2011. These operations resulted in the seizures of pangolins and birds, which, while encouraging, do not reflect the true scale of poaching and trade – TRAFFIC will therefore be encouraging even greater action in the future.

In India, TRAFFIC has developed an information network and generated actionable information in key habitat for Tigers, Asian Elephants and rhinos in Indian sites that are important with respect to wildlife crime e.g. Haryana, Punjab and Delhi. This network has helped to increase wildlife enforcement efforts and strengthen community participation in curbing illegal wildlife trade in the region. As a result, 15 poachers have been arrested and a number of seizures have taken place, including of four Leopard skins, 15 otter skins, three rhino horns, one Tiger skin and large mammal traps and rifles.

Documenting significant illegal international trade in wildlife

TRAFFIC surveys and research continued to document the scale of, and shifts in, the illegal trade in ivory and other wildlife products.

For example, TRAFFIC research showed that poaching and illegal trade of bears, driven largely by the demand for bile used in traditional medicine and folk remedies, continues unabated across Asia on a large scale. Bear bile products were found on sale in Traditional Medicine outlets in all but one of the 13 countries/territories surveyed, as documented in the 2011 report *Pills, Powders, Vials & Flakes: The bear bile trade in Asia*. The exception was Macao. An analysis of the origin of bear bile products found in TRAFFIC's surveys made it clear that import and export regulations are commonly flouted demonstrating the need to strengthen CITES implementation to stop illegal international bear bile trade.

An update on the ivory trade in Egypt was undertaken in March/April 2011. The study documented 9261 ivory items openly for sale in Cairo and Luxor, of which one-third appeared to be recently carved items, indicating only a marginal reduction over the results of a similar study in 2005. At least seven

workshops with a minimum of 23 craftsmen were documented in Cairo, where Chinese buyers reportedly accounted for at least half of all sales of ivory objects in Egypt's capital. This information has been provided to the authorities.

TRAFFIC also carried out internet site surveys in addition to a number of physical market surveys. More than 1000 new or revised ivory advertisements/posts were found on 11 major internet auction websites, BBS and professional E-commerce websites every month. In June 2011 alone, over 10 000 active ivory advertisements/posts were observed. The results of TRAFFIC's internet surveys were presented at a workshop in May 2011 on the control of Internet wildlife trade. Website managers have been consulting with TRAFFIC subsequent to the workshop regarding legal/illegal status of products to be traded on the Internet. Several websites, including www.taobao.com, www.alibaba.com and www.feiqu.com, and a Shanghai-based collectors website, have deleted all online information related to offering illegal Asian Big Cat products for sale as an immediate impact of the workshop.

Report findings to enforcement agencies and encourage action

As well as documenting and reporting on the significant trade in bear bile and other products noted above, TRAFFIC provided confidential intelligence information on the trade in bear bile to relevant enforcement agencies and CITES Management Authorities in Southeast Asia and the Republic of Korea. As a result, the governments of Sabah and Sarawak (Malaysian Borneo) and Singapore have asked for further aid in investigating their local trade in bear bile.

Developments in South African policy and law enforcement actions for rhinos continued to move at a fast pace, with a greater success rate in terms of arrests and prosecutions in the country beginning to emerge. There is no time to lose, with close to 450 rhino deaths due to poaching within South Africa during 2011. TRAFFIC staff have been monitoring the trade and supported bi-lateral meetings between the governments of South Africa and Viet Nam (Viet Nam is the main destination for rhino horn smuggled from South Africa). TRAFFIC also assisted public prosecutors on rhino crime cases, including through the provision of expert testimony in court. It is worth noting that sentencing of Vietnamese nationals attempting to smuggle rhino horn out of South Africa has resulted in some of the most stringent penalties imposed to date. TRAFFIC has long advocated for rhino crime punishment to be severe so that it serves as an effective deterrent.

- **Gathering, analysis and dissemination of information about illegal trade**

- Support to EU TWIX – the EU-wide seizures database and secure listserve
- Development of the intelligence analysis information management system for TRAFFIC
- Horizon scanning to identify emerging issues of concern
- Collection and analysis of information on illegal wildlife trade (both ongoing areas of concern, and new and emerging trends identified) and publication of the results

Support to EU TWIX and other databases

TRAFFIC continued to maintain EU-TWIX, the EU-wide wildlife seizures database and secure listserve established to support the efforts of EU enforcement authorities to tackle illegal trade in wildlife. The EU-TWIX mailing list is used daily by European enforcement officials, with over 550 enforcement staff now registered to use the service. From January to November 2011, nearly 500 messages containing information relating to illegal wildlife trade were exchanged via the mailing list. Information was shared on recent seizures (including the modus operandi and the relevant taxa and routes), alerts regarding stolen specimens and identification tools. In addition, practical, on-line assistance was provided with the identification of specimens. Messages circulated on the list triggered several investigations in the following European countries: France (timber), Italy (ivory), The Netherlands (birds), Slovakia (plants), and Switzerland (ivory). The number of seizure records included in the EU-TWIX database topped 31 000 in 2011, which represents a wealth of information to support analysis of wider trade patterns and trends.

TRAFFIC also regularly monitored and updated the Official Database of the National Tiger Conservation Authority for Tigers and Wildlife Mortality, www.tigernet.nic.in. Tigernet is run by TRAFFIC on behalf of the Indian government and provides regular updates and news related to Tigers, other Big Cats and associated wildlife crime. The website has had nearly 300 000 visitors to

date, bringing greater transparency to India's Tiger monitoring system and helping put information on Tigers and their management into the public domain.

Development of TRAFFIC's information management system

TRAFFIC continued to move forward with strengthening the information management system underpinning compilation and analysis of illegal trade information, using i2 software, specially designed for this purpose. The TRAFFIC i2 database has been designed to hold three main types of information: i) market monitoring data; ii) seizure records; and iii) intelligence information. Access to different levels of the database is strictly controlled to enable confidential and sensitive information to be handled in a secure manner.

Conversion of existing TRAFFIC data into i2 compatible formats is underway, including, for example, providing geographical coordinates and dates of all seizures and other wildlife crime records where possible. This will enable TRAFFIC to accurately map and help predict hotspots for wildlife crime. Over 3000 different records (seizures and wildlife crime reports) have been logged, with market monitoring information now also being migrated into the appropriate i2 format as well.

Collection and analysis of information on illegal wildlife trade

TRAFFIC documented the risk to highly endangered sturgeons of the Danube river basin because of the persistent illegal trade in their caviar involving Bulgaria and Romania. The two countries hold the only viable populations of wild sturgeons in the European Union (EU), but five of the six native sturgeon species in the Danube are Critically Endangered and sturgeon fishing there has been banned. TRAFFIC research showed that a total of 14 seizures of illegal caviar originating from Bulgaria (27.5 kg in five seizures) and Romania (25 kg in nine seizures) were reported by EU Member States between 2000 and 2009. However, neither Bulgaria nor Romania reported illegal caviar seizures themselves, which is of concern. TRAFFIC recommended that both Romania and Bulgaria raise awareness regarding illegal trade among enforcement agencies and strengthen their capacity to control and monitor the trade to protect these endangered species.



TRAFFIC's surveys in the Indonesian capital's animal markets, reptile expos and pet stores, showed that there were more species of tortoises and freshwater turtles in trade in 2010 (49 species) than recorded in a similar study in 2004 (47). This work was published in *The Trade in tortoises and freshwater turtles in Jakarta, Indonesia revisited*, which complemented a study of illegal trade of Indian Star Tortoise that analyzed the geographical spread of seizures, looking at the number of specimens in trade, trade hot spots, trade routes and directionality. The findings from this study were presented to the meeting: "The Conservation of Asian Tortoises and Freshwater Turtles: Setting Priorities for the Next Ten Years, during the reporting period. Key findings from this revealing work included that over 70 per cent of species seen in trade in Jakarta originated outside Indonesia, compared to just over half in 2004. Many of these were from other parts of Asia, with the highly-prized Indian Star Tortoise topping the list.

TRAFFIC also examined the trade in Malagasy reptiles to Thailand. Of particular concern was the large scale trade in endemic Malagasy chameleons, with 16 species for sale in markets, shops and internet traders' homes. These included the Antsingy Leaf Chameleon, a CITES Appendix I species, meaning that commercial international trade is prohibited.

- **Development of recommendations for remedial action, increasing awareness of illegal trade issues and capacity building support**

- Promotion of remedial measures in collaboration with governments, the CITES Secretariat, Interpol, UNODC and the World Customs Organization
- Increasing awareness of illegal trade issues among governments, enforcement agencies, and stakeholders such as NGOs, as well as the CITES Standing Committee, as necessary

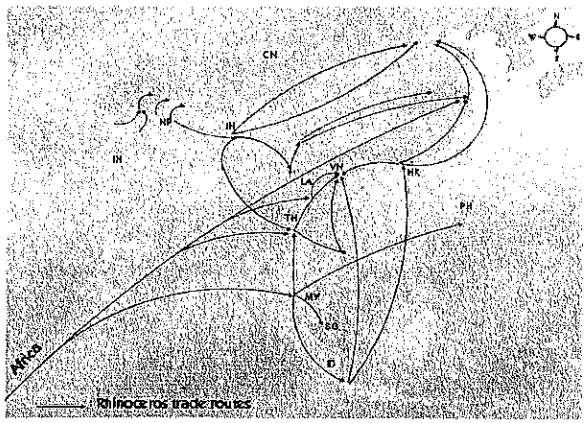
- Further development of TRAFFIC's capacity building programmes targeting government wildlife enforcement agencies and "wildlife enforcement networks" in key wildlife trade hotspots

Promotion of remedial measures

As well as providing information to encourage and support government enforcement efforts in relation to specific species or commodities, TRAFFIC also promoted and supported remedial measures aimed at strengthening enforcement action more generally. Several examples of this are profiled below.

In India, TRAFFIC has been assisting the government with acquiring and using "deep search" metal detectors to locate metal snares set by poachers within national parks. The detectors are useful both in identifying snares that have been set and in deterring poachers from setting additional snares. In 2011, TRAFFIC distributed detectors to 13 Tiger Reserves and five Tiger bearing areas across 10 States. TRAFFIC has also supported the acquisition, training and deployment of "sniffer dogs" in India, seven of which have been deployed by the forest departments of Maharashtra, Madhya Pradesh and Jharkhand in India. Jackie, one of the dogs trained, helped apprehend two poachers in Hoshangabad district of Madhya Pradesh in October 2011; in February 2012, Tracey, a two-year old female Alsatian helped recover two elephant tusks, weighing over 32 kg from the forests of Dalma Wildlife Sanctuary in Jharkhand.

In view of its strenuous efforts to support enforcement, TRAFFIC was invited by Malaysia's Ministry of Natural Resources and Environment to sit on a newly established committee to audit enforcement and corruption with regards to wildlife trade. TRAFFIC is the only NGO asked to sit on this committee, which is otherwise made up of enforcement and regulatory bodies, including police, Customs, and the anti-corruption agency, etc.



As highlighted earlier, TRAFFIC conducted several activities to support the tackling of poaching and illegal trade in rhino horn from South Africa to Viet Nam. As part of this, TRAFFIC co-ordinated the logistics of a second meeting between South African and Vietnamese government representatives during 2011. The meeting took place in South Africa and included development of a Memorandum of Understanding to support collaborative law enforcement between the two countries. TRAFFIC also arranged field trips for the Vietnamese delegates to Kruger National Park and Pilanesberg National Park to see law enforcement activities first-hand.

Changes in South African policy now require provincial and national authorities to use a database developed by TRAFFIC to monitor rhino horn stockpiles. TRAFFIC updated the database to accommodate recent developments in monitoring and management of horn stocks, including more widespread use of DNA technology and digital photography. TRAFFIC will be assisting the South African government with distributing and implementation of the database to aid registration of existing stocks and increase understanding of the national stockpile for future CITES reporting.

Many of these national level efforts were motivated and/or reinforced by efforts directed to inter-governmental organisations. For example, TRAFFIC continued to work very closely with the CITES Secretariat and Standing Committee in identifying steps needed to reduce illegal trade in ivory, and began discussions with the World Customs Organization regarding potential avenues to help countries gain greater control over their international timber trade.

Increasing awareness of illegal trade issues

As indicated above, much of TRAFFIC's work involves ensuring decision makers are made aware of illegal trade and possibilities to act to reduce it, as well as those supporting sustainable management

of legal trade. The following describes work to raise awareness of a particularly challenging problem, the intentional mis-declaration, or "laundering," of wild-caught CITES-listed species as captive-bred.

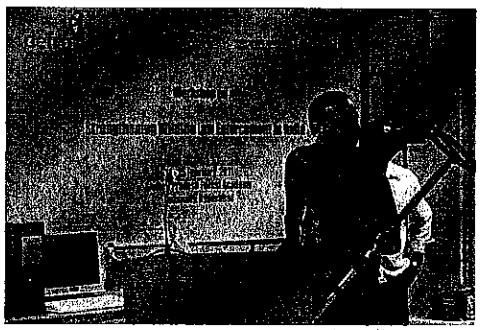
For several years, TRAFFIC has been documenting and drawing attention to false claims that animals in trade have been bred in captivity. A variety of species are being mis-declared in this way, particularly reptiles and birds, but also other taxa, as shown by a 2011 TRAFFIC paper on the trade in South American poison arrow frogs in Thailand. TRAFFIC's work prompted increased action in 2011, when the European Union drafted a document, with significant input from TRAFFIC, on fraudulent trade in captive-bred specimens for the 61st meeting of the CITES Standing Committee. TRAFFIC's recommendation that an inter-sessional working group be established to look for solutions to this problem, was accepted by the Standing Committee. TRAFFIC will act as part of this working group moving forward.

At the national level, TRAFFIC organized a special meeting with the head of the CITES Service of the Italian Enforcement Authority and agents from the investigation office to discuss the "laundering" problem. The meeting reflected on the findings of TRAFFIC's report on trade in reptiles from Southeast Asia to Europe, in order to determine how best to address the issue in Italy.

Capacity building

TRAFFIC's capacity building efforts took several forms in 2011, ranging from organization of training workshops to development and distribution of identification tools.

In total, TRAFFIC trained approximately 1900 law enforcement personnel, including postal workers, transportation workers, CITES MAs, land and airport staff and the judiciary in 2011. Examples of some of this training and the associated impact, is provided below.



Three capacity building workshops were conducted for Forest Department, Army and Customs staff working at the national level in India, with 120 officers trained. In addition, TRAFFIC was regularly invited to provide specialized training/lectures on illegal wildlife trade and the latest tools and techniques available to combat it by these and other agencies, e.g. the Central Bureau of Investigation. A further five wildlife law enforcement training workshops were conducted in the States of Maharashtra, Andhra Pradesh, West Bengal, Kerala and Uttarakhand. Approximately 350 enforcement officers were trained from within Forest Departments, the Directorate of Revenue Intelligence), SSB (Sashastra Seema Bal), police, Marine Intelligence, Railway Protection Force, Customs, Postal and Transport departments.

In Southeast Asia, 150 enforcement personnel from four countries were trained on wildlife trade regulations, species identification and wildlife crime investigations. As a follow-up to a previous "Training of Trainers" course, Vietnamese Government participants conducted their own wildlife trade regulations course using TRAFFIC developed modules and materials. The Vietnamese trainers tailored the materials to include local examples and images. Participant evaluation of these workshops was extremely positive with over 95% of participants stating that their capacity/ability to deal with illegal wildlife trade/ traders had increased through what they had learnt. A similar proportion agreed that the training materials provided were both relevant and useful.

In recognition for providing technical support to the Royal Thai Government in combating illegal wildlife trade, including training over 500 frontline staff, TRAFFIC was recognized by an award from two Thai Government agencies. The award was presented during celebrations to mark the ninth anniversary of Thailand's Wildlife and Plant Conservation Department and 115 years of its Royal Forestry Department.





Following training provided to the Royal Malaysian Customs in January 2011, Customs personnel made their first seizure of ivory since 2004. Three very large shipments of ivory were seized in July, August and September: a container with 405 African Elephant tusks, declared as plywood; 664 African Elephant tusks hidden in a container from the United Arab Emirates; and a 695 elephant tusks, originating from Tanzania.

Capacity building efforts extended to timber and fisheries, and to the private sector as well as governments. For example, TRAFFIC co-organised a workshop on combating illegal logging and promoting trade in legally harvested forest products: *Technologies that promote transparent timber trade in the Asia Region*. The workshop aimed to support governments and the timber industry to share technologies for traceability systems for timber supply chains. In South Africa, TRAFFIC provided training to compliance officials, building on previous training initiatives. Feedback provided either directly after training workshops or through independent project evaluation indicates that officials are making use of TRAFFIC's species identification and information materials and are using these for improved regulation of seafood trade in South Africa. All participants interviewed provided positive feedback on TRAFFIC and the role that they play in South Africa and confirmed that TRAFFIC is providing useful tools, well-facilitated training and the space and platform for stakeholders to learn from TRAFFIC and each other.

2. Working for Positive Changes to Wildlife Trade Policies

During 2011, TRAFFIC continued its 30-year tradition of providing high quality information and policy advice to government agencies, inter-governmental organizations and NGOs concerned with wildlife trade issues.

- **CITES**

TRAFFIC contributed positively to a number of significant international initiatives aimed at ensuring the effectiveness of CITES, including being actively involved at processes examining key implementation issues such as conducting non-detriment findings, the Review of Significant Trade and criteria for the inclusion of species in Appendices I and II. IUCN and TRAFFIC prepared a joint report on the review of the criteria for the inclusion of species in Appendices I and II for the CITES Scientific Committees, as requested by the Parties through Decisions 15.28/15.29. We also embarked upon a study for the CITES Secretariat on the Evaluation of the Review of Significant Trade. The process of conducting non-detriment findings is one of the most important in CITES and critical to ensuring that the Convention is an effective tool for the sustainable management of species in trade. TRAFFIC was consequently actively involved in the deliberations of the CITES Working Group established examining this issue. Captive breeding is another issue that TRAFFIC has brought to prominence in the CITES arena during the reporting period, as reported earlier in this report.

TRAFFIC has also worked hard in ensuring that CITES is used effectively as a valuable tool in the global fight against illicit trade in some of the world's most endangered species. 2011 was the worst year of large scale ivory seizures since records began, with 13 large-scale seizures, amounting to 23.7 t – representing the killing of at least approximately 2500 elephants. This was the first year ever to record tonnage in double digits and more than double the tonnage compared to the previous year. TRAFFIC helped to raise the alarm at the 61st meeting of the CITES Standing Committee (15-19 August, 2011), where members considered a consolidated report on the status of elephant populations, levels of illegal killing and the trade in ivory that was jointly submitted by CITES-MIKE,

UNEP-WCMC, the IUCN/SSC African and Asian Elephant Specialist Groups and TRAFFIC - the first such collective effort between five globally-recognised monitoring systems. The Standing Committee accepted TRAFFIC's recommendations in the report, including the call for the countries continually identified in successive ETIS analyses as most problematic - Democratic Republic of the Congo, Nigeria and Thailand – to take firm steps to close down the large retail ivory markets that continue to operate within their borders. The government of Thailand will submit a written report to the next meeting describing progress in regulating its internal trade in ivory.

TRAFFIC also highlighted the rapidly accelerating rate of rhinos being poached during the year, with the Standing Committee recommending that all Parties provide information on trade in rhinos and their parts or derivatives to IUCN and TRAFFIC, in support of implementation of CITES Resolution Conf. 9.14 (Rev. CoP15). In addition to facilitating the increased collaboration between Vietnamese and South African enforcement officials in South Africa detailed elsewhere in this report, TRAFFIC also assisted in convening a meeting the Coalition Against Wildlife Trafficking (CAWT) specifically on the issue of rhino poaching and trade.

Tigers were another important focus on TRAFFIC's CITES-related work, with the emphasis during 2011 on the importance of information on tiger trade trends and patterns in informing and supporting effective enforcement action. TRAFFIC held a side event at the 61st meeting of the CITES Standing Committee on the use of technologies, innovative approaches and partnerships in addressing illegal tiger trade. This featured presentations on the Tiger Trade Tracker / Wildlife Trade Tracker developed by TRAFFIC, and TigerNet, a comprehensive tiger protection and management system developed by the Government of India in cooperation with TRAFFIC.

- **Fisheries**

TRAFFIC achieved a number of significant milestones in its work on commercial fisheries, including the release of a joint report with the Pew Environment Group, *The Future of Sharks: A Review of Action and Inaction*. This examined progress in the implementation of the UN Food and Agricultural Organization's (FAO) International Plan of Action (IPOA) for sharks by the top 20 shark-catching countries. The report was released in conjunction with a meeting of the FAO Committee on Fisheries (COFI), and TRAFFIC convened a side event on the report that was attended by government representatives from some of the top shark catching countries. COFI subsequently called for a review of factors hampering improvements in reporting on fisheries and trade, as well as in shark management, in particular, of the IPOA for sharks. TRAFFIC also highlighted the findings of the report at the 25th Meeting of the CITES Animals Committee, which agreed to cooperate with the FAO on this review.

In complement to this, TRAFFIC targeted information and advocacy on sharks at meetings of the five "tuna-focused" regional fisheries management organizations (RFMOs), referred to as the "Kobe process". During their meeting in July, Kobe process participants consequently agreed to consider a series of specific recommendations for tracking and managing shark fisheries during 2011-2012.

- **Regional cooperation**

Regional illegal wildlife trade problems can often only be addressed with regional enforcement cooperation and TRAFFIC made huge strides during 2011 in the establishment of regional enforcement networks in some of the most biodiversity-rich regions of the world. In January last year, TRAFFIC helped to facilitate a meeting in Bhutan which saw the formal launch and operationalisation of the South Asia Wildlife Enforcement Network (SAWEN) - a network of all eight countries of South Asia, i.e. Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka. The purpose of the network is to have a co-ordinated regional response for combating wildlife crime. The meeting also agreed on an action-oriented work plan of joint activities, the establishment of a Secretariat hosted by the Government of Nepal and strategic collaboration on communications and fundraising. TRAFFIC also supported this regional initiative at the national level, for example, by assisting in the establishment of the Sri Lanka Wildlife Enforcement Network (SLaWEN) that same month.

In Central Africa, the important role that TRAFFIC plays in enhancing regional enforcement cooperation was recognized with the signing of a Memorandum of Understanding (MoU) with the

Commission of Central African Forests (COMIFAC) in March 2011. This will formalise further collaboration to better address the regional wildlife trade issues. In November, TRAFFIC also provided technical support to a meeting of eight COMIFAC member States — Burundi, Cameroon, Central African Republic, Chad, Congo, Democratic Republic of Congo, Equatorial Guinea and Gabon — which lea to agreement an Action Plan for strengthening enforcement of national wildlife laws in the region. The COMIFAC Regional Action Plan for Strengthening National Wildlife Law Implementation 2012–2017 will ensure better co-operation and intelligence sharing between enforcement officers in Central Africa, to help tackle large-scale poaching and illegal wildlife trade in Central Africa. A roadmap for implementation of the Action Plan was also agreed at the meeting, including submission of the Action Plan for formal endorsement at the next meeting of the Council of Ministers of COMIFAC countries.

3. Communicating Results and Influencing Choices

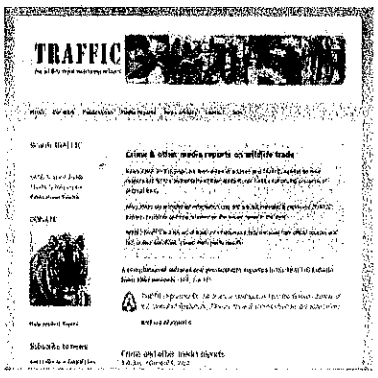
The success of TRAFFIC's work depends directly on our ability to communicate our research findings clearly and rapidly, to those who have the greatest ability to influence decisions at the local, national, regional and/or global levels. TRAFFIC uses a variety of communication vehicles to achieve this, largely through the written word, delivered via a combination of electronic formats as well as in printed form when required (for example to decision makers without reliable access to high speed internet connections). TRAFFIC's communication tools take a variety of forms, from news stories to briefings, brochures, printed and on-line reports and TRAFFIC's signature wildlife trade journal, the *TRAFFIC Bulletin*. Through these and other tools, TRAFFIC remains the premier source for reliable information on wildlife trade and trade controls, and an objective source of advice on actions that governments, the private sector and consumers can take to support sustainable and reduce unsustainable and illegal trade.



- **Getting the word out – Using the internet to communicate on wildlife trade issues**

- Further development and enhancement of the TRAFFIC website www.traffic.org and associated online communications tools and resources

Since November 1997, the TRAFFIC website has served as the network's most important communications tool. The website is a critical tool in delivering information to the wide variety of stakeholders that can make a difference to the coverage, character and implementation of wildlife trade policies and practices. It provides TRAFFIC with the most up-to-date means to communicate rapidly and cost-effectively to a wide readership, including staff within governments, intergovernmental organizations such as CITES, the CBD and the FAO, scientific institutions, trade associations, businesses, researchers, the mass media and NGOs. It also makes wildlife trade-related information available to interested individuals, including teachers and students around the world.



Further developments of the TRAFFIC website took place in 2011, for which support from the Forestry Bureau was critical.

A regular flow of news articles and media seizure reports (some 117 and ca. 1200 reports respectively) related to wildlife trade were posted on the TRAFFIC website during 2011. The media reports of seizures and other wildlife trade reports carries a prominent acknowledgement of COA's support for this service, as does the weekly e-newsletter, distributed to more than 1800 subscribers.

Rapid delivery of wildlife trade-related news stories is ongoing, aimed at alerting decision makers to news of major seizures, changes in legislation and other events, and making them aware of the latest

TRAFFIC publications, as well as providing an incentive for people to check the TRAFFIC website regularly for breaking news.

Further pages were added to the site covering more aspects of TRAFFIC's work, including in the form of an e-Annual report.

More than 50 TRAFFIC publications (reports, brochures, leaflets, films, posters etc) were produced during 2011, and the back-digitization of earlier TRAFFIC reports continued. More than 20 000 PDF report pages are now available for free download through the website, helping to ensure critical information is freely available to those who can use it to tack effective action to tackle illegal and unsustainable wildlife trade. Over time, all of TRAFFIC's publications will be made available electronically for download.

These products and services all helped to keep the TRAFFIC network at the forefront of delivering a rapid, high quality and effective flow of information to those concerned with wildlife trade and conservation, particularly government decision makers.

Clearly substantial staff time is needed to manage communication resources and their ongoing development. Generous contributions from the Council of Agriculture are critical in supporting this valuable work and the Forest Bureau's logo is prominently displayed on the TRAFFIC website accordingly.

- **Increasing awareness of wildlife trade problems and solutions through the international media**

- More regular and rapid delivery of wildlife trade related news items and messages to media outlets

The international media, both print, e.g. newspapers and magazines, and non-print, particularly television and radio, provide a powerful vehicle for delivering information and influencing thinking in relation to the trade in wild species. The media can be used to discourage certain behaviours; for example the illegal consumption of endangered species in traditional medicine. And to encourage others; for example greater investment in CITES implementation in response to increased public interest.

TRAFFIC's communication outreach can be very considerable. For example, in December 2011 TRAFFIC raised concern in the media over the record number of large scale ivory seizures made during the year. The report was covered by more than 480 English-language Google-news indexed websites over the next few days, including all of the major media newswires, and including many print newspapers, like the Taipei Times.

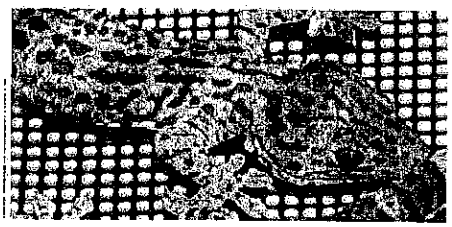
- **Leading the way in promoting understanding of emerging wildlife trade issues among governments, researchers, the private sector and the wider public**

- Publication and distribution of the *TRAFFIC Bulletin*

The journal of the TRAFFIC network—*TRAFFIC Bulletin*—is the only international publication devoted exclusively to global wildlife trade issues. It contains original reports and news on trade in wild animals and plants and their derivatives, much of which arises from investigations carried out by staff in more than 25 countries. The global reach of the TRAFFIC network means that issues covered range from local trade concerns to analyses of the enormous and lucrative international commerce in thousands of animal and plant species.

The *TRAFFIC Bulletin* currently reaches ca. 4500 individuals and institutions in over 150 countries, free of charge. These recipients include some 100 libraries, resulting in a far wider readership and reaching many who would be unable to pay for

MALAYSIA AT CENTRE OF TOKAY GECKO TRADE BOOM

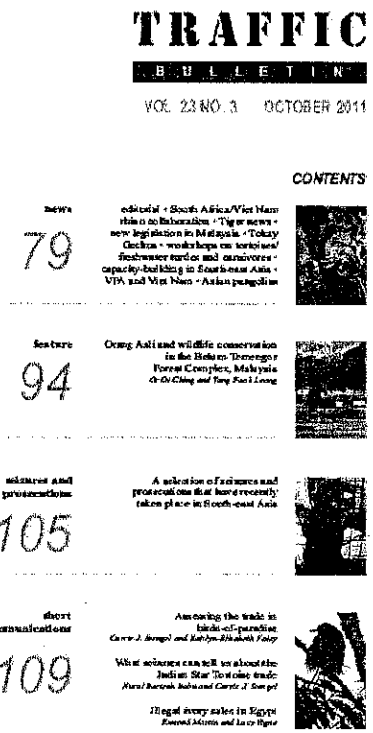


The trade in Tokay Geckos *Gekko gecko*—both legal and illegal—for the global pet market and use in traditional Chinese medicine (TCM) is well established. Recently, the medicinal trade appears to have acquired some peculiar new dynamics, seemingly involving Malaysia as a key hub, large sums of money and rumours of a potential cure for Human Immunodeficiency Virus (HIV). The sudden emergence of these factors, with currently no identifiable source, combined with the implausible nature of the rumours, has prompted fresh examination of this trade.

The Tokay Gecko is a nocturnal lizard easily identifiable by its orange-spotted, blue-grey skin and unmistakable vocalizations, which give rise to its common name. Specimens can grow up to 40 cm in length. They feed on insects and small vertebrates and are often found in forests as well as human-altered landscapes such as agricultural and urban areas (Das, 2010). Tokay Geckos naturally range throughout South-east Asia and parts of India, Nepal and China, and have also been introduced to parts of the USA, West Indies and Madagascar (Manthey and Grossman, 1997; Das, 2010).

the unique information that this publication provides. Many subscribers are those who make or inform decisions related to wildlife trade, including scientists, policy-makers, enforcement officials, conservationists, lawmakers, teachers, academics and the media. Governments of the 175 member States of CITES (as well as countries that are not party to the Convention), the CITES Management and Scientific Authorities, WWF National Organizations and other environmental NGOs also subscribe to the journal. Web access also ensures that information from the current and back issues is available throughout the world and allows for immediate pick up by the world's media of important news items. Two recent bulletin reports—on the rise in demand for Tokay Geckos and the sale of ivory in Egypt—were widely reported on international television and radio channels and online.

Over the past year, the contents have covered, for example:


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- the involvement of the indigenous Orang Asli in the hunting and trade in wildlife in the Belum Temengor Forest Complex (BTFC), Malaysia, for millennia the ancestral homeland of this community. Forest loss to illegal logging and the hunting of protected species are major threats to the wildlife upon which the Orang Asli depend for their food, water, shelter and medicines. It is clear, however, that some Orang Asli are themselves involved in illegal hunting and trade and this report examines the extent of their role in these activities. Given their ancestral skills and knowledge of the forest, it is imperative that these forest-dwellers are among the principal participants in any decisions relating to the management and development of BTFC, since the loss of wildlife has a profound impact both on the ecosystem and on the Orang Asli.

- the growing trade in Tokay Geckos for use in medicine and the pet trade. Malaysia appears to be playing a central role, importing specimens from elsewhere in Southeast Asia to meet demand. TRAFFIC will undertake further research to provide data necessary to ensure that wild populations are not adversely affected by the surge of interest in this nocturnal lizard.

- recent developments under CITES and the EU Wildlife Trade Regulations relating to the trade in European Eels *Anguilla anguilla*, traded in large quantities for consumption within the EU and in Asia; suspension in 2010 of all exports and imports of European Eels from and to the EU was an important step towards their conservation. This paper affirms that the situation will need to be reassessed, as will the role that internal EU trade and consumption plays in the demise of populations of this and other *Anguilla* species.

- an update on TRAFFIC projects implementing the FairWild Standard for six medicinal and aromatic plant species in Bosnia and Herzegovina, India and Nepal. Measures in place to enforce sustainable resource management practices for these species and development of legislative frameworks to support continued use of this conservation tool are covered.

- a summary of the trade in China of two species of wild asparagus that are used in traditional Chinese medicine in Asia and Europe. The authors describe the species, their use in TCM and natural status in the wild. They investigate local collection practices and the intensity of the harvest relative to the current population of plants in the area, and examine the prospects of a long-term sustainable harvest.

EXPENDITURE OF FUNDS

TRAFFIC is grateful to the Forestry Bureau, Council of Agriculture, Taiwan ROC for the USD60 000 allocated to the work of TRAFFIC under its 2011 Conservation Grant. The balance will be expended in the following period.

Expenditure of COA Conservation Grant to 31 December 2011	
Personnel expenses	39 284
Establishment costs	6 670
Travel	1 289
Subsistence	144
Telephone	434
TOTAL	47 821

ANNEX 1 - Background to the TRAFFIC network

The trade in wild plants and animals and their derivatives is big business, estimated to be worth billions of dollars and involve hundreds of millions of plants and animals every year. Most of the trade is legal but a significant portion of it is not. The trade is diverse, ranging from live animals for the food and pet markets to ornamental plants and timber. An array of wildlife products and derivatives, such as food, exotic leather goods, musical instruments and even medicines, can be found in markets around the globe.

TRAFFIC works to help ensure that wildlife trade is sustainable and in accordance with domestic and international laws and agreements through the investigation, monitoring and reporting of such trade, particularly that which is detrimental to the survival of flora and fauna and that which is illegal. TRAFFIC's reports and advice provide a technical basis for the establishment of effective conservation policies and programmes for wildlife in trade.

TRAFFIC is a joint programme of WWF, the world's largest conservation NGO and IUCN, an inter-governmental organization and the world's largest conservation network. TRAFFIC International, the headquarters of the TRAFFIC network, is based in Cambridge, UK. TRAFFIC's work, reputation and network has grown enormously since the mid-1970s when TRAFFIC was founded largely to assist in the implementation of CITES. Over a quarter of a century, TRAFFIC has developed from a single office into a global network of staff in over 25 countries in eight regional programmes around the world. CITES now covers some 30 000 plant and animal species and has 169 member countries.

These member countries face ever-more complex issues in determining how best to ensure that trade does not threaten the survival of species. A critical role for TRAFFIC is therefore to assist governments, CITES committees and the CITES Secretariat in their efforts to ensure the effectiveness of CITES and associated wildlife trade laws. This role is carried out through research on the trade in CITES-listed species, identification of problems with regard to the implementation and enforcement of existing CITES trade controls and the provision of assistance in the development of appropriate solutions. TRAFFIC has developed its role in addressing wildlife trade issues in a wider context, including major commercial sectors such as fisheries and timber trade and trade at the sub-national and regional levels.

TRAFFIC's Global Programme 2009-2012

TRAFFIC's work is focused through TRAFFIC's four-year Global Conservation Programme (2009-2012), which focuses around four major programme themes:

1. Flagship Species in Trade

Aim:	Driving urgent action for emblematic threatened species that act as flagships of wider trade and conservation challenges
Target themes:	Elephants, Great Apes, Marine Turtles, Tiger and other Asian Big Cats, Rhinoceroses, Vicuna

2. Resource Security and Wildlife Trade

Aim:	**Supporting trade measures that help encourage sustainable practice within some major wildlife resource sectors**
Target themes:	Fisheries, Medicinal Plants, Timber, Wildlife used for meat and medicine

3. Wildlife Trade Routes

Aim:	Taking focused action along priority trade routes to reduce wildlife trade threats to priority centres of biodiversity, species and resources

4. Early Warning

Aim:	Catalysing responses to new and emerging knowledge about wildlife hunting, harvest and trade levels, patterns and trends

國際植物園保育協會計畫執行摘要

國際植物園保育協會計畫內容及成果摘要如附：

國際植物園保育協會致力於全球受威脅物種保育工作，因維持植物的多樣性和人類生活、減輕貧窮、以及全球氣候變遷息息相關。BGCI組織網內的植物園和保育組織遍佈全球，會員包括來自 120 多國、600餘個機構(多數為植物園)。並透過提供支援協助和授權，同時建立並強化對保育的知識，以達成保育目標。BGCI 促進科學與技術方面的知識交換，並樂於分享最佳的保育方式、環境教育及永續性資訊。透過倫敦秘書處、及設立於芝加哥、廣州、新加坡植物園之地區辦公室，BGCI 以經濟又有效的方式運作，有利於全球植物園工作，並使官僚繁瑣制度和所需行政費用減至最少。

BGCI 很感激並重視台灣林務局所給予的大力協助，使我們得以朝著更有抱負的保育理想目標邁進；同時亦讓我們能夠特別針對氣候變遷此一議題著手製作教育專題，使兒童能在家庭中就從小培養正確觀念，知道自己的任何一個行為都有可能對全球氣候造成影響，進而教導兒童做出對環境和氣候有益的判斷，使其能更減緩及適應氣候變遷所帶來的轉變。

2009-2010 年 BGCI 計畫進度報告如下：

2009 年 8 月，全球植物園保育協會建立「氣候變遷全球教育入口網站」，內容包含開創性的新教材，以及各式各樣的活動素材提供給講師、學者免費下載使用。此一創舉的目的是要讓學生都能充分了解植物和氣候變遷議題密切相關。

此入口網站包含許多創新且立即可用的活動，讓各年齡層的學生都能參與，如【Voice Your Choice 表達你的選擇】即是讓 7-15 歲的學童積極參與終極辯論，回答：『滅絕之前，你會選擇救哪一物種？』學童必須藉由生物間的相互關係、可能導致的氣候變化來判斷如何抉擇，並在過程中學到批判性思考，邏輯能力及判斷力，同時瞭解植物、人類、氣候變化和地球各生物之間的聯繫。

網站中還有八個新教案，是根據 BGCI【Plants and climate change: which future?】報告中的案例所編寫而成，內容說明氣候變遷的幾個重要特點以及植物如何在其中扮演了極為重要的角色。

經由林務局協助，BGCI 將上述網站內容翻譯成中文及西班牙語版本，使「氣候變遷全球教育入口網站」得以有全球五大語系的其中三種版本。
中文版本網址：www.bgci.org/education/chinese/
西班牙語版本網址：www.bgci.org/education/cambio/
網站中所提供的資源內容獲得極正面的評價，特別是內容的關連性和即時性方面更是備受各方肯定。網站特色是以創新教材教導兒童氣候變遷的重要性。泰晤士報教育專刊(Times Education Supplement, TES) Heated debate 短文中，有提及此入口網站。BGCI 教育部門負責人 Julia Willison 在上開文章中提及「兒童就是未來的決策者，我們必須重新檢視我們的價值觀與行為，如此方能扭轉生物多樣性物種的繼續流失，並得以應付氣候變化所帶來之影響」。。

藉由林務局的協助，BGCI 得以將「氣候變遷之教育入口網站」的網站說明及翻譯版本於南非和英國發表。未來透過各地的植物園聯絡網，這些網站資訊亦能持續被報導。BGCI 並得以印製三種不同語言版本的宣傳用明信片，並於南非舉行之第七屆 BGCI 植物園教育大會(The 7th BGCI Education in Botanic Gardens Congress)廣發給前來參加的 24 國代表團。

「氣候變遷全球教育入口網站」已於 2009 年 11 月 18 日份假屏東縣高樹鄉「臺嚴倖雲保種中心」舉辦之東南亞植物園聯絡網(SEABGN)會議中正式發表，該會議旨在提供給會員們(東南亞各國之專家學者及保育人員)一個溝通與協調的交流論壇，對當前的國際保育議題提出討論與建議，以及協調其中的共同關注議題與跨國機構間的合作。與會代表共來自 13 國、分屬 20 個組織，參與國家有汶萊、柬埔寨、印尼、日本、寮國、馬來西亞、緬甸、菲律賓、新加坡、台灣、泰國、越南和中國(雲南)，以及來自澳洲和英國的觀察員。與會代表團對此一全球化「氣候變遷全球教育入口網站」的啟用展現了高度興趣，也極有意願使用。

BGCI 2009 年工作成果列於其出版品「Plants for the Planet: The work of Botanic Gardens Conservation International in 2009」中。

依據 2008 年至 2010 年計畫資料，國際植物園保育協會設立於 1987 年，設立宗旨為鼓勵植物園建立夥伴關係，參與植物多樣性保育工作，以增進人類福祉和地球健康。BGCI 專家來自 118 國的 800 餘個植物園，並與當地社區民間團體和政府單位合作執行保育受威脅物種

計畫，協助民眾瞭解植物是地球的重要資源。

BGCI 的重要工作成果包括：

- 協助擬定生物多樣性公約全球植物保育策略(Global Strategy for Plant Conservation, GSPC)，BGCI 為 2 項目標之負責單位，包括域外(*ex situ*)保育與復育(Target 8)和環境教育(Target 14)。
- 進行植物保育評估工作，出版木蘭科紅皮書(Red list of Magnoliaceae)和橡樹紅皮書(Red List of Oaks)。
- 2007 年發表「維生植物：藥用植物保育和植物園(Plant for life: Medicinal plant conservation and botanic gardens)」報告。
- 與國際自然保育聯盟(International Union for Conservation of Nature, IUCN)合作，確認哪些植物為受威脅物種，並於 6 個國家執行保護重要植物區計畫。
- BGCI 與植物園教育聯絡網(Botanic Gardens Education Network, BGEN)合作設計一套英語版網路教育宣導計畫，供全球植物園運用。宣導對象為 7-14 歲學童，宣導重點為植物和氣候變遷議題。2007 年間，有 26,000 人閱覽 BGCI 網站中 1,850 頁的教育宣導資料網頁。
- 2008 年出版「Plants and climate change: which future?」，該書依據最新研究報告，由多國專家撰寫，為全球首次詳述氣候變遷對植物生理、生物氣候學和生態系等不同層級之衝擊，以及此類衝擊如何影響全球人民生計和生存。

國際植物園保育協會在全球拯救植物多樣性危機中扮演領導角色。經由動員各國植物園和保育夥伴，BGCI 推動瀕危植物保育和提升民眾對植物資源重要性之瞭解。全世界的植物園每年有 2 億人前往參觀，提供絕佳的教育宣導契機。

全世界有 10 萬餘種植物面臨決滅之危機，若全球氣溫持續上升，植物絕種速率也會加快。科學家推估本世紀末增加 3-6℃，對水循環將有巨大影響，屆時連最普遍的植物都會面臨威脅。BGCI 於 2007 年在 6 個國家進行調查，發現大多國家沒有特別針對植物和氣候變遷的課程，也缺乏植物多樣性和保育相關資訊和教材。研究顯示民眾對生物多樣性和保育的興趣，通常衍生自親身的自然環境體驗。BGCI 因而研擬一套全球戶外教學教育宣導教材資料。

全球植物保育策略(GSPC)係世界各國政府於生物多樣性公約會議中認可之保護植物多樣性計畫。2008 年檢討目標執行進度時，與會者

建議將氣候變遷對植物多樣性的影響納入修訂目標，並研擬第二階段(2011-2020) GSPC，修訂版 GSPC 有已於 2010 年在日本召開之生物多樣性公約第 10 屆締約方大會(CBD COP10)中通過。第二階段 GSPC 有必要擴大參與，尤應加強教育宣導，讓教育和保育界人士，以及決策者更瞭解 GSPC。

2010 年計畫之目標包括：

- 製作一份簡單明瞭且引人入勝的「全球植物保育策略」指南資料供溝通、教育和宣導之用。
- 在網路上提供 GSPC 教材資源之英文、中文和西班牙文版本。
- 製作 PowerPoint 簡報資料，供世界各地植物園和其他機構使用，廣為宣導 GSPC 理念。
- 經由 BGCI 全球保育和教育聯絡網，宣導 GSPC 教材。

BGCI 希望我國能贊助經費，將資料翻譯為西班牙文和中文，以推廣至更多角落及更多讀者。下表顯示 3 種語言可能宣導的人數。

語言	人數
中文	1,075,000,000
英文	514,000,000
西班牙文	425,000

本計畫之主要工作項目包括：

一、草擬 GSPC 一般指南文字稿。
二、遴選 GSPC 宣導用圖像資料。
三、完成 GSPC 宣導資料初稿，將於 CBD COP10 期間展示，並徵詢各界意見。
四、設計 GSPC 宣導教材。
五、製作 PowerPoint GSPC 資料，置於 BGCI 網站。
六、將 GSPC 宣導教材翻譯成中文和西班牙文。
七、經由 BGCI 聯絡網、出版品和會議等管道，推廣 GSPC 宣導教材。

2010 年計畫工作進度如下：

- GSPC 一般指南文字稿部分，修訂版 GSPC 已於 2010 年 10 月在日本召開之生物多樣性公約第 10 屆締約方大會(CBD COP10)中通過。BGCI 彙整每項目標之資料，包括目標之背景、重要性、目前進展和執行所面臨之挑戰。
- 遴選 GSPC 宣導用圖像資料部分，辦理年度環境教育活動時，遴

選學童繪製之圖畫資料。辦理包含 GSPC 意涵之 T-Shirt 圖案徵圖活動，針對青年宣導植物保育之重要。也遴選其他圖像、事實說明、引言、詩句等，供製作 GSPC 指南運用。

- 設計部分，已選定 16 個目標之設計格式。
- 製作 PowerPoint GSPC 資料部分，於 GSPC 指南內容定稿後製作。
- 翻譯成中文部分，將於英文稿定稿後進行。西班牙文部分，將繼續募款辦理。

國際植物園保育協會 2011 年所提「強化非洲植物園角色保育瀕臨絕種樹種計畫」，摘要如附：

森林消失為主要的環境問題，約佔 20%之全球溫室氣體排放。非洲森林碳封存量約佔全球陸地 20%。聯合國宣布 2011 年為國際森林年，BGCI 為 IUCN/SSC 全球樹種專家小組(Global Trees Specialist Group)之秘書處，並推動非洲樹種保育現況調查。調查報告 Botanic gardens, endangered trees and reforestation in Africa 請參考 BGCI 所提供資料。本計畫目標為經由研討會提升非洲東部國家植物園能力，參與特有種和瀕臨絕種樹種之保育計畫，探詢在森林復育計畫和碳吸存計畫中栽植這些樹種之可行性。另外，新的 GSPC 也需推動，研討會中協助參加者瞭解下列 GSPC 目標。

- 目標 6：至少 75%之生產地以永續方式管理，符合植物多樣性保育目標。
- 目標 7：至少 75%之受威脅植物進行域內保育計畫。
- 目標 8：至少 75%之受威脅植物有域外蒐集(來源國尤佳)，至少 20%可供物種拯救和復育(recovery and restoration)計畫之用。
- 目標 9：保育至少 70%之作物物種之遺傳多樣性，包括其野外種和其他有社經價值之植物。並尊重、保存及維護原住民和當地傳統知識。
- 目標 11：沒有野生植物因國際貿易而瀕臨絕種。
- 目標 12：以永續方式採集所有野外植物相關產品。
- 目標 13：維護或增進原住民和當地傳統知識植物資源相關創新和實作，支援慣常使用、永續生計、當地食物安全和健康照護。

規劃 2012 年 1 月於肯亞奈洛比辦理 4 天研討會，針對非洲東部國家，尤其是肯亞、坦尚尼亞和烏干達，邀請參加之權益關係人或團體包括植物園或樹園、政府林務機構、有辦理植樹和環境計畫之非政府團體、當地和原住民團體、大學、國內和國際研究機構、木材貿易團體、

環境或氣候變遷政策團體。

研討會主題包括：

- 各國受威脅樹種之現況。
- 各國樹種保育計畫現況。
- 林業相關研究現況。
- 樹種保育缺口(gap)及必須採取的措施。
- 環境政策現況，包括 GSPC、CITES、降低因森林消失和退化造成之氣體排放(Reducing Emission from Deforestation and Forest Degradation, REDD)等。
- 各國林業政策。
- 各國非政府團體森林相關計畫。
- 林業貿易議題。
- 政策執行不足之處。
- 研究需求、資訊需求、補足不足處之機制、未來行動之建議等。

本計畫預期目標包括：

- 針對涉及森林保育、復育和永續利用之權益關係人，增進其資訊交流。
- 強化非洲東部國家植物園能力，擬定樹種保育和森林復育政策和推動計畫。
- 找出植物園可協助森林相關計畫之技術、專業和資源。
- 找出尚未列入域外(ex-situ)保育，而需優先哪入栽植計畫之樹種。
- 選出優先樹種，用於重新造林和復育計畫。
- 增加非洲保育和永續利用森林物種計畫相關資料，經由 GSPC 提供全球植物保育界參考。
- 出版報告闡述非洲東部瀕臨絕種樹種保育和森林復育及碳吸存計畫之關連。

2011 年計畫活動摘要如下：

- 2011 年 2 月至剛果民主共和國(DRC)兩個植物園討論保育議題，並與法國植物園協會(French Botanic Garden Association)合作，規劃培力計畫，為 DRC 和其他非洲法語國家提供訓練課程。
- 2011 年 3 月於美國紐約辦理全球生態復育聯盟第一次規劃工作坊。
- 2011 年 10 月於肯亞奈洛比辦理全球生態復育聯盟第二次規劃工

作坊。

- 與 Brackenhurst Botanic Garden 共同籌辦 2012 年 2 月於肯亞奈洛比召開之研討會，討論推廣運用瀕臨絕種樹種復育非洲森林議題。
- 2011 年間，進行非洲植物園所需訓練之評估計畫，並利用計畫報告向英國政府申請經費，將於 2012 年 2 月在南非辦理訓練班，課程包括保育政策和實務、物種保育資料管理、復育等。
- 規劃於 2012 年 5 月啟動全球生態復育聯盟，BGCI 將統整聯盟成員工作並研擬行動計畫，非洲植物園為執行計畫之一部分。
- 2012 年初，出版樹種復育手冊，包括 20 個世界各地案例研究，並分送包括非洲在內之全球各地之植物園。
- 持續建立夥伴關係，推動非洲植物園瀕臨絕種樹種保育和森林復育工作。

Report to the Taiwan Forestry Bureau on work supported by the Conservation Grant in 2011

BGCI
Plants for the Planet

Introduction

Since 1987, BGCI has worked to *mobilize botanic gardens and engage partners in securing plant diversity for the well-being of people and the planet.* An estimated 30-50% of the world's plant species are threatened with extinction. As the world's largest plant conservation network (comprising botanic gardens in 112 countries), BGCI plays a lead role in global efforts to reverse this impending extinction crisis. We operate in a catalytic and cost effective way with a small HQ Secretariat at the Royal Botanic Gardens, Kew in the UK. We work on policy issues, research related to endangered species, practical conservation, training and environmental education. In recent years we have placed particular emphasis on the conservation of plants for rural livelihoods and the conservation of endangered tree species. We are most grateful to the Taiwan Forestry Bureau for generous support in 2011 that has enabled us to make significant progress in "Enhancing the role of African botanic gardens in the conservation of endangered tree species".

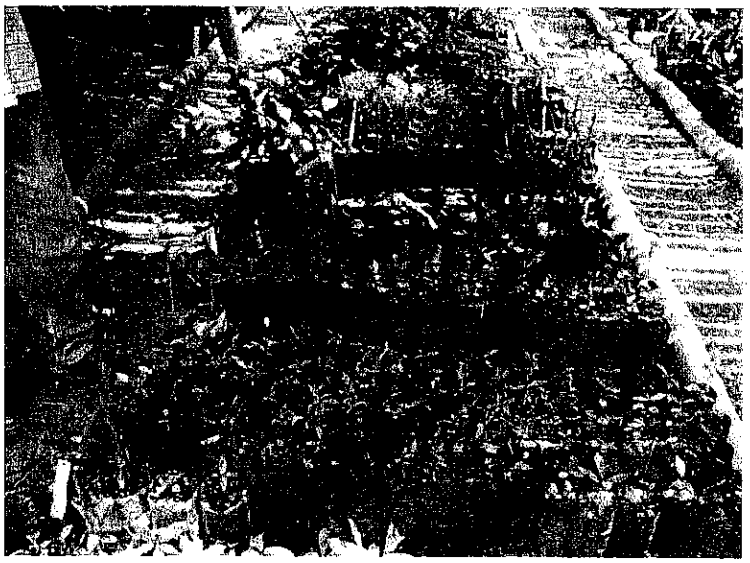
Project activities in 2011

With generous support from the Taiwan Forestry Bureau, BGCI continued to promote the roles of African botanic gardens in tree conservation and reforestation. This support enabled the BGCI Secretary General to visit Nairobi in October 2011. The purpose of this visit was to attend the second planning workshop for an Ecological Restoration Alliance of botanic gardens that BGCI has been requested to develop and coordinate. Following the organization of the first successful planning workshop held in New York in March 2011, BGCI chose to hold the second meeting at Brackenhurst Botanic Garden, near Nairobi in October. This enabled representatives from botanic gardens in the US (Chicago, Missouri and New York) to forge practical links with the Brackenhurst Botanic Garden offering support for the tree restoration activities undertaken there.

BGCI continued to seek funding for a regional workshop in Nairobi with partner gardens, African forestry departments, NGOs and other identified stakeholders. The aim of the workshop would be to determine how tree-planting schemes can link into current forestry policy mechanisms whilst remaining community-led, and establish which species can be planted in identified areas. The intention is to support practical conservation outputs in African botanic gardens. Applications were submitted to the Prince Albert II Foundation (in collaboration with the National Botanic Garden of Belgium) for workshops both in Nairobi and Kinshasa, and to the Darwin Initiative. These two applications were unsuccessful but BGCI has partnered with Brackenhurst Botanic Garden to further develop the plans for a regional workshop. This will be held in February 2012. BGCI has provided a small grant for to cover the costs of participants. The report from this meeting will guide BGCI's further efforts to promote the use of endangered tree species in the restoration of African forests.

The Ecological Restoration Alliance of botanic gardens mentioned above will be formally launched in May 2012 at a high level event at the Royal Botanic Gardens, Kew. BGCI will maintain the overall coordination role and work with Alliance member gardens to develop an Action Plan. Following a survey of current work by botanic gardens in ecological restoration, BGCI will ensure that African botanic gardens are fully involved in the implementation of the Action Plan. BGCI is actively fundraising for the work of the Alliance.

BGCI also used support from the Taiwan Forestry Bureau to review the training needs of African botanic gardens in 2011. Based on the information received BGCI successfully developed a proposal and received funding from the UK Government to deliver a training course in South Africa for botanic gardens in Eastern and Southern Africa. This is being held in February 2012. The training course aims to link policy and practical aspects of conservation and will include data management for species conservation and restoration.



The tree nursery at Kisantu Botanic Garden, DRC

BGCI's Secretary General, visited two botanic gardens in DRC in February 2011. The botanic gardens were Kisantu Botanic Garden which has a magnificent arboretum with mature specimens of a range of important and threatened timber species and the Kinshasa Botanic Garden which is in an area of immense urban deprivation and focuses more on environmental education. Subsequent to this visit BGCI is collaborating with the French Botanic Garden Association (Jardins Botaniques de France et des Pays Francophones) in the development of capacity building programmes that will benefit these gardens and others in French speaking countries. We will use the current training course being run in South Africa as a model.

In early 2012, BGCI will publish a manual on tree restoration that has been a work in progress drawing on 20 case studies from around the world. The manual on tree restoration makes the links between conservation of individual tree species by botanic gardens, forest restoration more broadly and carbon sequestration. This manual will be distributed to all BGCI member gardens including those in Africa.

BGCI will continue to promote and help support practical actions by botanic gardens working in Africa to conserve endangered tree species developing new partnerships in the forestry sector were necessary. We remain sincerely grateful for the grant from the Taiwan Forestry Bureau in 2011 and hope that we can continue to work with you to conserve and restore the world's endangered flora.

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國際鳥盟所提巴西計畫成果摘要

國際鳥盟所提巴西計畫執行情形摘要如附：

我國於 2007 年贊助「保育亞馬遜雨林重要生物多樣性地區計畫(第一階段)」，國際鳥盟各國合作單位(巴西、秘魯、哥倫比亞、厄瓜多、玻利維亞)均有參與，但第 1 年之重點地區為巴西。成果摘要如下：

亞馬遜計畫為國際鳥盟積極推動重要野鳥棲地(Important Bird Areas, IBAs)計畫之一環。主要針對亞馬遜雨林，實際探查、選址、決定保育優先順序等事宜。由國際鳥盟美洲分部負責統籌，各國合作單位共同參與。

亞馬遜雨林以生物多樣性高聞名於世，亞馬遜雨林為全球最大熱帶雨林，佔全球之 53%，約佔全球陸域初級淨生產量之 10%。亞馬遜雨林面積 600 萬 km^2，跨越南美洲 9 個國家，雨林中有全世界最大的河流系統。調查顯示亞馬遜雨林至少有 40,000 種植物(30,000 種特有種)、1,300 種鳥類(263 種特有種)、427 種哺乳類(173 種特有種)、387 種爬蟲類(216 種特有種)、427 種兩棲類(364 種特有種)。亞馬遜雨林資源調查不時發現新種，過去 8 年來，巴西境內的亞馬遜雨林就發現 18 個鳥類新種。1990 年以來也記錄了 10 種靈長類動物新種。亞馬遜雨林原住民文化豐富，巴西境內有 260 群、170 族。有些原住民的未來面臨危機，1/3 族人口少於 200 人。

亞馬遜計畫原訂工作項目及 2007 年執行進度，說明如下：

一、調查、紀錄、製圖列出巴西境內亞馬遜雨林重要野鳥棲地。

- 於 2007 年 4 月 16 至 20 日辦理研討會，討論於巴西境內亞馬遜雨林選擇 IBA 地點的標準，並研擬工作指南。參加成員包括 SAVE Brazil、國際鳥盟美洲秘書處、Conservation International 巴西分部及 G. A. Bencke (大西洋岸森林 IBA 指南之作者)。決議選定巴西境內亞馬遜 IBA 工作將以法定的亞馬遜地區(Amazonia Legal)為範圍。主要討論重點為如何將 IBA 標準運用於荒野地區(wilderness area)。
- 於 2007 年 5 月 11 至 13 日辦理研討會，繼續討論 IBA 標準運用於荒野地區相關議題，亞馬遜雨林 9 個國家中，有 8 國派員，其他有 wilderness area 的國家如阿根廷、加拿大、巴拉圭、烏拉圭和美國也與會討論。
- 初步選定 51 個有可能公佈為 IBA 的地區。

二、全面分析 9 國現況，應保育物種均納入亞馬遜雨林 IBA 系統。
- 目前有 5 個國家完成 IBA 評選工作。

三、亞馬遜雨林 IBA 相關資料納入網站供大眾查閱，另提供宣導用紙本出版品。
- 出版巴西亞馬遜 IBA、圭亞那 IBA 和包括 9 國 IBA 的海報等。
- 資料已納入國際鳥盟 World Bird Database。

四、排定保護優先順序，進行保育行動需求評估和可行性研究。
- 已討論排定優先順序的方法。
- 國際鳥盟美洲秘書處已聘請專家進行此項工作。

五、與各國政府和贊助單位合作，整合保育策略。
- 一旦優先順序排定後，就會進行此項工作。

國際鳥盟於2008年9月22至27日召開BirdLife World Conference時，發表本計畫相關出版品"The Important Bird Areas of Brazil: Amazonia, Cerrado and Pantanal"，該書有印出林務局logo。

2009 年之巴西保育瀕危鳥類和棲地計畫，計畫及報告摘要如附：

全球鳥類 10,000 餘種中有 1,200 種面臨危機，有 190 多種極度瀕危(極危，Critically endangered)，360 種為瀕臨絕種(Endangered)鳥類。國際鳥盟在 100 多個國家有當地合作團體，總會員人數超過 250 萬，為此國際鳥盟推動「防止絕種計畫(Preventing Extinctions Program)」，採取保育行動，加強培育人才和教育宣導，爭取經費以拯救瀕危鳥類。巴西有 123 種鳥類瀕臨滅絕，其中 25 種為極危物種，是全世界最多瀕臨滅絕物種的國家，亟需採取補救行動。

防止絕種計畫的主軸為負責領導該國瀕臨絕種鳥類保育計畫之物種守護者(Species Guardians)。物種守護者負責協調全國、當地社區和相關團體，採取保育措施，監測物種現況，評估保育計畫成效，並將結果通報國際鳥盟。

國際鳥盟 2009 年所提「巴西保育瀕危鳥類和棲地計畫」之目標為：
- 支援鳥類守護者執行相關計畫。
- 研擬「物種行動計畫」，協助政府部門和相關團體執行重要保育計畫。
- 執行上述行動計畫。
- 爭取經費，確保守護者能持續執行上述行動計畫。

本計畫之預期成果包括：
一、於巴西指定至少 5 種鳥類之守護者。
二、研擬至少 5 份「物種行動計畫」。
三、針對 2 種極危鳥類，執行緊急拯救行動。
四、爭取經費支援 2 種極危鳥類保育計畫 2 年。

Araripe Manakin (*Antilophia bokermanni*)是保育團體 Aquasis 於 1996 年發現的新種，Aquasis 集中精力研究此種鳥類之生物特性(覓食特性、繁殖生物學、遺傳變異等)和保育現況(族群數量、活動範圍、威脅因子等)。Aquasis 也在當地社區辦理活動，提倡將 Araripe Manakin 選為該區保育自然資源之象徵。國際鳥盟和巴西環境部共同支持上述計畫。研究資料顯示，Araripe Manakin 活動範圍侷限於 28 平方公里的區域內，且棲地消失為最主要的危機。棲地破壞的原因包括農業活動(最嚴重的包括香蕉、玉米、豆類和蕃茄)、牧牛、度假屋之建造、娛樂設施和火災。泉水和河流被轉向、分流或開挖也減少棲地面積。

原認為已絕種的 Stressemann's Bristlefront (*Merulaxis stresemanni*)，只在博物館有兩個標本。1995 年再度被發現，目前位於巴西美納斯傑瑞斯州(Minas Gerais)的 熱基坦永雅山谷(Jequitinhonha Valley)為此物種全球唯一棲地。

Restinga Antwren (*Formicivora littoralis*)面臨棲地日益縮小及高度破碎化的危機。目前分佈範圍為發展觀光業重點地區，興建度假村或旅社對棲地造成壓力，附近的製鹽工業和人類佔用棲地也是問題。

本計畫執行進度如下：
一、國際鳥盟已選定 3 個巴西民間團體擔任 3 種瀕危鳥類物種守護者
- Aquasis 負責守護 Araripe Manakin。
- Biodiversitas 負責守護 Stressemann's Bristlefront。
- Pingo d' Agua 負責守護 Restinga Antwren。

二、國際鳥盟巴西合作夥伴拯救巴西協會(Save Brasil)與上開守護者共同研擬 3 份「物種行動計畫」。
三、「物種行動計畫」之執行
- 經由 Save Brasil 和 Pingo d' Agua 之努力，巴西政府同意劃設 4,000 公頃之 Costa do sol State Park，以保護 Restinga 棲地。
- 進行 Restinga Antwren 活動範圍、覓食行為和族群評估研究，巴西政府設立保護區和研擬行動計畫均納入此研究之建議。
- The Chico Mendes Institute for Conservation of Biodivrsity(主管

巴西動植物保育之政府單位)同意採用 Restinga Antwren 和 Araripe Manakin「物種行動計畫」。

- 負責守護 Araripe Manakin 的 Aquasis 已逐步參與及影響當地議會，提倡永續性土地利用，保護湧泉和溪流之重要性，以保護 Araripe Manakin 棲息環境。
- Aquasis 已將 Araripe Manakin 評估和研究結果，以及族群分佈圖提供給統籌保護區設立的單位，巴西環境部將擇期召開會議，邀請各界相關人士，共同討論於阿勒萊皮高原(Araripe Plateau)設立保護區事宜。
- Aquasis 與 Araripe 當地 NGO Associacao Crista de Base 合作推動教育宣導和復育湧泉和溪流本土植物。Aquasis 也與當地天主教教會合作，提倡以 Araripe Manakin 為自然資源保育的象徵。
- Biodiversitas 積極推動設立佔地 600 公頃之 Stressemann's Bristlefront 私立保留區，已爭取到美國鳥類保育協會 (American Bird Conservancy)贊助經費，並將雇用一位保護區看守員。

四、教育宣導

- Pingo d'Agua 出版保護 Restinga Antwren 摺頁 1,000 份，T 恤 100 件。並辦理保育 Restinga Antwren 照片展覽，發放保育資料給參觀人士。2009 年 8 月爭取到一家重要電視台播放保育 Restinga Antwren 紀錄片。
- 巴西環境部出版 Araripe Plateau: Biodiversity and Conservation 一書中，包括由 Aquasis 撰寫之 Araripe Manakin 專章。2009 年 2 月 10 日爭取到 State of Ceara 一家重要報紙，整幅報導 Araripe Plateau 議題。

五、爭取經費部分，已爭取到三個物種擁護者(Species Champions)，應允提供三年保育經費。

2010 年，國際鳥盟所提「巴西保育瀕危鳥類和棲地計畫 Phase II」為上開計畫之延續計畫，摘要如附

Phase II 計畫目標和活動如下：

一、針對巴西極危物種設立保護區，並由物種守護者、各界相關人士和相關地方和中央政府機構共同合作促成。

1. 劃設 4,000 公頃之 Costa do sol State Park，以保護 Restinga Antwren 棲地，物種守護者 Pingo d'Agua 已於 Phase I 時提出建議範圍和分區。

2. Phase I 時物種守護者 Biodiversitas 購買土地於 Minas Gerais 的 Jequitinhonha Valley 設立 Stressemann's Bristlefront 保護區，Phase II 改善保護和經營管理措施，並建立保護區基礎設施。
3. 保護及永續經營管理 Araripe Manakin 重要棲地，包括於湧泉和溪流附近進行森林復育計畫。物種守護者 Aquasis 已於 Phase I 時標示出重要棲地。

二、進行 Restinga Antwren、Stressemann's Bristlefront 和 Araripe Manakin 生物研究，以供巴西政府規劃保育措施和排定優先行動之參考，以及監測物種行動計畫之進度。

三、利用電視或其他媒體宣導 Restinga Antwren、Stressemann's Bristlefront 和 Araripe Manakin 之保育，並針對上開物種與當地相關團體(例如教會)合辦教育宣導活動，如展覽、博覽會等。

四、爭取政府單位支持物種守護者所擬「物種行動計畫」。爭取政府單位承諾採用「物種行動計畫」建議事項，包括保護區之設立等。

本計畫執行進度摘要如下：

Restinga Antwren 部分：

- 巴西環境部 INEA 於 2011 年初公告劃設 4,000 公頃之 Costa do sol State Park，以保護 Restinga Antwren 之主要棲地。3 次保護區設立民眾意見徵詢會議都很成功。
- 2011 年初啟動 Restinga Antwren 物種行動計畫，製作分發 100 份資料夾，內容包括 Restinga Antwren 基本資料和行動計畫摘要。
- 外來種狨猴(marmoset)對 Restinga Antwren 造成威脅，已將 2 個研究地區狨猴移走，並於 Restinga Antwren 棲地建立狨猴管理系統。
- 於保護區設立前之徵詢民眾意見期間，辦理 Restinga da Costa do sol – a view beyond the dunes 展覽，描述 Restinga Antwren 為旗艦物種及其生物地位之重要性。此展覽巡迴 5 個都會區，吸引 1,400 人參觀。民眾對展覽予以肯定，對保護區諮詢程序有正面貢獻。
- 宣導 Restinga 生物多樣性布條掛在交通繁忙地區 2 個月，每天都有數千人車由該處經過。另有一所學校將 Restinga 生物多樣性布條長期在校內展示。
- 2010 年 7 月於當地期刊 O Saqua 發表文章，說明 Restinga Antwren 所面臨之威脅，O Saqua 每期印製 3,000 本，文章也列在期刊網站中。另外 Planeta Terra 雜誌刊登一篇外來種文章，以 Restinga Antwren 和狨猴為案例研究。
- 巴西很受歡迎的節目 Globo Ecologia，全力投入 Restinga Antwren 保育活動，2 段摘要短片可於 Youtube 中觀賞。

- 其他教育宣導包括發放貼紙給當地居民和觀光客，於教育宣導活動中贈送印有 Restinga Antwren 保育訊息的 T-shirt。

Araripe Manakin 部分：

- 負責守護 Araripe Manakin 的 Aquasis 已成為 6 個當地社區論壇和委員會之成員。一個論壇採用 Araripe Manakin 為保育水資源重要性之象徵，另一個論壇以 Araripe Manakin 為保育生物多樣性之象徵。3 個社區委員會有建設性的參與物種行動計畫之討論。
- Aquasis 發現大片地區之公有未使用土地可設立為 Araripe Manakin 保護區。2010 年 1 月 Aquasis 與保護區政府相關單位(Protected Areas Creation Department, PACD)討論此案，PACD 9 月指派 2 位專家負責此案，10 月至現場會勘。這些都是設立保護區之必要程序。
- Aquasis 與其他團體合辦活動，提升民眾對保育 Araripe Manakin 之認知，例如 2010 年 4-7 月間，辦理多場賞鳥活動。
- 湧泉和溪流區域為 Araripe Manakin 重要棲地，Aquasis 校訂由 Ceara 洲水資源部取得之資料庫，至 2010 年 9 月已訂正 10 處溫泉之位址標示，2009 年 12 月至 2010 年 7 月間發現 9 處未標示湧泉。新資料庫可更正確的規劃保育和族群監測計畫。
- 2010 年 10 月，進行系統性之族群調查。
- 參與各類團體或機構所辦活動，宣導 Araripe Manakin 保育議題，如 2011 年 5 月和 6 月環境教育週活動，11 月之計畫宣導活動等。
- 保育計畫相關宣導包括於 4 和 7 月接受全國性電視台 Rede Globo 採訪；4 和 6 月接受地區性電視台 Verdes Mares Cariri 採訪；2 和 4 月全洲性報紙 Diario do Nordeste 刊登文章，8 月另刊 1 次計畫簡介；地區報紙 Jornal do Cariri 和全洲性報紙 O Povo 各刊登 1 次計畫相關文章；8 月全洲性商業期刊 Jornal do Commercio 刊載採訪報導。

Stressemann's Bristlefront 部分：

- 擴大調查 Stressemann's Bristlefront，由 2009 年 120 個樣點增至 2010 年之 298 樣點。但僅發現 1 隻雄鳥，加上 2009 記錄到的 5 隻雌鳥，本計畫開始調查至今，僅發現 6 隻，證實 Stressemann's Bristlefront 極危的現況。
- 2010 年研究調查發現，Stressemann's Bristlefront 之領域大約為 2.36ha。
- 經由美國鳥類保育協會(American Bird Conservancy)贊助經費，Biodiversitas 已購置 600 公頃有發現 Stressemann's Bristlefront 的

林地，並將規劃設立私立保留區。

- 通往保護區之路況不佳，5-7 月間進行道路改善工程，7-9 月修復巡護人員宿舍後，雇用保護區 1 名看守員。

2011 年國際鳥盟所提「巴西保育瀕危鳥類和棲地計畫 Phase III」工作項目如下：

Restinga Antwren 部分：

- 廣為宣傳劃設 4,000 公頃之 Costa do sol State Park 保護 Restinga Antwren 主要棲地。
- 外來種狨猴(marmoset)對 Restinga Antwren 造成威脅，將執行狨猴移除計畫。
- 監測鳥巢被獵食情形，以瞭解狨猴移除計畫之成效。並進行 Restinga Antwren 繁殖生物學和行為研究。
- 持續教育宣導計畫，包括訓練班和與各類環境教育活動合作，增進大眾對 Restinga Antwren 保育計畫之支持。

Araripe Manakin 部分：

- 持續向地區及中央主管機關關切設立國立保護區之進度。並持續推動私立保護區之設立。
- 與當地保育團體 Associacao Crista de Base 合作，辦理教育宣導活動。
- 持續參與當地論壇和委員會，討論自然資源使用和規劃事宜，將 Araripe Manakin 議題納入。
- 持續鼓勵權益關係人或團體參與 Araripe Manakin 保育計畫。

Stressemann's Bristlefront 部分：

- 持續進行族群調查，以確認 Stressemann's Bristlefront 分佈棲地和族群數量。
- 草擬 Stressemann's Bristlefront 保護區經營管理計畫。
- 執行教育宣導計畫，與學校合作於各項活動中設立保育資訊亭，規劃辦理展覽，運用各式宣傳，如貼紙、T-shirt、報紙、電視等。
- 雇用巡護人員看守保護區，工作包括預防火災、警戒及巡視等。

2011 年執行情形如下：

一、推動設立保護區

- 2011 年 4 月 15 日正式公告劃設 9,840 公頃之 Costa do sol State

Park，以保護 Restinga Antwren 棲地。

- 2011 年出版 3,000 本 Restinga Antwren 物種行動計畫。

二、Restinga Antwren 活動範圍、覓食行為和族群數量評估研究

- 進行 Restinga Antwren 領域範圍研究。標放 72 隻 Restinga Antwren，領域範圍 0.025-0.136ha。
- 持續進行外來種狨猴(marmoset)對移除計畫。

三、執行保育宣導和環境教育計畫

- 於 Restinga Antwren 棲地附近學校辦理相關保育展。

Araripe Manakin 部分：

一、2011 年持續參與當地論壇和委員會，討論自然資源使用和規劃事宜，以及 Araripe Manakin 議題。其中媒體有報導的包括 Salgado River Watershed Committee, Araripe National Forestry Council, Araripe Desertification Prevention Forum, Crato Municipal Environmental Council。

二、2011 年 10 月 19 日，巴西環境部代表至 Araripe Plateau 訪視，討論規劃設立國立保護區事宜。

三、推動社區參與活動包括：與 Nature Brigade Project 合作，將 Araripe Manakin 置入計畫 logo；至 Federal University of Ceara 說明 Araripe Manakin 議題；2011 年 6 月 22 日發表 Araripe Manakin 生活史影片，並於數個地點播放。

四、持續更新資料庫，包括湧泉和溪流區域(Araripe Manakin 重要棲地)、棲地類型、Araripe Manakin 分佈資料等。2011 年 1 月 14 日發現一處有 10 對 Araripe Manakin 的新棲地。

五、2011 年至三個社區辦理保育 Araripe Manakin 宣導活動。2011 年 7 月 1 日舉辦保育 Araripe Manakin 遊行活動。

Stressemann's Bristlefront 部分：

一、已界定 12 種行為類別，包括活動、覓食、鳴叫等。發現 Stressemann's Bristlefront 被也會出現在被砍伐森林。

二、已購入 594 公頃森林，規劃設置私立保護區。2010 年 10 月起雇用 1 名保護區守護員，定期巡邏防止非法盜獵或伐木，並協助設立步道系統，設立原生種苗圃，設立圍籬防止家畜進入，建立防火線等。

BirdLife
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Mr. Lee Tao Sheng
Acting Director General
Forestry Bureau,
COA No. 2, Section 1,
Hangchow South Road,
Taipei 100,
Taiwan

15th February 2012

Subject: Reports for projects supported by the 2011 conservation grants of the Forestry Bureau, CoA

Dear Mr Sheng,

It is my pleasure to attach the project reports for which you have granted support in 2011. As you can see from the reports, the projects have been implemented successfully by BirdLife in 2011.

Cambodia

BirdLife Forests of Hope Programme
Conservation of a large forest block in North Western Cambodia through carbon financing and local community involvement – Phase 2

This project has built on BirdLife's success in Indonesia, supported by the Forestry Bureau in previous years, where BirdLife is now managing a lowland forest concession covering over 101,000 hectares. This successful experience is now being replicated in other tropical forests around the world under the BirdLife "Forests of Hope" programme, including at Western Siem Pang in Cambodia.

During phase 2 of the project, the Ministry of Agriculture of Cambodia (MAFF) submitted the sub-decree to establish Western Siem Pang Protected Forest covering 149,710 ha, for consideration by the Council of Ministers. This endorsement from MAFF is an extremely significant step in gaining further national governmental support for the project. The full report for the baseline biodiversity survey for the project area has been drafted and biodiversity surveys of other areas in the north-east have been undertaken, highlighting other areas of conservation importance. Finally, the investigation and development of sustainable management strategies through carbon financing and potential ecotourism activities are also underway.

São Tomé and Príncipe

BirdLife Preventing Extinctions Programme
Conserving the world's most threatened birds and their habitats: Preventing Extinctions in São Tomé and Príncipe, Phase III

Threats to the rich biodiversity of São Tomé and Príncipe continue to increase, especially as a result of the gradual encroachment into secondary forests for agriculture and collection of wood for charcoal. Building on the activities supported by the Forestry Bureau in 2010, during 2011 the project has continued to provide support to the local NGO *Associação dos biólogos Santomenses* (ABS), as the BirdLife Species Guardian in São Tomé. Three species have been prioritized for action: Dwarf Olive Ibis, Sao Tomé Fiscal Shrike and Sao Tomé Grosbeak. During 2011, the project has made further progress in understanding the status and distribution of the species, developing conservation plans, building local support, and addressing threats to the forest. In particular, much progress was made in 2011 towards gaining governmental and private sector support for ensuring forests

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are protected alongside the rehabilitation and expansion of oil palm plantations at the edge of the Obe Natural Park.

Brazil

BirdLife Preventing Extinctions Programme
Conserving the endemic and most critically endangered bird on the brink of the extinction - Phase III

The final year of this project has resulted in tremendous conservation success in the formal designation of the Costa del Sol State Park, covering 9840 ha, which was officially announced by the Governor of Rio de Janeiro State in April 2011. This new state park results directly from activities supported by the BirdLife Preventing Extinctions Programme, and protects the unique coastal habitat rich in cacti and bromeliads, and the only place in the world for the Critically Endangered Restinga Antwren.

A further conservation success for the project was the discovery of a new and unexpected locality for the Critically Endangered Araripe Manakin, in the Araripe Plateau. Fortunately, this area is already protected as a National Forest which greatly improves the prospects for the survival of this species.

The success of these exciting conservation projects has been made possible so far by the critical contribution of several donors including the Forestry Bureau of the Council of Agriculture of Taiwan.

I leave you to the details of the reports and should you have any questions, please don't hesitate to contact me.

We are very grateful for your support to these projects as a sign of your commitment to international conservation and also a proof of the productive and continued collaboration between your institution and BirdLife International.

Thank you and best regards.

Dr. Marco Lambertini
Chief Executive
BirdLife International

Cc :
Mr. Kuan, Li-Hao, Director, Conservation Division, Forestry Bureau, COA
(Ms) Yang Hui-liang, Conservation Division, Forestry Bureau, COA

BirdLife INTERNATIONAL

PREVENTING EXTINCTIONS

BirdLife International's Preventing Extinctions Program

Conserving the world's most threatened birds and their habitats

Preventing Extinctions in Brazil

Phase III



Report from BirdLife International to the Forestry Bureau of the Council of Agriculture of Taiwan

Cambridge, United Kingdom, February 2012

INTRODUCTION

BirdLife International has embarked upon an ambitious program to halt and reverse the threat of extinction. BirdLife has launched the **Preventing Extinctions Program** which is spearheading greater conservation action, human capacity and awareness, as well as funding support, for the world's most threatened birds. The core of the BirdLife Preventing Extinctions Program is the establishment of two new communities: *BirdLife Species Guardians* and *BirdLife Species Champions.*

Species Guardians take the lead in conserving a globally threatened species in their country or region. Their primary role is to take and encourage greater conservation action for their species, working with national and local governments, other concerned individuals, organisations and local communities. BirdLife Species Champions are individuals, organisations and companies who raise awareness for threatened species and provide the vital funding that supports the work that the BirdLife Partnership and the *BirdLife Species Guardians* undertake to prevent extinctions.

The most important country for the implementation of the BirdLife Preventing Extinctions Program is Brazil. Brazil supports 123 species which are globally threatened with extinction, of which 25 are Critically Endangered.

The Forestry Bureau of the Council of Agriculture of Taiwan has provided generous support for the project ***Preventing Extinctions in Brazil.*** During phases I (2009) and II (2010), the main achievements were the following:

1. Locally-based organisations appointed in Brazil as Species Guardians.

Three locally-based organisations in Brazil were appointed as Species Guardians in 2009. These are: Aquasis, Biodiversitas and Pingo d' Água. Agreements were reached with these Guardians who made a commitment to advance the most urgent conservation actions for the species and to report back on the results of actions taken. They were appointed by the BirdLife Partner in Brazil, Save Brasil, in consultation with the BirdLife Secretariat in the Americas (Quito, Ecuador).

2. Species Action Plans prepared

BirdLife and Save Brasil worked with the Species Guardians in Brazil to prepare simple conservation plans for three species, which have then formed the basis for project funding and implementation.

3. Implementation of Species Action Plans

The core of the project in 2009 and 2010 has been the implementation of the three species action plans. They have been implemented with technical support from Save Brasil. The three species that have been the focus of project activities are Stresemann's Bristlefront *Merulaxis stresemanni* (Species Guardian is Biodiversitas), Araripe Manakin *Antilophia bokermanni* (Species Guardian is Aquasis) and Restinga Antwren *Formicivora littoralis* (Species Guardian is Pingo d' Água).

4. Securing additional funding for the Guardians

Based on the actions set out in the action plans, and the funding that is required to implement these, BirdLife has recruited Species Champions for two of the species. These Champions have each made a commitment to support the conservation work over three years.

ACTIVITIES AND RESULTS FROM PHASE III

This report summarises progress with Phase III of the project which covers the third and final year of the *Preventing Extinctions in Brazil* project. It focuses on the implementation of species action plans for the three species covered by the Project: Restinga Antwren, Araripe Manakin and Stresemann's Bristlefront. This project forms an integral part of BirdLife International's Preventing Extinctions Program and BirdLife is extremely grateful to the Forest Bureau for its support to the Program.

BirdLife 'Species Guardians' Project: Restinga Antwren



Restinga Antwren *Formicivora littoralis*

The Restinga Antwren has an extremely small and highly fragmented range around Cabo Frio in Rio de Janeiro state, Brazil. The species inhabits coastal scrub vegetation, notably restinga – a beach-scrub habitat.

Its range occurs within an area of major tourism development, and suitable habitat is under considerable pressure from clearance for beachfront housing and holiday resorts. The species is also threatened by the salt industry and the increasing presence of squatters, and from nest predation by introduced marmosets (which are not native to the area).

Background

The Restinga de Maçambaba, located in the northeastern coast of the Rio de Janeiro state, is important for the Critically Endangered Restinga Antwren *Formicivora littoralis* and the Vulnerable Black-backed Tanager *Tangara peruviana.* This area consists of a narrow strip of coastal restinga about 40 km long. The restinga ecosystem is characterized by a beach-scrub habitat, rich in cacti and bromeliads, growing on sand dunes. The Restinga de Maçambaba separates the Araruama lagoon from the ocean and it is one of the last well preserved beach lagoon systems in Rio de Janeiro state. The Restinga de Maçambaba is considered an Important Bird Area, and also an Alliance for Zero Extinction (AZE) site. The IBA is under enormous pressure from clearance for real-state projects (beachfront housing), the salt industry and the increasing presence of squatters.

Most occupation in the area is illegal, and occurred once the paved road between Araruama (beside the Araruama lagoon) and Arraial do Cabo (on the coast) was constructed. The Restinga Antwren is one of the most abundant birds in this avifaunally depauperate ecosystem. Pairs occupy relatively small areas and occur at high densities. However, being totally reliant on the restinga habitat the population will decline rapidly with further habitat loss. Furthermore, the breeding success of the species is threatened by nest predation by introduced marmosets.

The Species Guardian for the Restinga Antwren is Pingo d' Água

Planned activities

1. Promotion of the creation of a public protected area in the region

2. Development of biological research on the Restinga Antwren to determine home range, foraging behaviour and population estimates.

3. Implementation of an awareness raising and environmental education program.

Results

1. Promotion of the creation of a public protected area in the region

Important progress had already been made during 2010 towards the creation of a protected area, with three public consultations held with local communities, local and regional media, interested business people, representatives from the INEA (Brazilian Environmental Agency), local governments, NGOs and research institutions. This public consultation process paved the way for the designation of the 9840 ha Costa del Sol State Park, which was officially announced by the Governor of Rio de Janeiro State on 15 April 2011 (see http://www.birdlife.org/community/2011/04/threatened-antwren-to-benefit-from-creation-of-new-state-park-in-rio/).

The new State Park encompasses 9840.90 hectares in 6 municipalities, incorporating almost the entirety of the Restinga Antwren's geographical distribution. The creation of the protected area represents a true milestone in the efforts to protect the Restinga Antwren and all of the biodiversity from the Restinga de Massambaba. SAVE Brasil has been working towards this end since 2004, in partnership with the INEA and local NGOs. With the protected area now designated, the key challenge is its effective implementation, including the development of a management plan.

During 2011, 3000 copies of the Restinga Antwren Species Action Plan were printed. About 900 were distributed by SAVE Brasil to government agencies in Rio de Janeiro State, local institutions and universities. These groups then distributed the plan to key stakeholders throughout the species' geographic distribution and in surrounding areas. The plan will be an important guide to plan and influence conservation action for the species. SAVE Brasil is the lead organization in charge responsible for evaluating the effectiveness of the activities planned for the next five years. In addition to the Action Plan, ICMBio and SAVE Brasil have also published a leaflet with a summary of the key actions for the species (see Annex 1).

In an additional important development, there is a possibility of new state legislation that will invest money from environmental compensation fines into the threatened species' conservation in Rio de Janeiro state. If the legislation is approved, the Restinga Antwren would be the first species to benefit from this new state law.

2. Biological research on the Restinga Antwren to determine home range, foraging behaviour and population estimates.

Research was undertaken to determine territory size of the species. Restinga Antwrens were caught in mist-nets and marked with unique combinations of colour rings, allowing individuals to be identified in the field. Field observations were facilitated through careful use of playback, to attract individuals and permit identification of each individual bird. The location of each sighting was then mapped, and territory size was estimated through the Minimum Convex Polygon methodology and was calculated using ArcGIS and the Hawths Tools software.

During fieldwork there were 72 records of individually marked birds. For defining territory size, only data from males with 5 or more records were considered. The territory sizes of 3 males were calculated, ranging from 0.025 ha to 0.136 ha. This is a very small territory size compared to other species in the same genus and is presumably related to the high density of Restinga Antwrens within its range. No overlap was found among the territories suggesting that the species has strong territorial behaviour.

Removal of introduced marmosets (*Callithrix jacchus*) continued at two sites within the Restinga de Massambaba: the "Área de Relevante Interesse Ecológico Formigueiro-do-litoral" (Area of Relevant Ecological Interest Restinga Antwren) located in Saquarema municipality and in Massambaba, Praia Seca district, Araruama city. The marmoset capture campaigns were led by the Universidade Estadual do Rio de Janeiro (Rio de Janeiro State University), and accompanied by representatives from INEA (the Environmental Agency of Rio Janeiro State) and the Association of Neighbours from Jaconé (a local organization). While the campaigns were successful in removing many marmosets, groups still remain within the restinga, and thus it is necessary to undertake further removal campaigns in the future.

3. Implementation of an awareness-raising and environmental education program.

Many of the outreach and education activities conducted in 2010 were continued into 2011. This included the very successful "Restinga da Costa do Sol – Um olhar além das dunas (Restinga da Costa do Sol – a view beyond the dunes) exhibition, which was held at the state school "Comandante Sérgio Ribeiro de Vascocelos" in Praia Seca, Araruama district. This school lies within the Restinga de Massambaba, and is close to the project's main research site. The exhibition was organized by SAVE Brasil and the Species Guardian Pingo D' Água, with the support of the Rio de Janeiro State University and the NGO Instituto Biomas. As part of the exhibition presentations were given to 140 students and staff of the elementary school about the restinga, birds, and the Restinga Antwren, and a professionally produced video (by Globo Ecologia) about the issues was shown. The exhibition itself remained in the school, where approximately 250 other students could appreciate it.

BirdLife 'Species Guardians' Project: Araripe Manakin



raripe Manakin *Antilophia bokermanni*

his species is the most endangered manakin in e world. Restricted to the slopes of the Araripe lateau in the State of Ceará, NE Brazil. It is very stinctive, and remarkably it was only discovered 1996.

Background

Since the discovery of the species by AQUASIS (the BirdLife Species Guardian) in 1996 they have concentrated their efforts on documenting its biology (e.g., feeding habits, reproductive biology, and genetic variability) and its conservation status (e.g., population size, present range, major threats). They have also conducted an extensive outreach campaign among the local community to promote the Araripe Manakin as a symbol for the conservation of the region's natural resources. These initial efforts were supported by the BirdLife Conservation Leadership Program and the Brazilian Ministry of Environment and the results have been summarized in a formal Species Action Plan (SAP).

The initial studies showed the species to be confined to just a 28km² range, with habitat loss the major issue for its survival in the wild. This has been driven by clearance for agriculture (especially banana, maize, beans and tomatoes), cattle-raising, construction of holiday homes and other recreational facilities, in addition to fires. Diversion, channeling and piping of springs and streams are also reducing the availability of the species' preferred gallery forest habitat.

Planned activities

1. Participation in key local forums and councils to include the Araripe Manakin in the discussions of natural resource use and planning

2. Follow up closely the Protected Area creation process with the local and national environmental authorities, providing them with the technical information required.

3. Promote the involvement of local stakeholders.

4. Refine the mapping of spring and watercourses and conduct a new population census to evaluate trends (5 years after first census).

5. Conduct an awareness campaign with selected communities living in the lower slopes of Chapada do Araripe, along the Araripe Manakin´s range.

Results

1. Participation in key local forums and councils to include the Araripe Manakin in the discussions of natural resource use and planning

AQUASIS has actively participated in a number of local fora and councils during the year, with the goal of promoting and planning the conservation and sustainable use of the natural resources of the Araripe Plateau.

These fora have included (with links to corresponding news stories in Portuguese):

- Salgado River Watershed Committee (quarterly)
http://soldadinhodoararipe.blogspot.com/2011/12/soldadinho-do-araripe-toma-posse.html
http://soldadinhodoararipe.blogspot.com/2011/11/projeto-soldadinho-do-araripe-ajudara.html

- Araripe National Forest Council (irregular)
http://soldadinhodoararipe.blogspot.com/2012/01/soldadinho-do-araripe-capturas-de-aves.html

- Araripe Desertification Prevention Forum (monthly)
http://soldadinhodoararipe.blogspot.com/2011/02/projeto-soldadinho-do-araripe-participa.html

- Crato Municipal Environmental Council (monthly)
http://soldadinhodoararipe.blogspot.com/2011/05/nova-unidade-de-conservacao-e-tema-de.html

A recent meeting of the Crato Municipal Environmental Council (on the 8th February 2012) was devoted to planning the *Semana da Água & da Árvore* 2012 (Water and Tree week). The Araripe Manakin was chosen as the symbol for the event and many activities will focus on the broader importance of conserving the bird's habitat for biodiversity and natural resources conservation.

- Araripe GeoPark Management Council (monthly/irregular)

2. Follow up closely the Protected Area creation process with the local and national environmental authorities, providing them with the technical information required.

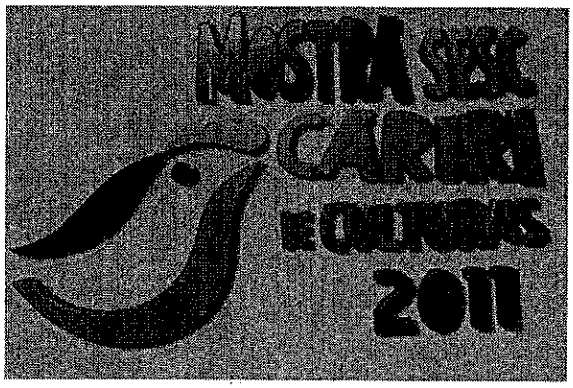
Representatives of ICMBio (the main unit of Brazil's Ministry of the Environment) made a site visit to the Araripe Plateau on 19 October 2011 to discuss and plan the formal process for creating a federally protected area that would encompass almost the entire known distribution of the focal species. Also discussed was the possibility of financial compensation from a project that will change the course of the São Francisco river being used to support the creation of the protected area.

In addition, AQUASIS has recently held meetings with a potential donor in Sao Paulo who owns a property on the slopes of the Araripe Plateau and is interested in conserving the bird and helping stimulate more social and educational outreach work in the

communities living along the base of the plateau. The property is approximately 60 hectares, including a pristine river, and is contains significant areas of prime habitat for the species. Furthermore, at least 10 Araripe Manakin territories have already been located in the area. While the details are still under negotiation, it is possible that full ownership of the area (or at least the responsibility for managing it) could be transferred to Aquasis.

3. Promote the involvement of local stakeholders.

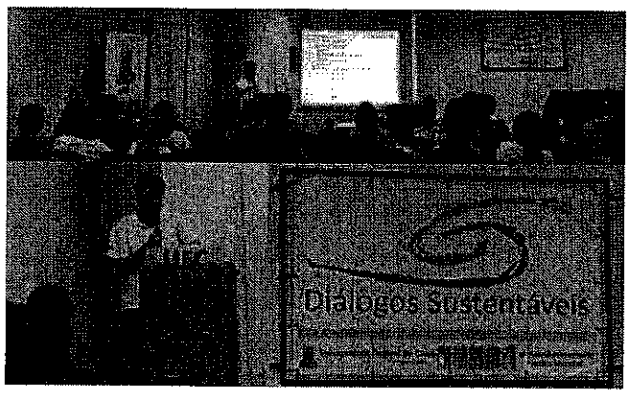
In collaboration with the "Projeto Brigada da Natureza" (Nature Brigade Project), AQUASIS was present at the SESC Cariri "Display of Cultures". This year the Araripe Manakin formed the centre piece of the event's logo.





The event logo (left) and the AQUASIS stand (right)

The Araripe Manakin project was also presented at the Federal University of Ceará (UFC) in Juazeiro, as part of a programme called "Sustainable Dialogues" which forms part of the university's Masters Course on Sustainable Regional Development. This provided a great platform to inform students of the history and conservation status of the species, and to present and discuss the species' Conservation Action Plan.



Presenting on the Araripe Manakin at UFC

A 15-minute short film on the natural history of the Araripe Manakin was shown on 22 June 2011 in the first cinema of Crato (Ceara). This event was organized in partnership with the Cultural Institute of Cariri. The short film was in the local language "tamandua" and was first shown to students of a public school. The film was shown on other days as well and reached a wide public.



Presentation of a film on the Araripe Manakin

Many other activities were carried out in order to reach different stakeholders and summaries of these can be found on the project's blog (in Portuguese): http://soldadinhodoararipe.blogspot.com/

4. Refine spring mapping and conduct a new population census to evaluate trends (5 years after first census).

AQUASIS constantly updates their extensive GPS database of freshwater springs, streams, habitat types, and known territories of the Araripe Manakin. Nearly every foray into the field results in new information which is incorporated into what is proving to be crucial tool for the conservation plan for the species.

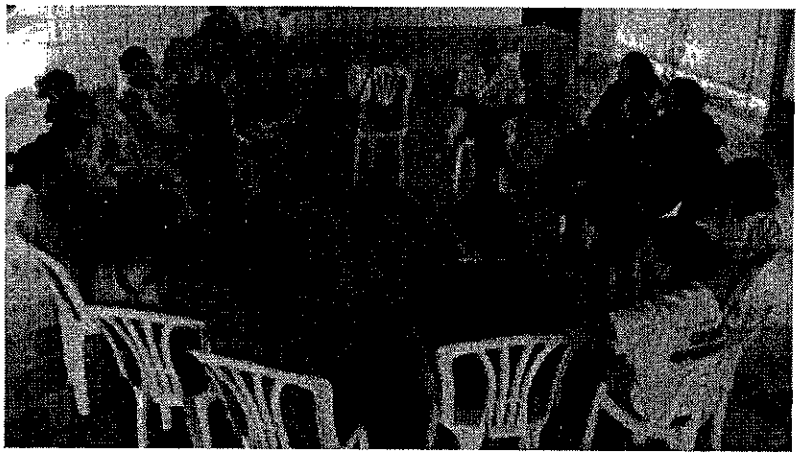
The most recent population survey was conducted in 2010 and plans are currently being developed to conduct a new and more extensive census in 2012. This requires the coordination of at least 6-8 field biologists to be consistent with previous efforts. Given the effort required, it has not been possible to conduct annual surveys. To help address this, AQUASIS are currently working to incorporate autonomous sound recording units into the survey methodology, both as a means of testing the accuracy of the auditory survey approach used thus far, and to significantly expand the geographic coverage of each survey.

On the 14th of January, project Leader and co-discoverer of the Araripe Manakin, Weber Andrade de Girão Silva, discovered a new and unexpected locality for the manakin. This location is in an area of unusually dense forest on top of the Araripe Plateau, an area that has long been protected as a National Forest (known as a FLONA and actually the first of its kind to be designated in Brazil). Curiously, the area is only 1 km by 30 m and has no running water, but appears to hold as many as 10 breeding territories. Preliminary estimates suggest there are about five similar small areas of habitat occurring on the plateau that will also be surveyed as time permits. This is a very significant discovery for many reasons. Not only does it mean that the bird has the potential to reproduce in areas without running water, it also means that the distribution and population size of the bird are greater than previously thought. Furthermore, this will likely result in new zoning and a new management plan for the FLONA.

5. Conduct an awareness campaign.

Visiting communities

Awareness activities have been initiated in three small communities that live directly with the Araripe Manakin. These are Gameleira de São Sebastião (Missão Velha), Riacho do Meio (Barbalha) and Guaribas (Crato). After some initial research on the local knowledge of the manakin, the first activities included a visit to each community to identify local leaders. During the next steps, group activities were undertaken with these leaders to promote actions that raise environmental awareness and result in changes towards a more sustainable life. One of these localities, the Riacho do Meio, has a state conservation area where the species occurs, which was recently visited by a team from TV Assembléia, highlighting the importance of water conservation, the forest and the Araripe Manakin.



Meeting with leaders of Gameleira de São Sebastião



TV crew Assembléia at Riacho do Meio

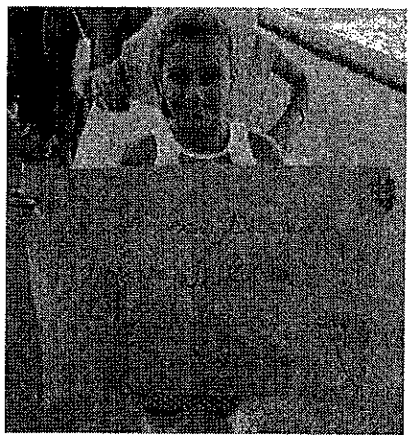


Meeting with leaders of Guaribas

Araripe Manakin Parade

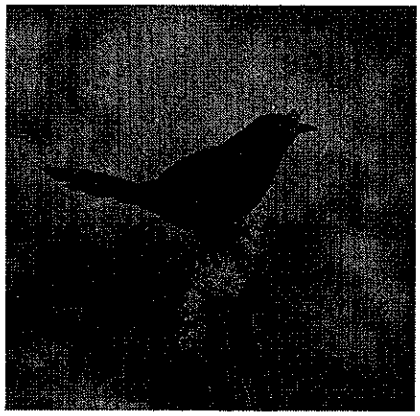
On the first of July 2011 the 44th "Vaquejada" of Missão Velha was celebrated, which is one of the most important and traditional festivals of the region and which includes parades by all the municipal schools. This year, the Elementary School Faustino Manoel de Nascimento of Gameleira of St. Sebastian, used the conservation of the Araripe Manakin as their theme, supported by the PSA and Associação Cristã de Base. Thanks to this initiative, Missão Velha begins to understand the treasure it houses (the manakin), and the municipality has expressed interest in reforesting more forested slopes of the plateau





Araripe Manakin Parade at Missão Velha

BirdLife "Species Guardians" Project: Stresemann's Bristefront



Stresemann's Bristefront *Merulaxis stresemanni*

Until recently Stresemann's Bristlefront was known from just two museum specimens. It was rediscovered in 1995, and at present the only known site for the species is in the Jequitinhonha valley, Minas Gerais, near the border with Bahia, where conservation actions for the species are now focused.

Background

The small population of Stresemann's Bristlefront in the Jequitinhonha valley was found at the Sossego do Arrebol farm. A local NGO, the Fundação Biodiversitas, has developed an emergency plan for the farm, and has been identified as the most appropriate organisation to be the BirdLife Species Guardian. Their emergency plan for the Sossego do Arrebol Farm comprises of the following activities:

Planned Activities

1. Investigate the conservation status of Stresemann's Bristlefront to determine its population size, trend, distribution and habitat requirements, which, along with a refined definition of major threats to its environment will form the basis of conservation planning and action.

2. Hiring a Park guard who, in addition to security, will be responsible for operational activities. These will include setting up the reserve's infrastructure and establishing a preliminary relationship with local communities. The guard will also conduct a habitat preservation monitoring program in order to evaluate the effectiveness of the proposed conservation actions.

These short term steps will facilitate the long-term effective conservation of the site by establishing a conservation presence at the site, developing some basic infrastructure, establishing relationships with local stakeholders and undertaking much needed studies of the biology of the species.

Results

1. Investigate the conservation status of Stresemann's Bristlefront

Just six individuals of Stresemann's Bristlefront (five females and one male) have been found during project fieldwork. Four of them were seen in the forests of the Sossego do Arrebol farm, with approximately 200m between the records of the individual birds. The fifth bird was found in the region known as Lodo, a local name for the eastern part of

same forest fragment. A male was located using playback in June 2010, and in January 2011 this male was observed together with a female, suggesting possible reproductive activity.

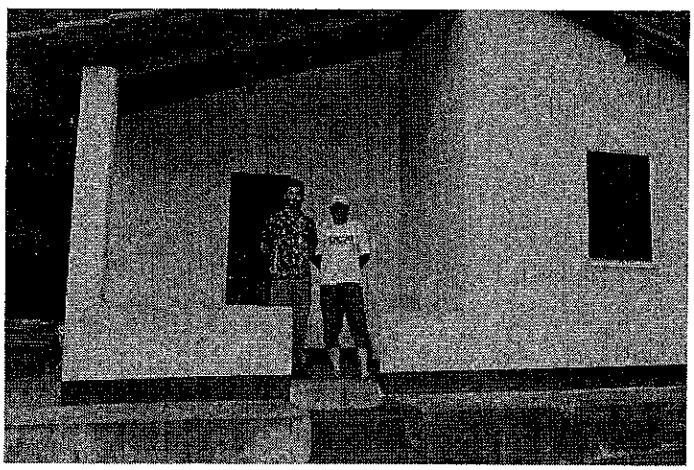
All the individuals were found in forest areas on slopes, with lots of vines and a dense leaf litter with lots of twigs and large leaves (especially of *Cecropia* sp. and similar species) and large fallen logs. Birds were always seen moving by short jumps on the forest floor, feeding on insects in the dry litter or under fallen, moist logs. To date a total of 12 types of behavior have been identified, grouped into behavioral categories such as Maintenance, Locomotion, Feeding and Vocalization. Although males and females are easily distinguished by song, foraging and other behaviors do not appear to differ between the sexes. A first estimate of average territory size for three individuals was 2.36 ha, although more data and from more individuals is required to produce more accurate measurements.

Interestingly, the species may be able to use logged forests which are regenerating and have a high density of *Cecropia* and similar tree species. Leaving more standing trunks and fallen logs in such plantations may make the habitat more favourable for the species.

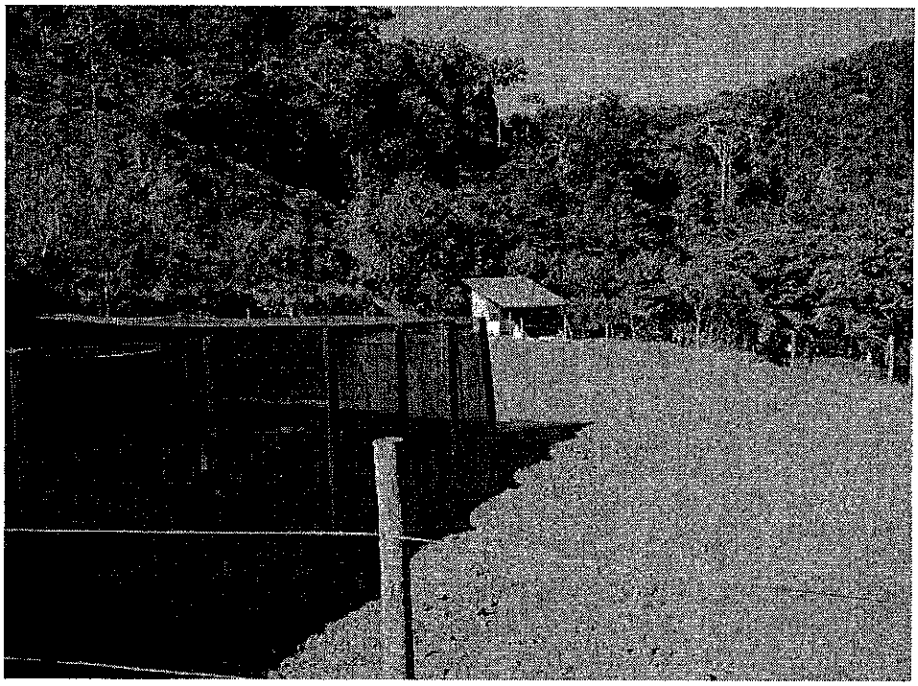
2. Setting up the reserve's infrastructure and establishing a relationship with local communities.

A total of 594 ha of the forest area where Stresemann'a Bristlefront occurs has been acquired by Fundação Biodiversitas with support from the American Bird Conservancy. The area will be transformed into a private nature reserve.

A park guard was hired and has been residing in the reserve since October 2010, when the renovation of the accommodation and basic infrastructure was completed. The guard undertakes regular patrols to control for, and where possible, prevent, illegal activities such as hunting, logging and fires. The presence of the park guard has been fundamental to the protection of the reserve, and there have been no cases of hunting, logging or fires since regular patrols started. The work of this park guard has also been important for the development of reserve infrastructure including a new system of trails, a nursery of native trees, fencing to restrict livestock access and series of firebreaks.



Alexandre Enout (left), Reserve Manager, and Edilson dos Santos (right), park guard hired with support from BirdLife, in front of the guard's house.



Tree nursery built by the park guard.



Fences and firebreaks in place to protect the reserve and Merulaxis stresemanni.

Financial report (in US dollars)

Item	Expenditure (see note 1)
Office equipment	600
Office running costs	1,800
Field equipment	720
Vehicle running costs	760
Vehicle	0
Infrastructure	0
Education materials	2,110
Field activities	2,260
Printing	720
Awareness materials	1,540
Field coordinators	2,770
Awareness officer	0
Reserve wardens	0
Suppport to Guardians	7,680
Species conservation planning	7,820
Promotion and fundraising	7,470
Subtotal	36,250
Project management @15%	5,440
Total	41,690
Request to COA	15,000
Funding contributed by BirdLife	26,690

Note 1. Financial reports for year 3 are still awaited from the Species Guardians prior to finalizing the financial report

Acknowledgement of the Council of Agriculture

BirdLife intends to make of this project a cutting edge demonstration of effective conservation action for threatened species, and an example of what might be implemented in other countries in South America. It will be promoted nationally and internationally at different levels.

The project will also be strongly promoted within Brazil where national communication initiatives will also take place.

SAVE Brasil offers their sincere gratitude for the support of the Council of Agriculture and the BirdLife network and we look forward to further implementing the objectives of this project.

國際鳥盟聖多美普林西比計畫成果摘要

國際鳥盟聖多美普林西比保育計畫成果摘要如附：

我國於 2008 年提供贊助國際鳥盟(BirdLife International)所提「賞鳥生態旅遊改善聖多美普林西比人民生計計畫」，報告摘要如附：

聖多美普林西比(Sao Tome and Principe)係位於非洲西部幾內亞灣之大西洋島國，為非洲第 2 小的國家，面積約 1,001 平方公里。該國有 95 種鳥類，其中 27 種為特有種，保育現況堪虞的特有種有 11 種。哺乳類爬蟲類和兩棲類的特有種比例也很高。植物有 685 種。威脅聖多美普林西比生物多樣性之原因主要是農業活動侵入次生林，以增加糧食生產或蒐集製木炭用之木材。破壞森林之根源為貧窮和高失業率。旅遊業為全球最大產業，生態旅遊的成長相當快速，而賞鳥正是生態旅遊中成長最快的類別之一。本計畫宗旨係發展生態旅遊，提倡永續發展和生物多樣性保育。聖多美普林西比自然資源和環境部有提供支持計畫信函。

本計畫之目標包括：

- 訓練民間團體和當地社區發展觀光和賞鳥活動。
- 強化各界相關人士間之合作，包括政府、民間團體、當地社區等，於地方、區域和全國 3 種不同階層之合作。
- 經由生態觀光，促使民眾瞭解生物多樣性保育和降低貧窮之關係及重要性。

國際鳥盟以聖多美普林西比為重心之非洲重要野鳥棲地(Important Bird Area, IBA)計畫成果包括：

- 選定聖多美普林西比生物學家協會(Association of Biologists of San Tome, ABS)為當地國際鳥盟執行計畫合作單位。完成檢視和分析觀光相關法令和活動，發展以賞鳥為重點之生態觀光。包括經濟可行性和永續研究、行銷計畫、社會環境影響評估等。
- 選定 3 種瀕危鳥類為重點保育及具吸引力物種，並指派 3 位守護人如下：
  1. Angnus Gascoigne; Dwarf Olive Ibis (*Bostrychia olivacea*)
  2. Virginia Carvalho d'Almeida Goudinho; Sao Tome Fiscal (*Lanius newtoni*)
  3. Maria Manuela Bandeira; Sao Tome Grosbeak (*Neospiza concolor*)
- 針對 ABS 辦理計畫執行訓練班。

- 辦理「發展聖多美賞鳥觀光作為永續發展途徑」研討會。
- 選定 2 個社區發展生態觀光計畫。成立社區團體，召開會議討論社區需求、面臨問題、發展賞鳥觀光活動和面臨之威脅等。
- 辦理宣導活動，製作宣導小冊。
- 設立景點支援小組(Site Support Groups, SSGs)負責社區永續發展計畫。
- 選定社區、民間團體、政府人員等，辦理野外鳥類鑑識訓練班和導遊訓練班。
- 發展生態觀光基礎建設。

全球鳥類 10,000 餘種中有 1,200 種面臨危機，有 190 多種極度瀕危(極危，Critically endangered)，360 種為瀕臨絕種(Endangered)鳥類。國際鳥盟在 100 多個國家有當地合作團體，總會員人數超過 250 萬，為此國際鳥盟推動「防止絕種計畫(Preventing Extinctions Program)」，採取保育行動，加強培育人才和教育宣導，爭取經費以拯救瀕危鳥類。

聖多美普林西比(Sao Tome and Principe)有 3 種極危特有種鳥類，包括 Dwarf Olive Ibis (*Bostrychia bocagei*)、Sao Tome Fiscal (*Lanius newtoni*) 和 Sao Tome Grosbeak (*Neospiza concolor*)。ABS 將擔任這 3 種鳥類的守護者(Species Gardians)，負責協調全國、當地社區和相關團體，採取保育措施，監測物種現況，評估保育計畫成效，並將結果通報國際鳥盟。

國際鳥盟 2009 年所提「聖多美普林西比保育瀕危鳥類和棲地計畫」之目標為：
- 支援鳥類守護者執行相關計畫。
- 研擬「聖多美普林西比極危物種行動計畫」，協助政府部門和相關團體執行重要保育計畫。
- 執行上述行動計畫。
- 爭取經費，確保守護者能持續執行上述行動計畫。

聖多美普林西比極危物種行動計畫中主要的工作計畫包括：
- 監測 3 種極危鳥類之族群現況和棲地分佈。
- 找出實際可行之方法保育鳥類多樣性，建立永續發展和環境監測之架構。
- 進行 3 種極危鳥類田野調查，包括生態、族群現況、威脅因子等，並劃定保護區範圍圖。
- 訓練當地社區執行保育計畫及發展生態旅遊活動。

本計畫受益者包括：

- 本計畫之鳥類守護者 ABS。
- 當地社區執行保育計畫，環境將更穩定，森林資源(食物、薪材和建材)受到較佳保護，水資源和河川保護可降低河流氾濫和土壤侵蝕。
- 國際鳥盟將協助政府單位達成生物多樣性保育之目標。

2009 年「聖多美普林西比保育瀕危鳥類和棲地計畫」執行情形如下：

一、BirdLife 秘書處非洲地區辦公室協助物種守護者 ABS 草擬物種行動計畫，及推動計畫活動之方法，例如野外技術、保育規劃、和教育宣導等。

二、「物種行動計畫」工作

- 製作保育宣導品(海報、筆記本、T 恤等)及辦理活動(3 種極危鳥繪圖比賽、有獎徵答活動、專題演講等)。重點地區為 Emolve，該地主要為 oil palm 人造林，社區緊鄰 Monte Carmo (Dwarf Olive Ibis 之重要棲地)。第一階段先針對該地 180 位學生，希望藉由學生影響成人。ABS 並拜會政府單位，說明保育鳥類和森林之迫切性。
- 已成功訓練五位保育人員和解說員，訓練班於 2009 年 7 月辦理，課程包括鳥類導覽、資源管理和觀光等，這 5 人目前與 ABS 研究人員一起執行保育或宣導計畫，也擔任觀光客解說員。
- 監測 3 種極危鳥種
  1. 觀察到 Dwarf Olive Ibis 47 次，聽到叫聲 6 次。第一次觀測到五隻 Dwarf Olive Ibis 成群飛行，這種鳥通常單獨或成對飛行，並已繪出 Dwarf Olive Ibis 分佈圖。
  2. 觀察到 Sao Tome Grosbeak 13 次，聽到叫聲 2 次。
  3. 觀察到 Sao Tome Fiscal 15 次，聽到叫聲 14 次。
- 執行 3 種極危鳥種之生態研究，包括族群現況、威脅因子、規劃保護區。重點研究地區為 Sao Miguel 和 Bombain，最重要的成果為發現兩處 Dwarf Olive Ibis 所築之巢。

三、針對 ABS 人員訓練調查及監測方法，目前包括：

- 穿越線(line transects)和利用 DISTANCE 軟體分析資料。
- 定點觀察(fixed point surveys)。
- 播放鳥鳴聲(play-back)。

四、爭取經費部分，已爭取到一位 Dwarf Olive Ibis 物種擁護者(Species

Champions)，應允提供部分保育經費。

國際鳥盟 2010 年所提「聖多美普林西比保育瀕危鳥類和棲地計畫 Phase II」為去年計畫之延續計畫，摘要如下：

Phase II 計畫目標如下：

- 提倡和宣導原始林和物種保育，包括以法令保護 3 種極危鳥種。
- 訓練社區人士成為當地保育措施聯絡員，以及觀光活動之解說員。
- 監測 3 種極危鳥種及進行生態研究。
- 找出長程保育鳥類和生物多樣性最佳方法，建立永續發展和環境監測架構。

Phase II 計畫成果摘要如下：

一、長期拯救聖多美普林西比三種特有極危鳥類應採取之關鍵行動，以及永續發展和鳥類監測所需架構均已建立。長期保育鳥類建議事項包括：

- 需特別留意 Parque Natural d'Obo de Sao Tome，尤其是東南方之保護區。因 Dwarf Olive Ibis 僅分佈在緊鄰棕櫚油人造林之保護區內。
- BirdLife、ABS、Directorate of Nature Conservation 及 Parque Natural d'Obo de Sao Tome 已開始與與棕櫚油公司 Agripalma Lda 初步會談，此類對話應持續進行並增加次數。
- 聖多美普林西比批准加入濕地公約(Ramsar Convention)，並公告第 1 個 Ramsar site。應將 Dwarf Olive Ibis 之重要棲息地公告為 Ramsar site。
- 應推動三種極危鳥類之生物和分佈研究。
- ABS 應擴充現有調查範圍以支援上述研究。
- 應加強教育宣導，重點包括極危鳥類、特有鳥類、Natural Park 之重要性及其保育原始林之角色等。

二、繼續監測三種特有極危鳥類，建立分佈、族群大小和保育需求資料。

- 進行多次鳥類調查。
- 2010 年 2-9 月調查，觀察到 Dwarf Olive Ibis 85 次。
- 調查期間常發現入侵種老鼠和猴子(*Ceropithecus mona*)，將持續觀察這兩種動物是否為獵食者。調查 Dwarf Olive Ibis 繁殖行為時發現其築巢於較其他種 ibis 高出許多之地點，將研究

是否為躲避天敵之適應行為。

- 老鼠和 Mona monkey 廣泛分佈全島，除非有密集且全面性之移除計畫，否則不可能將這兩種動物驅逐至 Dwarf Olive Ibis 繁殖區外面。
- 觀察到 Sao Tome Fiscal 14 隻。

三、聖多美普林西比受威脅鳥類及其棲地納入法定保護系統。

- 繼續與相關主管單位聯繫，推動納入保護。原始林部分因在國家公園範圍內已受到保護，但個別物種沒有特定法令保護，2011 年 2 月 ABS 與環境和自然資源部討論此議題。

四、新開發的大片棕櫚油人造林已對棲地和生物多樣性構成威脅，已開始評估其可能衝擊和減緩影響的方式。

- 亟需留意的項目包括次生林之砍伐、獵捕受威脅物種案件增多 、侵佔國家公園土地、社會衝擊、環境影響評估等。

五、辦理訓練課程。

- ABS 於 2010 年月和 8 月辦理第 2 梯次生態觀光訓練課程。建立 7 個社區聯絡點(community focal point)。
- 訓練 2 位鳥類解說員，訓練 2 位生物系學生協助執行鳥類監測計畫。

六、持續社區溝通聯繫，ABS 與數個保育團體與當地政府討論保育議題。

- 2010 年辦理全國性和當地社區之教育宣導活動。
- 針對社區權益相關人士辦理 2 次保育鳥類展覽和演講活動。
- ABS 參與其他環保團體辦理之活動，廣為宣導計畫事宜。
- 2010 年 8 月 23 日出版「聖多美普林西比鳥類圖鑑」。

2011 年聖多美普林西比保育瀕危鳥類和棲地計畫 Phase III 工作目標和項目如下：

一、遊說政府訂定法令確保受威脅物種能受到長期保護

- 敦促立法保護受威脅物種被獵捕。
- 將 Parque Natural d'Obo de Sao Tome (PNO)管理由農業部移至環境部。
- 確實保護 Parque Natural d'Obo de Sao Tome 外圍緩衝區。
- 監督開發單位確實依照環境影響評估建議辦理後續事宜。
- 因保護區鄰棕櫚油人造林，應確保 ABS 能繼續其研究計畫。

二、雖然棕櫚油人造林造成新的危機，應確保 PNO 之完整性。

- 停止砍伐次生林。
- 請專家評估棕櫚油人造林對環境和社會之衝擊，瞭解規劃之

復育措施，確實執行減輕衝擊之計畫。

- 瞭解棕櫚油人造林租約內容，以及租地、緩衝區與國家公園邊界圖。
- 瞭解是否有其他棕櫚油人造林租地類似案例。
- 與其他團體合作確保上述租地適當開發和管理，以保護生物多樣性。

三、持續進行監測和研究。

- 因棕櫚油人造林開發案之影響，干擾和生殖成功率研究更重要。
- 持續 Dwarf Olive Ibis 繁殖生物學研究。

四、繼續辦理教育宣導活動。

- 提升社區民眾對物種及棲地保育之認知，瞭解國家公園對保護原始林之重要性。
- 以生態觀光支援，三種極危鳥類之保育。
- 當地非常潮濕，提議建造永久性營地，除住處、炊煮、工作有所遮蔽外，更有助於 ABS 野外研究。
- 永久性營地也可提供導覽人員就業的機會。

2011 年執行工作如下：

一、持續遊說政府訂定法令確保受威脅物種能受到長期保護，2011 年重點工作為敦促立法保護受威脅物種被獵捕，以及設立 Parque Natural d'Obo de Sao Tome 經營管理單位。

二、Agripalma 公司放棄 1,200 棕櫚油人造林租地。相關政府單位原本並未特別留意 Agripalma 開發行為，2011 年起要求砍伐森林前需先評估並取得許可。

三、持續進行監測和研究，2011 年進行 4 次極危物種調查；發現非法獵捕 Ibis 證據並函知相關單位；3 月 ABS 支援美國研究團隊之兩棲類和昆蟲調查； 6-7 月 ABS 支援蠟嘴鳥調查工作；與 Agripalma 洽談合作事宜。

四、教育宣導部分，ABS 訓練大學生參與野外調查工作；於學校辦理照片展；至高中講解生物多樣性之重要性。

BirdLife INTERNATIONAL

PREVENTING EXTINCTIONS

The BirdLife International Preventing Extinctions Program

Conserving the world's most threatened birds and their habitats

Preventing Extinctions in São Tomé and Príncipe

Phase III



Sao Tome Fiscal

A Report from BirdLife International to the Forestry Bureau of the Council of Agriculture of Taiwan

Cambridge, United Kingdom, February 2012

General Background

This report provides a summary of activities undertaken in 2011 for the project *'Preventing Extinctions in São Tomé and Príncipe', Phase III*. This project forms an integral part of BirdLife International's Preventing Extinctions Program and began in 2009, thanks to the invaluable support of the Council of Agriculture.

BirdLife International's Preventing Extinctions Program is spearheading greater conservation action, human capacity and awareness, as well as funding support, for the world's most threatened birds. The focus of the program is the protection of 190 species, which are listed as Critically Endangered on the IUCN Red List. Central to BirdLife's Preventing Extinctions Program is the appointment of 'Species Guardians' who are taking the lead in conserving a globally threatened species in their country or region.

A BirdLife Species Guardian, *Associação dos biólogos Santomenses* (ABS), has been appointed for three Critically Endangered São Tomé species. ABS is a union of biologists created in March 2005. It is the only NGO in São Tomé that has a biodiversity conservation objective and whose members are not only dedicated but have demonstrated their commitment to the organization through financial support for its constitution and launch. The Species Guardian's primary role is to take and encourage greater conservation action for their species, working with national and local governments, other concerned individuals, organizations and local communities. In addition to undertaking conservation work themselves, the Species Guardians also monitor the status of the species, track the implementation and effect of actions taken by others, and report back to BirdLife on these each year.

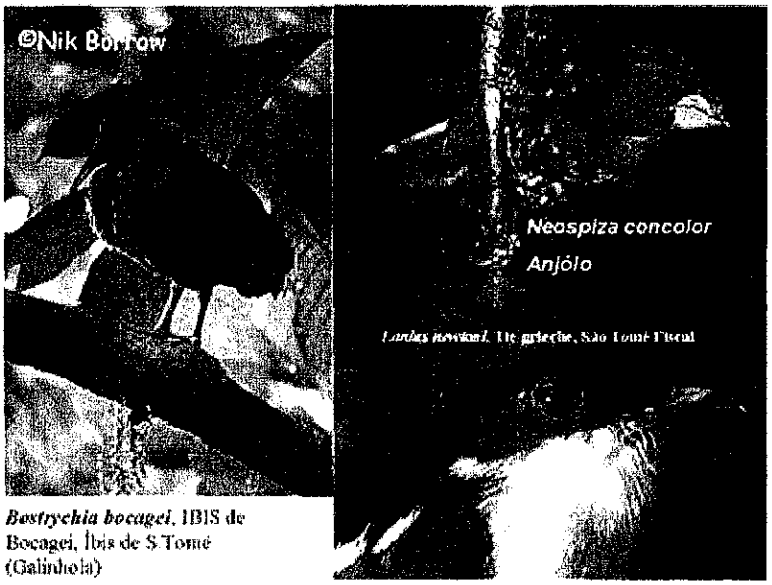
Critically Endangered Species in Sao Tome

One of the most important countries in Africa for the implementation of the BirdLife Preventing Extinctions Program is São Tomé and Príncipe. São Tomé supports three species of Critically Endangered bird: the São Tomé Fiscal (*Lanius newtoni*), São Tomé Grosbeak (*Neospiza concolor*) and Dwarf Olive Ibis (*Bostrychia bocagei*), which are found nowhere else on earth. São Tomé and Príncipe is one of the Africa's major centres of endemism, and its lowland forest has been classified as the second most important for bird conservation in Africa. So the need for conservation is urgent.

The Dwarf Olive Ibis is confined to the catchments of the São Miguel, Xufexufe, possibly the Quija rivers in the south-west, and along the Io Grande and Ana Chaves rivers in the centre of the island. It has a tiny population (previously estimated at <50 individuals) and is confined to a small area of primary forest, mainly found within the São Tomé lowland forests Important Bird Area (c. 13,000 ha). It feeds on the forest floor in areas with sparse undergrowth, especially where the ground has been disturbed by wild pigs, and in swampy areas bordering watercourses. There is only limited information about the species, and not many people have been able to observe it due to the relative remoteness of its preferred habitat and its ability to conceal itself in the forest. However, despite this, there are reports of the Ibis being killed by hunters.

The São Tomé Fiscal is known from the Xufexufe catchment, in the valley of the Rio Io Grande in the centre of the island, and in the Bombaím area. Its population is unknown, but is likely to be tiny given the limited area of suitable habitat. All records of the Fiscal are from primary lowland and mid-altitude (up to c.1,000 m) forest, predominantly under closed canopy, in sites with little or no undergrowth, but with bare ground and rocks. Many records are from ridgetops.

The São Tomé Grosbeak is known from close to the Rio Xufexufe in the south-west of the island and São Miguel areas. Given the limited area of suitable habitat and the paucity of records it probably has a tiny population. It occurs in lowland, closed-canopy primary forest. It is probably a canopy species and is reportedly quite silent, which could partly explain why it has so rarely been seen. Recently, however, some vocalisations have been recorded.



Bostrychia bocagei, IBIS de Bocagei, Íbis de S Tomé (Galindola)

Historically, large areas of lowland and mid-altitude forest were cleared for cocoa and coffee plantations. Today, land privatisation is leading to an increase in the number of small farms and the clearance of trees. This does not currently affect primary forest but may be a threat in the future. Road developments along the east and west coasts are increasing access to previously remote areas. Introduced Black Rat *Rattus rattus*, Mona Monkey *Cercopithecus mona* and Weasel *Mustela nivalis* are potential predators.

The project

The project '*Preventing Extinctions in São Tomé and Príncipe*" was undertaken because of the continuing importance of Sao Tome as a high-risk area for extinction. It was also deemed important to continue to support conservation action by the Species Guardian there. The project was supported for a third year by the Forestry Bureau of the Council of Agriculture, Taiwan. It has the following objectives:

1. To undertake advocacy and awareness activities for the species and primary forest protection in São Tomé, including the promotion of protection by law for the three Critically Endangered bird species;

2. The training of and support to community members as site-based focal points and guides to implement conservation measures and conduct tourism activities;

3. The surveillance of the three Critically Endangered bird species and the undertaking of ecological research;

4. The identification of best practice for the long-term conservation of birds and biodiversity, and the establishment of a framework for sustainable development and environmental monitoring.

BirdLife staff have assisted ABS in supporting the implementation of key actions for the species previously developed in phase 1 of this project. During the second year of the implementation of the project, the following progress was made:

- Continued monitoring of the three São Tomé endemic CR species helped establish a clearer picture of their distribution, population sizes and conservation requirements.

- Key actions were identified that are required for the long-term recovery of the three focus species and a framework for sustainable development and bird monitoring was recommended.

- Action was advanced to ensure proper legal protection could be established for all São Tomé's threatened bird species and habitats.

- A sizeable new oil palm plantation development was identified as a significant new threat to the habitat and biodiversity of São Tomé. BirdLife conducted an initial evaluation of its potential impact and proposed preliminary mitigation actions.

- A second eco-tourism training course was implemented ensuring seven 'community focal points' were established.

- Outreach in the local community was maintained and several local NGOs have been engaged in discussions with local government.

Activity Report for 2011 (phase III)

Lobbying government to ensure legislation is passed that ensures long-term protection for all threatened species in São Tomé.

For several years ABS has been working closely with the Directorate of Nature Conservation and the Director of the Parque Natural d'Obo de São Tomé (both within the São Tomé Ministry of Environment and Natural Resources) in order to influence development of laws protecting primary forest and threatened species.

The primary forests in Sao Tome are already protected by existing legislation that established the Parque Natural d'Obo de São Tomé and the Parque Natural d'Obo de Príncipe. As yet there are no specific laws protecting individual species. Indeed, there is currently no hunting law in São Tomé and the Dwarf Olive Ibis in particular is seriously threatened by hunting.

The focus of activities in 2011 has included lobbying for legislation to be passed protecting threatened species from hunting, lobbying for the formalization of the management of the Parque Natural d'Obo de São Tomé, and the enforcement of buffer zones surrounding the Parque Natural d'Obo de São Tomé.

In relation to these activities, and building on recommendations made by ABS, the government has now prepared a draft hunting regulation which has been passed to BirdLife for review and comments, and will also be made available for public consultation. This is thus an important step towards greater control and regulation of hunting in the project areas.

BirdLife International, with the generous support of the Council of Agriculture is continuing to build capacity for ABS as an organization for them to continue undertaking these activities in 2012.

Maintenance of the integrity of the Parque Natural d'Obo de São Tomé in the face of new threats posed by the Agripalm palm oil plantation development.

In 2006, most of São Tomé's forests received legal protection when the Obô Natural Park was first established. The natural park also has a buffer zone, which was proclaimed by ECOFAC - an EU-funded programme aiming to help preserve forests in Central Africa. The buffer zone is an important and sensitive area, essential to assure the long time survival of the unique habitats and biodiversity contained within the Natural Park.

In late 2009, BirdLife became aware of announcements in the Santomean press concerning a major oil palm project in the country. It discovered that an investment of up to US €50 million was likely to be made to recover and expand oil palm plantations (covering an area of 5,000 ha) in the regions of southern São Tomé (Ribeira Peixe and Porto Alegre) and north of Príncipe (Sundy). By March 2010 the press reported that particularly rapid progress was already being made with the new venture in the area of Ribeira Peixe. The concession in Ribeira Peixe is very close to the Monte Carmo forests of the Obô Natural Park and actually overlaps the Natural Park's buffer zone. The project aims to rehabilitate and develop an existing oil palm plantation previously run by a government-owned company EMOLVE.

As detailed in previous reports, BirdLife is very concerned that the development of the oil palm plantation at Ribeira Peixe will have a significant adverse impact on the forests and biodiversity in the area, and there is evidence that this is already happening. BirdLife is ready to assist the joint-venture company Agripalma (with investment from Socfinco) in ensuring that conservation and economic development can go hand-in-hand in the conservation of these globally important forests.

Regarding this issue, a number of significant positive developments took place in 2011:

- Agripalma gave up their 1,200 ha concession in Principe because Principe's regional government and a key South African entrepreneur have other plans for the island which involve turning it into a model World Heritage Site (see below).

- Following the first couple of years during which the government took no notice of Agripalma's operations, the relevant government departments have developed greater oversight and control over Agripalma's operations throughout 2011, and have asked for prior evaluation and approval before any further activities involving any form of forest clearance take place.

  The lack of involvement of the government so far has mainly been due to the fact that the concession for Agripalma was originally signed by the previous government. In early 2011 however, the Environment Directorate General (DGA) asked for Agripalma to suspend their operations on the ground so that an Environmental Impact Assessment (EIA) could be undertaken. Thus, the EIA which had been produced at the end of 2010 was further modified in 2011 with input from the DGA, and was approved in 2011. This was a very significant step in dealing with this threat to the area's biodiversity. Indeed, Agripalma is now under obligation to produce a formal plan for any further forest clearance to DGA to be evaluated before any further operations can take place. It has been agreed that if the suggested planned logging activities have a potential demonstrated negative impact on biodiversity, the activities will be cancelled, and an alternative solution found. Solutions will include strategies such as offering Agripalma the possibility of working on an alternative plot of land.

  With operations now being much more controlled under evaluation from the government, it is important that the evaluation process is informed by appropriate data collection and analysis on areas of importance for biodiversity. This is necessary in order for BirdLife/ABS to demonstrate and reinforce the biodiversity value of key areas that must remain unaffected by Agripalma's operations.

- Agripalma and relevant government departments such as DGA currently welcome BirdLife International's involvement and are keen to collaborate in coming months in order to seek alternative solutions if indeed any of the areas proposed for conversion are demonstrated to be critically important for the 3 Critically Endangered species targeted for protection by this project.

Regarding the integrity of Parque Natural d'Obo in itself, the park is unfortunately currently lacking in staff and funding towards its management. The park is lacking an operational budget. Despite this however, two projects has been put together but the current staff – one in the park area in the north of the country (Savannah), to establish markers on the park boundaries around Praia das Conchas, and one to control an invasive plant from Lagoa Amélia.

Monitoring and research activities

The monitoring conducted under Phases I and II of this project in 2009-2010 was the first time consistent, regular and reliable fieldwork could be conducted for the three São Tomé endemic Critically Endangered Species. This has provided a reliable methodology and baseline of current population numbers/estimates that can be used for future monitoring.

In light of any potential disturbance caused by the new Agripalm development, monitoring of disturbance and breeding success becomes increasingly important. There is a distinct likelihood that disturbance to breeding birds will now increase.

During 2011, ABS has continued the support and undertaking of monitoring activities and field work with their own funds. They have reported the following activities for 2011:

- Four field trips took place to the Monte Carmo area to undertake surveys of the three Critically Endangered species.

- ABS has identified evidence of Ibis hunting and sent this information to relevant stakeholders.

- In March 2011, operational field support was provided by ABS to a team from California who came to the area to study amphibian and insects in São Tomé (March 2011).

- In June-July 201, operational field support was also provided to an expedition that visited the area to survey the presence of São Tomé Grosbeak.

- ABS also met with Agripalma in 2011 in order to discuss the possibility of collaborating on the development of a project on the conservation of the São Tomé Barn Owl (through the building of artificial nests). Agripalma has also offered logistical support to ABS with local transport.

Now that ABS have collected a range of data on distribution, density and habitat selection of the three Critically Endangered species that are the focus of the project, the next important steps are for the data to be collated and analysed and for gaps in data to be filled through the undertaking of further field work in the next few months. These are important steps to take in order for the data to be made available for governmental decision-making and conservation management purposes. This is currently an urgent priority, in particular in order to inform the future planned activities for Agripalma as detailed above.

In order for this process to take place, BirdLife has made plans in collaboration with its Portuguese partner, the Portuguese Society for the Study of Birds (SPEA) to organise a data collation and species action planning workshop in Sao Tome within the next six months. This workshop will involve 10 experts who that can contribute to the exercise to develop a database using data obtained so far from ABS and other research entities and students on the distribution of the key species of interest, in order to develop detailed Species Action Plans. It is also intended that further fieldwork with funding provided by BirdLife will take place in the next few months that will focus on identifying and filling current existing gaps in data on species distributions, density and habitat selection.



Children on Sao Tome

Outreach and education activities with local communities and local ecotourism development plans

A number of outreach activities have continued to take place during 2011, working with local communities:

- As part of the educational activities within the Instituto Superior Técnico for the natural science courses offered there, ABS has been taking students to undertake fieldwork at the project site.
- Photo exhibitions and presentations were organized by ABS in a number of schools throughout 2011.
- Presentations were made at the national high school on the importance of the biodiversity in Sao Tome, during National Biodiversity week.

Ecotourism has been identified as a strategy to assist in the conservation of the ecosystems which support the three Critically Endangered species and other endemic species. The ABS study site is of considerable interest to visiting ecotourists given the presence of the three

Critically Endangered species there and its relative ease of access. Plans for ecotourism development are still being considered. In particular, establishing a permanent camp site consisting of a covered open-sided sleeping shelter and a cooking/work shelter at Monte Carmo remains a planned activity. This will be taken forward when sufficient funding and capacity is available to develop the project further but plans for these activities continue to be developed.

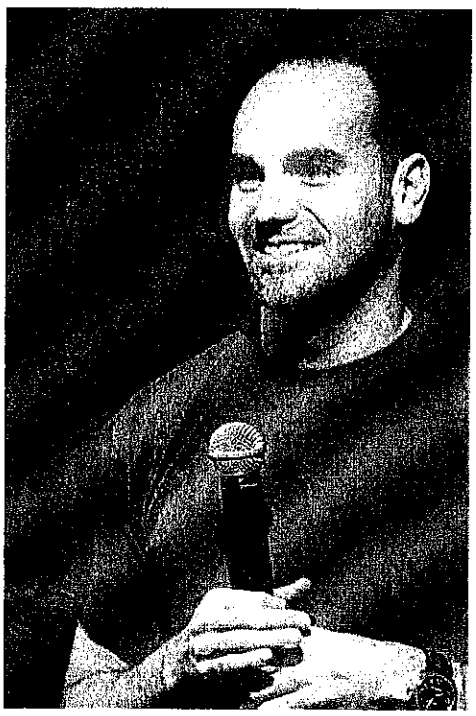
Further insight into activities and politics on Principe



Female Príncipe Golden Weaver Ploceus princeps one of several endemic species on the island of Príncipe

In 2011, BirdLife has become increasingly aware of the importance of understanding what is happening developmentally and politically on Principe island. Indeed, Principe island has an autonomous government, and most of the central governmental structures are replicated there. For example, the Parque Natural d'Obo has a Director there too.

This increasing understanding of the political framework which governs each of the islands and of the activities taking place on Principe is extremely relevant and important for the project implementation. In particular, the authorities in Principe are currently exploring a model for sustainable development and eco-tourism on the island. Supported by the main external investor in the island – South African entrepreneur Mark Shuttleworth, (also a Birdlife patron) the Principe government has recently commissioned a multi-disciplinary study to propose a sustainable development model for the island and will submit a bid to propose the island as a World Heritage Site. Moreover, in conflict with the central government, the regional government in Principe has fought hard and seemingly with success, against the clearance of more than 1,000 ha of forest in Roça Sundy, originally included in the Agripalma concession. For these reasons, a greater understanding of activities and politics on Principe will also become an important focus for the future of this project.



South African entrepreneur Mark Shuttleworth

Financial report (in US dollars)

Item	Phase III (see note 1)
Field equipment	1600
Office equipment	
Travel and subsistence	7020
Printing, postage and stationery	
Other office costs	1600
Professional fees (consultants etc.)	4020
Local personnel costs	1610
Support to Guardians	3,840
Species conservation planning	3,910
Promotion and fundraising	3,730
Subtotal	27330
Project management @15%	4,100
Total	31,430
Funding from COA	15,000
Funding contributed by BirdLife	16,430

Note 1. Financial reports for year 3 are still awaited from the Species Guardians prior to finalizing the financial report

Support from the Government of São Tomé and Príncipe

The Government of São Tomé and Príncipe has provided a letter of support for BirdLife's work in the country and this is attached to this report.

Acknowledgement of the Council of Agriculture

BirdLife intends to make of this project a cutting edge demonstration of effective conservation action for threatened species, and an example of what might be implemented in other countries in Africa. It is promoted nationally and internationally at different levels.

The CoA's support will be acknowledged in web based materials, scientific communications and publications, communications materials, and other events organised locally, nationally and internationally.

The project is strongly promoted within São Tomé where national communication initiatives are taking place.



República Democrática de S. Tomé e Príncipe

Ministério dos Recursos Naturais e Ambiente
Direcção Geral do Ambiente
(Unidade-Disciplina-Trabalho)

EXMA SENHORA
PRESIDENTE EXECUTIVO DA ASSOCIAÇÃO
DOS BIÓLOGOS SANTOMENSES

MRNA-DGA/ 211 /2008

Assunto: ***Projecto na zona de Monte Carmo sobre a conservação de espécies endémicas de aves.***

Em resposta à solicitação dessa Associação, relativamente ao assunto, e tendo em conta a importância que tal actividade pode trazer tanto para a conservação particular de espécies de aves endémicas como para o desenvolvimento de actividades de protecção de outras espécies, a Direcção Geral do Ambiente vem por este meio declarar que aceita plenamente que contactos possam ser estabelecidos pela vossa associação junto às suas congéneres ou outras organizações internacionais no sentido de encontrar mecanismos que possam facilitar o desenvolvimento de programas de conservação.

Apresentamos os nossos melhores cumprimentos.

Direcção Geral do Ambiente, em S. Tomé, aos 27 de Fevereiro de 2008.

O DIRECTOR,

ARLINDO DE CEITA CARVALHO

國際鳥盟柬普寨計畫成果摘要

國際鳥盟(BirdLife International)所提「經由碳融資(carbon financing)和社區參與保育柬普寨西北部森林計畫」，內容及成果摘要如附：

國際鳥盟於印尼執行「拯救蘇門答臘最後低地雨林計畫」，經過數年努力，進行探勘合適地點、與印尼政府簽訂合作計畫、遊說印尼政府修訂森林相關法令、教育宣導、承租值得保護的地點等工作後，於2007年2月於蘇門答臘取得100,000ha伐木租借地之經營管理權。因印尼計畫之成功，國際鳥盟希望將此模式運用到柬普寨，保護West Siem Pang 152,000ha之森林，此地已被國際鳥盟列為重要鳥類棲地(Important Bird Area, IBA)。柬普寨計畫為國際鳥盟希望森林計畫(Forests of Hope Programme)之一環。

計畫目標為建立柬普寨示範計畫，提供全球長期支援下列工作財源之參考模式：

- 由政府和當地社區共同經營管理森林。
- 降低碳排放量。
- 改善當地人民生計和保育生物多樣性。

柬普寨東北部平原仍有大區域之落葉林、少數針葉林和季節性濕地。Siem Pang西部森林是僅存最重要的森林地區之一。柬普寨尚未完全從30年的內戰中恢復，因此自然資源經營管理和野生動物保育仍於起步階段。Siem Pang西部森林當地居民(尤其是原住民族)主要依賴自然資源生存，但多為非永續之利用。

West Siem Pang仍有90%未被破壞的森林，半數為乾龍腦香森林(Dry Dipterocarp forest)，40%為濃密的半常綠森林(semi-evergreen forest)。其餘為惡化的半常綠森林(5%)、包括農耕地的毀林區(3%)和水域(2%)。15,000餘公頃IBA主要為乾森林生態系(dry forest ecosystem)，其中有5種極度瀕危(極危，Critically Endangered)鳥類，包括白肩黑鸛 White-shouldered Ibis (*Pseudibis davisoni*)、巨鸛 Giant Ibis (*Thaumatibis gigantea*)、白臀禿鷹 White-rumped Vulture (*Gyps bengalensis*)、細嘴兀鷲 Slender-billed Vulture (*Gyps tenuirostris*)和黑兀鷲 Red-headed Vulture (*Sarcogyps calvus*)。其他受威脅鳥類包括綠孔雀 Green Peafowl (*Pavo muticus*)、赤頸鶴 Sarus Crane (*Grus antigone*)、禿鸛 Lesser Adjutant (*Leptoptilos javanicus*)，以及受威脅哺乳類坡鹿 Eld's Deer (*Cervus eldi*)等。

此 IBA 生物多樣性所面臨最大威脅為人造林租借(plantation concession)，其他威脅因子包括過度放牧(overgrazing)、供當地或商業目的之小規模伐木，以及將林地變更為農耕地。另外，獵捕大型水鳥作為食物來源也是問題。

2006 年柬普寨森林覆蓋率為 59%，與 2002 年相較，少了 2.06%。另一項評估資料顯示 2000 年和 2005 年間，原始林喪失 29%。森林被破壞的主要原因包括：

- 人力和預算不足以執行永續森林經營管理。森林經營管理之改革、經營區之劃分、森林資源管理地方化等措施進展緩慢。
- 非法盜伐林木。
- 因土地炒作、農地擴張和居民移入所造成的森林濫伐。
- 柬普寨為亞洲地區最貧窮的國家之一，鄉村普遍貧窮，人民依賴森林生存，84%當地居民以薪材煮飯，6%使用煤碳。
- 人口成長(1.7%)和鄉村人口外移，85%的增加人口住在鄉村，將林地清除變更為農地的案例日多。
- 缺乏保育森林之經濟誘因。
- 其他國家改由柬普寨取得林木和其他森林產品。
- 森林火災。

Reducing Emissions from Deforestation and Forest Degradation (REDD)即是「減少來自森林砍伐與林地退化的溫室效應氣體排放」的簡稱，內容涉及富有國家付錢向開發中國家購買每公頃未砍伐林地消耗的二氧化碳量。

本計畫與 REDD 議題相關，預期能達成下列功效：

- 改善森林管理。
- 連結 REDD 之經濟誘因與貧窮村民之需求。
- 改善當地社區相關人士對 REDD 之瞭解。

針對本 IBA 預期推動之工作包括：

- 向政府單位爭取將 Western Siem Pang 公告為森林保護區和 REDD 試驗區。
- 與地區政府、省政府和民間團體商討，宣導 REDD 和當地社區各界相關人士共同參與之重要性。
- 於 Western Siem Pang 執行計畫，研究森林經營管理方法和惠益分享機制。

- 創設或強化社區民間團體(Community-Based Organizations, CBOs)，共同參與森林經營管理工作。
- 辦理 CBOs 森林學習之旅，尤其是 Oddar Meanchey 省 REDD 試驗區。
- 技術支援及訓練 Western Siem Pang 地區政府、省政府和 CBOs 人員，課程包括永續森林經營管理以減少碳排放量、生物多樣性和協助人民生計等。
- 執行示範計畫，為參與之社區和 CBOs，尋求新的謀生方式。培訓 CBOs 提供經濟和技術支援。

國際鳥盟柬普寨計畫與該國相關主管單位簽訂運作備忘錄(附於 2010 年計畫)，並與各級(全國性、省及地區)政府單位合作。合作單位包括隸屬農業、林業暨漁業部(Ministry of Agriculture, Forestry and Fisheries, MAFF)之林業署(Forestry Administration, FA)和環境部(Ministry of Environment)。FA 為本計畫之重要夥伴，FA 主管 REDD 計畫和永久森林地產(Permanent Forest Estate)。國際鳥盟與 FA 中央和地方單位自 1990 年代起合作迄今，重點地區即為 Western Siem Pang 森林。

2010 年「經由碳融資和社區參與保育柬普寨西北部森林計畫」執行進度如下：

一、宣揚 Western Siem Pang 森林之重要性

2009 年 MAFF 決定將 152,825ha Western Siem Pang 森林規劃為保護區，但仍須經由部長委員會(Council of Ministers, CoM)同意。此地中央區和南區原有 2 個租地供人造林和生質燃料之用，此利用違反 REDD 原則。為此加強宣導保護之重要性，包括多次與政府單位會談，印製區內稀有野生動物圖片，與當地繼續溝通，與權益關係人建立夥伴關係等。

二、林地租借(Forest concessions)

- 上述努力於 2010 年 8 月獲得成效，MAFF 於 8 月 16 日正式函請首相 Hun Sen 取消一家公司租約，8 月 19 日獲准。CoM 於 8 月 27 日行文 MAFF 撤銷租約。2011 年初，上開公司團隊，包括重機具全部撤出 Western Siem Pang。
- 2011 年 MAFF 所屬林業署致函 MAFF 部長建議減少另一塊租地之面積，並提議將 Western Siem Pang 森林規劃為保護區。
- 除地區支援小組(Site Support Groups, SSGs)外，2010 年 12 月新設立查緝小組，2011 年 1 月沒收 6 組電鋸。

三、生物多樣性評估

- 進行數年生物調查，已進入監測階段，將於近期出版調查報告。
- Western Siem Pang 森林目前已記錄到 100 餘種植物、301 種鳥類、30 種不會飛的哺乳類、12 種爬蟲類、10 種兩棲類、47 種蝴蝶。其中有 5 種極危鳥類(請參考本摘要第 1 頁)。

四、威脅因子評估

- 對生物多樣性最大的威脅是綠海農業公司(Green Sea Agriculture Co. Ltd)的 100,852ha 租地，租約有效期至 2070 年。租地中有 85,036 與森林保護區預定地重疊。重疊地區為許多受威脅物種(含 5 種極危鳥類)重要棲地。砍伐森林改植人工林將對野生動物和社區造成負面影響，當地居民依賴此地區放牧，採集非林木森林副產品如魚、青蛙和松脂。目前政府單位正重新審查此公司租約。
- 其他威脅因子包括非法打獵、電魚、非法交易保護物種、不適當的小型農業和聚落、過度放牧、火災等。
- 最新的威脅為毒藥，2010 年發現 10 隻禿鷹被毒死。

五、生態旅遊倡議

- 因計畫地區知名度不高，很少觀光客到訪。國際鳥盟安排稀有鳥類俱樂部(Rare Bird Club, RBC)會員至 Western Siem Pang 森林賞鳥，引發當地居民極大興趣。若禿鷹和 ibis 族群受到保護，大型哺乳類數量增加，該地有潛力發展以自然為主之生態旅遊，改善當地經濟現況。
- 禿鷹數量減少主要原因是缺乏食物，肇因野生動物被非法獵捕。另外，以前自由放牧逐漸被集中管理取代。國際鳥盟引進禿鷹餐廳(vulture restaurant)計畫，將牛的屍體放置於特定地點提供食物給禿鷹，並吸引遊客，造福當地生意。柬普寨禿鷹族群降低情況也因而有所改善。2004 年全國禿鷹調查發現 140 隻，2009 年記錄到 286 隻。2010 年調查更顯示 Western Siem Pang 森林之重要性，此處有全國 1/3 的白臀禿鷹和 46% 的細嘴兀鷲。
- 2010 年調查計畫，白肩黑鸝數量打破紀錄，全國共有 429 隻，Western Siem Pang 森林約有 200 隻。

六、工作規劃、計畫提倡和國際宣傳

- 準備計畫提案，向歐洲和美國申請經費都獲贊助。
- RBC 生態之旅後，於其通訊中刊載希望森林計畫相關文章。
- 於國際鳥盟網站刊登 4 個故事，描述白肩黑鸝、巨鸝和 3 種極危禿鷹。
- 在新加坡辦理希望森林計畫相關活動，並邀請柬普寨政府人

員參加。

- 於國際鳥盟網站募款，呼籲大眾支持柬普寨計畫。

2011 年「經由碳融資和社區參與保育柬普寨西北部森林計畫 Phase II」執行進度如下：

一、林地租借(Forest concessions)

- 2011 年 3 月 9 日 MAFF 函請部長委員會(Council of Ministers, CoM)同意將 149,710ha Western Siem Pang (WSP)森林規劃為保護區。
- CoM 需先檢視租借林地相關法律定位後，方可將此案陳交首相決定。
- 2010 年 12 月新設之查緝小組加強了經營管理團隊之能力，2011 年非法伐木、盜獵等活動均有下降。

二、生物多樣性評估

- 持續數年之生物調查，2010 年完成報告初稿，2011 年進行修訂，此報告將對推動保護區之設立有所助益，將於近期出版完整調查報告。
- 進行 WSP 北部和東部基礎生物多樣性調查，調查報告草擬中。初步發現大量巨鸚族群、白肩黑鸚數量不多、禿鷹數量不多、應有野牛(Gaur)族群、沒有爪哇野牛(Banteng)、食肉動物不多。

三、威脅因子評估

- 進行 WSP 居民生計方式調查，並發表報告。
- 發現機械耕作日漸盛行，以往水牛及傳統農耕方式對減少植被很有效果，提供白肩黑鸚等鳥類較多良好棲地，有些水鳥也以水田為棲地。當地居民原飼許多水牛和黃牛，2011 年間農民也因擔心家畜疫病賣出許多牛隻，將持續觀察食草動物之減少對棲地和生物多樣性之影響。

四、研擬經營管理策略和增加居民收入之活動

- 2012 年 3 月將針對此議題發表報告。
- 2011 年增雇人員評估居民生計、飼養家畜和當地保育之關係，並將考量疫苗注射防止疫情。

五、減少碳排放量

- 2011 年 Western Siem Pang 被選為 REDD (Reducing Emissions from Deforestation and Forest Degradation)先驅地點。
- 進行與其他 REDD 區如 Oddar Meanchey 省 REDD 試驗區之連結工作。

- 針對氣候變遷對 WSP 乾燥森林之影響進行研究。

六、生態旅遊之潛力

- 2011 年，針對 WSP 有否潛力成為亞洲第一個 game safari reserve 進行研究評估。
- 國際鳥盟及柬普寨相關部會人員赴南非考察 game reserve 之運作。
- 預計 2012 年發表評估報告。

七、工作規劃、計畫提倡和募款

- 持續健全 WSP 經營管理團隊。
- MacArthur Foundation 和 Cargill Foundation 訪視 Western Siem Pang，評估長期投資之可行性。
- MacArthur Foundation 同意贊助 WSP 乾燥森林生物多樣性保育計畫。
- 林務局贊助碳融資和社區參與保育柬普寨西北部森林計畫 Phase II。
- Prince Albert II of Monaco Foundation 同意贊助 WSP 保育計畫。
- Mohamed bin Zayed Species Conservation Fund 同意贊助巨鸛監測計畫。

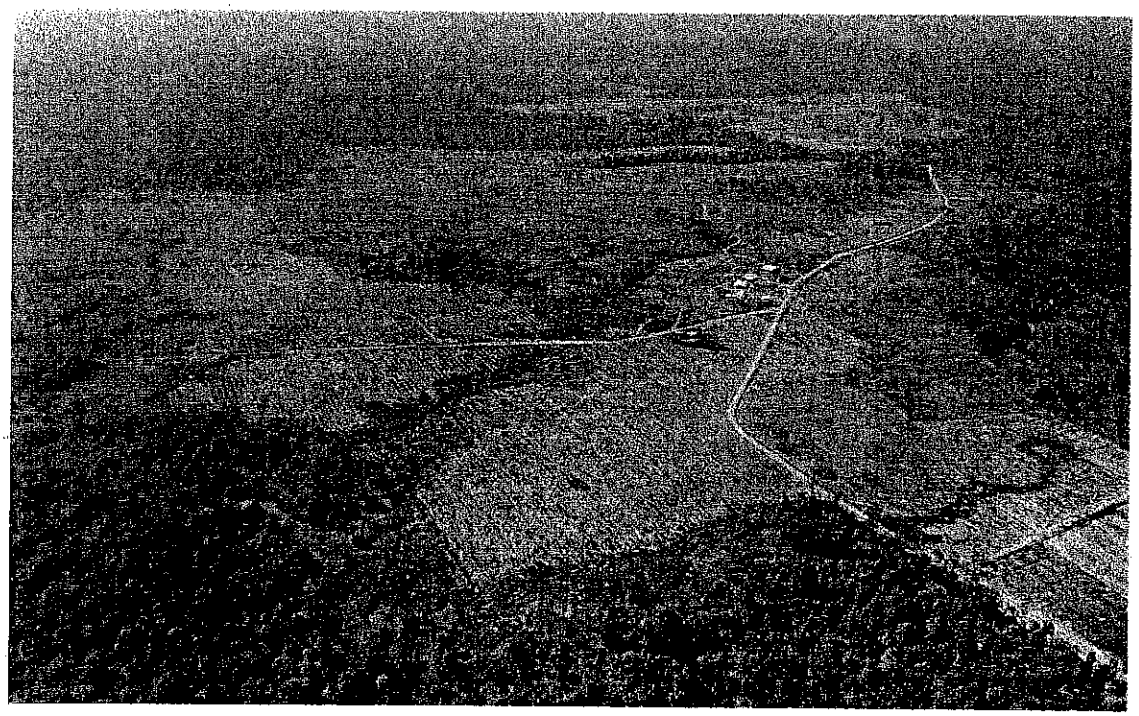
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INTERNATIONAL

BirdLife International

Forests of Hope Programme

Conservation of a large forest block in Northern Cambodia through carbon financing and local community involvement

Phase II



Deforestation to the S of Western Siem Pang

A Report from BirdLife International to the Forestry Bureau of the Council of Agriculture of Taiwan

Cambridge, United Kingdom, February 2012

General Background

Since 2006, BirdLife International is implementing a conservation project to protect the unique biodiversity of the western part of Siem Pang District, near the confluence of the San and the Mekong River. This is the area referred to as Western Siem Pang.

The main purpose of the project is to demonstrate a model with global lessons for long-term financing for:

- forest co-management by Government and local communities,
- reducing carbon emissions and
- enhancing local livelihoods and biodiversity conservation.

Biodiversity

Western Siem Pang was identified as a priority because of its exceptional biodiversity. Ninety percent of Western Siem Pang is covered by intact forest typical of the original vegetation of the region. Half is dry dipterocarp forest and 40 % denser semi-evergreen forest; the remainder is degraded semi-evergreen forest (5%), deforested land including cultivation (3%) and water (2%). Scattered throughout the forest are a number of pools and seasonally wet meadows (trapaeng) which are of great importance to the site's biodiversity.

This IBA is one of very few places in the world where as many as five Critically Endangered bird species can be found, and it is globally important for all five. These species include: White-shouldered Ibis *Pseudibis davisoni*, Giant Ibis *Thaumatibis gigantea*, White-rumped Vulture *Gyps bengalensis*, Slender-billed Vulture *Gyps tenuirostris* and Red-headed Vulture *Sarcogyps calvus*. It also supports a range of threatened mammal species including Eld's Deer *Cervus eldi*. The area is also important for other biodiversity and ecosystem services: included in the area are forests that are vital for the protection of the upper watershed of the Sekong River, a major tributary of the Mekong. These areas are probably very important in sustaining fisheries based in Stung Treng and other populous areas within the province.

BirdLife has been collecting biological information on Western Siem Pang for several years, and this is now moving towards a monitoring programme as the baselines become complete and trends can be identified. A full report describing the biodiversity of the site was completed in 2010.

Threats

The biggest threat to biodiversity in the proposed Western Siem Pang Protected Forest remains the existence of a land concession for the establishment of tree-crop plantations. This, the 100,852 ha Green Sea Agriculture Co. Ltd land concession, is valid until the year 2070, and overlaps considerably with the proposed Western Siem Pang Protected Forest. Indeed, almost the entire mosaic of deciduous dipterocarp forest is currently within the Green Sea land concession area. This area of overlap is the most important for many species of threatened wildlife in the proposed Protected Forest. However, the legality of the Green Sea concession is questionable and it is under government review. The establishment of tree crops in the proposed Protected Forest would have irreversible negative effects on the area's unique wildlife as well as on the lives of local communities, many of whom depend on the area to graze their livestock and collect non-timber forest products, including fish, frogs and resin. Meanwhile low-level threats include small scale extraction of timber for local or commercial use, and clearance of forest for cultivation. Collection of large water birds, presumably for food, has also been noted as a threat.

Conservation approach

The approach proposed is the designation of Western Siem Pang as Protected Forest; this would make the area part of the national permanent forest estate, but not part of the Protected Areas system, and would represent an ideal arrangement for local communities and Government while conserving the area's biodiversity and carbon stocks. The Government wishes and needs to maximize revenue from forest, and large concessions are possible, which are ideal for conserving dispersed species; a project response must deliver such revenue. Privately held forest leaseholds are permitted for logging concessions and Protected Areas, for up to 99 years.

In 2001, the southern and central parts of the site were placed under two concessions to Cambodian companies to establish tree crop or biofuel plantations, which were found to be of dubious legality. Accordingly the concessions were placed under a Government review process, while BirdLife continued its programmes at the site and national level to promote the importance of Western Siem Pang, and show that there was a viable alternative to the concessions.

A major result of these efforts came in August 2010. The concession licence for one of the two corporations seeking to log and convert the forest was cancelled. By early 2011, the field team of this company, including all heavy equipment, had completely withdrawn from Western Siem Pang.

In January 2011, the Head of the Forestry Administration of the Ministry of Agriculture, Forestry and Fisheries wrote to his Minister, firstly to propose a reduction in the land concession held by the other corporation in Western Siem Pang, and secondly to urge him to designate Western Siem Pang as Protected Forest.



Two young **Northern Cambodian** girls walk together to school

Activity Report for 2011

Forest concessions

On 9th March 2011, the Ministry of Agriculture, Forestry and Fisheries of Cambodia (MAFF) submitted the sub-decree to establish Western Siem Pang Protected Forest covering 149,710 ha, for consideration by the Council of Ministers, for eventual transmission to the Prime Minister. The endorsement of the Protected Forest plan by the MAFF is a significant step in gaining further national governmental support for the project.

Unfortunately, the Council of Ministers was forced to suspend a decision on the Protected Forest Plan for the time being, as the exact legal status of the concession needs to be resolved initially. The plan is thus currently undergoing further revision, and investigation into the status of the concession will continue to be undertaken in 2012. Other options are currently being investigated to speed up the process of approval including potential for direct liaison with the Prime Minister or with the owner of the concession. Advocating for the government to take the decision to approve the Protected Forest plan is currently the top priority for the project and significant progress on this is expected to take place in 2012.

The capacity of the Western Siem Pang management team was strengthened as a result of the establishment and equipping of a new law enforcement team. Furthermore, illegal activities recorded, such as logging, hunting, trapping and poisoning decreased during 2011.



Natural Resource Management in the Critical Habitat of **Western Siem**

Biodiversity assessments

Biodiversity data collection has been significantly improved in Western Siem Pang over the last few years. The baseline biodiversity report undertaken in 2010 for the Proposed Protected Forest was drafted and has undergrone extensive revision throughout 2011, to assist with lobbying for Protected Forest designation. The full report will be published by BirdLife in the near future.

Another baseline biodiversity survey was recently undertaken in the northern and eastern areas of Western Siem Pang (which do not currently overlap with the concession area) and a full report is in the process of being prepared with the details of the results of the survey. However, preliminary results suggest:

- A significant presence of populations of the Giant Ibis
- No significant numbers of White-shouldered Ibis
- No significant numbers of vultures
- Some evidence of population of Gaur but not Banteng
- No significant carnivore records

The presence of a significant population of Giant Ibis indicates the high biological importance of this north-eastern area. However, the absence ofa significant population of the White-shouldered Ibis indicates that the northern and eastern areas of Western Siem Pang are not a conservation alternative to the protection of southern area overlapping with the current concession area. Indeed, the area covered by the current concession is critical habitat for the White-shouldered Ibis and thus also has a highly significant conservation value.

Assessment of new threats

A detailed study (with report) has been carried out on livelihoods models for WSP, noting the trend towards mechanisation and away from use of buffalo. This will have impacts on threatened birds at Trapaengs if it continues. Previously in Western Siem Pang, the abundance of wild herbivores played a significant role in reducing vegetation and exposing areas of bare substrate, offering greater foraging habitats for species such as the White Shouldered Ibis, in particular in trapaeng habitat.

With these wild herbivores no longer present in the area, the traditional livelihoods and management practices of the local communities such as rice cultivation and livestock rearing, have come to play an integral part in maintaining these habitats. Local communities rely on the trapaeng to fish and collect food, as well as for rearing their livestock (cattle and domestic buffalo), who play a similar role to the previously abundant wild herbivores in maintaining foraging habitats for waterbirds. Traditionally-cultivated rice fields are now also important for a number of waterbird species.

However, during 2011, an increase in the mechanisation of agriculture in the project area was recorded, along with a decrease in the number of domestic buffalo. This observation is mainly due to the increase in livestock epidemics in the area. The decrease in the number of grazing domestic buffalo, along with the sale of the animals by farmers to avoid the costs of epidemics, could have important consequences for the conservation of the biodiversity, in particular for the maintenance and conservation of trapaeng which are of great importance to the rest of the area's biodiversity.

Development of management strategies and income generating activities

The preparation of a comprehensive project design document for conservation activities in Western Siem Pang has been planned for March 2012. This document will provide details on the project as developed so far, and include a further detailed vision of potential strategies for ensuring project sustainability through the development of income-generating activities with benefits for local communities (to include a review of REDD and ecotourism potential).

As a result of the potential impacts of the decrease in the number of domestic buffalo in the project area, a new staff member was recruited in 2011 to work on the links between livelihoods and livestock rearing in areas of conservation importance, such as in Western Siem Pang. The provision of treatment and vaccinations to local farmers for their buffalo is being considered as a potential conservation strategy for maintenance of the trapaeng. The strategy could ensure a reduction of the impacts of epidemics on their livestock in return for the management of the trapaeng for conservation.

Reducing carbon emissions

A priority for 2011 was consultations with district and provincial Government and civil society to introduce REDD and the importance of stakeholders' involvement. Consequently, in 2011, the Western Siem Pang Protected Area was selected as a Reduced Emissions from Deforestation and Forest Degradation (REDD+) pilot site for Cambodia by the Forestry Administration, with support from the Japan International Cooperation Agency (JICA). This is a significant step towards the use of REDD as a financing mechanism for conservation of the project area.

Linkage to other REDD+ pilot sites is also important, and BirdLife has developed links to the first pilot site at Oddar Meanchey in NW Cambodia, assessing the biodiversity of this site in collaboration with the NGO, PACT, that is supporting pilot acitivities at this other site, while also exchanging lessons on site management with PACT staff in Cambodia.

An assessment regarding the vulnerability of the Western Siem Pang dry forest landscape to climate change was undertaken by two consultants and two technical reports have now been completed. The reports include analysis of some appropriate management adaptation measures and their monitoring frameworks for the project area. A strategic vision and a feasibility study to develop a long-term biodiversity conservation programme for Western Siem Pang that responds to expected climate change impacts, have not yet been developed but are planned for 2012.

Ecotourism potential

Currently, few international tourists visit Western Siem Pang as it is not sufficiently accessible and promoted as a tourist destination. However, in 2010, BirdLife hosted a visit to the project area for BirdLife's Rare Bird Club (a group of committed BirdLife supporters). This visit generated great local interest and was an extremely important first step towards the potential development of valuable nature-based enterprises in the area. Indeed, as well as REDD financing, ecotourism could make a significant contribution to local development and provincial economy.

In 2011, a specific concept was investigated regarding the potential of Western Siem Pang to become the first game safari reserve in Asia, through the development of a high level safari ecotourism initiative. In order to gain a better understanding of this model, and the benefits and challenges involved, BirdLife staff, staff from the Forestry Administration and

the Real Estate and Tourism Operator in Cambodia travelled to South Africa to the Madikwe game reserve to meet with communities, conservationists and site managers. This study Tour took place in November 2011. The Madikwe reserve was created through the purchase of 70 000 ha of unproductive farms. The area was then restocked with key animal species and concessions were sold for the construction of ecolodges.

The development of a similar model at Western Siem Pang would require the identification of an investor for the project who would be committed to its conservation and to the development of the first game safari park in Asia. A number of challenges will be faced should this approach be taken, including the restoration of sufficiently charismatic game to attract high level tourism, increased road accessibility to the project area, and that of investor confidence in project success. A concept for this potential economic enterprise to ensure sustainability of the conservation of Western Siem Pang will be detailed and evaluated in the project design document planned for March 2012.

Programme planning, advocacy and fundraising

The capacity of the WSP management team was strengthened as a result of the establishment and equipping of a new law enforcement team. Illegal activities recorded, such as logging, hunting, trapping and poisoning have decreased during the reporting period. Biodiversity data collection and management systems were also improved, allowing more rigorous comparisons and analysis of conservation success.

Representatives of the MacArthur Foundation and Cargill Foundations visited Western Siem Pang during the reporting period to assess potential for longer-term investment, building on successes to date.

Funding was secured from the MacArthur Foundation for the project "Western Siem Pang, towards a vision for biodiversity conservation in the dry forests of Cambodia"; and the following project has provided the necessary resources to ensure the completion of activities for 2011, complementing (and leveraged by) the essential support from the Council of Agriculture.

Additional funding was secured from the Prince Albert II of Monaco Foundation for conservation activities at Western Siem Pang, and a small grant also secured from the Mohamed bin Zayed Species Conservation Fund for monitoring Giant Ibis.



Giant Ibis

Income and Expenditure for 2011 (all figures in US$)

The total **expenditure** of the programme in 2011 was as follows.

Personnel cost in Cambodia	24,781
Equipment, supplies and office costs	34,503
Travel in country (strategy and consultation)	7,742
Strategy and feasibility plan	3,000
Communications costs	726
BirdLife International staff	13,138
Study tour	14,461
Finance, contracts, office, IT and HR support	4,658
Total	**103,009**

Income

Forestry Bureau of the Council of Agriculture of Taiwan	15,000
Co-financing and BirdLife International contribution	88,009
Total	**103,009**

Acknowledgement of the Council of Agriculture

The support of the Forestry Bureau (CoA) will be acknowledged in all web based materials, scientific communications and publications, communication materials that the project will produce.

The project will also be publicised by the BirdLife Cambodia programme through its website.



Children playing in Northern Cambodia

海馬計畫執行成果摘要

加拿大卑詩省大學(The University of British Columbia, UBC)魚類研究中心(UBC Fisheries Centre)和海馬計畫(Project Seahorse)所提計畫內容和成果，摘要如次：

本計畫提案人為 Project Seahorse 主任 Dr. Amanda Vincent。Dr. Vincent 也是加拿大海洋保育研究主任。計畫主要目的為支援有效執行重要商業海洋魚類列入華盛頓公約附錄二之相關措施。依據華盛頓公約(Convention on International Trade in Endangered Species of Wild Fauna and Flora, CITES)相關規範，自 2004 年 5 月 15 日起，所有海馬(genus *Hippocampus*)國際貿易出口文件需提出並未危及野外族群之證明。同樣的規定也適用於鯨鯊(whale shark, *Rhincodon typus*)和姥鯊(basking shark, *Cetorhinus maximus*)。2004 年末，大白鯊(great white shark, *Carcharodon carcharias*)和蘇眉(隆頭魚、曲紋唇魚 humphead wrasse, *Cheilinus undulates*)也被列入 CITES 附錄二物種。海洋魚類被列入 CITES 附錄物種，突顯了國際保育界對這些物種之重視，但各國經濟、社會等層面也會受到影響。

列入 CITES 附錄物種只是第一步，後續規範必須有效執行，才有保育效果。每年國際海馬貿易量超過 2,500 萬隻(70 公噸)，包括至少 34 種海馬，涉及將近 80 個國家。乾海馬零售價為一公斤約 US$1,200。

CITES 秘書處、美國(海馬列入附錄提案國)和許多其他國家都希望 Project Seahorse 能就貿易分析、技術和經營管理建議、鑑定指南等提供協助。同時，利益相關團體則希望 Project Seahorse 協助解說法令和指導因應措施等。

本計畫主要目的包括：

- 提供技術協助和相關參考資料給海馬貿易國，建立永續經營管理系統。
- 進行海馬貿易評估和海馬貿易管理可行性研究，以供其他海洋魚類案例研究之參考。
- 向國際社會宣導「以國際貿易管理方式，經營管理漁業」之理念。

Project Seahorse 數年來的工作報告，綜合主要內容如下：

2004 年「國際海馬貿易經營管理措施計畫」已達成下列目標：

- 取得正確的海馬成體長度市場貿易資料。
- 研發測量海馬長度的方法。
- 利用研究所獲新資料，修正 CITES 動物委員會所訂「海馬最小貿易長度」。
- 進一步瞭解海馬貿易現況。
- 調查 CITES 將海馬列入附錄後的市場變化。

2004 年「國際海馬貿易評估計畫」成果包括：

- 完成馬來西亞/泰國和印度國家報告。預訂的 27 個國家的海馬貿易報告，僅有印尼報告尚未完成。
- 重新整理國家報告，加以發表，擴大讀者群。已發表一篇報告。
- 2004 計畫成果報告「Measuring for management of the international trade in seahorses, *Hippocampus* spp.」寄給贊助單位參考，包括林務局、CITES 秘書處和瑞士政府。該報告有摘要版(9 頁)和完整版(共計 82 頁)兩種。

2005 年計畫期末報告中所列工作成果包括：

- 提供 CITES 締約國技術支援。
- 完成海馬養殖對保育和經濟之影響相關報告，除向相關締約國簡報外，並於相關國際研討會中發表，並出版報告。
- 完成菲律賓海馬貿易分析報告「The catch, export and conservation implications of the seahorse trade in the Philippines, pre-CITES」，並將刊載於 Fisheries Management and Ecology 期刊。
- 全球海馬養殖或有興趣飼養海馬人士聯絡網(主要是公立水族館)於 1998 成立，當初只有 30 個會員，2005 年擴充至 284 個會員。
- 海馬研究人員聯絡網擴充至 112 人，分別來自 31 個國家，80 個單位(包括大學、政府機構、研究單位、養殖業者等)。
- 2005 年 7 月 13-15 日，於菲律賓之東南亞漁業發展中心(Southeast Asian Fisheries Development Center)向東南亞國協(Association of Southeast Asian Nations, ASEAN)成員報告海馬養殖對保育和經濟之影響。
- 2005 年 11 月 8-20 日，於英國水族館研討會(National Aquarium Workshop)報告「以法令和貿易許可方式，改善海洋觀賞魚類貿易之永續性」。
- 完成馬來西亞和泰國海馬貿易分析報告「Fisheries, large-scale trade and conservation of seahorse in Malaysia and Thailand」，並將刊載於 Biological Conservation 期刊。

2006 年計畫報告中所列工作成果包括：

- 設立「執行 CITES 規範全球支援網站(Global support website for CITES implementation)」，網址 www.HippocampusInfo.org。
- 協助香港傳統醫藥界人士，永續利用海洋資源。
- 提供 CITES 締約國技術支援。
- 全球海馬養殖或有興趣飼養海馬人士聯絡網(主要是公立水族館)2006 年擴充至 300 個會員，分別來自 17 個國家，75 個公立水族館或動物園和 7 個獨立機構。
- 海馬研究人員聯絡網擴充至 143 人，分別來自 36 個國家(包括大學、政府機構、研究單位、養殖業者等)。
- 完成海馬貿易分析報告初稿「The dried seahorse trade in key traditional medicine markets of East Asia」。

2007 年計畫報告中所列工作成果包括：

- 建立各國海馬貿易資料庫，第 1 階段蒐集海馬列入 CITES 前貿易資料，以後可加入官方記錄和海馬列入 CITES 之後的貿易資料。
- 製作完成海馬鑑定參考資料，包括基礎版和進階版。
- 研究製作動態海馬分佈圖之可行性。

2008 年計畫報告中所列工作成果包括：

- 完成網站開放測試工作。測試期間多位專家提供意見，改善網站之功能。
- 改善網站機能，包括網站架構、瀏覽、資料擷取、網站外觀等。
- 在海馬列入 CITES 附錄二前，將各國海馬貿易資料庫已建立事宜公告週知。
- 介紹管理方法，列出決定無危害程序(non-detriment finding procedure, NDF procedure)之建議事項，包括可輸出海馬之最小體長、棲地保護、法令執行和未來資料需求等。

Project Seahorse 團隊參加 2008 年 11 月於墨西哥召開的 CITES NDF 研討會，針對海馬部分協助各國 CITES 管理機構擬定標準，衡量可否輸出，提供如何決定 NDF 的方法。參加會議者約有 100 人，Project Seahorse 團隊的主要貢獻包括：

- 以海馬為案例，說明決定 NDF 的方法。內容包括海馬生物學、生活史、全球保育現況、面臨威脅、現行經營管理方法、貿易情形、NDF procedure 等。
- 公布海馬相關資料，請大家提供建議，以利改進海馬網站。與會認同海馬模式可作為其他物種之參考，許多人對網站的 NDF

procedure 提出建議。

2009 年計畫報告中所列工作成果包括：

依據 2008 年 11 月於墨西哥召開的 CITES NDF 研討會之建議，已完成下列網站改善工作：

- 增列資料以回答各界「何謂海馬?」之問題。因為各國 CITES 管理機構人員科技背景差別很大，有許多人專長並非海洋。
- 與海馬圖鑑建立聯結，有需要者可印出 pdf 檔帶至現場運用。並為 8 個國家編訂海馬鑑定手冊，以協助相關管理工作。此包括 8 個主要海馬貿易國，以及面臨海馬管理問題的國家，例如巴西、中國(香港)、印度、印尼、馬來西亞、墨西哥、秘魯、菲律賓、泰國、越南。
- 改善互動式鑑定檢索表之使用簡介。
- 建立圖書館包括下列資料：
  1. 一般資料：海馬生物學、水產養殖、貿易、管理方法、族群評估等。
  2. 技術資料：調查設計、海馬測量和性別判定、貿易監測、上標和註記、快速族群評估、海洋保護區之優點、替代性管理方法等。也包括可印出的基本資料供攜帶至野外運用。
  3. 參考資料：包括大量第 1 項內容的參考資料。
- 改進網站之功能：例如網站架構、網站導覽、資料取得等。

另外，2009 年完成「國際海馬貿易追蹤：首次 CITES 貿易資料分析」報告，發現年度海馬出口量約為 19.4 噸，有 61 國涉及乾海馬貿易，98%輸出目的地為亞洲國家。以前不知道有海馬貿易的國家包括埃及、幾內亞、新喀里多尼亞(New Caledonia)、塞內加爾和多哥。泰國為最大乾海馬來源國，2004 年起每年均 16.2 噸，第 2 大輸出國為中國(但重量比泰國少 96%)。其他乾海馬輸出國包括幾內亞、秘魯、塞內加爾和越南。乾海馬貿易量記錄數量大幅下降，最明顯的是中國，海馬未列入 CITES 附錄前，中國每年平均輸入 30 噸，海馬列入 CITES 後，CITES 資料記錄為 2.1 噸。香港和臺灣也有類似現象。2004 年海馬列入 CITES 對活海馬貿易也有重大影響，CITES 資料顯示每年 101,359 隻活海馬輸出量中，野生海馬約佔一半。但未列入 CITES 前，100%為野生海馬。最大活海馬輸出國為越南，2004 年以來，每年平均輸出 23,750 隻，66%為人工繁殖海馬。活海馬主要輸入國為歐洲和北美國家，2004 年以來，每年平均輸入量分別為歐洲(24,919 隻)和北美國家(68,086 隻)。以前不知道有輸入活海馬的國家包括巴貝多

(Barbados)、關島、匈牙利、冰島、波蘭和南非。2004 年之後，人工繁殖場數量增加，尤其是越南和斯里蘭卡。不過，CITE 海馬輸出資料減少，有可能是貿易量真的下降，也有可能是各國資料少報，需與各國資料比對方可瞭解真相。

Project Seahorse 2010 年計畫內容及成果，摘要如下：

繼續協助加強「執行 CITES 規範全球支援網站」之功能。該網站之設立第 1 年由 Whitley Fund for Nature 贊助，網站設立主要目的係提供各國 CITES 相關機構或民間團體運用。網站資料包括：

- 海馬相關資料和海洋保育資料。網站提供相關資料之連結。
- 各國海馬和海洋相關活動，海馬生物和社經資料。
  包括物種、族群現況、趨勢、貿易調查和分析等資料。第 1 年，主要針對 8 個海馬主要輸出國，包括印度、印尼、馬來西亞、墨西哥、秘魯、菲律賓、泰國和越南。
- 協助各國採取經營管理決策之相關資料。

網站正式運作後，因應各締約國的需求，進行的工作包括：

- 回應各界對網站的建議。
- 加入資料以提供全面性技術諮詢服務。
- 充實 8 個試用國家的海馬資料庫。
- 加入更多國家的海馬資料。
- 改善決策分析資料。
- 確保使用者能快速及有效查詢到網站上提供的資料。
- 各締約國或使用者瞭解本網站之潛力後，推廣運用到其他物種。

本網站與其他網站連結，以加強保育效益，包括：

- FishBase：可連結大量魚類基本資料。
- AquaMaps：可瞭解物種分佈之地理範圍和貿易路線。
- GBIF/OBIS：可連結到博物館和有典藏海馬標本的機構。
- Sea Around Us Project：可連結到地緣相關漁業、貿易和保育資料。

除我國贊助，Project Seahorse 也向其他國家或團體申請經費，經過數年計畫執行經驗及考量經費限制等因素，本計畫工作項目調整如下：

- 針對調查設計、測量和分辨海馬性別、貿易監測、標記和註記、快速族群評估、設立海洋保護區之優點、替代性經營管理方案等提供技術協助。
- 協助各締約國瞭解不斷更新的海馬分類系統(締約國必須列出海

馬貿易之物種，並向 CITES 提出報告)。

- 更新 FishBase 中海馬相關資料，提供海馬之生物和保育資料，給締約國、資源管理和利益相關人士、保育團體等參考。
- 分送 Project Seahorse 有關海馬生物分析之報告。
- 與各國和相關團體分享貿易分析資料和報告。
- 分析非正式、各國和 CITES 貿易資料，瞭解貿易趨勢和型態，以供擬定保育措施之參考。
- 取得並分析 CITES 的第 1 份海馬貿易資料。
- 協助執行 CITES 海馬貿易長度限制(minimum size limit)之規定。
- 彙整並擴充海馬研究人員聯絡網，鼓勵資料分享，敦促各國遵守 CITES 規範，鼓勵各國採取保育海馬相關措施。

預計成果為強化「執行 CITES 規範全球支援網站」之功能，包括：

- 提供海馬族群經營管理、漁業和貿易相關技術指導資料。
- 協助各國 CITES 相關機構、海關、和資源管理人員執行海馬列入附錄二之相關規範。
- 建立海馬族群、漁業和貿易資料庫。

本計畫之效益包括：

- 締約國及相關團體對 CITES 保護海洋魚類物種之瞭解有所提昇。
- 改善 CITES 貿易資料之一致性及可信度。
- 各國對附錄二物種輸出所需之無危害準則(non-determent findings)有更明確之界定。
- 推廣運用至其他 CITES 附錄管制貿易之物種，建立相關資料庫。
- 平面、廣播和電視媒體之報導。

2010 年彙整分析 1,200 份 CITES 海馬貿易資料，包括 2004-2008 年輸出、輸入和再輸出資料。分析結果包括：

- 記錄到 28 種海馬之貿易資料，18 種為乾海馬貿易，27 種為活海馬貿易。海馬列入 CITES 前所記錄到貿易種類為 24 種，海馬因此列入 CITES 後，貿易種類略有增加。2004-2008 年貿易資料中，77%記錄到種的層次，其餘的記錄到屬的層級。
- 2004-2008 年間，有 71 國(除南極洲外，各洲都有)被列為來源國或消費國。一半以上為乾海馬貿易，約有半數為活海馬貿易。有 46 國消費海馬，大多數為活體輸入。
- 累計至 2008 年，涉及海馬國際貿易，包括來源國和消費國共有 89 國。
- CITES 資料顯示 16 個新來源國(以前沒記錄)，另有 20 國之資料，

沒有出現在海馬列入 CITES 前之貿易資料中。

2011 年海馬計畫(Project Seahorse)所提「支援華盛頓公約動物委員會大宗貿易評估計畫」，計畫及報告摘要如次：

華盛頓公約第 24 屆動物委員會討論海馬議題，有 3 種海馬(*Hippocampus kelloggi, H. Kuda, H. spinosissimus*)貿易量相當大，決定將其列入大宗貿易評估程序中。只有少數來源國提供貿易資料，包括澳洲、印尼、日本、馬達加斯加、新喀里多尼亞(New Caledonia)、美國和越南。CITES 第 25 屆動物委員會也將討論此議題。華盛頓公約秘書處表示 Project Seahorse 進行海馬之大宗貿易評估，將對此議題之後續有重大協助。

本計畫工作項目包括：

- 蒐集三種海馬大宗貿易資料，資料來源包括聯合國環境總署所屬世界保育監測中心(UNEP-WCMC)資料，海馬列入 CITES 前 Project Seahorse 調查資料(1993-1995 和 1998-2001)。
- 參加 2011 年 7 月召開之 CITES 第 25 屆動物委員會(AC25)，於大宗貿易工作小組中討論此議題。
- 將三種海馬大宗貿易資料匯入 www.hippocampusinfo.org 網站中。
- 鼓勵並支援動物委員會將其他海馬納入大宗貿易評估程序中，尤其是 *H. histrix* 和 *H. trimaculatus*，這兩種都是印太洋物種，CITES 貿易記錄量大。新一輪的評估將於 CITES AC25 發動。
- 詢問各締約國輸出入海馬時，如何確認無危害準則(non-determent findings, NDF)，並告知可參考 www.hippocampusinfo.org 網站中所列出之方法或工具。
- 進行 NDF 調查時，將特別留意印尼，因為印尼是唯一淨輸出海馬但採取保留(reservation)立場之國家。
- 校對 Project Seahorse 彙整海馬生物、保育、經營管理和貿易資料。
- 撰寫各國 NDF 概述，並針對其方法和缺點提出意見，並將報告送 CITES 秘書處、動物委員會、原產國和貿易國。
- 將 NDF 資料匯入 www.hippocampusinfo.org 網站中，供各國 CITES 機構參考，調查結果於 CITES 第 26 屆動物委員會中公告週知。

海馬大宗貿易評估包括蒐集生物、保育、經營管理三種貿易海馬物種 *Hippocampus kelloggi, H. kuda* 和 *H. spinosissimus*。資料來源包括：

- 海馬計畫針對 UNEP-WCMC 國際海馬貿易資料庫之評估報告。

- 海馬計畫國際海馬貿易資料 1993-1995 和 1998-2001。
- 海馬計畫出版之海馬保育和水產養殖評估報告。
- 經由各式管道包括網站、Facebook 和 Twitter 所蒐集之資料。

資料提供給 UNEP-WCMC，為 CITES 秘書處準備海馬大宗貿易評估報告，報告已置入 CITES 網站。依據上述評估，CITES 秘書處已將這三種海馬列入泰國緊急關切物種(Urgent Concern)。泰國為國際海馬貿易主要來源，每年約五百萬隻，貿易衝擊未明，也沒有 NDF 資料。2012 年 3 月 CITES 召開動物委員會討論此議題，並決定後續行動。

野生鮭魚中心計畫報告摘要

野生鮭魚中心(Wild Salmon Center, WSC)所提「遠東哲羅魚保育計畫」歷年來計畫報告摘要如附：

本計畫宗旨為保護瀕臨絕種 Sakhalin taimen 之棲地及永續經營管理。Sakhalin taimen 為大型鮭魚，又名 Ito 或 Japanese huchen，成體體重 50-100 公斤，體長超過 2 公尺，壽命超過 30 年。俄羅斯僅限日本海沿岸和庫頁島，另外，日本北海道和千島群島(Kuril Islands)有少量族群。Sakhalin taimen 於 2006 年被列入 IUCN 紅皮書中。俄羅斯 Sakhalin taimen 棲地雖然大都完整，但許多重要河流系統受到日益增加之威脅，例如盜獵、商業捕鮭業之誤捕、伐木、發展快速的石油和天然氣相關工業。依據俄羅斯漁業統計誤捕資料(Bycatch record of the Russian commercial fishery)顯示 Sakhalin taimen 過去 50 年來數量減少 70%。日本的 Sakhalin taimen 可能少於 2,000 隻。

2008 年計畫報告摘要如下：

俄羅斯的庫頁島州立大學(Sakhalin State University)、俄羅斯聯邦漁業局奧卡辦公室(Okha Office of Russian Federal Fisheries Agency)、庫頁島鮭魚中心(Sakhalin Salmon Initiative Center, SSIC)、遠東魚類試驗所(Far East Fisheries Institute)和野生鮭魚中心(Wild Salmon Center, WSC)共同至 Langry 和 Bolshaya 兩條河流，進行野外調查 2 次，評估魚類多樣性及豐富度，蒐集水質和地形基本資料，同時蒐集魚鰭(Fin clips)樣本供 DNA 分析之用。並運用這些資料，草擬建議設立保護區之文件及 Langry 流域保育行動計畫。除上述單位外，共同執行計畫之單位包括庫頁島魚類和海洋學試驗所(Sakhalin Fisheries and Oceanography Institute)、位於莫斯科的俄羅斯科學院遺傳研究中心(Institute of General Genetics, Russian Academy of Sciences)和美國之華盛頓大學(University of Washington)。

一、 研究

- 研究團隊發現 Langry 和 Bolshaya 流域鮭魚物種多樣性很高，但也發現 Bolshaya 流域密集盜獵的現象很嚴重。
- 研究團隊於 Langry 的支流發現一尾遠東哲羅魚，證明 Langry 流域為唯一兩種瀕臨絕種哲羅魚(Sakhalin and Siberian)都有分佈的區域。以前的調查尚未發現這兩種魚之棲地有重疊的狀況。這項發現的生態意義重大，並可協助持續研究 2 種魚

特殊棲地需求。

- 俄羅斯科學家也同時蒐集水質化學資料、動植物和鳥類資料，包括數種瀕危物種和全球新發現種。這些資料均將納入「保護區設立提案文件」中，並於 2009 年底遞件至政府主管單位。調查結果舉例說明無下：
  1. 發現列入紅皮書的卡盧加鱘(Kaluga sturgeon)和鱖魚(Chinese perch)。
  2. 大型無脊椎動物分析結果發現許多稀有及新發現種。
  3. 記錄到第 1 次在庫頁島發現的 1 種珍珠貝(pearl oyster)，並建議納入庫頁島紅皮書中。
  4. 記錄到第 1 次在庫頁島發現的 6 種軟體動物，其中 4 種為新種。
  5. 寶刀魚科(chironomids)和昆蟲部分，發現 3 個新種、1 個俄羅斯新紀錄種和 12 個庫頁島新紀錄種。
- 因為輸入生物樣品困難，WSC 決定在俄羅斯建立哲羅魚基因分析設施，預計 2009 年於莫斯哥遺傳試驗所開始進行此物種之基因分析研究。

二、 教育

- 本計畫成果促成民間團體參與資源經營管理新機制，此為俄羅斯首例。SSIC 與奧卡(Okha)省府協談合作，設立流域委員會(watershed council)，負責辦理設立保護區之公聽會。
- 建立以社區為基礎之反盜獵計畫。

三、 保育

- 研擬 Langry 流域保育行動計畫，目標物種為 Sakhalin and Siberian taimen, summer chum salmon, fall chum salmon, lenok, grayling。內容包括因應威脅因子之策略、反盜獵策略、建議設立保護區、保育團體聯合行動發展地區和全國性反盜獵策略、監測油污染等。
- 推動設立保護區計畫。
- SSIC 和美國阿拉斯加魚獵部(Alaska Department of Fish and Game)合作，設立長期監測站，持續追蹤 taimen 活動、產卵、遷移行為等。

2009 年計畫報告內容，摘要如下：

2009 年原計畫目標為：

一、 研究：進一步瞭解 taimen 族群結構，及進行監測計畫。

- 蒐集更多之魚鰭樣本。

- 進行 DNA 分析，區分 *Hucho perryi* 和 *Hucho timen* 族群分佈界限。
- 研發和執行估計族群數量(escapement)和產卵量(spawning)之正確方法。
- 以釣(angling)、網(netting)和誘捕(trapping)方式進行鮭魚族群調查，瞭解其分佈範圍。

二、 教育：提升社區參與保育行動。

- 針對新設立之 watershed council 會員，訓練計畫籌備和流域評估方法。
- 評估於當地推動 Salmon Watch 教育宣導計畫之可行性。
- 邀請所有相關單位和人士共同參與保育行動計畫之修訂及後續執行，尤其是反盜獵部分。

三、 保育：藉由反盜獵建立保護區方式，增加族群數量。

- 根據野外調查結果，修訂保育行動計畫。
- 於鮭魚產卵季節(8 月和 9 月)加強巡邏，並持續以前之保育策略。
- 完成設立保護區提案，並送交政府單位審查。

2009 年日本最大造紙公司 Oji Paper 與 WSC 合作設立保護區，保護日本最大的淡水魚 taimen。另外，WSC 之俄羅斯合作單位 Sakhalin Salmon Initiative 榮獲俄羅斯的公司團體贊助獎(Corporate Donor Awards)最佳計畫(Best Program)獎項。2009 年研究、教育和保育成果包括：

一、研究

- 2009 年 WSC 的俄羅斯主要合作單位 SSIC 與俄羅斯科學院遺傳研究中心正式簽訂 3 年研究合作協定，並取得俄羅斯自然資源部(Ministry of Natural Resources)核准進行 Sakhalin taimen 相關研究。對瞭解族群結構助益良多。
- 2009 年研究團隊在 Langry 流域沒有發現 Sakhalin taimen，而且只取樣到 2 隻 Siberian taimen。證實 Langry 流域的 taimen 很少，可能是盜獵造成的。因此族群復育需有配套管制措施。
- 研究團隊在 Dagi 流域發現大量的 Sakhalin taimen，有可能是全世界 Sakhalin taimen 密度最高的棲息地。
- 於 Dagi 流域取樣 20 餘隻 Sakhalin taimen，紀錄捕獲地點，魚的長度、重量和大約年齡。並取魚鰭(Fin clips)樣本供 DNA 分析之用。俄國和奧地利專家將合作分析，結果可供族群保育和復育之用。

- 研究團隊在 Langry, Dagi, Kura, Bakhura, Dudinka, Anna 流域蒐集鮭魚族群數量、未成年往外遷移和產卵資料。這些基本資料可做為未來保育和反盜獵之參考。

二、教育

- 2009 年 5 月，辦理專題演講「研擬有效策略供庫頁島鮭魚委員會運用」，自然資源管理、社會發展專家與委員共同討論經營管理、反盜獵和環境教育等議題。
- 庫頁島 6 個流域委員會針對學生辦理多場生態保育宣導活動，例如辦理畫圖比賽、兒童季活動、生態保育納入幼稚園教材、青少年環境科學暑期課程等。並於 2009 年 11 月 28-29 日辦理成果發表會。
- 獲准實施 Salmon Watch 中小學課程和 Water Droplet 幼稚園課程。共有 200 餘位學生參加 7 梯次 Salmon Watch 戶外教學活動。已有 20 個幼稚園、30 個小學和 34 個中學採用這兩項教育課程。2009 年 10 和 11 月，有 80 位教師接受此項課程之訓練。SSIC 專家於俄羅斯生態教育專家會議演講 Salmon Watch 計畫，來自 60 多個團體 600 餘人參加。
- 4 位俄羅斯教師和 12-15 歲學生 12 人，參加 2009 年 7 月 22-31 日於美國奧勒崗舉辦之第 1 屆國際鮭魚營活動。俄羅斯學生由保育徵文比賽中遴選優秀者參加，共有 160 人報名徵文比賽。
- 2009 年 9 月 19 日，辦理第 7 屆鮭魚季活動，有 300 名兒童人和 60 名成人參加。活動內容包括 9 個學校說明當地社區生態保育計畫，學童參加河流沿岸淨灘活動，庫頁島自然資源保育演說，以及野外觀察鮭魚活動。
- 2009 年 9 月 26 日，辦理繪圖比賽，分為鮭魚生活史、鮭魚與人以及保護鮭魚三大主題。共有 100 人參加比賽，選出 11 位優勝作品，並製作 2010 年月曆(WSC 有提供一份供參)。

三、保育

- 2009 年夏季於 Langry 盆地推動以社區為基礎之反盜獵計畫。由當地社區人士和執法人員 22 人，共組反盜獵小隊和設立檢查站。計查獲 3 個盜獵營地，逮捕盜獵者 20 人。10 月 6 日攔截一部貨車載運 450 公斤魚子醬和鹽漬 chum salmon。在河流中下游發現非法漁網，約沒收 1,000 至 1,100 公斤魚子醬。另外，蒐集鮭魚族群數量、未成年往外遷移和產卵資料等，評估反盜獵措施之成效。
- 選定 Dagi 流域推動下一階段之保育行動計畫(Conservation Action Planning, CAP)。

- 俄羅斯遠東和莫斯科 6 地區鮭魚專家會議，選定 Langry 和 Dagi 流域為設立「鮭魚保育區」候選名單。

四、 夥伴關係

參與 2009 計畫之單位包括：遠東魚類試驗所(Far East Fisheries Institute)、俄羅斯科學院遺傳研究中心、俄羅斯聯邦漁業局奧卡辦公室、庫頁島魚類和海洋學試驗所、庫頁島鮭魚中心、庫頁島州立大學、華盛頓大學、奧地利格拉茲大學(University of Graz, Austria)。

2010 年計畫報告摘要如下：

一、研究：

- 2009 年蒐集 52 份 Sakhalin taimen 樣本，2010 年進行 DNA 分析研究，發現不同河流間基因差異很小，顯示河流間有遷徙族群。但有兩個例外，Vabaisky Lake 顯現隔離繁殖(reproductive isolation)現象，最近也證實通往該湖的遷徙行為受阻。另外，Nabile 和 Dagi 兩河流族群之遺傳特性相似，但與其他河流族群差別很大。
- 由 Dagi River 蒐集到之資料顯示該河為 Sakhalin taimen 產卵之理想地點，但林業和道路工程嚴重影響產卵棲地。
- 建立 Sakhalin taimen 分佈和風險評估模式，2011 年初將於 Transactions of the American Fisheries Society 發表報告，並將林務局列入感謝名單。

二、教育： 2010 年有 3,979 人參加相關教育宣導活動。

- Save Salmon 繪圖比賽有 975 件參賽作品，優勝作品編製桌曆。(註：WSC 寄來之月曆將於會場傳閱)。
- 9 位教師和 24 位學生(美國奧勒崗 8 人、俄羅斯 16 人)12 人，參加 2010 年舉辦之第 2 屆國際鮭魚論壇。
- 於 40 所中小學推廣 Salmon Watch 和 Water Droplet 課程，195 人參加認識本土鮭魚野外活動。
- 229 位學生參加鮭魚產卵地水下參觀之旅活動。
- 2010 年 9 月舉辦第 8 屆年度鮭魚季活動，吸引 300 人參加。
- watershed council 之 64 位會員參加三次訓練班課程。

三、保育：

- 經過十餘年之努力，設立保護區 Koppi River Preserve。
- Smirnykh river Partnership 入圍 2010 年國際河流研討會(International River Symposium)國際河流獎(International River Prize)，雖未得獎，但引發更多人對此地區之關心。

- 當地政府和社區支援 watershed council 進行 300 次反盜獵行動。

2011 年計畫目標包括：

一、完成 Sarufutsu (日本猿拂村) Conservation Action Plan
- 辦理保育行動計畫研討會，邀集相關人士參加。
- 與科學家和 Oji Paper Company 研議，擬定保育計畫。
- 草擬永續釣魚指南，減少對 taimen 之傷害，並納入社區意見。

二、設立 Koppi River Watershed Council。
- 蒐集、翻譯 Sakhalin 和 Sarufutsu 資料，如最佳經營管理方法、社區參與、保育行動計畫、釣魚規範、保育之科學作為、宣導和監測等。
- 研究 Sakhalin 運作模式，決定 watershed council 最合適之組成方式。
- 與政府和相關人士共同擬定保育行動計畫。

三、將庫頁島 taimen 保育需求納入地區保護區計畫
- 進行 taimen 保育 gap analysis，評估現行保育措施，提出進一步保育行動之建議。
- 與政府和當地相關人士共同推動設立地區保護區案。

四、進行產卵地調查計畫，蒐集生物資料以利未來設立 Dagi River 地區保護區。
- 調查 Dagi River 之 taimen 產卵地點。
- 撰寫 Dagi River 生物價值報告，包括土地利用、encumbrance analysis、保育建議等。

2011 年計畫報告，摘要如下：

- 已召開會議，擬定 Sarufutsu (日本猿拂村) Conservation Action Plan，討論 taimen 之主要威脅因子和列出優先行動清單。調查 Oji Paper Company 排水口對 taimen 迴游之影響，已將所有出水口列入記錄，找出需要改善之部分，並協助執行棲地改善計畫。
- 2012 年初，在 Sovetsko-Gavansky municipal district 設立 Khabarovsk 地區第一個公立鮭魚委員會(salmon council)，成員包括附近自然保留區經營管理人員、林業人員、當地土著代表和當地居民等。
- 與民間團體獵人及垂釣人士協會(Association of Hunters and Anglers)和地區野生動物保育和保護區主管單位(Regional Agency

for Wildlife Conservation and Protected Areas)共同規劃反盜獵查緝行動，發現三件違法案件。

- 協助伐木公司建立監測非法盜伐機制。
- 宣導鮭魚保護區活動包括電台訪問一次，地區性報紙專訪兩次，雜誌報導一次。辦理全年度社區宣導活動，辦理 Koppi River 生態系照片巡迴展，設計 Koppi River 生態系摺頁 Nature's Pearl，將於 2012 年秋季出版。
- 設立機動巡邏站，執行環境相關法令。
- 於 Dagi River 及其他河流調查 taimen 產卵地點時，蒐集亞成魚及成魚資料。
- 遺傳基因分析奠定保育計畫之科學基礎，界定地區性保育單位 (conservation units)，此突破性報告將於 2012 年春季投稿至科學期刊。
- 為推動新保護區之劃設，設立工作小組。

WILD SALMON CENTER

Sakhalin Taimen Conservation Partnership
Final report to the Forestry Bureau, Taiwan Council of Agriculture
February 2012



Project Goals and Objectives

The goal of this project was to support habitat protection and sustainable management of Sakhalin taimen on the Sarufutsu River in Japan, Koppi River in Khabarovsk, Russia, and Sakhalin Island, Russia. Our objectives were as follows:

1) Complete Sarufutsu Conservation Action Plan with the support of key stakeholders.

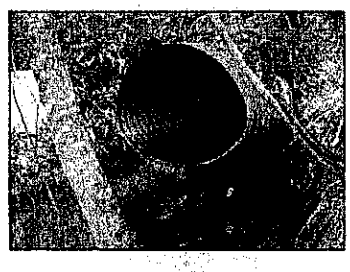
2) Establish a Koppi River Watershed Council to act as a coordination mechanism for sustainable watershed management.

3) Incorporate taimen conservation needs for Sakhalin Island into the regional protected areas plan.

4) Conduct spawning ground surveys and complete biological justifications for establishing a protected area on the Dagi River, Sakhalin.

Summary of Progress

- Sarafutsu River, Japan



A meeting of the Sarufutsu Itou Conservation Council (SICC) was held to initiate the development of a Conservation Action Plan (CAP) for the Sarufutsu River. Key threats to taimen in the Sarufutsu River were discussed, and a list of priority actions was identified. Included in this list was action on understanding impacts of culverts on migration of taimen on Oji Paper property in the Sarufutsu watershed. Since this meeting, all the culverts on Oji Paper property have been inventoried, and culverts that need replacement or modification have been identified. We intend to work with SICC to implement the recommendations from the CAP process to improve the habitat conditions for the species on Oji Paper property.

- Koppi River, Khabarovsk, Russia

WSC has made significant strides organizing local stakeholders and fishery leaseholders to protect the Koppi. The first public salmon council in the Khabarovsk region was created in the Sovetsko-Gavansky municipal district earlier this year under the district's Association of Hunters and Anglers, which boasts 1,500 members. The council is modeled after other successful public salmon councils in Sakhalin and includes managers from a neighboring nature reserve, foresters, representatives from local indigenous populations, and local residents.

In cooperation with the Association of Hunters and Anglers and the Regional Agency for Wildlife Conservation and Protected Areas, the council organized anti-poaching raids throughout the summer and educated recreational users on the effects of poaching on the ecosystem. While the raids were mainly a preventive measure they did result in three violations. The council is also working with logging companies to establish best practices and monitor for any illegal harvesting, helping to prevent any violations of the law.

Since the reserve's creation, WSC and KWF have been educating the public on the Koppi River. Our partner in the Russian Far East, Aleksandr Kulikov, Chairman of KWF, recently gave a live radio interview discussing the newly created regional nature reserve on the Koppi River. Mr. Kulikov and the reserve were also featured in two regional newspapers and one magazine. KWF carried out significant community outreach throughout the year, creating a mobile photo exhibit showcasing the uniqueness of the Koppi River ecosystem. These have been displayed or distributed in a number of local agencies, including eleven branches of the district library, and used to engage local residents and businesses. In addition, WSC is designing a brochure showcasing the nature of the Koppi River titled *Nature's Pearl*. The brochure will be published this fall and copies will be sent to libraries in Khabarovsk and various community organizations, particularly those involved with land and ecosystem management.

Based on a Cooperation Agreement between KWF and the Regional Agency for Wildlife Conservation and Protected Areas, a range of joint actions has been planned for enforcing environmental laws within the Koppi River Reserve and the rest of the river basin outside the reserve's boundaries. Following provisions of this agreement, a mobile ranger station has been installed for use by Agency patrol groups. To increase its mobility, the station was equipped with skids to move on snow.

- Sakhalin Island, Russia



Dagi River, Sakhalin Island

Surveys of Dagi and a collection of other Sakhalin rivers are complete. While we were unable to document spawning activities in the rivers, important information was collected on juveniles and some captured adults. A number of scientific publications have been completed by Wild Salmon Center staff and our research partners in Russia. One of our key research colleagues, Dr. Lev Zhivotovsky, has just completed a genetic analysis of the river survey data. His preliminary results were presented at a special symposium and workshop organized by the Wild Salmon Center in Auckland, New Zealand, as part of the annual meeting of the Society for Conservation Biology. His research is groundbreaking, and establishes a scientific basis for a conservation plan to protect this species in Sakhalin. Based on his genetic analysis, he has described "conservation units" throughout Sakhalin. He is emphasizing the importance of protecting river populations within each of these regional "conservation units". Dr. Zhivotovsky will complete a manuscript this spring and submit it to a scientific journal, and the key results of this research will be incorporated into the justification for a protected area in the northeastern Sakhalin region.

To help facilitate this, a special working group has been established, composed of a number of specialists, including Dimitry Lisitsyn, Mikhael Skopets, Lev Zhivotovsky, Pete Rand, Sergei Makeev, Sergei Zolotukhin, and Olga Krever. This group will work with the Russian Ministry of Natural Resources to propose a new river protected area in the northeast region of Sakhalin, with a focus on conservation of Sakhalin taimen.

Expense Report

BUDGET ITEM	ACTUAL EXPENSES
Project Personnel	$48,996
Transportation Expenses	18,600
Professional Fees	12,736
Rent/Occupancy	2,445
Communications	6,511
Equipment/Supplies	1,831
Subgrants	131,000
Information Technology	5,426
Planning and Evaluation	8,682
Administrative Overhead	15,065
TOTAL in US $	$251,292

國際自然保育聯盟(IUCN-The International Union for Conservation of Nature)物種存續委員會(Species Survival Commission, SSC)貓科動物專家小組(Cat Specialist Group, CSG) 歷年計畫成果報告，摘要如次：

IUCN/SSC 貓科動物專家小組(CSG)由全球 200 多位貓科動物專家組成，包括學者、野生動物經營管理人員和保育人士等。成員廣佈全球 57 國，主要工作是推動全世界 37 種貓科動物的研究及保育工作。CSG 之各項工作由貓科動物專家小組之友(Friends of the Cat Specialist Group)支援，CSG 之財務由瑞士伯恩大學會計部門專業管理。

IUCN/SSC 專家小組除評估動物的保育和族群現況外，也推動原產國保育計畫之執行。IUCN/SSC 新設的物種保育規劃小組(SSC Species Conservation Planning Task Force, SCPTF)，負責研擬更有效率的保育瀕臨絕種動物計畫，尋求保育物種更有效作法。CSG 也參與此項工作，以及全球各地貓科動物保育策略之研擬。貓科動物專家小組曾經提供報告供我國參考，包括 CAT NEWS 特刊「高加索花豹保育現況」、CAT NEWS 特刊「非洲南部獵豹保育現況」、非洲東部及南部非洲獅保育策略、高加索生態區花豹保育策略、肯亞獵豹和非洲豺犬國家保育策略、CSG 2006/2007 年年度報告、德文版全世界貓科動物簡介、物種保育策略計畫概要(Strategic Planning for Species Conservation: An Overview)、物種保育策略計畫指南(A Handbook)等。我國贊助計畫有印出林務局 logo，或列入贊助者名單。

2006 年贊助之「貓科動物數位圖書館計畫」，2007 年和 2008 年報告內容如下：

2005 年間貓科動物數位圖書館(Digital Cat Library, DCL)約有 6,000 份 PDF 檔報告，供會員運用，網址為 www.catsg.org。DCL 每年約增加數百份文件。原本只能依字母次序找到要下載的文件，或由目錄搜尋作者、年代或關鍵字。重新設計後，可直接網路查詢本文，例如由關鍵字搜尋現有文件等，功能包括：

- 每份 PDF 檔文件包括完整參考資料(作者、標題、發表時間、來源)和英文摘要等一般文字檔資料，以利蒐尋。
- 加入全文蒐尋功能，可供蒐尋 PDF 檔文件。

重新設計的網頁可有下列不同的版面(以下引用 2007 年報告原文)：

- list view (with customizable columns),
- details view – shows all fields of a particular record,

- cite view – displays record entries in a citation style chosen by the user,
- print view – eases printing or coping of records.

新版貓科動物數位圖書館網站已於 2007 年 12 月與 CSG 網站連結，開放專家使用。新版蒐尋項目包括 Highlights, Update, Reference Search, Keyword Search, Browse Library, DVD, About。About 的內容中有列出所有贊助單位之名稱。

2007 年贊助之「修訂貓科動物分類系統—Cat News 特刊」計畫，2008 年至 2011 年進度報告，摘要如下：

IUCN 的紅皮書(IUCN Red List)是全球瀕臨絕種動植物的重要指標，紅皮書的評估有賴正確的動植物分類系統。目前使用的貓科動物分類系統係依據 Nowell and Jackson (1996)出版之「Wild Cats-Status Survey and Conservation Action Plan」。依據最近的分子生物和型態學研究，貓科動物分類系統已有所修訂，亟需儘速修訂。

本計畫執行之步驟包括：
- 成立貓科動物分類專家工作小組(Cat Classification Task Force, CCTF)，完成「貓科動物分類系統修訂版」初稿。
- 請專家審閱「貓科動物分類系統修訂版」初稿。
- 出版「修訂貓科動物分類系統—Cat News 特刊」，包括動物照片和分佈圖。

工作小組之召集人為 Andrew Kitchener，成員包括 Colin Groves, Steve O'Brien, Eduardo Eizirik, Lars Werdelin, Mel Sunquist, Gustav Peters, Carlos Driscoll, Christine Breitenmoser。已於 2007 年 9 月於英國開會討論新貓科動物分類相關議題，草擬「貓科動物分類系統修訂版」過程中，又有新發現(尤其是東南亞地區)，初稿修訂後供專家審閱。已編輯本 Cat News 特刊版面。動物繪圖部分，由藝術家 Linda Rosen-Dupuis 負責。2010 年初，依據基因分析、型態學和動態生物地理學完成「修訂版貓科動物分類系統」初稿。2010 年 10 月開會討論物種階層議題及 2011 年工作計畫。最新加入的資料包括：
- Balkans 的 lynx 被列為 Eurasian lynx 之亞種 *Lynx lynx balcanicus*。此項變更將可納入 IUCN 紅皮書評估為 Critically Endangered。堪稱為分類對保育的重要性之最佳範例。
- 2011 年 1 月發表之報告，Borneo 和 Sumatra 雲豹(clouded leopard)為不同種，學名分別為 *Neofelis diardi diardi* 和 *Neofelis diardi*

borneensis。

2011 年完成下列工作：

- 界定貓科動物分類專家工作小組(CCTF)權限，包括目標、原則、成員、預定工作和工作進度規劃。
- CCTF 組員變更，日後將分為核心、專家和審核三個小組。
- 擬定 CCTF 參考原則，包括名詞定義如 species, subspecies, ESUs, MUs, clines, intergradations/secondary contact/hybridization, post-glacial colonization, domestic cat, human-cause fragmentation, habitats, (bio)geographical terms。
- 規劃 CCTF 工作時間表，逐步審核貓科動物分類系統。
- 確定 CCTF 報告架構。(報告舉例：物種資料應包括之內容)
- 於 google 建立溝通聯繫管道。

2008 年贊助之「貓科動物保育方法之彙集計畫」工作項目及 2009 年至 2012 年報告，摘要如下：

- 檢視 SCPTF 的建議，並針對貓科動物之需求予以調整。
- 針對貓科動物現況報告、保育策略、物種或族群保育和經營管理行動計畫之研擬，訂定一套可遵循的方法或模式。
- 整理可協助規劃上開報告的各種方法。
- 設立資料庫，收納世界各地貓科動物保育策略和行動計畫。
- 將新規劃的方法或模式、資料庫、保育策略和行動計畫 PDF 檔納入 CSG 網站及貓科動物數位圖書館。

CSG 持續推動全球各地貓科動物保育策略之研擬工作，已蒐集 84 件保育策略和行動計畫，納入資料庫及進行初步分析，並避免各區域資料不平均的狀況。2009 年資料比例為歐洲 20%、北美洲 27%、亞洲 41%、非洲 9%、南美洲 9%。貓科動物 37 種中，蒐集到的保育策略和行動計畫，包括 18 種。老虎的文件最多，其次為美洲豹和雪豹。

依據 SCPTF 所訂指南，CSG 研擬適合貓科動物之保育策略(Conservation Strategies)和國家行動計畫(National Action Plans)，並根據上述經驗，擬定保育計畫流程圖，列出步驟和方法等。

2009 年進行工作包括：

- Regional Conservation Strategies 部分：非洲中部和西部獅子、非洲東部和南部獅子、Arabian Leopard、高加索地區花豹、非洲東部獵豹、非洲南部獵豹、巴爾幹半島山貓(Balkan Lynx)

- National Action Plans s 部分：波札那獵豹(Cheetah in Botswana)、肯亞獅子、蘇丹南部獵豹和獅子

2010 年，已完成下列工作：

- 完成如何拯救貓科動物：物種保育策略計畫(How to Save the Cat: Strategic Planning of Species Conservation Programmes-A Cat Conservation Cookbook)初稿 70 餘頁。
- 2010 年 6 月召開會議，討論物種保育小組(Species Conservation Task Force)未來工作及上述初稿。
- 編纂簡版 Strategic Planning of Species Conservation Programmes-A Cat Conservation Compendium (約 40 頁)。
- 更新現況報告和保育策略清單。
- 更新 CSG 網站架構及設計。
- CSG 網站新設 Cat Conservation Centre，內容包括 Cat Conservation Compendium 和相關文件。

2011 年完成之工作包括：

- 依據簡版 Strategic Planning of Species Conservation Programmes-A Cat Conservation Compendium 和 CSG 建議，設立 IUCN/SSC Sub-committee for Conservation Planning，並於 2011 年 2 月在英國牛津召開第一次會議。
- 依據上開會議建議，修訂資料後，預計於 2012 年以特刊(CAT News Special Issue: Cat Conservation Compendium)與春季號一併出刊。

2009 年贊助之「世界貓科動物—Cat News 特刊計畫」，計畫性質、工作項目和進度報告摘要如下：

除了參與科學領域外，CSG 也有責任扮演保育界和一般民眾(例如媒體、政府、學生和老師等)之橋樑，提供正確且容易取得的 37 種貓科動物之生物、生態和保育資料給大眾運用。以往係由 Cat News 和 CSG 網站提供，但這些資料主要依據 1996 年的「貓科動物行動計畫(Cat Action Plan)」，資料已過時。資料更新工作陸續進行中，第 1 階段工作為全世界貓科動物基本資料描述。2008 年 11 月 1 日，在瑞士伯恩舉辦「All for the Cats 研討會」時，編纂一份德文版全世界貓科動物簡介小冊，廣受歡迎。CSG 已翻譯為英文，除出版紙本外，也將納入網站。下一期 Cat News 正好是第 50 期，將以「世界貓科動物」為主題出版特刊，提供所有 37 種貓科動物基本資料。

本計畫工作項目包括更新並翻譯貓科動物資料；更新插圖，聯繫提供照片專家，洽談版權事宜；Cat News 特刊排版、印刷(1,000 本)、發表和分送。2010 年初完成初稿，請 CSG 專家審查後，完成 Cat News 特刊彩樣。完稿送印後，與 Cat News 54 同時出刊及分送。

2010 年所提「貓科動物保育教材研擬計畫」，計畫內容及 2011 年至 2012 年成果報告摘要如次：

CSG 致力於全球 37 種貓科動物之保護及監測，協調及支援來自 57 國 200 餘位學者專家、政府機構保育和野生動物管理人員之工作。因 CSG 專家仍是歐洲和北美佔多數，為加強訓練其他國家參與貓科動物保育工作，CSG 與瑞士伯恩大學合作，每年開辦為期三週之訓練課程。本計畫預計研擬指南、操作手冊、簡報資料等。訓練課程內容包括：

一、保育計畫
- 物種保育策略計畫
- 現況報告和基本資料調查
- 策略和行動計畫之執行
- 保育計畫之執行和控管

二、監測
- 分層監測的概念(stratified monitoring)
- 大規模監測 1：歐亞山貓(Eurasian lynx)實作-ELOIS 計畫(即歐洲歐亞山貓調查計畫)和 SCALP 計畫(Alpine lynx 族群現況和保育計畫)
- 大規模監測 2：偶發性觀察(chance observation)、出現/不出現資料(presence/absence data)、棲地模式(habitat modeling)
- 中等規模監測：分佈和相對豐富度
- 小規模監測：捕捉/再捕捉(capture-recapture)方法、無線電追蹤(radio-telemetry)

三、實作訓練
- 主持保育研習班
- 照相偵測(camera-trapping)：設計、野外調查和分析
- 獸跡採樣 Track transects (identification of signs) for occupancy analyses
- 山貓捕捉系統和處理(handling)

為提升成效和長期效益，有必要編纂資料供受訓者攜回，以供將來擔任訓練教師時運用，這些資料包括：

- 監測手冊：調查和監測理論和指南
- 野外調查手冊：野生動物研究和監測方法實作說明
- 教材資料例如 PowerPoint 簡報資料等

本計畫工作項目包括：

一、整理所有和保育課程相關課題之資料

二、準備教具展示箱(頭骨、足印、毛皮、照相偵測器材等)

三、於第一屆訓練課程中試用此套教材

四、採用對上述教材之試用建議

五、教材定稿並印製手冊

2010 年工作進度如下：

準備一系列簡報資料，題目如下：

List of prepared presentations

1. Introduction簡介
   1.1. Presentation of Cat SG貓科動物專家小組簡介
   1.2. Presentation of KORA瑞士伯恩大學
   1.3. Ecology of lynx in Switzerland瑞士山貓生態
2. Conservation planning保育計畫
   2.1. And how is the cat? Assessment of status and conservation needs of felids
   2.2. How to save the cat – Strategic conservation planning保育策略計畫
   2.3. How to save the cat 2 – Development of status report, conservation strategy and national action plan研擬族群現況報告、保育策略和行動計畫
3. Monitoring監測
   3.1. Principles of monitoring監測原則
   3.2. Camera trapping照相偵測
   3.3. Baseline surveys基礎調查
   3.4. Disease surveillance疾病監測
   3.5. Conservation genetics保育遺傳學
   3.6. Habitat modeling棲地模型
4. Practical training實務訓練
   4.1. Kill identification辨認死亡個體
   4.2. Scat analysis排遺分析

4.3. Trapping systems陷阱系統
4.4. Field anesthesia of Eurasian lynx歐亞山貓野外麻醉
4.5. Animal location and home range analyses動物位置和活動範圍分析
4.6. Camera trapping – practical aspects照相偵測實務
5. Concepts概念
5.1. How to write a scientific paper如何撰寫科學報告
5.2. SCALP: an expert network for cross border cooperation in conservation 保育專家聯絡網

撰寫野外手冊，內容如下：

Content of Field Handbook

1. Field signs and kill identification野外痕跡和死亡個體辨識
1.1. Species accounts物種介紹(1 page A5 per species: Picture, fact sheet, track, etc.)
1.2. Field signs (Tracks, scats獸跡、排遺)
2. Collection of data and samples for monitoring蒐集供監測用資料或樣品
2.1. Baseline surveys (Interviews: Protocols, forms訪談規範表格等)
2.2. Recording of (chance) observations (Categories, forms)觀察記錄
2.3. Recording of kills死亡個體紀錄(Protocol: kill site, kill, killing signs; Data recording: Pictures, measurements, forms...)
2.4. Genetic samples遺傳樣品(Captures: blood, hairs, etc.; Necropsies; Field: saliva, hairs, scats (e.g. at kills)
2.5. Scats & urine排遺及尿液
2.6. Photos照片(Taking pictures in the field; Storing pictures in the system)
3. Tracking & Transects獸跡追蹤和條形樣區
3.1. Purpose and goals目標(Opportunistic (e.g. to find kills) versus "behavioural" tracking versus transects)
3.2. Field procedures野外調查程序(Personal gear and tools; Protocol(s); Recording data in the field (forms))
3.3. Transfer of data and data analysis (Download of GPS data, pictures, field notes, etc.)
3.4. Track transects獸跡採樣
4. Camera trapping照相偵測 (photo and video)
4.1. Planning & preparation規劃及準備(Identification of reference area and sites (grid, density, distribution...) (Guidelines?); Materials, inventory, checklists)

4.2. Camera-trap handling照相偵測處理(Types of camera traps, uses and handling)
4.3. Setting and checking架設和檢查(Mounting at different sites (path, kill, marking spot); Controls and control rhythm; Materials and checklists)
4.4. Analyses of the data資料分析(Analogue cameras/films: development, scanning; Digital camera/pictures: handling of cards, downloading, storing... ; Brief (detailed in Guidelines): Identification of lynx, construction of capture history, estimation of abundance and density)

5. Captures and immobilization捕捉和固定
5.1. Box traps誘捕籠(Description and function; Installation and set up; Survey (alarm system) and control; Maintenance; Materials, checklist)
5.2. Foot-snares纏腳式捕獸器and leg-holds獸夾(Description and function; Installation and set up; Survey (alarm system); Maintenance; Materials, checklist)
5.3. MICS多重指標調查系統(Description and function; Installation and set up; Maintenance; Materials, checklist)
5.4. Immobilization & animal handling固定和動物處理(Introduction (drugs); Material and checklist (capturing kit); Application of drugs; Handling of immobilized animals incl. vet. Protocols; Transport of immobilized animals)

6. Telemetry遙測
6.1. Introduction簡介: the meaning of life and telemetry
6.2. VHF甚高頻(Materials; Field procedures, protocols and forms)
6.3. GPS (GSM)全球定位系統
6.4. Data handling...資料處理

2011 年 5 月，新編教材於 Tbilisi 發表後，納入與會者意見加以修訂，並於 2011 年 11 月於伊朗召開之研討會中測試，完成納入貓科動物保育課程預備工作。另編纂野外調查手冊，已完成初稿，並將於 2012 年 3 月於貓科動物保育課程中開始測試。(註：報告舉例捕捉 lynx 所需器材清單、照片和操作程序)。

2011 年 CSG 所提「東南亞小型貓科動物分布及保育現況計畫」，工作項目和計畫報告摘要如次：

持續評估貓科動物族群和保育現況為 CSG 的工作項目之一。CSG 對大型貓科動物之資料較多，小型貓科動物資料較缺乏，以東南亞地區

為甚。過去照相偵測大都針對老虎和豹，也同時蒐集到小型貓科動物資料，但從未發表也未作族群和保育現況評估。本計畫預計將這些非目的物種資料予以整理，並出版一期 Cat News 特刊，資料也可供未來保育工作運用。

本計畫之目標包括：

- 彙整可確認地點的東南亞小型貓科動物資料(主要是照相偵測大型貓科動物資料之 by-catch)。
- 匯集動物毛皮顏色和紋路之照片資料，做為物種分類參考資料。
- 探討運用 by-catch 資料，監測小型貓科動物族群現況之可行性。
- 提升保育界對此類資料重要性之瞭解及其出版之價值。

此 Cat News 特刊內容包括：

- Bukit Barisan Selatan National Park, Sumatra 十餘年以老虎為重點之照相偵測計畫期間蒐集到之小型貓科動物資料。
- Endau-Rompin National Park, State of Johor, West Malaysia 近年來以老虎為重點之照相偵測計畫期間蒐集到之小型貓科動物資料。
- Western Forest Complex, Thailand 數年間以老虎為重點之照相偵測計畫期間蒐集到之小型貓科動物資料。
- Dong Phayayen – Khao Yai Forest Complex, Thailand 數年間以老虎為重點之照相偵測計畫期間蒐集到之小型貓科動物資料。
- 泰國小型貓科動物現況回顧。
- 緬甸小型貓科動物現況回顧。
- 越南小型貓科動物現況回顧。
- 柬普寨小型貓科動物筆記。
- 馬來西亞西部小型貓科動物筆記。

本計畫工作項目包括：1.準備一份指南給各章節之作者。2.研擬各章節內容及負責協調之人員。3.將內容送給專家審核，以確保刊物品質。4.納入審核意見後定稿。5.版面編排。6.印刷及分送特刊。

2011 年和 2012 年初完成之工作包括：

- 確定 Cat News 特刊內容。
- 與所有主要作者聯繫。
- 2011 年 10 月收到兩篇報告，2012 年 1 月收到一篇報告，已請專家審核中。
- 其他報告進行中，進度請參考報告列表。

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SPECIES SURVIVAL COMMISSION
CAT SPECIALIST GROUP

Development of Teaching Material for a Cat Conservation Course

Progress Report January 2012

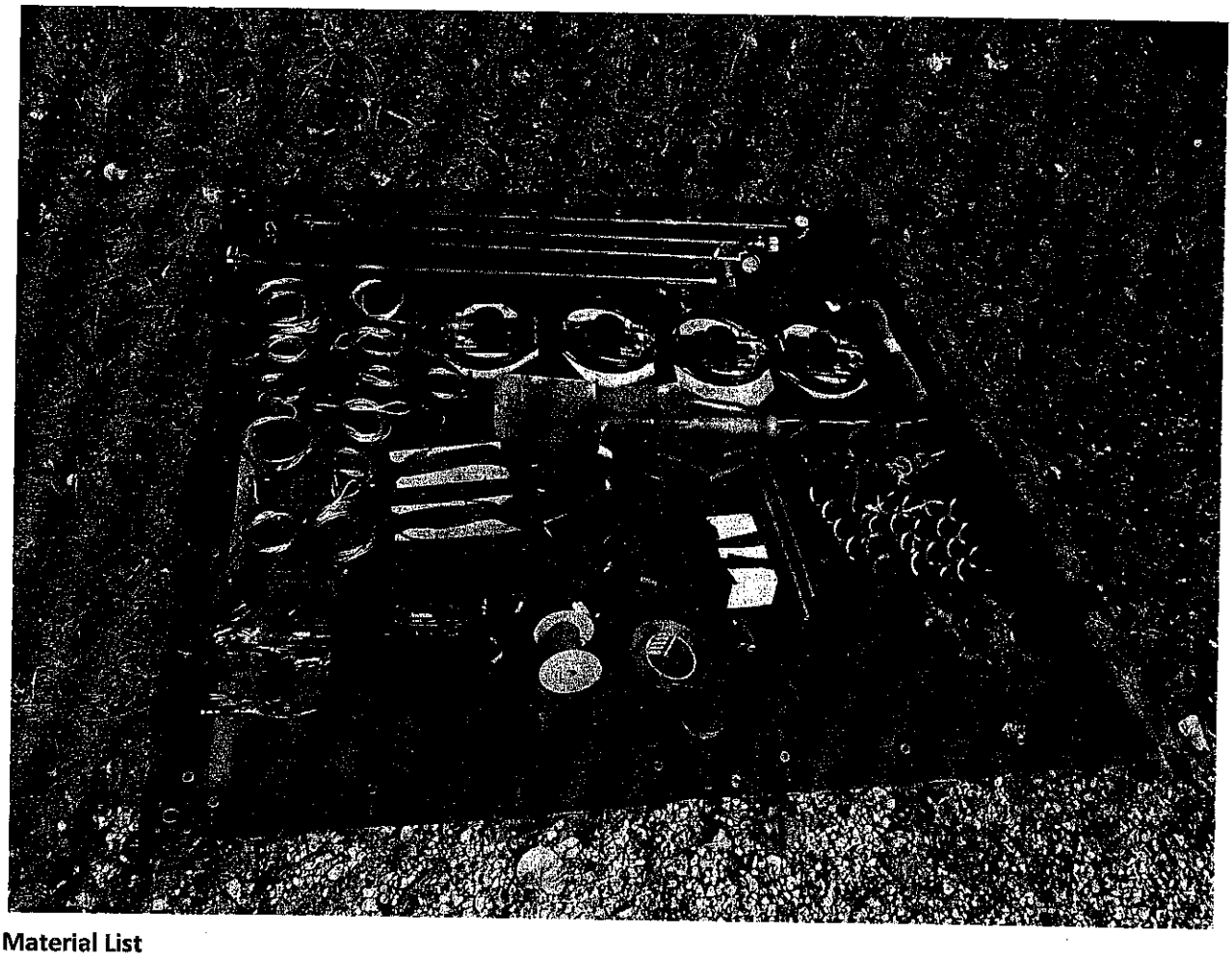
In September 2010, the Forestry Bureau, Council of Agriculture of Taiwan, has granted the IUCN/SSC Cat Specialist Group an amount of US$ 10,000 to develop "Teaching Material" for cat conservation courses that the Cat Specialist Group is carrying out to increase the capacity around the globe.

The following progress has been made since the last reporting:

- The presentations have been modified after the experience in the course in Tbilisi in May 2011 and some of them tested again in a workshop in Iran in November 2011. They are now ready for the Cat Conservation Course.
- The focus over the past months has been on the Field Handbook (for an example see attachment) so it will be ready to be tested in the Cat Conservation Course in March 2012 and finalize thereafter.

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Setting of the snares to capture a lynx



Material List

- 4 snares (traps)
- 4 tubes
- Steel cables (1m, 2m und 4m) for anchoring the sling
- Karabiners (one per tube and two per cable)
- Ground screws (6-7)
- Ground anchors (4)often these are rebar to anchor the carcasss
- Electrical cables (2x 1m, 2x 2m, 2x 7m)
- Trap transmitter
- Receiver
- Batteries for the transmitter and receiver
- Small shovel
- Hatchet or small ax
- Vice grips (small, for holding cables)
- Cord (small diameter for securing wires, etc)
- Camouflage Material (dry!)

Overview

The KORA-snares are set around a lynx kill. The carcass needs to be fixed to the ground with ground anchors (earth screws). All moving body parts (e.g. legs or head) need to be secured to prevent triggering the traps unintentionally. According to the situation 3 or 4 KORA-snares are used. While placing the traps try to imagine where the lynx may most likely come from and where it will start to feed. The tubes and snares needs to be placed $\pm$ horizontally and firmly set on the ground (no teetering when pressure is applied) and well anchored with steel cables. The snares need to be as close as possible to the carcass to prevent the lynx climbing over them to feed. Gaps between traps may be filled with wooden sticks or branches stuck into the ground to make them appear uncomfortable or impossible to walk on. To keep the gaps as small as possible drag the carcass against a rock or tree. When fixing the tubes make sure they can move freely up and forward! If fixed only

with ground anchors, secure the ground anchors with ground anchors...make sure, everything is double-fixed! Make the electrical cables between the tubes as short as possible; coil the cables around small branches tucked in the ground. Check all cables and wires to see that no loose pieces stand out that the lynx could trip on.

If possible disguise traps and tubes: dry beech leaves, dry hairs or dry hay are good materials for such camouflaging. It is wise to gather dry material well in advance and keep it ready. Keep in mind that the tubes need to be moving up and forward easily - don't cover them too much! Long and stiff grass and snow are not good since they may become wet and heavy and snow will freeze. When using the traps in snow conditions, underlay the tubes with branches of fir or leaves to prevent the metallic tubes freezing to the ground!

Step by step:

1. Position the carcass. If you have to drag the carcass some distance, make sure to move it with the bloody side on the ground (a lynx may follow the scent track). Generally: don't move it too far (up to 10 meters should be ok).
2. Fix the carcass and all moving body parts.
3. Position the traps and tubes. Level and set firmly on the ground.
4. Secure the tubes with cables to trees or ground screws.
5. Secure the tubes with one big cable loop around the carcass.
6. Connect the tubes with the electrical cables.
7. Connect the trap transmitter.
8. Load the traps and make sure both springs are hooked in.
9. Check that the trap transmitter is working properly!
10. Check that all cables are fixed and all karabiners are closed! EVERY set needs this final Inspection.
11. Camouflage
12. Before leaving, make sure your immobilization kit is ready!



Good operating procedure shows that designating one team member as the "leader" of the day insures that nothing is forgotten and that each and every single karabiner and anchor are inspected at the very end of the set, for example. A rather formal step like this has saved a few mishaps.

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SPECIES SURVIVAL COMMISSION
CAT SPECIALIST GROUP

A Collection of Cat Conservation Tools

Progress Report January 2012

In September 2008, the Forestry Bureau, Council of Agriculture of Taiwan, has granted the IUCN/SSC Cat Specialist Group an amount of US$ 10,000 to adapt the recommendations of IUCN/SSC's Species Conservation Planning Task Force for cats and to compile the experience in the development of Strategies and Action Plans in a set of conservation tools, and also to build a database and a library of existing Strategies and Action Plans in order to facilitate their implementation and revision. These recommendations, tools and the library will be made available through the Cat Specialist Group's web portal (www.catsg.org).

The project although well advanced has undergone the following major steps and changes during the past year:

- Based on a meeting in the Abruzzo Mts, Italy, in June 2010, we have been asked to produce a shorter version of the cookbook, which is now called Cat Conservation Compendium.
- Based on our input and the shorter document we have been appointed members of the newly formed IUCN/SSC Sub-committee for Conservation Planning, which has met for the first time in person in Oxford in February 2011.
- This meeting has provided additional input for the final document, which is currently being set in the final layout. It will be distributed with the spring issue of Cat News 2012.

For further information, please contact:
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CAT news



Cat Conservation Compendium

SPECIES SURVIVAL COMMISSION

CAT SPECIALIST GROUP

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SPECIES SURVIVAL COMMISSION
CAT SPECIALIST GROUP

Distribution and conservation status of smaller cats of SE Asia

Progress report January 2012

In September 2011, the Forestry Bureau, Council of Agriculture of Taiwan, has granted the IUCN/SSC Cat Specialist Group an amount of US$ 10,000 to produce a special issue on the smaller felids from SE Asia.

The following progress has been made since the project has been approved last fall:

- The list of content has been finalized
- Contact has been made with all main authors
- The first manuscripts have arrived according to schedule and are currently in review
- The remaining manuscripts are in different stages, some of them are well advanced (see overview table).

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Title	**Coordinator**	**Status**	**Submitted**
Smaller cat records from tiger-focussed camera-trapping in Endau-Rompin NP Johor, West Malaysia	M. Gumal		21.10.2011
Smaller cat records from camera-trapping in the Dong Phayayen – Khao Yai Forest Complex, Thailand	Tony Lynam	mid-stage draft 18.1.12	
Status review of the smaller cats of Thailand	Naruemon Tan-tipisanuh		21.10.2011
Status review of the smaller cats of Myanmar	Than Zaw	advanced draft 18.1.12	
Status review of the smaller cats of Vietnam	S. I. Robertson	needs more time 18.1.12	
Notes on the smaller cats of Cambodia	WCS Cambodia	Needs more time 18.1.12	
Notes on the smaller cats of West Malaysia	??	needs more time 18.1.12	
Gn Leuser, Sumatra	??	advanced draft 18.01.2012	
Hair-based identification of Prionailurus incidental records in Thailand			19.01.2012
Fishing cat Vietnam	Will	essentially ready 18.1.12	
Lao cat records	Will	Needs more time 18.1.12	

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SPECIES SURVIVAL COMMISSION
CAT SPECIALIST GROUP

Revision of the Cat Taxonomy - Special Issue of Cat News

Progress Report January 2012

In July 2007, the Forestry Bureau, Council of Agriculture of Taiwan, has granted the IUCN/SSC Cat Specialist Group an amount of US$ 10,000 for the revision of the cat taxonomy and the production of a Special Issue of Cat News on this subject. This grant enabled us to set up a Task Force of renowned taxonomists to review the classification of the FELIDAE.

We finally were able to get started the process in a proper way and made respective progress. The expert group is now set and working on the project.

The chairs of the Cat Specialist group were visited by Andrew Kitchener in November 2011 for three days. The following steps were undertaken and documents produced:

- Terms of References for the Classification Task Force
- Cat Classification Task Force – revised membership
- General principles for CCTF to consider including definition of terms
- Approach by and timetable for CCTF to review of felid classification
- Structure of the final report of the CCTF
- Set up communication tools: google group and google site https://sites.google.com/site/webcattax/

For further information please contact:
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Cat Classification Task Force

Terms of Reference

The main task of the IUCN/SSC Cat Specialist Group is the continuous review of the conservation status of all cat species and subspecies according to the IUCN Red List™ process. A critical subject in this task is the systematic classification of the family of the cats, the FELIDAE. The taxonomy of cats has undergone considerable changes in the past, not only on the level of SPECIES and SUBSPECIES, but even at the level of the GENUS. The classification presently used by the Cat Specialist Group was published in *Wild Cats – Status Survey and Conservation Action Plan* edited by K. Nowell and P. Jackson (published by IUCN 1996) and is based on the state of research in the early 1990s. Since then, mainly studies using molecular techniques have provided new insights into cat phylogeny, suggesting several important changes in regard to species and subspecies, and the evolutionary relationships between genera. These changes can have an impact on the Red List process and on the listing of taxonomic units in international treaties and national legislation. The classification used by IUCN institutions has therefore significance beyond the Red List. The Cat Specialist Group is initiating a review of the present taxonomic system of the FELIDAE by an expert group, the Cat Classification Task Force (CCTF).

1. Goal

The CCTF will propose on behalf of the Cat Specialist Group and the IUCN Red List Unit, based on the best science and expert knowledge presently available, an updated and practical classification of the FELIDAE, including genera, species and subspecies and the most likely distribution ranges of the respective taxa.

2. Principles

The starting point of the CCTF is the classification used by the Cat Specialist Group based on Nowell and Jackson (1996) and the classification (species, subspecies) used in the present version of the Red List (www.iucnredlist.rg), generally based on Wozencraft in Wilson and Reader (2005). The CCTF will consider all recent taxonomic reviews and scientific publications on the taxonomy of cats. The CCTF will review these works and make a proposal for an updated classification. The review should be based mainly on new molecular genetics and morphological research, but should also consider general evolutionary, phylogenetic, palaeontological and biogeographical principles, especially in cases where molecular genetics and morphology are in disagreement. Conventional rules of zoological taxonomic nomenclature have to be respected, but traditions in the use of vernacular names – especially in cases where subspecies are merged – are also to be considered in order to produce a classification of cats useful for the practical work of the Cat Specialist Group and

conservation in general. The CCTF will suggest a set of principles and criteria for decisions regarding the acceptance of proposed species and subspecies that can also be applied for future reviews. In case of uncertainty or lack of consensus, a conservative approach is suggested. Further cat specialists will review the proposals of the CCTF, especially in regard to the distribution of the taxa (e.g. the borders between neighbouring subspecies). After the peer review process, the proposal of the CCTF will be published and formally adopted as the current cat classification used by the IUCN/SSC Cat Specialist Group until the next revision. An important role of the CCTF will be to identify key areas for future research in order to resolve current taxonomic inadequacies. We suggest future reviews every five years in order to keep pace with future research, but so as not to be too disruptive for legislators, field workers and other cat workers.

3. Group composition and working processes

The Cat Classification Task Force (CCTF) will work in three groups (Appendix I):

1. **Core Group** members will set out general principles of the approach to be taken, review current evidence, consult with experts and draw up the proposed new classification of the felids.

2. **Expert Group** members will provide specific and critical expert advice on species and subspecies, morphology, genetics, biogeographical areas, etc. to support the core group. Membership is not fixed and may vary as specific expertise is required by the core group.

3. **Review Group** members will provide a robust peer review of the proposed cat classification. Expert Group members can assume the role of reviewers at this stage.

The CCTF will be chaired by Dr. Andrew Kitchener, Principal Curator of Vertebrates at the National Museums of Scotland in Edinburgh. The CCTF will mainly work by e-mail and via an internet platform.

4. Output and time lines

The result of the work of the CCTF will be an updated classification of genera, species and subspecies of the FELIDAE and the approximate distribution of the respective taxa (mainly for species of topical conservation concern). This classification will be published as a Special Issue of CAT NEWS, the biannual newsletter of the Cat Specialist Group. The issue will present the new list, a bibliography of scientific works considered, photos and drawings of the species or subspecies, and, wherever needed and possible, maps indicating the distribution of species and subspecies. For groups of special interest, short review papers will be included. The CCTF is constituted in fall 2011 and aims to finish its work by the end of 2012. The Special Issue of CAT NEWS will be published in spring 2013. A specific agenda for the CCTF and its three groups will be developed after the task force has been formed.

Urs Breitenmoser and Christine Breitenmoser-Würsten
Co-chairs, IUCN/SSC Cat Specialist Group

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Cat Classification Task Force – revised membership

The Cat Classification Task Force (CCTF) will have three categories of membership:

1. **Core Group** members will set out general principles of the approach to be taken, review current evidence, consult with experts and draw up the proposed new classification of the felids.
2. **Expert Group** members will provide specific and critical expert advice on species/subspecies, morphology, genetics, biogeographical areas, etc. to support the core group. Membership is not fixed and may vary as specific expertise is required by the core group.
3. **Review Group** members will provide a robust peer review of the proposed cat classification. Expert Group members can assume the role of reviewers at this stage.

Group members are proposed as follows:

Core Group:
Andrew Kitchener (chair CCTF), National Museums of Scotland in Edinburgh
Nobuyuki Yamaguchi
Andreas Wilting, IZW Berlin
Eduardo Eizirik
Anthea Gentry
Lars Werdelin
Christine Breitenmoser, IUCN/SSC Cat Specialist Group

Expert Group:
Warren Johnson
Carlos Driscoll
Carlos Fernandez
Shu-Jin Luo
Pat Quillen
Per Christiansen
Ji Mazak
Jim Sanderson
Jonathon Kingdon
Erik Meijaard
Mario de Vivo
David Woodruff, University of California San Diego

Review Group:
Colin Groves
Mike Bruford
Shane Tobe
Kristin Nowell
Mike Hoffmann
Helmut Hemmer

General principles for CCTF to consider including definition of terms

In order to overcome any misunderstandings of approach owing to different definitions of technical terms, the CCTF should define these as used in the task force. This would also include the interrelationships between different technical terms and the taxonomic approaches that would be taken, e.g. naming of clines, relationship between species, subspecies, ESUs, etc., how to deal with the domestic cat.

Suggested required definitions and the relevant relationships between them:

Species

Subspecies

ESUs

MUs

Clines

Intergradation/secondary contact/hybridisation

Post-glacial colonisation

Domestic cat

Human-caused fragmentation

Habitats

(Bio)Geographical terms

Key taxonomic issues for consideration by CCTF

1. Recent proposed changes of species composition of genera, e.g. *Caracal, Pardofelis, Leopardus, Puma*

2. Current taxonomic uncertainties relating to species:
   - Pampas cats
   - Tigrina (*Leopardus tigrinus*)
   - Small cats SE Asia
   - Wildcat, Chinese mountain cat and domestic cat

3. Current taxonomic uncertainties relating to subspecies:
   - Lion
   - Tiger
   - Leopard
   - Snow leopard

Approach by and timetable for CCTF to review of felid classification

Month 1

1. Establish general principles and definitions, and approach by Core Group
    - request input of Expert Group
    - invite Expert Group to submit any further evidence

Month 2

2. Review of genera and likely included species
    - request input of Expert Group
    - invite Expert Group to submit any further evidence

Months 3-4

3. Review of species focussing on those of key significance
    - request input of Expert Group
    - invite Expert Group to submit any further evidence

Months 5-7

4. Review of subspecies focussing on those of key significance
    - request input of Expert Group
    - invite Expert Group to submit any further evidence

Months 8-10

5. Core group assembles draft report

Months 11-12

6. Draft report reviewed by Review and Expert Groups

Months 13-14

7. Final report drafted for publication

Suggested structure of final report of CCTF

Executive Summary

Introduction - aims

Short history of felid systematics

Approach
Group structure, membership and working
General principles and definitions
Key issues

Summary of Main Findings

Genera – definitions and composition

Species entries

Proposed new classification of Recent Felidae

Research priorities

References

Example of Species Entry for CCTF

1. Species name, authority name and date:
2. Vernacular names: English, French, German, Spanish, Portuguese, etc.

3. Diagnosis

4. Subspecies names, authority names and dates:
   (and relevant vernacular names and diagnoses, if possible)

5. Taxonomic history including type description and photo of holotype (if it exists) and recent relevant research

6. Distribution (and map)

7. Ecology (habitats, constraints, sympatry with other felids)

8. Discussion – summary of any decisions made by CCTF with supportive evidence

9. Future research – highlight any taxonomic uncertainties, who is doing what research if already underway

10. References (in brief)

IUCNSSC 入侵種專家小組計畫成果摘要

IUCNSSC 入侵種專家小組(Invasive Species Specialist Group, ISSG)所提計畫，摘要如下：

依據數年計畫資料，入侵種專家小組(ISSG)於 1993 年設立，目前有來自 40 餘國 196 名志工會員。ISSG 的任務為「提升大眾對防除入侵性外來種(Invasive Alien Species, IAS)之瞭解，以減少自然生態系及物種所面臨之威脅」。ISSG 的全球入侵種資料庫(Global Invasive Species Database, GISD)彙整全世界外來種資料，ISSG 研究人員負責蒐集資料，初稿經專家審核修訂後，即置入資料庫供各界人士運用。IUCN/SSC 入侵種專家小組辦公室原設於紐西蘭奧克蘭大學(University of Auckland) Tamaki 校區。2008 年底，義大利籍新任主席 Dr. Piero Genovesi 上任，ISSG 秘書處也移至義大利環境保護和研究試驗所(Institute for Environmental Protection and Research)，但 GISD 仍繼續由紐西蘭奧克蘭大學負責，並擔任太平洋地區辦公室。

ISSG 是全球性團體，主要工作項目包括：

- 經由系統化及合作方式，採取保育行動。
- 政策和入侵性外來種主要議題。
- 彙集資料，建立全球入侵種資料庫，包括入侵種名錄、生態、衝擊、分佈、入侵途徑、專家聯絡資料、預防和經營管理等資料。2007 年有 432 種 IAS 資料，2008 年 485 種，2009 年 2 月增至 515 種。2008 年每天約有 1,100 人(約有 75,000 次)上網查閱資料。2009 年 2 月增至每天 1,800 人(125,000 次)。
- 出版外來種通訊(Aliens newsletter)。

ISSG 過去數年的主要工作成果包括：

一、協助 IUCN、IUCN 會員和合作單位

- 2002 年 5 月，代表 IUCN 總部籌辦入侵性外來種研討會。
- 準備入侵性外來種資料，供 IUCN 參加生物多樣性公約相關會議。
- 2003 年世界保護區大會(World Parks Congress)期間，於 Management Effectiveness Stream 議題項下，合辦入侵性外來種研討會。
- 2003 年 9 月，協助辦理全球環境與貿易生物多樣性論壇。
- 協助 IUCN 參加世界襲產公約(World Heritage Convention)會議。

二、出版品

- 外來種移除相關出版品：Turning the Tide: The Eradication of Invasive Species, Proceedings of the International Conference on Eradication of Island Invasives。
- 世界百大入侵性外來種(100 of the World's Worst Invasive Alien Species)。
- 外來種通訊 Aliens: bi-annual newsletter 和 Aliens-L:入侵種名錄。

三、建立全球入侵種資料庫(Global Invasive Species Database, GISD)

- 已收錄 515 種對生物多樣性有負面影響的微生物、動物和植物資料(http:www.issg.org/database)。

四、2002 年 6 月起，與紐西蘭政府合作統籌「島嶼入侵性外來種合作行動」。

GISD 2007 年和 2008 年計畫，主要為因應氣候變遷對外來入侵種在天然林和造林地分佈和數量之影響，提供生態、散佈、衝擊和經營管理資料，給森林經營管理人員運用。氣候變遷對外來種之散播有所影響，而全球 1/3 的森林有可能遭受氣候變遷的負面衝擊。預計建立數種森林入侵性外來種資料。

2007 年計畫係彙整 4 種日漸嚴重的森林入侵性外來種資料，納入 Aliens-L 和 PestNet 等網站供大家參考。GISD 工作成果摘要如下：

- GISD 已建立 485 種 IAS 資料。
- 與 IUCN 法國委員會簽訂合作備忘錄。
- 建立 15 種海洋入侵種(Marine Invasive Species)資料，經費由 Biosecurity New Zealand (隸屬農業和森林部)和重要生態系合作基金(Critical Ecosystem Partnership Fund, CEPF)贊助。
- 2008 年初 CEPF 贊助製作新版資料 CD。

2007 年我國贊助計畫，已建立 4 種森林入侵性外來種資料(詳如下列網站連結)：

- Pine-needle scale insect- *Hemiberlesia pitysophila* Takagi
  http://www.issg.org/database/species/ecology.asp?si=1202&fr=1&sts
- Fall web-worm - *Hyphantria cunea* (Drury)
  http://www.issg.org/database/species/ecology.asp?si=1201&fr=1&sts
- Pine mealy bug- *Oracella acuta* (Lobdell)
  http://www.issg.org/database/species/ecology.asp?si=1203&fr=1&sts
- Pine-shoot beetle- *Tomicus piniperda* (Linnaeus)

http://www.issg.org/database/species/ecology.asp?si=1200&fr=1&sts

2008年，ISSG和GISD工作成果摘要如下：

- ISSG主席暨創始人Prof. Mick Clout於2008年終卸任，新任主席為義大利籍Dr. Piero Genovesi，ISSG總部也移至義大利環境保護和研究試驗所(Institute for Environmental Protection and Research)。
- 2008年10月於西班牙召開世界保育大會(World Conservation Congress)期間，辦理4次活動，宣導入侵種對島嶼生態系之衝擊。
- 查閱GISD人數大量增加，每天有8,100人瀏覽，被點閱125,000次。
- 更新GISD法文資料，GISD中文版事宜，也與臺灣之中央研究院洽談中(註：2009年4月間已討論至簽訂備忘錄階段)。
- 研擬設立Global Register of Invasive Species。

2008年我國贊助計畫，已建立數種森林入侵性外來種資料(詳如下列網站連結)：

- *Anoplophora chinensis* (Forster, 1771) the citrus long-horned beetle beetlehttp://interface.creative.auckland.ac.nz/database/species/ecology.asp?si=1404&fr=1&sts=&lang=EN
- *Dendroctonus valens* LeConte, 1860 the red turpentine beetle http://interface.creative.auckland.ac.nz/database/species/ecology.asp?si=1405&fr=1&sts=&lang=EN
- *Brontispa longissima* Gestro, 1885 the coconut hispid beetle http://interface.creative.auckland.ac.nz/database/species/ecology.asp?si=1406&fr=1&sts=&lang=EN

於2008年將捐款經費撥給ISSG後，保育組與ISSG洽談合作將全球入侵種資料庫翻譯為中文事宜，對方非常樂意進行此計畫。取得對方同意後，保育組委託中央研究院繼續討論細節，2009年4月間，簽訂備忘錄，2009年目標為將世界百大外來入侵種譯為中文。為配合此項計畫之實施，ISSG電腦須要調整，讓中研院團隊可以取得基本資料，而GISD也需設定為可以顯示中文資料。另外，世界百大外來入侵種資料係2000年代早期蒐集，有28種需大幅修訂，20種需小幅修訂。

2009 年，IUCN/SSC 入侵種專家小組所提「全球入侵種資料庫中文版計畫」，依據計畫和報告資料，摘要如下：

為配合將全球入侵種資料庫翻譯為中文，ISSG電腦須要調整，2009年目標為將世界百大外來入侵種譯為中文。

本計畫工作進度如下：

- GISD和中文版相容性處理，持續進行中。
- 已將48種外來種資料圖像資料納入網站。
- 審核參考資料，整理網站連結。
- 整理文獻資料，更新28種外來種資料。
- 持續進行的工作包括：建立資料結構、更新資料、檢視和更新資料庫等。

2010 年，IUCN/SSC 入侵種專家小組所提「島嶼、受威脅和入侵物種主題資料庫：建立太平洋和亞洲資料(包括日本群島和台灣及所屬小島)」計畫，摘要如下：

依據2009年IUCN紅皮書(IUCN Red List of Threatened Species)分析報告：

- 入侵種為兩棲類第5大威脅，列在棲地消失、污染、疾病和火災之後。
- 入侵種為鳥類第3大威脅，列在農業和伐木之後。
- 入侵種為哺乳類第3大威脅，列在棲地消失和人類利用(主要為食物及醫藥)之後。
- 入侵種為爬蟲類第4大威脅，列在污染、殺害和天然災害之後。
- 歐洲受威脅淡水魚主要影響因子為水污染(66%)、入侵種(55%)和抽水(55%)。
- 面臨絕種的海洋物種中，入侵種被認為是主要威脅因子。

大洋中的島嶼特有種比例高，本土生物多樣性更容易受到棲地消失和外來種入侵之影響。依據國際鳥盟(BirdLife International)2008年世界鳥類資料庫(World Bird Database)資料，75%大洋型海島(oceanic islands)之受威脅鳥類，因入侵種而受害。比較起來，僅有21%大陸型海島(continental islands)之受威脅鳥類，因入侵種而受害。GISD因而規劃設立特殊主題之資料庫，以島嶼、受威脅和入侵物種為重點。另外，也規劃將此資料庫與全球島嶼資料庫(Global Islands Database, GID)整合，此即為全球島嶼夥伴關係(Global Islands Partnership, 簡稱GLISPA)工作。

太平洋區特殊主題資料庫於2009年5月啟動，重要生態系合作基金(Critical Ecosystems Partnership Fund, CEPF)支援九個國家的資料庫，包括Cook Islands, Fiji, French Polynesia, Federated States of Micronesia, Marshall Islands, Palau, Pitcairn, Samoa, Toga。另外，美國政府的太平洋環境補助金(Pacific Environmental Grant)贊助太平洋島國中的另外

15國，包括American Samoa, Guam, Kiribati, Nauru, New Caledonia, Niue, Norfolk Island, Northern Mariana Islands, Papua New Guinea, Solomon Islands, Tokelau, Tuvalu, US Minor Outlying Islands, Vanuatu, Wallis and Futuna。

太平洋區資料庫仍須納入的包括澳洲、紐西蘭、附近島嶼、日本群島和台灣及所屬小島、South China Sea小島。澳洲和紐西蘭資料庫部分已向澳洲太平洋科學基金會(Australia-Pacific Science Foundation)申請經費。希望我國能贊助日本群島和台灣及所屬小島之資料庫經費。

經過文獻整理和外來種資料蒐集後，預計2010年3月設立資料庫，預計2010年8月啟動網路可搜尋資料庫。

島嶼、受威脅和入侵物種主題資料庫目前已蒐集資料包括：

- 24個太平洋島國之島嶼基本資料，入侵種和受威脅物種資料。
- 9個國家的67種優先物種(priority species)之入侵種威脅摘要資料和保育行動摘要資料。
- 5個綜合案例研究準備中。
- 9個太平洋島國的160種優先物種，資料蒐集中。
- 2010年3月資料庫開放試用及徵詢各界意見。

2010年計畫執行情形摘要如下：

工作項目執行情形如下，預計2011年9月完成所有工作：

- 已聯絡相關國家蒐集資料，工作持續進行中。
- 完成文獻回顧工作。
- 完成基本資料之彙整。
- 整理物種資料工作持續進行中。

資料蒐集部分包括：

- 多篇報告和日本小笠原群島(Ogasawara Islands)申請世界襲產研究報告中彙整的經營管理和行動計畫相關資料，包括物種現況細節、入侵種之衝擊、將採取之行動等，共60餘頁A4資料。
- 小笠原群島特有之軟體動物為受威脅物種，聯絡相關學者彙整資料，整理IUCN和日本紅皮書資料，整理需處理清單，包括入侵種威脅因子摘要、入侵種管理摘要和保育成果。
- 物種受威脅原因資料持續整理中。

2011年ISSG所提「島嶼生物多樣性和入侵種之威脅：建立南太平洋

島嶼資料庫計畫」，摘要如下：

本計畫為延續計畫，背景資料請參考2010年計畫。本資料庫最主要的識別項目為島嶼名稱，次要識別項目為受威脅物種名稱，資料庫資料包括：

- 島嶼資料：經緯度、面積、所有權、公告指定區、保育價值等皆納入國家/島嶼摘要中。
- 入侵種資料：國家/島嶼入侵種調查。
- 受威脅物種資料：國家/島嶼受威脅物種清單，包括紅皮書位階、分類、和入侵種造成威脅之資料。
- 文獻參考資料、資料庫說明資料和使用指南。

島嶼生物多樣性和入侵種之威脅資料庫(Island Biodiversity and the threat of Invasive Species, IBIS)，已納入下列資料：

- 24個太平洋島國之島嶼基本資料、入侵種和受威脅物種資料。
- 24個國家的244種優先物種(priority species)之入侵種威脅摘要資料和保育行動摘要資料。
- 14個太平洋島國的365種優先物種，資料蒐集中。

2011年ISSG所提「島嶼生物多樣性和入侵種之威脅：建立南太平洋島嶼資料庫計畫」，計畫和工作進度摘要如下：

本計畫為延續計畫，背景資料請參考2010年計畫。本資料庫最主要的識別項目為島嶼名稱，次要識別項目為受威脅物種名稱，資料庫資料包括：

- 島嶼資料：經緯度、面積、所有權、公告指定區、保育價值等皆納入國家/島嶼摘要中。
- 入侵種資料：國家/島嶼入侵種調查。
- 受威脅物種資料：國家/島嶼受威脅物種清單，包括紅皮書位階、分類、和入侵種造成威脅之資料。
- 文獻參考資料、資料庫說明資料和使用指南。

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- 24個太平洋島國之島嶼基本資料、入侵種和受威脅物種資料。
- 24個國家的244種優先物種(priority species)之入侵種威脅摘要資料和保育行動摘要資料。
- 14個太平洋島國的365種優先物種，資料蒐集中。

島嶼生物多樣性和入侵種威脅資料庫已募集經費，除林務局外包括：

- 次南極島基本資料：生物學院暑期實習和 ISSG 提供 US$7,500。
- 福克蘭群島詳細資料：福克蘭保育協會和 ISSG 提供 US$5,000。

2011年已進行文獻整理，包括外來種現況、擴張範圍、對本土種和自然生態之衝擊、已執行之經營管理計畫、保育成效等。已匯集280重要資料來源。已著手將資料納入特定格式中，下階段將完成外來種對列入IUCN紅皮書物種之影響。

目前工作進度說明表(預計2012年8月完成，9月提交報告)：

工作項目	進度
聯絡及資料蒐集	已完成基礎資料蒐集，持續進行其他資料蒐集
文獻回顧	已完成
彙整基本資料	持續進行中
彙整物種資料	已完成規畫，持續進行中

保育組

行政院農業委員會　　公文移文單

茲有　駐紐西蘭代表處　　100 年 09 月 22 日

字第 NZL-0493　　號函乙件，因案屬貴管，

移請卓辦。

主旨：　呈報常代表以立赴奧克蘭辦理捐助國際自然保育聯盟物種存續委員會入侵種專家小組計畫事

此　致

移文機關：　林務局

☐　附件　　件

☐　支票　　張

其　他：

行政院農業委員會　　秘書室　　行政院農業委員會 100.09.22 收文章　　啟

機密等級：
洩露、交付、毀棄、損壞、隱匿或遺失國家機密，依法究辦。

23

駐紐西蘭代表處電報

100.9.22

專號：NZL-0493 第 1 頁 流水號時間：
日期：100.9.22 方式：[E] F 本電：電文 2 頁，附件 1 頁，共 3 頁

擬辦		批示	

事由：呈報常代表以立赴奧克蘭辦理捐助國際自然保育聯盟物種存續委員會入侵種專家小組計畫事

外交部鈞鑒（環境外交）：行政院農業委員會林務局100年8月24日致鈞部林保字第1001701040號函副本及條法司環境永續外交小組第0087號電均奉悉。

一、為擴大辦理本案，促進國際宣傳，本處常代表訂於本(9)月30日赴奧克蘭辦理旨揭林務局捐贈案，本處已洽請國際自然保育組聯盟(IUCN)物種存續委員會（SSC）入侵種專家小組(ISSG)於是日下午2時15分至4時辦理捐贈儀式，IUNC將簡介ISSG以及Pacific Invasives Initiative（PII）計畫，屆時ISSG及PII計畫主持人Mick Clout及相關成員共7人與會。

二、另為加強本案宣傳效果並增加駐地政務及學術聯繫，常代表是日上午11時30分將拜會奧克蘭大學主管國際關係副校長Iain Martin，中午12時15分邀請執政國家黨新出任不分區國會議員候選人(排名第37)之奧克蘭大學教授楊健馨敘。

三、為增加拜會效益，以上行程常代表將偕駐奧克蘭辦事處同仁共同參加。

	部長		政次	/	常次		常次	/	主秘		秘書處	/	亞太司
	亞西司		非洲司		歐洲司		北美司		中南美司	○	條法司		國組司
	新文司		禮賓司		經貿司		總務司		檔資處		電務處	/	人事處
	政風處		會計處		研設會		NGO委員會		法規會		國聯組		外構所
	領務局		亞協		北協								

行政院農業委員會總收文
1000161037 100/09/22 處

機密等級:
洩露、交付、毀棄、損壞、隱匿或遺失國家機密，依法究辦。

駐 紐 西 蘭 代 表 處 電 報

四、 電傳常代表赴奧克蘭行程乙頁如附件，此行常代表所需機票款將於本處辦公費項下支應。

五、 本案後續辦理情形將適時電部。以上謹報請核備。

駐紐西蘭代表處(林組長恩真)(已分電駐奧克蘭辦事處)(副本請抄送行政院農業委員會林務局)

謹註：本電已代轉

常代表以立100年9月30日赴奧克蘭行程表

9月30日(星期五)

時間	行程
09:30	自紐京搭乘NZ0420赴奧克蘭
10:30	抵達奧克蘭機場
11:30	拜會奧克蘭大學國際關係副校長 Mr Iain Martin(Deputy Vice Chancellor – International Relations, University of Auckland)(地點: Room 107, Alfred Nathan House, Princes St, Auckland)
12:15	與奧克蘭大學教授、國家黨新任不分區國會議員楊健(Dr Jian Yang, Senior Lecturer in Political Studies, University of Auckland) (地點: Room 103, 14 Symonds St, Auckland 會面後前往餐廳)
14:15	與物種存續委員會（SSC）入侵種專家小組(ISSG)會晤並辦理林務局捐助國際自然保育聯盟物種存續委員會入侵種專家小組計畫事(地點: Tamaki Campus, University of Auckland)
18:30	搭乘NZ0461班機返抵紐京

機密等級：
洩露、交付、毀棄、損壞、隱匿或遺失國家機密，依法究辦。

保育組

駐奧克蘭辦事處電報

不封緘隨文

專號：AKL0230　第 1 頁　流水號時間：100.10.4

日期：100.10.3　方式：[E] F　本電：電文 2 頁，附件 0 頁，共 2 頁

擬辦		批示	

事由：駐紐西蘭代表處常代表及本處丁處長辦理捐助國際自然保育聯盟物種存續委員會入侵種專家小組計畫事

外交部鈞鑒（環境外交）：駐紐西蘭代表處第0493號電計邀 鈞察。

一、駐紐西蘭代表處常代表偕本處丁處長及吳組長於 9 月 30 日上午 11 時將拜會奧克蘭大學主管國際關係事務副校長 Iain Martin，洽談兩國學術文化交流，I 副校長甫新上任，感謝我方之到訪，並承諾未來在其 5 年任期內將持續推動該校與我國之學術交流合作關係。常代表一行續於中午拜會奧克蘭大學亞洲研究院中國研究中心主任及國家黨排名國會議員候選人楊健博士並餐敘，討論雙方學術合作，華人在紐西蘭參政情形，馬總統之兩岸政策理念、我總統大選情勢及我有意義參與「國際民航組織」（ICAO）及「聯合國氣候變化綱要公約」（UNFCCC）組織並願提供積極貢獻之立場，籲請渠協助支持我以觀察員身分參與上述組織及公約。

二、常代表偕丁處長及吳組長於下午續赴奧克蘭大學Tamaki Campus拜會國際自然保育聯盟物種存續委員會入侵種專家小組計畫(Invasive Species Specialist Group，ISSG）及Pacific Invasives Initiative（PII）計畫主持人Mick Clout博士及該計畫

中華民國壹佰 年 拾 月 肆 日

行政院農業委員會林務局總收文
1001620560 100/10/06
外交部電務處 10004627220 P. 203

機密等級:
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駐奧克蘭辦事處電報

相關成員等7人，常代表代表我行政院農委會林務局捐助上述計畫，並由國際自然保育組聯盟(IUCN)，物種存續委員會入侵種專家小組(ISSG)及Pacific Invasives Initiative（PII）計畫分別簡介其工作概況，常代表及本處丁處長亦說明我盼參加「聯合國氣候變化綱要公約」（UNFCCC）及「國際民航組織」（ICAO）組織並願提供積極貢獻之立場，籲請渠等協助支持我以觀察員身分參與上述組織及公約。

三、以上，謹報請 鑒察。

駐奧克蘭辦事處（吳組長懷健）（已分電駐紐西蘭代表處）（副本請抄送行政院農業委員會林務局）

註：請主辦單位核轉

裝 訂 線



IUCN/SSC Invasive Species Specialist Group
Regional Office for the Pacific
School of Biological Sciences
University of Auckland, Tamaki Campus
Private Bag 92019, Auckland, New Zealand
Tel: + 64 9 3737 599
Fax: + 64 9 3737 042
Email: *issg@auckland.ac.nz*

Progress report: for the Conservation Grant 2011-2012, Conservation Division Forestry Bureau. COA, Taiwan- February 2012

Project title:

Island Biodiversity and the threat of Invasive Species [IBIS]: Development of the Southern Ocean Islands component

Project progress:

The project activities commenced during November 2011.

A comprehensive desk-top review was undertaken to collate information related to invasive species presence, extent of spread, impacts on native species and natural ecosystems, management action completed, on-going and planned and conservation outcomes as a result of action. Over 280 key information sources have been compiled for data mining and aggregation. This is the next phase of work to be undertaken. Information on native and threatened species has also been extracted from the IUCN Red List of Threatened Species and other sources of information such as the Australian Antarctic Division, that focus on native biodiversity and ecosystems in the sub-Antarctic and Antarctica. Information has also been collated from the Agreement on Conservation of Albatross and Petrels (ACAP) resources.

Work has commenced on aggregating collated data and information and structuring it into prepared templates and worksheets. The next phase will be to complete baseline

invasive species threat summaries for each of the threatened (Critically Endangered, Endangered, Vulnerable Red List categories) species on these islands.

Table 1: Activities status

Activity	Status
Contact with practitioners for data and information	Initial contact and information collated completed; on-going
Desktop literature survey for relevant info	completed
Compilation of baseline information	On-going
Species summary compilation	planned

It is envisaged that the project will be completed by end August 2012. A full report will be submitted by the September 2012.

For more details and any comments please contact:

Shyama Pagad (s.pagad@auckland.ac.nz)

Program Manager
Invasive Species Information Management
University of Auckland

Manager, Information Services
IUCN SSC Invasive Species Specialist Group

龜類動物存續聯盟計畫報告摘要

龜類動物存續聯盟(Turtle Survival Alliance, TSA)主要任務為將對龜類動物之熱愛轉化為保育行動，建立全球活標本蒐集聯絡網和執行復育計畫。TSA 為達成「21 世紀沒有龜類動物絕種(zero turtle extinctions in the 21st century)」之宗旨，執行下列工作：

- 推動繁殖計畫，包括為瀕臨絕種淡水龜和陸龜興建繁殖設施。
- 進行野外研究。
- 擬定並執行保育計畫。
- 於當地社區辦理保育宣導活動。
- 與全球各地保育團體合作，並提供支援、專業知識、訓練和資源。
- 倡導有效執行野生動物相關法令。

為供應中國市場，亞洲龜類動物族群大量被捕，造成族群危機，此即亞洲龜危機(Asian Turtle Crisis)。有些物種族群若無有效管理可能面臨絕種命運，TSA 於 2001 年設立，為國際自然保育聯盟(International Union for Conservation of Nature, IUCN)合作夥伴，負責瀕臨絕種龜類動物繁殖計畫(breeding programs)，確保永續性淡水龜和陸龜圈養繁殖。TSA 在 IUCN 架構下運作，為陸龜和淡水龜專家小組(Tortoise and Freshwater Turtle specialist Group, TFTSG)之特別工作小組(Task Force)。TSA 在歐洲和美國均有分部，成員包括動物園、水族館、大學、龜類繁殖者、龜類愛好者、獸醫、保育團體、原產國龜類動物救援中心(turtle rescue center)或相關設施等。TSA 總部在美國德州之 Fort Worth Zoo，為全球唯一以保育龜類動物為單一目標之團體。TSA 網站有列出執行計畫，包括將近 60 種龜類動物，計畫執行地包括貝里斯(Belize)、柬普寨、中國、印度、印尼、馬達加斯加、緬甸、泰國、馬來西亞、菲律賓、美國、越南、TSA 非洲計畫、TSA 歐洲計畫等。

TSA 於 2010 年提供野生動物保育協會(Wildlife Conservation Society, WCS)支持信函，主要內容為 WCS 於 1993 年與緬甸林業部(Ministry of Forestry, MOF)簽訂野生動物保育合作備忘錄，淡水龜和陸龜保育計畫為其中之一。WCS 與 TSA 共同執行緬甸淡水龜和陸龜域內(*in-Situ*)和域外(*ex-Situ*)保育計畫。TSA 提供經費和技術協助，於緬甸設立龜類動物救援中心和繁殖設施。興建 Lawkananda Wildlife Sanctuary 瀕臨絕種龜類圈養繁殖設施為 WCS 、TSA 和 MOF 所同意之優先計畫。WCS 係由美國紐約市數個動物園和水族館(例如 Bronx Zoo、New York Aquarium、Queens Zoo 等)聯合組成之團體，在全球 53 國執行保育計畫。

2010 年林務局與台北動物園共同贊助龜類動物存續聯盟所提「緬甸星龜物種復育計畫(Implementation of the Species Recovery Plan for the Critically Endangered Burmese star tortoise, *Geochelone platynota*)」，媒體有報導相關捐贈儀式，及計畫內容。

緬甸星龜物種復育計畫之內容及報告摘要如附：

緬甸星龜(Burmese star tortoise, *Geochelone platynota*)為分佈於緬甸中部乾燥地區之特有種，為 IUCN 紅皮書中列為 25 種最危險的瀕臨絕種淡水龜和陸龜之一。野外族群經多年過量搜捕，已被認定為功能性滅絕(functionally extinct)。目前緬甸星龜復育計畫完全仰賴管理良好之圈養族群，日後野放至緬甸保護區。

幸好緬甸星龜於圈養環境繁殖狀況良好，緬甸國內和美國緬甸星龜人工繁殖情形也越來越普遍。美國動物園協會(American Zoos Association, AZA)數據顯示全美國現有緬甸星龜雄 74 隻、雌 66 隻、性別不明 276 隻，其中 AZA 的動物園中有雄 31 隻、雌 20 隻、性別不明 31 隻。目前緬甸有將近 1,800 隻圈養緬甸星龜，分別在 5 個地點，4 處為政府設立之繁殖設施，一處為私人設置之 Griffin Enterprise。Griffin 為緬甸最大之圈養設施，有 1,000 隻緬甸星龜，每年孵育 500 隻幼龜。第 2 大的位於 Lawkananda Wildlife Sanctuary，2010 年有 512 隻緬甸星龜，每年孵育約 50 隻幼龜。緬甸政府和 Griffin Enterprise 簽約，每年 Griffin 提供 20%年產圈養緬甸星龜給政府設立之繁殖設施。Lawkananda 設施與 Griffin 距離很近，Griffin 每年提供 100 隻幼龜給 Lawkananda。

2007 年，TSA 贊助 Yadanabon Zoo 和 Minsontaung Wildlife Sanctuary 設立圈養設施，這兩處的飼養環境有所改善，繁殖成功率也有增加。2010 年 TSA 爭取到經費協助 Lawkananda 擴充繁殖設施，2010-11 生殖季有 39 窩，257 個蛋，為設立 11 年來繁殖最成功的一次。

2009 年 1 月 TSA 草擬緬甸星龜復育計畫。緬甸星龜復育計畫內容包括下列改善建議事項：

- 圈養族群管理：例如為維持圈養繁殖族群之基因多樣性，4 處政府設施應至少有 200 隻或 100 對繁殖個體等。
- 圈養設施：針對 4 處政府設施之改善建議。
- 飼養管理。

- 註記及資料記錄。
- 健康注意事項：例如 4 處政府設施應設立檢疫設施，以防止私人設施提供之幼龜散佈疾病。
- 再引入指南(Reintroduction)及注意事項：包括選擇野放地點、個體健康狀況、挑選野放個體、野放季節、野放前之野外環境適應期、野放前資料記錄、野放後監測等。

TSA 於 2009 年 1 月至 Lawkananda Wildlife Sanctuary 考察其圈養繁殖設施，並提出改善建議，包括改善飼養環境和加強安全措施，原設施為 88x88ft，建議另建立一個 60x60ft 之擴充設施。設施擴建工作於 2010 年 11 月 4 日開始，2011 年 3 月 20 日完工，擴充後設施圍籬為 154x88ft。設施照片請參考計畫報告。

擴充設施預算支出情形如下：

擴建項目	經費(US$)
幼龜生長區	6888.88
雛龜養育區	2777.77
靴腳陸龜(*Manouria emys*)圈養區	166.66
圍籬	10555.56
保全塔(Security Tower)	1666.66
水源供應	277.77
供電系統	888.88
除水槽	666.66
總計	23,888

2011 年龜類動物存續聯盟(Turtle Survival Alliance, TSA)所提「建立緬甸龜類動物收容中心計畫」，摘要如附：

2010 年 TSA、WCS 和緬甸林業部合辦「處理緬甸沒收龜類策略研擬研討會」，約有 50 餘人參加，研討會重要結論包括建議於緬甸東部的臘戌(Lashio)設立龜類動物收容中心，Lashio 為緬甸通往中國南部之非法野生動物貿易集散中心，邊界經常有動物被沒收。此次研討會擴充 2009 年 1 月在 Mandalay 召開之研討會議題。

2011 年 2 月在新加坡召開龜類動物保育研討會，由 TSA、WCS、IUCN 陸龜和淡水龜專家小組、San Diego Zoo Global 和新加坡野生動物保護區主管單位 Wildlife Reserves Singapore 合辦，約 70 人參加，分別來自 19 個亞洲國家，以及歐洲、澳洲和美國代表。於緬甸臘戌設立

龜類動物收容中心也被列為最優先項目。

許多非法走私之龜類動物於臘戌邊界被沒收，2007 年 987 隻，2008 年 6,000 餘隻，2009 年 516 隻，2010 年 2,065 隻。現有收容中心無法容納大量沒收龜類，預計於緬甸林業部的 Kho San Tan Park 興建新的龜類動物收容中心，建築藍圖列於計畫提案附件二。主要包括：

圍籬：10ft 菱形粗鋼絲網牆，上方加刀片刺網。
支援設施：15 x 30ft，包括食物準備、儲藏、獸醫處理、檔案紀錄等區域。
陸生龜類動物區：包括圍籬、飼養區、遮蔽區、水池等。
水生龜類動物區：包括水池、沙地區、供水設施、水池間之木牆、遮蔽區等。

2012 年 2 月 TSA 來函要求交報告時間往後延 6 個月，專家團隊於 4 月才赴緬甸進行現勘設計，發現收容中心預定地中的河川因上游蓋水壩而乾涸，附近的樹也被砍，沒有陸龜需要的遮蔭處，必須另覓他處設立收容中心。後來在林業部的 May Myo 找到合適地點，此地氣候也較溫和。設計初稿已完成，經修訂後，預計建築工程於 6 月完成。另外依據最近統計資料，由 Lashio 走私至中國被沒收的大都為大頭龜(又稱平胸龜 Big-headed Turtles, *Platysternon*)，收容中心設計會將此納入考量。

TSA

turtle survival alliance

Transforming passion for turtles into conservation action

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14 February 2012

Mr. Lee Tao Sheng
Acting Director General
Forestry Bureau, COA
No. 2, Section 1, Hangchow South Road, Taipei 100, Taiwan

Dear Mr. Lee Tao Sheng,

The TSA respectfully requests a six month extension on the report for our 2011 grant from the Taipei Forestry Bureau ("Construction of a Turtle Rescue Facility in Lashio, Myanmar"). Due to unforeseen delays with getting our team to Myanmar to finalize design plans, construction on the turtle rescue facility has not begun. However, we will be traveling to Myanmar in late April and meeting with the architect and construction foreman, and we fully expect that construction will get underway in May 2012. We have decided to hire the same company that did the excellent work for us on the new Burmese star tortoise facility at Lawkananda, as the quality of his work is, from our experience, unequaled.

Design plans are likely to change somewhat, and will now include specialized facilities for Big-headed Turtles (*Platysternon*) based on new information indicating that this is now one of the most frequently seen species in large confiscations passing thru Lashio on their way to China. The TSA team will consist of Rick Hudson (TSA President), Cris Hagen (TSA Director of Animal Management) and Bill Holmstrom (TSA Board of Directors), and will be accompanied by Kalyar Platt (TSA Director of Turtle Conservation in Myanmar). Though these delays are unfortunate, we fully expect that the Lashio rescue facility will become a model facility for the region, and will prevent countless turtles and tortoises from dying due to mishandling and poor treatment.

Sincerely,

R. H. Hudson Jr.

Rick Hudson, President

CC: Mr. Kuan, Li-Hao
Director
Conservation Division
Forestry Bureau, COA
No. 2, Section 1, Hangchow South Road, Taipei 100, Taiwan

Hui-liang Yang

寄件者: Rick Hudson [RHudson@fortworthzoo.org]
寄件日期: 2012年5月23日星期三 上午 4:59
收件者: 'Hui-liang Yang'; Heather Lowe; 'HLowe@turtlesurvival.org'
主旨: RE: request 2011 project report
附件: taipei 2011 report extension request.pdf

Dear Yang Hui-liang

In February 2012 we requested a six month extension on this report, see attached. We are still on schedule and finally in April our team traveled to Myanmar and went to Lashio where we intended to build the facility in 2009. Unfortunately the beautiful stream that ran through the property had gone almost dry due to damming up stream. And many of the trees had been removed and the area lacked the necessary shade. So we began looking for another site and fortunately found one on Forestry Department land near the town of May Myo (Pwin Ool Win), which is a much more favorable location with milder climate and closer access to Mandalay. We designed a new facility to fit the new site and received the first round of drawings back; we wait now for the second set of diagrams and costs and then we will send the funds and construction can get underway. I fully expect that we will be building this new rescue center by June.

Please contact us should you have any further questions.

Rick Hudson, President
Turtle Survival Alliance

1989 Colonial Parkway
Fort Worth, TX 76110

phone: 817-759-7177
www.turtlesurvival.org

-----Original Message-----
From: Hui-liang Yang [mailto:hlyang@forest.gov.tw]
Sent: Monday, May 21, 2012 2:37 AM
To: Heather Lowe; HLowe@turtlesurvival.org
Cc: Rick Hudson; RHudson@turtlesurvival.org
Subject: request 2011 project report

Dear Ms. Lowe,

Please advise us about the status of 2011 project report. Many thanks!

With best regards,

Yang Hui-liang
Conservation Division
Forestry Bureau, COA

國際拯救犀牛協會計畫執行報告

2009 年國際拯救犀牛協會所提「加強夥伴關係保育亞洲犀牛計畫」，計畫內容及報告摘要如下：

亞洲犀牛面臨危機主要是盜獵和棲地破壞，棲地破碎化增加人和犀牛衝突頻度，也間接造成犀牛尋偶不易。通往保護區的道路更使盜獵者更容易設置圈套或陷阱。近來，外來植物入侵也影響到犀牛食物來源。

「加強夥伴關係保育亞洲犀牛計畫」主要為籌畫辦理東南亞犀牛保育研討會，由國際拯救犀牛協會、亞洲犀牛專家小組(Asian Rhino Specialist Group, AsRSG)和國際犀牛基金會(International Rhino Foundation, IRF)共同規劃。

亞洲犀牛專家小組隸屬國際自然保育聯盟(IUCN- the International Union for Conservation of Nature)物種存續委員會(Species Survival Commission, SSC)。小組成員包括研究人員、公務員、野生動物獸醫師、動物園和植物園工作人員、保護區管理者、亞洲犀牛專家、國際保育團體等。AsRSG 主要工作目標為：

- 評估亞洲犀牛野生和圈養族群現況和趨勢，蒐集盜獵案件資料。
- 促進資訊交換和合作。
- 提供犀牛經營管理技術資料，促成亞洲犀牛保育研究計畫間之相互合作。
- 協助擬定犀牛保育策略，並對執行事宜提出建議。
- 召開亞洲犀牛專家小組會員會議。
- 告知 AsRSG 會員，非洲犀牛保育現況及相關保育計畫。

「加強夥伴關係保育亞洲犀牛計畫」工作項目包括：

- 設立犀牛管理者和研究人員聯絡網，改善原產國犀牛保育工作。
- 研擬亞洲犀牛保育策略。
- 彙整各原產國亞洲犀牛現況和保育資料。
- 提供和改善亞洲犀牛保育技術資料，並提供相關建議。
- 鼓勵辦理亞洲犀牛保育相關活動。
- 經由經驗交換，強化會員之能力。
- 建立 75 筆聯繫資料，並納入 AsRSG 網站。

AsRSG 東南亞研討會 2010 年 2 月 10-12 日於印度召開，由 AsRSG 和阿薩姆省森林部(Assam Forest Department)合辦，會場布條上列有所

有贊助單位(包括林務局)的 logo。參加者包括亞洲犀牛研究人員和管理人員，原產國(range states)專家分別來自印尼、馬來西亞、越南、印度和尼泊爾。非原產國專家來自美國、英國、澳洲和瑞士。

國際拯救犀牛協會所提「保護印尼布吉巴里桑西拉坦國家公園受威脅物種和棲地計畫」內容，以及 2009 年和 2010 年執行情形，摘要如下：

依據 2009-2011 年計畫資料，國際拯救犀牛協會(Save the Rhino International)於 1994 年向英國政府註冊為非營利保育團體，設立宗旨為保育瀕臨絕種的亞洲和非洲犀牛，成立以來與 13 個亞洲和非洲民間團體合作，努力從事犀牛保育工作。

國際拯救犀牛協會之目標為：
一、增加野生犀牛族群之數量
二、增進生態系之健全
三、確保當地社區能由保育行動中獲益

國際拯救犀牛協會 2007 至 2008 年募得 604,000 英鎊，贊助計畫包括：
- 反盜獵和巡邏監測計畫，保護和改善生態系計畫。
- 犀牛族群再引入(reintroduce to former habitats)計畫。
- 社區保育和發展計畫，協助當地社區以更有創意的方式經營管理自然資源。
- 環境教育計畫，針對學童和民眾宣導保育自然資源之重要性，並處理人和野生動物衝突相關議題。
- 調查影響犀牛生存之原因，以及犀牛角替代品之研究。
- 獸醫相關工作，例如於犀牛角上裝設發報器或索套移除等。

國際拯救犀牛協會非洲計畫之成果包括：
- 保護 126,374 平方公里生物多樣性高之地區。
- 直接贊助保護 57%現有之 4,240 頭黑犀牛及 14%現有之 17,500 頭白犀牛。
- 協助雇用 250 當地工作人員。
- 經由社區發展和環境教育計畫，支助 334,420 人。

國際拯救犀牛協會亞洲計畫之成果包括：
- 保護 17,033 平方公里生物多樣性高之地區。
- 協助保護 64%現有之 2,700 頭印度犀牛、53%現有之 200 頭蘇門達臘犀牛及 91%現有之 55 爪哇犀牛。

- 協助雇用 250 當地工作人員。

蘇門達臘犀牛(Sumatran rhino)為極危(critically endangered)物種，野外族群不到 200 頭。1980 和 1990 年代，因森林消失和棲地破碎化族群量減少 50%。布吉巴里桑西拉坦國家公園(Bukit Barisan Selatan National Park, BBS)和 Way Kambas (WK) National Park 為蘇門達臘犀牛三個主要分佈地中的二個。此兩個國家公園也有蘇門達臘虎和蘇門達臘象。目前 BBS 約有 50-70 頭犀牛，40-50 隻老虎，500 頭大象。Way Kambas 有 25-27 犀牛(不包括未成年犀牛)。蘇門達臘犀牛主要分佈在印尼三個國家公園。其中兩個國家公園設有犀牛保護小組(Rhino Protection Unit, RPUs)，負責防止盜獵、非法入侵、監測和保護受威脅物種和棲地。

早期蘇門達臘犀牛族群減少主要因為犀牛角盜獵，但現在主要受限於棲地，因為人口成長佔用國家公園土地，砍伐森林改為農業用地，國家公園面積少了 30%。印尼國家公園資源和人力都有限，由民間協助組成的 RPU 對保護野生動物和棲地的功能，更顯其重要性。1995 年起 BBS 的 RPUs 開始運作，WK 的 RPUs 於 2001 年設立。計畫主要目標係維持 BBS 8 個巡邏隊和 WK 5 個巡邏隊之持續運作。特定工作目標包括：

- 經由密集巡邏(每隊每月至少 15 天)維護犀牛保護區之功能。
- 移除各式為犀牛和其他野生動物所架設之陷阱，逐出任何不該在犀牛保護區出現的人。
- 由情報和執法小組(Intelligence and Law enforcement Units, ILEU)保持情報和線民聯絡網正常運作，以預防盜獵和非法侵佔事件。
- 調查及蒐證，以利逮捕或起訴於國家公園中非法盜獵、盜伐、入侵和從事其他非法行為的人士。
- 改善棲地侵佔現況。

2001 年起，RPUs 開始運作，協助於國家公園進行重點地區巡邏，移除各式陷阱，逮捕非法入侵者(包括盜獵者)，調查犯罪現場等工作，以達到預防野生動物數量減少的功效。RPU 為 4 人一組之反盜獵小隊，隊長為國家公園 ranger，可攜帶武器和逮捕盜獵嫌疑犯。其他 3 名隊員選自當地社區，僅攜帶防身噴霧器(pepper spray)，當犯案者拒捕時提供協助。隊員經過嚴格遴選程序並需通過訓練課程。巡邏任務通常一次 4-7 天，休息 1 天，填寫報告 1 天，準備下次任務 1 天。最佳狀況是每隊每月巡邏 15 天。ILEU 情報蒐集工作為 RPUs 的後盾，RPUs 也與國家公園工作人員密切合作，成效卓著。有 RPUs 巡邏的

國家公園已超過3年未發生犀牛盜獵案件。

本計畫主要針對印尼布吉巴里桑西拉坦國家公園，1995年RPUs開始運作，起初係針對保護犀牛而設，後來任務擴充至其他物種及棲地。

2009年的工作成果包括：

- RPUs平均每人每月巡邏15天，巡邏或調查路程共計3,600公里。
- 記錄到207個犀牛足印。
- 發現7件非法盜伐林木案件。
- 發現61件非法侵佔案。
- 發現8件非法獵捕魚類、鳥類、鹿等案件。
- 移除16個陷阱。
- 逮捕40人涉及非法獵捕、買賣、釣魚、伐木和侵佔。

2010年統計資料和工作成果包括：

犀牛族群	50-70頭
大象族群	約500頭
RPUs數量	7小隊
平均每月巡邏天數	16天
巡邏步行總公里數	3,181公里
被盜獵犀牛	0
被盜獵大象	0
發現或調查非法佔用案件	42件
發現或調查非法伐木案件	9件
發現或調查非法狩獵案件	51件
移除陷阱	29個
逮捕盜獵者或非法佔用者	13人

RPU每次巡邏均會紀錄犀牛獸跡資料，例如足跡、排遺、打滾泥坑、覓食痕跡、目擊犀牛資料或其他痕跡資料。所有資料都輸入資料庫，日後可彙整出月報、季報和年度活動和成效報告(Annual Activities and Performance Reports)。資料和GIS系統也運用到分析或製作犀牛或其他野生動物分佈圖，估計犀牛密度。非法資料例如侵佔、盜伐林木、非法盜獵、非法採集林產品等均列入記錄並進一步調查。同時蒐證、逮捕嫌犯，並準備犯罪報告。

RPUs有提供詳細巡邏報告二份，Rhino Protection Unit (RPU) Activities & Performance Report Bukit Barisan Selatan NP, Way Kambas

NP & Ujung Kulon NP 2010 年第 3 季和第 4 季報告。

RPUs 與當地社區互動良好，也協助居民改種對環境較友善的作物，除增加收入外，也減少野生動物棲地被侵佔的情形。例如輔導農民將部分土地改種每月可收成的可可豆，取代一年一收的咖啡豆，增加農民收入。另外，設立 2 處農民合作社，設立帳戶的農民可借支經費。加入合作社要簽署「不侵佔國家公園土地保證書」，且提供非法活動情報。有些地區侵佔地因上述措施減少 60% (印尼首次)，並交出 87 把非法槍枝。農民收入增加，侵佔土地因而減少，野生動物棲地得到保護，可說是雙贏的作法。RPUs 也提供當地居民就業機會，相當於國家公園與附近居民建立夥伴關係共同推動保育工作。

2011 年 1-6 月 BBS 和 WK RPUs 工作報告摘要如下：

- 1-3 月 BBS 和 WK RPUs 移除 91 個陷阱(主要是意圖非法捕鳥、鹿和野豬)，逮捕 15 人，包括逮捕非法伐木者 6 人，非法盜獵鳥類者 2 人。並與國家公園巡護人員和當地警察共同蒐集情報，逮捕非法買賣野生動物製品嫌犯 7 人。其中 2 人非法持有小塊象牙、虎皮和豹皮。5 人非法持有矛、鹿角、兩大塊象牙。
- 1-3 月 RPUs 平均每人每月巡邏 17 天，巡邏或調查路程共計 759 公里。執行 6 次非法伐木調查，26 次非法侵佔調查。拆除 8 個非法營地或木屋，以及兩座橋樑(意圖非法進入國家公園)。查獲非法捕魚 3 件。
- 4-6 月 RPUs 平均每人每月巡邏 15 天，巡邏或調查路程共計 3,600 公里。記錄到 112 個犀牛腳印，觀察到 2 頭犀牛，並新發現一頭三天大的小犀牛。發現 26 件非法佔用案，3 件非法伐木，23 件非法獵捕(主要是鳥、鹿、魚和野豬)，發現捕犀牛陷阱一個。
- 4-6 月 BBS RPU 與國家公園管理單位一起調查非法佔用土地現況，記錄到 126 個家庭非法住在國家公園內。發現 15 公頃非法種植咖啡，拆除 38 個非法營地(主要是供盜獵鳥類和非法捕魚)。
- 4-6 月 BBS RPU 逮捕非法伐木 4 人，盜獵鳥類 3 人，非法佔用 1 人，非法買賣野生動物產製品 14 人(主要是象牙和鹿製品)。WK RPU 逮捕非法採集森林產品 1 人，非法伐木 1 人，並拆除 38 個陷阱和 2 座橋。
- RPUs 成員 31 人參加經營管理資訊系統(Management Information System)訓練班。
- 設立對環境友善之農耕示範區，由 RPUs 成員輔導國家公園附近農民永續耕作方式，及種植提升收入的長期作物或經濟樹種。

2011 年 7-12 月 BBS 和 WK RPUs 工作報告摘要如下：

- 7-9 月 RPUs 平均每人每月巡邏 13.4 天，巡邏路程共計 681 公里。記錄到 103 個犀牛腳印，254 個犀牛痕跡，觀察到 1 頭犀牛。
- RPUs 發現非法活動 17 案，包括盜伐和非法佔用案。
- WK RPUs 協助國家公園主管單位處理 17 件非法狩獵和非法佔用案。盜獵物種主要是鳥類和除犀牛之外之大型哺乳類。
- 10-12 月 RPUs 平均每人每月巡邏 17.12 天，巡邏路程共計 2,032 公里。記錄到 63 個犀牛腳印，127 個犀牛痕跡，觀察到 1 頭犀牛。11 月在 BBS 發現母犀牛和小犀牛腳印，證實族群有繁殖。
- RPUs 在 BBS 逮捕非法盜伐 4 人，並協助國家公園驅逐非法佔用 58 公頃土地案。
- RPUs 在 WK 逮捕 37 案涉及非法捕魚，11 件非法放牧，1 件盜獵，1 件野生動物貿易。另移除大型哺乳類(野豬和鹿)陷阱 9 案，犀牛陷阱一案。另發現 288 公頃非法焚燒森林，1 件毒魚案。
- 民眾通報一群大象侵襲社區林地，RPUs 協助國家公園將大象引導回園區內。

RPUs 有提供 2011 年第 3-4 季詳細巡邏報告二份，Rhino Foundation of Indonesia Protection Report 1 July-30 September 2011 (Q3)和 Rhino Protection Unit (RPU) Activities & Performance Report Bukit Barisan Selatan NP, Way Kambas NP & Ujung Kulon NP 4th Quarter Report。

SAVE THE RHINO

Connecting conservation and communities

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Progress report from Save the Rhino International to Taiwan Forestry Bureau: *Protecting Threatened Species and Habitats in Bukit Barisan Selatan National Park, Indonesia*

Recap
In October 2010, the Taiwan Forestry Bureau awarded a grant of $5,000, towards the project entitled "Protecting threatened species and habitats in Bukit Barisan Selatan National Park, Indonesia". The grant was to be used towards the calendar year 2011 running costs and operations of the Rhino Protection Units (RPUs). The RPUs are highly-trained anti-poaching teams that intensively patrol key areas within this critical National Park, in the southwest of the island of Sumatra, in order to prevent poaching of threatened species and halt habitat encroachment and destruction.

Save the Rhino International is delighted to provide the following programmatic report, which is based on the detailed quarterly reports submitted by the Rhino Protection Unit programme and Yayasan Badak Indonesia (YABI) for the period 1 July to 31 Dec 2011. (Copies of the detailed reports are available upon request).

Indonesian Rhino Protection Units
Between 125 and175 Critically Endangered Sumatran rhinos are believed to remain on Earth. The population declined at a rate of 50% in the 1980s and 1990s, primarily due to deforestation and habitat fragmentation. Bukit Barisan Selatan National Park (BBS) and Way Kambas National Park (WK) in Sumatra, Indonesia, are two of the three major habitats for Sumatran rhino, and are also two of the highest priority areas for other threatened megafauna, including the Sumatran tiger and Sumatran elephant. Approximately 50 rhino, 40-50 tigers, and around 500 elephants inhabit BBS. WK is home to 25-30 Sumatran rhino. The Javan rhino is also Critically Endangered, with fewer than 44 animals believed to exist in just one known population in Java's Ujung Kulon National Park (between 37 and 44 animals). Ujung Kulon National Park, Indonesia's first UNESCO World Heritage Site, is the largest remaining lowland forest site in Java. In addition to holding the world's only population of Javan rhino, Ujung Kulon is home to a number of other endangered species, including the Javan gibbon, ebony leaf monkey, Javan leaf monkey, leopard, fishing cat, and the banteng, a species of wild cattle.

The main cause of the initial decline of Javan and Sumatran rhinos was poaching for horn for use in Traditional Chinese Medicine. Now, the populations are also limited by available habitat, which is continuously being encroached by human populations. In BBS and WK, illegal encroachment and conversion of forests to agricultural land has reduced the parks' area by up to 30%. However the rate is now declining in some areas, where in partnership with national park authorities, RPUs are helping implement community development schemes to reduce encroachment. In one area bordering BBS, encroachment has decreased by as much as 60%,

and – a first for Indonesia – farmers turned over 87 illegal guns to the RPUs.

With our partners, the International Rhino Foundation and the Indonesian Rhino Foundation (YABI), a comprehensive programme is delivered, aimed at protecting and increasing the populations of Sumatran and Javan rhinos in Indonesia – the Rhino Protection Units are the backbone of this programme.

Rhino Protection Units (RPUs) are highly-trained, four-person anti-poaching teams that intensively patrol key areas within Indonesia's national parks. They monitor threatened wildlife, deactivate traps and snares, identify and apprehend illegal intruders including poachers, and investigate crime scenes, thus preventing or reducing the loss of wildlife. The goal of the RPU programme is to prevent the extinction of Sumatran and Javan rhinos and other threatened species and to protect critical habitats in Java and Sumatra through proactive prevention of poaching and habitat destruction.

Thanks to the RPUs, there have been no incidences of poaching of Sumatran rhinos in BBS and WK National Parks in Sumatra for the past six years, or of Javan rhinos in Ujung Kulon National Park in Java, for the past 14 years. The RPUs also protect numerous other threatened species, including tigers, elephants, tapirs, gibbons, monkeys, leopards and fishing cats.

Bukit Barisan Selatan National Park Update
Bukit Barisan Selatan National Park (BBS) in Sumatra, Indonesia, is one of the highest priority areas for Sumatran megafauna, including the Sumatran rhino, Sumatran tiger, and Sumatran elephant. Approximately 50-70 rhino, 40-50 tigers, and about 500 elephants inhabit the Park. The Taiwan Forestry Bureau's grant was allocated in full to BBS's RPU programme.

RPUs have been operating in BBS since 1995. Originally, the BBS anti-poaching units focused mainly on rhino, but now cover all the megafauna and habitats in both the southern and northern portions of the Park (rhinos occur only in the southern half), counteracting all forms of wildlife crime and habitat destruction, such as illegal logging and encroachment. This work is augmented by a law enforcement and advocacy programme (Intelligence and Law Enforcement Unit or ILEU) that facilitates prosecution of poachers. The RPUs set up 15 new camera traps in BBS in 2011 to improve monitoring of all of these species.

RPU patrol outputs: 1 July – 31 Dec 2011
As explained above, the grant from the Taiwan Forestry Bureau funded RPU activities in BBS; however this report will document the combined patrol outputs from both BBS and WK.

Below are the breakdowns of activities for quarters 3 and 4 of 2011. Please see the interim report for information concerning quarters 1 and 2.

Quarter 3. During the third quarter of 2011, both Parks' Units averaged 13.4 days per month on patrol, walking a total of 681 km. These numbers are down slightly from the average in the first half of the year. RPUs recorded 103 rhino footprints, 254 rhino signs and had one direct rhino sighting. In addition to routine patrolling, RPUs were extensively involved with efforts to remove encroachers within BBS, in collaboration with the National Park authority, handling cases of elephant-human conflict and in preparing evidence for the judiciary.

Traps and snares set for Sumatran rhinos and other wildlife are routinely found and destroyed by RPUs in both protected areas. Fortunately, the number of traps set for rhinos, tigers and other large mammals remains relatively low. However, incidents of encroachment and other illegal activities within the Parks, such as logging, fishing and the collection of non-timber forest products, remain a significant problem. 17 cases of illegal activities, such as illegal logging and encroachment, were encountered and handled in the third quarter. The WK RPUs assisted the National Park authority with driving elephants from areas where there was intense conflict with

villagers and working with the judicial system to provide solid evidence to prosecute cases. They also handled 17 cases of illegal activities, including illegal hunting of non-mammals (mostly birds) and large mammal (non-rhino) and encroachment.

Quarter 4. During the fourth quarter of 2011, both Parks' Units averaged 17.12 days per month on patrol, walking over 2,032 km. They recorded 63 rhino footprints, 127 rhino signs, and had one direct rhino sighting. In BBS, footprints of a cow and calf were found in November; important confirmation that the population is breeding.

The RPUs in BBS arrested four individuals for illegal logging and submitted the evidence to the judiciary. They also assisted authorities in removing encroachers from 58 hectares within the Park. In WK, 37 arrests were made for illegal fishing, 11 for illegal grazing, one for poaching and one for wildlife trade. Nine snares for large mammals (boar, deer) and one rhino snare were de-activated. The RPUs in WK detected 288 hectares of illegally burned forest, an incident of fish poisoning in Way Negara Batin River and worked with Park authorities to drive a marauding herd of elephants back into the Park after they had raided a local plantation.

In the fourth quarter, RPUs were trained in collecting and processing faeces and urine samples to be used in DNA analysis of the rhino populations (see below).

Training: 1 July – 31 Dec 2011
The RPU programme is strongly supported by local communities, because it provides a source of employment and income – all RPU members are recruited from local communities. IRF works to ensure that local communities living in closest proximity to the Parks serve as active partners in wildlife protection and reap direct benefits from conservation efforts.

Recently, the RPUs from BBS and WK Parks took part in training, led by YABI's partner the Eijkman Institute (based in Jakarta). The training involved how to collect and preserve faeces and urine so that they can be used for DNA analysis of the rhino populations in the two Parks. We have secured funding for faeces and urine samples collected in BBS to be analysed but we are still seeking funds to analyse samples from Way Kambas.

Individual rhino profiles have been obtained by collecting their DNA using the capture-recapture methodology. This will therefore mean that population size and spatial distribution estimates will have a high accuracy and low bias when analysing data from faeces and urine samples.

This component of the project allows us to continue to ensure that management interventions are effective and based on the actual occupancy of the rhinos across the two Parks. We will also have an estimate of the most effective (breeding) population size and sex ratio, be able to analyse the impact of roads on rhino distribution (in BBS). We believe that this additional analysis complements the existing data generated by the RPU patrols, and will greatly enhance our ability to understand and thus continue targeted protection of these rhino populations.

Education: 1 July – 31 Dec 2011
Poaching is not the only threat affecting the rhino's decline as encroachment from human populations and agriculture affects their distribution. In BBS, Sumatran rhinos now occupy less than 40% of the area they occupied before 2002 and signs of the rhinos breeding have been low for the past 2-3 years.

The RPUs have been working with communities living legally adjacent to WK National Park on alternative farming practices, so that local people living near the park can earn income for their families without encroaching in the park to clear land and plant crops. They help them to develop environmentally-friendly crop production (e.g., helping them to switch from a one-harvest-per-year coffee monoculture to crops like cacao which produce throughout the year) to help create good relationships with local communities.

Farmers who participate in the programme receive cacao seedlings, and training on planting and care of trees, integrated pest management, harvesting, and marketing. In return, they sign community agreements pledging not to encroach in Park areas, and provide intelligence to the RPUs to assist apprehension of poachers, encroachers and perpetrators of other wildlife- or forest-based crimes.

To date, this engagement with local farmers has decreased encroachment into protected areas by as much as 60% and has increased for local farmer's income. This combined with no incidents of poaching has benefited the Sumatran rhino and its ecosystem as well as local people, with the ultimate impact being the continued survival of the species.

Thanks
We would like to offer our sincere thanks to the Taiwan Forestry Bureau, for its continued support for Sumatran rhino conservation efforts. Thank you!

Caption: One of the Rhino Protection Units on patrol in Bukit Barisan Selatan National Park



YAYASAN BADAK INDONESIA - YABI
Rhino Foundation of Indonesia - RFI

PROTECTION REPORT

QUARTERLY ACTIVITY AND PERFORMANCE REPORT

1 JULY – 30 SEPTEMBER 2011 (Q3)

Prepared by:

M. WALADI ISNAN
M. SYAMSUDIN

Reviewed by :
WIDODO S. RAMONO

PROJECT TITLE : PROTECTION PROGRAM OF YAYASAN BADAK INDONESIA

Reporting Period: July – September 2011

Name and Address of Grantee:

1. International Rhino Foundation (IRF)
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Authorship:

Reporting provided by Protection Manager (Mr. M. Waladi Isnan). Material and information gathered from field report and associated document.

Executive Summary:

The decline of Sumatran and Javan rhino has been in process for a long time. The Javan rhino for example was eliminated from Malaysia in the 1930's. Meanwhile, following the Sumatran rhino PHVA (1993), it was indicated that the decline of Sumatran rhino was probably 50% during the last decade. The total population of Sumatran rhino in Indonesia is estimated only 215 – 319 and will be extinct for the next decade if there are no appropriate and serious management. (Strategy and Action Plan for the Conservation of Rhinos in Indonesia 2007 – 2017). Rhino decline in South East Asia is due to a combination of reduction in habitat and overexploitation of rhino (most recently by poachers after the horn). At this time, poaching pressure continues to be high in Indonesia, hence there is a strong need of this country to emphasize anti-poaching activities. To this the rhino protection program of Yayasan Badak Indonesia (YABI) is activated to answer the need. Rhinoceros is subject to poaching pressure both from hunters and form trappers, they use wire snares and other traps that maims to kill animals. The method employed in poaching prevention are primarily in forms of field patrols to search for traps and other signs of poaching attempt, to destroy these traps, and to collect evidence to identify and apprehend the suspects involved. While in support to field patrol intelligence activities is operated to assist in the apprehension of poachers and identify the routes of illegal trade of protected animal parts (horn, skin, hooves etc.).

The Indonesian Rhino Protection Program of YABI integrates partners of

governmental and non-governmental namely Directorate General of Forest Protection and Nature Conservation of the Ministry of Forestry, International Rhino Foundation and World Wide Fund for Nature as well as local villagers . The program entails series of approaches that includes: wild population protection by intensive patrolling of areas to detect traps and arrest intruders, more intensive and extensive surveys and monitoring of the rhino population and intelligence operations to assist in the apprehension of poachers and identify of routes used for the horn trade and establishment of rhino database system using the Geographic Information System (GIS) techniques.

The Indonesian Rhino Conservation Program (that was originated from GEF Project and that is now has merged into YABI) and this Rhino Protection Program of YABI fully understood that the program very costly. But, it is important to bring an understanding the operation of Rhino Protection Units (RPUs) backed-up by Intelligence and Law Enforcement Unit (ILEU) is the most effective measure in protection of rhinos in the wild. Therefore it is important to develop a simultaneously funding plan for sustainability of rhino conservation program.
A new approach on rhino inventory through genetic forensic was just initiated. With collaboration of Eijkman Institute (Jakarta), RPU member were trained on method of effective collection of genetic sample out of rhino excrements and hair.

Introduction

The decline of both species of rhinoceros, Sumatran and Javan, has been in process for a long time. The population of Sumatran rhino have been reduced to 50% in the last decade and will be extinct for the next decade if there are no serious and appropriate management of rhino. Its decline in range and number in Sumatra is attributed chiefly to fragmentation of its habitat through indiscriminate forest clearance and to poaching, stimulated by the illegal trade in horns, hides and hooves, and other parts of rhino's body.

A population and Habitat Analysis conducted in November 1993 in conjunction with the IUCN SSC and its Conservation Breeding Specialist Group (CBSG) and the AsRSG revealed a significant decline in the numbers of Sumatran rhino in Indonesia. The estimates that emerged from the new data and more rigorous assessment was arround 200 (215 – 319). Meanwhile, the previous estimate had been 420 – 875. The GEF project RPU YABI estimates that until June 1998 the presence the population of Sumatran rhino in Kerinci Seblat National Park 27 – 32, Bukit Barisan Selatan National Park 40 - 50, and Way Kambas National Park 24 - 30

Although the Javan rhino population in Ujung Kulon National Park seems to be holding at about 50 –60, yet the threat of poaching still remains. The loss of rhino has become a matter of global concern. In 1994, at least one rhino was poached in Ujung Kulon and a suspect has been identified but no prosecution has in

progress at that time. Between May and June 2010, there were 3 skeleton out of carcasses of Javan rhino had been evacuated from the field without any evidence of poaching. Although rhino poaching evidence and attempt was not found during this quarter, poaching of other wildlife such as birds, langusts/lobster and other marine products were still occurring.

Saving the remaining rhino population needs further alternatives. There should be series of efforts to protect the remaining population by activating rhino patrol and strengthening its anti-poaching activities, until poacher activity and habitat destruction is reduced to the point of elimination. The other one important activity which has just been implementing "The Strategy and Acton Plan for Conservation of Indonesian Rhinos 2007 - 2017" by way of developing the Javan Rhino Study and Conservation Area (JaRhiSCA) in Ujung Kulon National Park, Banten, since last October 2010. It is unfortunate that implementation of this project received a number of concerns from parties which doesn't understand the pressing need in order to save the Javan rhino from the verge of extinction.

The Protection Program of YABI provides protection from poaching and habitat disturbance for viable nucleus populations of Sumatran and Javan Rhinos through the establishment and operation of Rhino Protection Units, and supporting management, coordination and supervisory structures. Formerly, YABI had been operated 17 Rhino Protection Units (RPUs) until middle of 2009, while due to shortage of funding in this quarter, only 16 RPUs continued their operation in and surrounding areas of Bukit Barisan Selatan (7 RPUs), Way Kambas (5 RPUs) and Ujung Kulon (4 RPUs) National Parks.

Objectives

The objective of the Program is to contribute to the long-term viable conservation and management of Indonesian rhinos (the Javan rhino – *Rhinoceros sondaicus*, and the Sumatran rhino – *Dicerorhinus sumatrensis*) and their habitats in Java and Sumatra.
The Indonesian Rhino Protection Program of YABI it self addressed to enhance the capabilities of the Directorate General of Protection and Nature Conservation and associated wildlife agencies to arrest and reverse the decline of rhinoceros due to poacher activity and habitat disturbance toward the national and global goal of recovery of viable populations of rhino species in Indonesia.

Output

1. Establishment and operate of at least 16 Rhino Protection Units (RPUs) in Sumatra and Java.
2. Establishment and operate Intelligence and Law Enforcement Unit to support law enforcement process which is undertaken by RPU and Park

authority or proceed to identify information of threats from ILEU's informants for further judicial process. .

3. Community facilitation for better livelihood and to reduce threats from surrounding community.

Changes: -

Progress:

The Rhino Protection Program of YABI provides protection from poaching and habitat disturbance for viable nucleus populations of Sumatran and Javan Rhinos through the establishment and operation of Rhino Protection Units (RPUs), and supporting management, coordination and supervisory structures. The outcome of operations of 7 RPUs in Bukit Barisan Selatan National Park (BBS NP), 5 RPUs in Way Kambas National Park (WK NP) and 4 RPUs in Ujung Kulon National Park (UK NP) is reported as seen in Annex 1 . (*RPUs Activities Report Periode July – September 2011.), as per attached.*

During the implementation of this activities such as surveys and patrols the RPU/RMPU achieved numbers of surveys, distance walked and duration of time they have consumed in every each of their activities. The Team also encountered many cases of illegal activities / offenses in the National Parks, into which prosecution had been made through filing the cases and hand over the cases to local Police Stations.
The achievements of the Protection Program for this period *July – September 2011* is described below in *Annex 1.*
Records on illegal killing of animals and other forest offenses detected by both RPUs (BBS, WK and UK) and ILEU is shown in *Annex 2.*

The field days per month of RPU's personnel is shown in Annex-1.

Intelligence and Law Enforcement Unit (ILEU) has been operating to identify the threats which come from surrounding people or outside of the Park; its operations also covers identifying possible facilitations for raising local's alternative income in order to reduce threats to the park and its rhinos . There are only 3 personnels in this unit that have to work in collaboration with informants, RPUs, Park Rangers and Police, in the case that they have a confirmed case and have to apprehend / arrest the suspect/s for further law enforcement efforts (judicial process). Although ILEU's base operation is in BBS and surroundings, they also available to assist ILEU operation in both WK and UK NPs.
ILEU's findings of their activities, together with RPU BBS findings, is reported in Annex-2,
Activation of Assistant Manager Protection (Mr. Arief Rubianto) for Sumatera has been performing , since the Manager Protection (i.e. Mr. M. Waladi Isnan) is needed to be more intensively perform as Operational Manager of Javan Rhino

Study and Conservation Area (JaRhiSCA) in Ujung Kulon National Park, Banten.

Conclusions and Recommendation :

In this period, the average number of field days per month of every person of RPU has less than required by the Program, 20 days per month.
But .RPU UK reached the highest (21.92).
RPU WK achieved 12.73 as the result of only 12 of all their 34 activities were patrols / surveys . While their other activities were involvement in other collaborative activity such as driving elephant from some plantation areas, following judicial process etc.
RPU BBS has achieved only 14.04 (higher than before 13.65) from their 29 patrols/surveys activities (of their total 47 activities). Since there is a serious action by Park Administration to remove the encroachment on rhino habitat, the RPU had been intensively involved in collaborative operation. There was also on law enforcement/investigations of cases and in wildlife-human conflict resolutions.

During their 29 patrol, there was 102 independent rhino signs encountered by RPU BBS, and 1 direct sighting.
In WK, 12 patrol / survey, there were 151 independent rhino signs encountered, and no direct sighting.
Whilst in UK, the RPU encountered 120 independent rhino signs during their 12 patrol / survey, with 1 direct sighting of one of male rhino close to Karang Ranjang guard post.

In BBS, during the surveys and patrols a total of 17 cases of illegal activity were detected. The major case encountered were encroachment and Gaharu theft. No rhino trap.
In WK, during the surveys and patrols a total of 17 cases of illegal activity were detecte, 9 snares for small mammals and 2 snares for large mammals. The major case encountered was poaching of non mammals and then encroachment.
In UK, during the surveys and patrols a total of 28 cases of illegal activity were detected. The most cases encountered were poaching / trapping non big mammals as birds, fish.

The Program had found many rhino footprints in this period but it can not be utilized to determine the number of rhino population. It still need to be analyzed with the sophisticated method (genetic forensic survey)

The Javan Rhino Study and Conservation Area (JaRhiSCA) development progress activities is reported separately..

YAYASAN BADAK INDONESIA - YABI
Rhino Foundation of Indonesia - RFI

ANNEX-1 :

QUARTERLY ACTIVITY AND PERFORMANCE REPORT

1 JULY - 30 SEPTEMBER 2011
(Q3)

BUKIT BARISAN SELATAN NATIONAL PARK

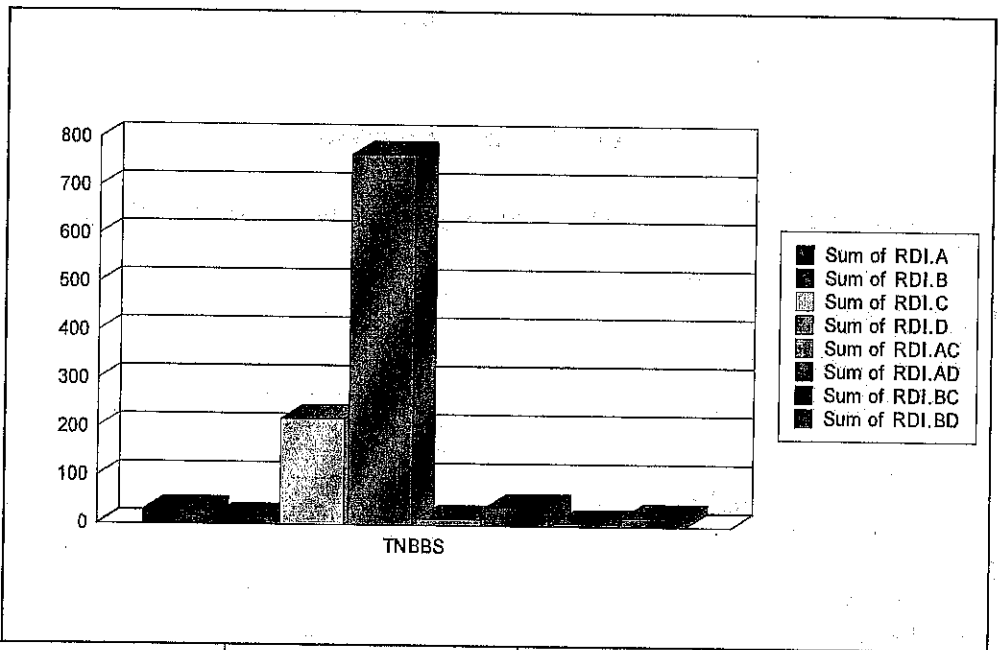
BASIC POPULATION PARAMETERS

Number of Footprints Encountered	Number of Locations with rhino signs					
	Footprints	Wallows	Feces	Feeding	Other Signs*	Direct Sighting
62	77	6	10	3	6	1

** Include Urine, Scratches, Rubbings, etc.*

During the 29 patrols / surveys in this period, 103 independent signs of rhino were encountered and 1 direct sighting

RHINO DENSITY INDICATORS



Rhino	RPU Field Presence	Density Indicators

A	B*	C	D	A/C	A/D	B/C	B/D
Number of print locations	Number of Rhino Signs*	Field Days**	Distance Walked***	Rhino prints/ 100 days	Rhino prints/ 1000 km	Rhino signs/ 100 days	Rhino signs/ 1000 km
62	**26**	**233**	**681**	**26.61**	**91.04**	**11.16**	**38.18**

(B) The total number of sign (excluding footprints) of rhino found. ** Total number of RPU group field days during surveys only (excluding other activities). *** Total number of range in kilometer covered by RPU group during surveys activity.*

ILLEGAL ACTIVITIES ENCOUNTERED

Gaharu * Theft	Encroachment	Timber Theft	Forest Product Theft	Illegal Hunting		
				Rhino / Trap	Non Rhino (Mammals)	Other
5	5	3	0	0	2	2

** Gaharu (a component for incense) theft is listed separately, because it is a major threat in any forest in Indonesia*

In BBS, during the surveys and patrols a total of 17 cases of illegal activities were detected. The major case encountered were encroachments and Gaharu theft then followed with timber theft . **No trap of rhino** encountered.
Record of cases as per what attached in **Annex – 2**, which includes : date of incidence, date of detection, type of offences, place of occurrence, evidence (forest / wildlife produces recovered, Arms /other evidence, suspects, legal status and comments.

ENCOUNTERED ANIMALS

Patrol Areas	Rhino	Elephant	Tiger	Tapir	Other	Offences
Tampang, Sinar ogan, Tjg.mas, Hulu way blambangan, Hulu way sekawat, Hulu way belimbing dsk	✓	✓	✓	✓		
Km 30, Hulu anak way bamban, Way bamban tengah, Tlg.pagelaran, Tlg.gunung batu, Km 13 dsk		✓	✓	✓		✓
Kubu perahu, Way krui, Km 17, Jala lintas liwa - krui		✓	✓	✓		
Panji wayang, Way ngambur dsk	✓			✓		✓
Pahmongan, Hulu way mahnay dsk	✓	✓	✓	✓		
Mendati, Pematang langgar dsk	✓					
Way Tenumbang, Damarpak, Pg.pius, Hulu way ngambur, Way biha, Bkt.penetoh, Suoh dsk	✓	✓		✓		✓
Km 50, Km 24, way pemerihan dsk			✓	✓		✓
Siring huwong 1,ay ngambur 1,2,3 Hulu way ngambur pangkalan, Hulu	✓			✓		

way marang dsk						
Panji wayang, Telemak, Way ngambur dsk	✓		✓	✓		
Kubu Perahu, Hulu way menterang, Hulu way tenumbang dsk	✓	✓	✓	✓	✓	
Negri ratu, Tenumbang, Kebudu, Anak way mahnay lunik dsk	✓		✓	✓		✓
Grogol, Way ngaras dsk	✓		✓	✓		
KM 50, Jalan lintas sukaraja bengkunat, Hulu way pemerihan dsk				✓		
KM 50, KM 30, Hulu wayu pemerihan dsk				✓		✓
KM 24, Hulu way bamban dsk		✓		✓		
Kubu gedung dsk		✓		✓	✓	
Ngaras, Panjiwayang, Mendati dsk		✓				
Kotaagung, Sugiwaras, Tirom dsk						✓
Tampang muda, Tanjung mas, Way biambangan, Way sulaiman, Hulu way sulaiman, Post pelepasan dsk	✓	✓	✓	✓		
Hulu way ngambur bundik dsk	✓		✓			✓
Kubu Perahu, Hulu way krui, Hulu way tenumbang, Hulu way mahnay dsk	✓	✓	✓	✓		

DETAILS OF RHINO SIGN

Patrol Area	Footprint	Direct sighting	Wallows	Feeding	Dungs	Other signs
Tampang, Sinar ogan, Tjg.mas, Hulu way blambangan, Hulu way sekawat, Hulu way belimbing dsk	0	0	1	0	1	0
Panji wayang, Way ngambur dsk	10	0	0	0	0	1
Pahmongan, Hulu way mahnay dsk	10	1	0	1	0	0
Mendati, Pematang langgar dsk	3	0	0	0	0	0
Way Tenumbang, Damarpak, Pg.pius, Hulu way ngambur, Way biha, Bkt.penetoh, Suoh dsk	2	0	0	0	2	0
Siring huwong 1,ay ngambur 1,2,3 Hulu way ngambur pangkalan, Hulu way marang dsk	6	0	1	0	0	0
Panji wayang, Telemak, Way ngambur dsk	4	0	0	0	2	1
Kubu Perahu, Hulu way menterang, Hulu way tenumbang dsk	6	0	0	0	0	0
Negri ratu, Tenumbang, Kebudu, Anak way mahnay lunik dsk	6	0	0	1	3	3
Grogol, Way ngaras dsk	1	0	2	1	0	0
Tampang muda, Tanjung mas, Way blambangan, Way sulaiman, Hulu way sulaiman, Post pelepasan dsk	0	0	1	0	0	0
Hulu way ngambur bundik dsk	8	0	1	0	2	1
Kubu Perahu, Hulu way krui, Hulu way tenumbang, Hulu way mahnay dsk	6	0	0	0	0	0

Patrol Area	Footprint	Direct sighting	Wallows	Feeding	Dungs	Other signs
Tampang, Sinar ogan, Tjg.mas, Hulu way blambangan, Hulu way sekawat, Hulu way belimbing dsk	0	0	1	0	1	0
Km 30, Hulu anak way bamban, Way bamban tengah, Tlg.pagelaran, Tlg.gunung batu, Km 13 dsk	0	0	0	0	0	0
Kubu perahu, Way krui, Km 17, Jala lintas liwa - krui	0	0	0	0	0	0
Panji wayang, Way ngambur dsk	10	0	0	0	0	1
Way ngambur dsk	0	0	0	0	0	0
Way ngambur dsk	0	0	0	0	0	0
Way ngambur dsk	0	0	0	0	0	0
Pahmongan, Hulu way mahnay dsk	10	1	0	1	0	0
Mendati, Pematang langgar dsk	3	0	0	0	0	0
Way Tenumbang, Damarpak, Pg.pius, Hulu way ngambur, Way biha, Bkt.penetoh, Suoh dsk	2	0	0	0	2	0
Km 50, Km 24, way pemerihan dsk	0	0	0	0	0	0
Siring huwong 1,ay ngambur 1,2,3 Hulu way ngambur pangkalan, Hulu way marang dsk	6	0	1	0	0	0
Panji wayang, Telemak, Way ngambur dsk	4	0	0	0	2	1
Kubu Perahu, Hulu way menterang, Hulu way tenumbang dsk	6	0	0	0	0	0
Negri ratu, Tenumbang, Kebudu, Anak way mahnay lunik dsk	6	0	0	1	3	3
Grogol, Way ngaras dsk	1	0	2	1	0	0
KM 50, Jalan lintas sukaraja bengkunat, Hulu way pemerihan dsk	0	0	0	0	0	0
KM 50, KM 30, Hulu wayu pemerihan dsk	0	0	0	0	0	0
Kubu Perahu, Way menterang, Penyungkaian, Landos, Way menguang dsk	0	0	0	0	0	0
KM 24, Hulu way bamban dsk	0	0	0	0	0	0
Mendati dsk	0	0	0	0	0	0
Hulu way pemerihan, Siwalaya, Cawang haro dsk	0	0	0	0	0	0
Kubu gedung dsk	0	0	0	0	0	0
Tampang muda, Tanjung mas, Way blambangan, Way sulaiman, Hulu way sulaiman, Post pelepasan dsk	0	0	1	0	0	0
Hulu way ngambur bundik dsk	8	0	1	0	2	1
Kubu Perahu, Hulu way krui, Hulu way tenumbang, Hulu way mahnay dsk	6	0	0	0	0	0

PATROL DATA

Location	Activities	Start Date	End Date	Days	No. of Person	Length (Km)	Remarks
Sekitar kawasan BBTNBBS, Bandar lampung, Tampang, Kaur gading, Way asahan dsk	Patrol	01 - Jul	14 - Jul	14	2	0,00	Detected information on wildlife part trading
Kotaagung, Krui, Liwa	Patrol	01 - Jul	09 - Jul	9	4	0,00	Hand-overed suspect Mr. Darwin and evidence to attorney of Liwa – krui region
Tampang, Sinar ogan, Tjg.mas, Hulu way blambangan, Hulu way sekawat, Hulu way belimbing dsk	Patrol/ Survey	07 - Jul	15 - Jul	9	4	37,5	Signs of rhino : dung and wallow.
Km 30, Hulu anak way bamban, Way bamban tengah, Tlg.pagelaran, Tlg.gunung batu, Km 13 dsk	Patrol/ Survey	07 - Jul	15 - Jul	9	4	38,5	No new signs of rhino. Signs of trespassing.
Kubu perahu, Way krui, Km 17, Jala lintas liwa - krui	Patrol/ Survey	08 - Jul	15 - Jul	8	4		No signs of rhino. Footprint of tiger, elephant, tapir and deer.
Panji wayang, Way ngambur dsk	Patrol/ Survey	14 - Jul	25 - Jul	12	1	0,00	Footprint of rhino. Detected bones of

							elephant.
Way ngambur dsk	Patrol/ Survey	15 - Jul	26 - Jul	12	1	43	Detected wallow, footprint and food.
Way ngambur dsk	Patrol/ Survey	15 - Jul	26 - Jul	12	1	59,4	Detected wallow, footprint and food.
Way ngambur dsk	Patrol/ urvey	15 - Jul	26 - Jul	12	1	51,4	Detected footprint and food of rhino. Detected of old encroachment.
Pahmongan, Hulu way mahnay dsk	Patrol/ Survey	21 - Jul	29 - Jul	9	5	55,5	Direct sighting of 1 female rhino.
Mendati, Pematang langgar dsk	Patrol/ Survey	21 - Jul	28 - Jul	8	4	30	Detected foot-print, dung and other sign (tilt leaves)
Way Tenumbang, Damarpak, Pg.pius, Hulu way ngambur, Way biha, Bkt.penetoh, Suoh dsk	Patrol/ Survey	21 - Jul	30 - Jul	10	4	47,5	Detected rhino sigms : foot-print; faeces. Signs of bird trapping.
Km 50, Km 24, way pemerihan dsk	Patrol/ Survey	28 - Jul	31 - Jul	4	2	0,00	Detected and inactivated 1 snare for deer . Signs of tiger, elephant and tapir.
Siring huwong 1,ay ngambur 1,2,3 Hulu way ngambur pangkalan, Hulu way marang dsk	Patrol/ Survey	21 - Jul	29 - Jul	9	3	37,6	Rhino foot-prints. No illegal activity.
Gisting, Kantor balai TNBBS, Way ngambur, Hulub way	Training	11 - Jul	18 - Jul	8	2	0,00	Training aqupanccy dan hostpot

ngambur (free survey)							
Taman Nasional Gunung Lauser	Training	07 - Jul	05 - Agu	29	2	80	No new rhino signs. Detected new illegal activities. i.e. bierd trapping, fishing, gaharu collecting.
Panji wayang, Telemak, Way ngambur dsk	Patrol/ Survey	04 - Agu	11 - Agu	8	2	0,00	New dung of rhino and other signs.
Kubu Perahu, Hulu way menterang, Hulu way tenumbang dsk	Patrol/ Survey	07 - Agu	16 - Agu	10	5	37	Rhino foot-print.
Negri ratu, Tenumbang, Kebudu, Anak way mahnay lunik dsk	Patrol/ Survey	07 - Agu	15 - Agu	9	7	45	Detected new signs of rhino, i.e. 2 male and 1 sub adult Detected signs of old gahuru collecting.
Grogol, Way ngaras dsk	Patrol/ Survey	08 - Agu	15 - Agu	8	4	40	Signs of rhino and other big mammals.
KM 50, Jalan lintas sukaraja bengkunat, Hulu way pemerihan dsk	Patrol/ Survey	15 - Agu	20 - Agu	6	1	0,00	Detected of trespassing
KM 50, KM 30, Hulu wayu pemerihan dsk	Patrol/ Survey	21 - Agu	27 - Agu	7	2	0,00	Detected of 11 trespassers passed.
Sukaraja atas, Pal 50, Pemerihan, Tlg.gisting, Tlg.remaja, Pintau dsk	Patrol	29 - Agu	29 - Agu	1	2	0,00	Patrol using 2 units motorcycles. No illegal activities .
Kubu Perahu, Way menterang, Penyungkaian,	Patrol/ Survey	20 - Agu	26 - Agu	7	5	0,00	No illegal activities .

Landos, Way menguang dsk							
KM 24, Hulu way bamban dsk	Patrol/ Survey	20 - Agu	25 - Agu	6	5	27,5	No rhino signs. Detected foot-print of elephant and deer.
Mendati dsk	Patrol/ Survey	20 - Agu	25 - Agu	6	5	0,00	No illegal activities.
Hulu way pemerihan, Siwalaya, Cawang haro dsk	Patrol/ Survey	20 - Agu	25 - Agu	6	5	11,01	No illegal activities No sign of rhino.
Krui, Kubu perahu, Liwa, Suoh dsk	Patrol	21 - Agu	25 - Agu	5	2	0,00	No illegal activities
Kubu gedung dsk	Patrol/ Survey	07 - Agu	15 - Agu	9	3	0,00	No new signs of rhino. Foot-prints of elephant, tiger, tapir etc.
Pemerihan, Blok 7, Kebudu, Panjiwayang dsk	Patrol	24 - Agu	28 - Agu	5	2	0,00	No illegal activities
Banding, Blok 3, Blok 8, Pungkalan, Gunung malang, Sukajadi, Suoh dsk	Patrol	01 - Sep	03 - Sep	3	2	0,00	No illegal activities
Pos Dal RPU BBTNBBS	Collaborative operation	11 - Sep	14 - Sep	4	2	0,00	Team for re-construction of border marks.
Ngaras, Panjiwayang, Mendati dsk	Patrol	11 - Sep	18 - Sep	8	2	0,00	Signs of 1 elephant. In Siring Lili Pardasuka Ngaras, Bengkunat area. No poaching . No illegal logging.

KM 50, KM 30, Pemerihan, Jalan lintas sukaraja-bengkunat dsk	Patrol	13 - Sep	19 - Sep	7	3	0,00	Detected signs of trespassing
Kotaagung dsk	Patrol	03 - Sep	08 - Sep	6	2	0,00	Detected sawn timber with no owner in Sugiwaras. Detected rumors on elephant tusk trading. In city Metro (central Lampung), dent from Bengkunat.
Pal 50, Pemerihan, Batu balai dsk	Patrol	04 - Sep	05 - Sep	2	2	0,00	No illegal activities.
Sukaraja atas, Pal 50, Pemerihan, Panjiwayang, Batu balai dsk	Patrol	02 - Sep	03 - Sep	2	2	0,00	No illegal activities encountered.
Kotaagung, Sugiwaras, Tirom dsk	COOLABORATIVE OPERATION	09 - Sep	11 - Sep		8	0,00	Arrested 1 suspect of illegal and evidence sawn timber.
Tampang muda, Tanjung mas, Way blambangan, Way sulaiman, Hulu way sulaiman, Post pelepasan dsk	Patrol/ Survey	13 - Sep	22 - Sep	10	6	30	No rhino signs. Detected foot-print of elephant, tapir and tiger.
Hulu way ngambur bundik dsk	Patrol/ Survey	18 - Sep	27 - Sep	10	4	19,2	No illegal activities k Detected sign of rhino.
Kubu Perahu, Hulu way krui, Hulu way tenumbang, Hulu way mahnay dsk	Patrol/ Survey	18 - Sep	27 - Sep	10	4	40,5	Detected signs of rhino , tiger, elephant and tapir.

Pal 50 dsk	Guest guiding	20 - Sep	24 - Sep	5	2	0,00	Guest guiding berjalan lancar No illegal activities.
Pengenan II, Gunung kukusan, sukamaju, Kaur gading dsk	Collaborative operation	19 - Sep	26 - Sep	8	5	35	Destroyed encroachment about 51 ha of all 100 ha. i.e. coffee plantation.
Sinar laut, Peninggaman dsk	Collaborative operation	16 - Sep	18 - Sep	3	6	11	Arrested 3 suspect of encroachers in Sinar laut area (Mr. Muhtar and 2 others).
Sukaraja atas, Pal 50, Ngaras dsk	Patrol	26 - Sep	30 - Sep	5	2	0,00	No elephant disturbed
Pos Dal RPU BBTNBBS	Meeting	11 Sep	12 - Sep	1	25	0,00	Coordination

GENERAL PERFORMANCE PARAMETERS

Number of general activities	47
Number of Patrol and Surveys	29
Distance Walked (Kilometers)	807,81
Distance Walked for Patrol and Survey	681,81
Number of Field Days	352
Number of Field Days for Patrol and Survey	233
Field Days per-person per-month	14.08

A total of 47 activities were conducted during the 3th quarter (July - September) of the year and among of them were 29 activities of patrol/surveys, which covers 681.81 km and field days 14.08 days per person per month. The field days in this quarter is lower than previous one, because of their involvement in collaborative operation with The Park Administration to remove encroachments and wildlife conflict resolution.

PROGRAM PERSONNEL

(Summary of Field Days Per-Person Per-Month 1 July – 30 September 2011)

Personnel	Days	Average Field days / month	
Agung S	54	18,00	*3 (month)*
Agus Sulaeman	46	15,33	*3 (month)*
Bahara	31	10,33	*3 (month)*
Budiono	36	18,00	*2 (month)*
Edi Rusmanto	24	12,00	*2 (month)*
Hendra Wijaya	29	9,67	*3 (month)*
Heryanto	51	17,00	*3 (month)*
Jalisi	44	14,67	*3 (month)*
Madnurzen	52	17,33	*3 (month)*
Maris Feriyadi	33	11,00	*3 (month)*
Marsum	51	17,00	*3 (month)*
Merli Aroc Hulu	38	12,67	*3 (month)*
Nang Jamadi	20	6,67	*3 (month)*
Olih	45	15,00	*3 (month)*
Rahmari	40	13,33	*3 (month)*
Romianto	47	15,67	*3 (month)*
Samsurizal	52	17,33	*3 (month)*
Saptono	45	15,00	*3 (month)*
Sinyo Handoko	50	16,67	*3 (month)*
Sudari	45	15,00	*3 (month)*
Suharsono	55	18,33	*3 (month)*
Syahroni	39	13,00	*3 (month)*
Teguh Taryono	43	14,33	*3 (month)*
Timbul TB	50	16,67	*3 (month)*
Toho	43	14,33	*3 (month)*
Uga Yogaswara	27	9,00	*3 (month)*
Zen Afrial	45	15,00	*3 (month)*
Zulkifli	18	6,00	*3 (month)*

Other personnels :

1.	Titus Ramadhani	Field Coordinator (Formerly was as Administrative and Finance staff of RPU BBS)
2.	Maman	Administrative and Finance staff of RPU BBS
3.	Nasarius S. Waja	Driver-1
4.	Suparmin	Driver-2
5.	Era Herawati	Cook-1
6.	Wawah	Cook-2
7.	Hari Saputra	Office boy-1
8.	Rubianto	Office boy-2

WAY KAMBAS NATIONAL PARK

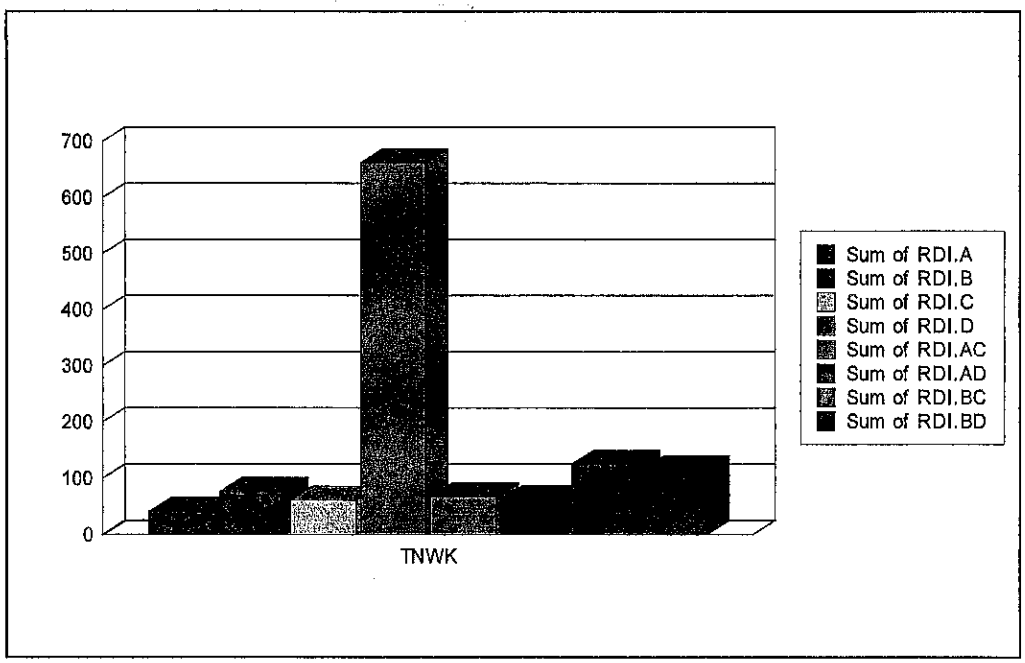
BASIC POPULATION PARAMETERS

Number of Footprints	Number of Locations with rhino signs					
	Footprints	Wallows	Feces	Feeding	Other Signs*	Direct Sighting
46	70	5	30	4	42	0

- *Include Urine, Scratches, Rubbings, etc.*

During the 12 Patrols/Surveys in this period, 151 independent signs of rhino were encountered but no direct sighting.

RHINO DENSITY INDICATORS



Rhino		RPU Field Presence		Density Indicators			
A	B*	C	D	A/C	A/D	B/C	B/D
Number of print locations	Number of Rhino Signs*	Field Days**	Distance Walked***	Rhino prints/ 100 days	Rhino prints/ 1000 km	Rhino signs/ 100 days	Rhino signs/ 1000 km
41	**76**	**61**	**662.00**	**67.21**	**61.93**	**124.59**	**114.80**

(B) The total number of sign (excluding footprints) of rhino found. ** Total number of RPU group field days during surveys only (excluding other activities). *** Total number of range in*

kilometer covered by RPU group during surveys activity.

ILLEGAL ACTIVITIES ENCOUNTERED

Gaharu * Theft	Encroachment	Timber Theft	Forest Product Theft	Illegal Hunting		
				Rhino / Trap	Non Rhino (Mammals)	Other
2	4	1	0	1	3	6

** Gaharu (a component for incense) theft is listed separately, because it is a major threat in any forest in Indonesia*

In WK, during the surveys and patrols a total of 17 cases of illegal activities were detected. The major case encountered was illegal hunting of non mammals , and followed by encroachment and illegal hunting of non rhino mammals. 1 trap of rhino encountered.

Record of cases as per attached in **Annex – 2**, which includes : date of incidence, date of detection, type of offenses, place of occurrence, evidence (forest / wildlife produces recovered, Arms /other evidence, suspect, legal status and comments.

ENCOUNTERED ANIMALS

Patrol Areas	Rhino	Elephant	Tiger	Tapir	Other	Offences
Susukan Baru, Camp 5000, Sentral Wako	√		√			√
Susukan Baru, Camp 5000, Sentral Wako	√	√				√
Tegal Yoso, Toto Projo		√				
Sungai Kuala Seputih, Sungai Bayan						√
Susukan Baru, Central Wako, Wako Benteng	√		√			√
D2, Hulu Kali Biru, D2	√					√
Plang Hijau dan sekitarnya						√
D1, Kambas Kecil, D1		√	√	√		
Susukan Baru, Beruang, Lempuk wako benteng	√					√
D2, Rawa Badak	√	√	√			
D2, Rawa Badak	√	√		√		
PLG						√
Susukan Baru, Camp 5000, Sentral Wako	√	√				√
Gubug Asbes RPTN Rawa Bunder						√
Susukan Baru, Camp	√					√

5000, sentral Wako, Mundu						
Plang Hijau, PLG, Braja Kencana		√		√		√
Susukan Baru, Wako Atas, Bincung						√
Braja Kencana, Braja Luhur		√				
D2, Cengok, Tangkil	√					

DETAILS OF RHINO SIGN

Patrol Areas	Footprint	Direct Sign	Wallow	Fedding	Dung	Other sign
Susukan Baru, Camp 5000, Sentral Wako	2	0	0	0	1	3
Way Kanan, Kali Biru	0	0	0	0	0	0
Susukan Baru, Camp 5000, Sentral Wako	1	0	0	0	0	2
Susukan Baru, Central Wako, Wako Benteng	5	0	0	0	7	5
D2, Hulu Kali Biru, D2	7	0	2	1	3	7
D1, Kambas Kecil, D1	0	0	0	0	0	0
Susukan Baru, Beruang, Lempuk wako benteng	4	0	0	0	6	2
D2, Rawa Badak	4	0	0	2	2	3
D2, Rawa Badak	5	0	1	1	4	11
Susukan Baru, Camp 5000, Sentral Wako	11	0	1	0	3	6
Susukan Baru, Camp 5000, sentral Wako, Mundu	1	0	0	0	1	1
D2, Cengok, Tangkil	6	0	1	0	3	2

PATROL DATA

Location	Activities	Start Date	End Date	Days	Person	Length (km)	Remark
Desa Labuhan Ratu VI	Elephant conflict (Drive Elephants)	2 - Jul	3 - Jul	2	4	3,00	Success to drive elephants back to the forest
Rawa Bunder, Rawa Kerek, Plang Hijau	Patrol	5 - Jul	6 - Jul	2	4	4,00	Detected an illegal activity
Lapangan Kecamatan	Ceremony of independent	17 - Agust	17 - Agust	1	9	0,00	Done

Labuhan Ratu	day						
Plang Hijau dan sekitarnya	Patrol	12 - Agust	13 - Agust	2	4	2,00	Inactivated 14 active traps for deer.
D2, Rawa Badak	Patrol/ Survey	20 - Agust	23 - Agust	4	4	12,00	Rhino dungs
Susukan Baru, Wako Atas, Bincung	Patrol	23 - Sep	28 - Sep	6	8	76,00	Detected an old fishing signs. Detected a water buffalo inside the forest.
Braja Kencana, Braja Luhur	Patrol	21 - Sep	22 - Sep	2	4	4,30	Detected a rumor about dead elephant.
Desa Margahayu	Assisted survey on livestock diseases	11 - Jul	11 - Jul	1	3	0,00	Able to collect blood sample of 12 livestock (water buffalo and cattle .
Plang Hijau dan sekitarnya	Assissted survey on livestock disease	19 - Jul	19 - Jul	1	3	0,00	Collect blood sample from Plang Hijau (10 cattles)
Susukan Baru, Camp 5000, sentral Wako, Mundu	Patrol /Survey	15 - Sep	19 - Sep	5	5	92,00	Detected illegal activit y (fire and fishing)..
Susukan Baru, Camp 5000, Sentral Wako	Patrol/ Survey	24 - Jul	29 - Jul	6	20	96,20	Inactivated 1 bat trap.
Tegal Yoso, Toto Projo	Elephant conflict (Drive Elephants)	6 - Jul	9 - Jul	4	4	0,00	Success to drive elephants back to the forest
Sungai Kuala Seputih, Sungai Bayan	Patrol	23 - Jul	24 - Jul	2	4	0,00	Detected illegal signs of old activity
Susukan Baru, Central Wako, Wako Benteng	Patrol/ Survey	5 - Agust	10 - Agust	6	11	110,00	Detected signs of tiger and rhino. Collected 6 dung samples.

D2, Rawa Badak	Patrol/Survey	20 - Agust	24 - Agust	5	4	0,00	Detected signs of rhino and elephant. Collected 3 dung samples.
PLG	Forest fire suppression	8 - Sep	8 - Sep	1	6	0,00	Suppressed fire
Susukan Baru, Camp 5000, Sentral Wako	Patrol/ Survey	9 - Sep	15 - Sep	7	7	80,30	Signs of trespassing. Detected foot-print of 1 female and 1 juvenile.
Kuala Kambas dan sekitarnya	Patrol	10 - Sep	14 - Sep	5	8	41,70	Detected fishermen activities in Kuala Kambas. Boat repairing
Kantor RPU BBS	Meeting	16 - Sep	19 - Sep	4	3	0,00	Coordination
Gubug Asbes RPTN Rawa Bunder	Patrol	21 - Sep	21 - Sep	1	6	6,20	Signs of poaching.
Karetan RPTN Rawa Bunder	Patrol	30 - Sep	30 - Sep	1	3	0,80	Signs of illegal activity.
Pos Kali Biru, Kali Biru Atas	Patrol	2 - Jul	3 - Jul	2	4	5,00	Detected a group of elephant in the river bank of way kanan
Tegal Yoso, Toto Projo	Assist survey on livestock diseases	7 - Jul	8 - Jul	2	4	0,00	Collected t 6 samples of cattle and 6 samples of buffalo
Susukan Baru, Camp 5000, Sentral Wako	Patrol /Survey	12 - Jul	16 - Jul	5	16	90,00	Detected after fire areas. Detected signs of tiger, tapir and rhino.
Way Kanan, Kali Biru	Patrol/ Survey	21 - Jul	22 - Jul	2	4	22,50	No rhino signs

Kambas Kecil dan sekitarnya	Patrol	23 - Jul	23 - Jul	1	6	22,50	No illegal activities.
D1, Kambas Kecil, D1	Patrol/Survey	18 - Agust	22 - Agust	5	4	13,50	Detected sign of elephant, tiger and tapir. No illegal activity.
SRS, D2, SRS	Guest guiding	22 - Sep	22 - Sep	1	4	7,00	Well done
D2, Hulu Kali Biru, D2	Patrol/ Survey	5 - Agust	9 - Agust	5	6	18,50	Rhino signs : dung, urine, fott-print, scratch Detected signs of fishing.
Pengadilan Negeri Sukadana	Court session	15 - Agust	15 - Agust	1	4	0,00	Waiting for sentence / punishment
Susukan Baru, Beruang, Lempuk wako benteng	Patrol/ Survey	19 - Agust	24 - Agust	6	5	96,80	Detected after fire area- Detected sign of rhino and tiger.
Plang Hijau, Way Kanan	Provide water for wildlife r	19 - Sep	19 - Sep	1	12	3,60	100 pockets of water for wildlife inside the Park.
Plang Hijau, PLG, Braja Kencana	Patrol	23 - Sep	25 - Sep	3	9	13,50	Inactivated 8 traps for wildpig. Early detected 3 people who will trap birds. Found dead elephant in kopi area,.
D2, Cengok, Tangkil	Patrol/ Survey	28 - Sep	2 - Okt	5	9	30,20	No rhino signs.

GENERAL PERFORMANCE PARAMETERS

Number of general activities	**34**
Number of Patrol and Surveys	**12**
Distance Walked (Kilometers)	**851,6**
Distance Walked for Patrol and Survey	**662,0**
Number of Field Days	**107**
Number of Field Days for Patrol and Survey	**61**
Field Days per-person per-month	**12,73**

A to tal o f 34 a ctivities w ere c onducted d uring t he 3th quarterly (July – Sepember) **of the year and among of them were 12.73 activities of patrol/surveys, which** covering 662.0 km and field-days 1 days per person per month. It's lower than previous one (18.04), because of their involvement on collaborative operation with Park Administration (encroachment, driving elephant attack to agriculture etc), and other activities.

PROGRAM PERSONNEL

(Summary of Field Days Per-Person Per-Month 1 Juli – 30 September 2011)

Personnel	Days	Average Field days / month
Agus Riadi	23	7,67 (3 Month)
Amrodi	37	12,33 (3 Month)
Aris Hendriyanto	44	14,67 (3 Month)
Balyan Irawadi	50	16,67 (3 Month)
Bambang Meiyono	50	16,67 (3 Month)
Bonari	37	12,33 (3 Month)
Boston Kaloko	22	7,33 (3 Month)
Daryono	42	14,00 (3 Month)
Encang Sutarma	39	13,00 (3 Month)
Ferry Agus Bangun	45	15,00 (3 Month)
Joko Iswanto	21	7,00 (3 Month)
Muslimin	44	14,67 (3 Month)
Nur Basuki	41	13,67 (3 Month)
Nurhadi	36	12,00 (3 Month)
Sugondo	39	13,00 (3 Month)
Suhadi	26	8,67 (3 Month)
Sujoko	48	16,00 (3 Month)
Supriyono	48	16,00 (3 Month)
Totok Riyadi	29	9,67 (3 Month)
Yusuwardi	43	14,33 (3 Month)

Other personnels :

1.	Hartato	Field Coordinator
2.	Rosdi Hartono	Adinistrative and Finance Officer
3.	Suyana	Driver
4.	Yahmin	Boat driver
5.	Suparmi	Cook
6.	Dede Rahmat	Office boy

UJUNG KULON NATIONAL PARK

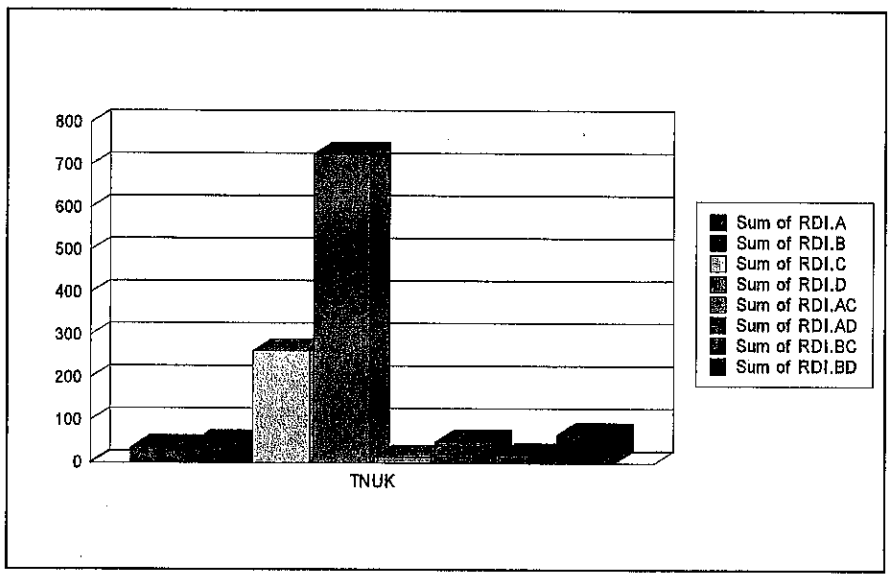
BASIC RHINO POPULATION PARAMETERS

No. Of Case Footprint Encountered	Number of Footprints	Wallow	Feces	Feeding	Other Signs*	Direct Sighting
36	72	6	3	38	1	0

** Include Urine, Scratches, Rub*

During the 12 Patrols/Surveys in this period, 156 independent signs of rhino were encountered, no direct sighting.

RHINO DENSITY INDICATORS



Rhino		RPU Field Presence		Density Indicators			
A	B*	C	D	A/C	A/D	B/C	B/D
Number of print locations	Number of Rhino Signs*	Field Days**	Distance Walked***	Rhino prints/ 100 days	Rhino prints/ 1000 km	Rhino signs/ 100 days	Rhino signs/ 1000 km
36	**48**	**263**	**726**	**13,69**	**49,59**	**18,25**	**66,12**

(B) The total number of sign (excluding footprints) of rhino found. ** Total number of RPU group field days during surveys only (excluding other activities). *** Total number of range in kilometer covered by RPU group during surveys activity.*

ILLEGAL ACTIVITIES ENCOUNTERED

Encroachment	Timber Theft	Forest Product Theft	Illegal Hunting		
			Rhino / Trap	Non Rhino (Mammals)	Other
5	0	0	0	0	23

In UKulon, during the surveys and patrols a total of 28 cases of illegal activity were detected. The all case encountered was s poaching / trapping other big mammals as birds, fishing. **No trap for rhino** encountered.
Record of cases as per attached in **Annex – 2**, which including : date of incidence, date of detection, type of offences, place of occurrence, evidence (forest / wildlife produces recovered, Arms / other evidence, suspect, legal status and comments).

ENCOUNTERED ANIMALS

Patrol Area	√ = encountered			
	Rhino	Banteng (wild cattle)	Other Mammal	Offences
Taman jaya, Cikarang, Cigenter, P. Handeulem	√	√	√	√
Taman jaya Karang ranjang, Bandawoh, Cikeusik, Transek 10, Rorah daon, Cihandeuleum, Cigenter, Cikeuyeup, Cicangketek, Citengah	√	√	√	
Cikembang, Cibom, Tj Layar, Cidaon citerjun	√	√		√
Tamanjaya, Lg Pakis, cilintang, solokan duyung, Cikalejetan Ermokla	√	√	√	
Tamanjaya,DAS Cilintang, Ciperepet, Cisimping, Pamanggangan, Cikabembem, cangkeuteuk, Citengah, Citelang, Nyawaan, Citerjun, Talanca, Cidaon, Cibom, Tj Layar, Kp Salam, Peuteuy, Sempur, Tj Girang, Cimenteng, Paniis	√	√	√	√
Tamanjaya,DAS Cilintang, Ciperepet, Cisimping, Pamanggangan, Cikabembem, cangkeuteuk, Citengah, Citelang, Nyawaan, Citerjun, Talanca, Cidaon, Cibom, Tj Layar, Kp Salam, Peuteuy, Sempur, Tj Girang, Cimenteng, Paniis	√	√	√	√
Tamanjaya,DAS Cilintang, Ciperepet, Cisimping, Pamanggangan, Cikabembem, cangkeuteuk, Citengah, Citelang, Nyawaan, Citerjun, Talanca, Cidaon, Cibom, Tj Layar, Kp Salam, Peuteuy, Sempur, Tj Girang, Cimenteng, Paniis	√	√	√	√
Tamanjaya,DAS Cilintang, Ciperepet, Cisimping, Pamanggangan, Cikabembem, cangkeuteuk, Citengah, Cikalejetan, Ciermokla, Cegog, Cimahi, Cipakis,	√	√		√

Patrol Area	√= encountered			
	Rhino	Banteng (wild cattle)	Other Mammal	Offences
Tamanjay, P.Handeulem, Cikabembem, Citengah, Cicangketeuken, Cikeuyeup, Cigenter, Balagadigi, Kp Peuteuy, Salam, Cikawung, Cimenteng, Paniis	√	√	√	√
Tamanjay, P.Handeulem, Cikabembem, Citengah, Cicangketeuken, Cikeuyeup, Cigenter, Balagadigi, Kp Peuteuy, Salam, Cikawung, Cimenteng, Paniis	√	√	√	√
Tamanjaya, P.Handeuleum, Lg Ajag, P.Peucang, Cidaon, Cibunar, Ciujung kulon, Talanca, Citerjun, Cinogar	√	√	√	
Tamanjaya, Lg pakis, Cikalejetan, Errmokla, Cibangkonol, cilintang, Kp Salam	√		√	

DETAILS OF RHINO SIGN

No.	Patrol Area	Footprints	Direct Sighting	Wallow	Feeding	Dung	Other Signs
1.	Taman jaya, Cikarang, Cigenter, P. Handeulem	4	0	1	0	0	0
2.	Taman jaya Karang ranjang, Bandawoh, Cikeusik, Transek 10, Rorah daon, Cihandeuleum, Cigenter, Cikeuyeup, Cicangketek, Citengah	10	0	2	5	1	1
3.	Cikembang, Cibom, Tj Layar, Cidaon citerjun	2	0	0	o	0	0
4.	Tamanjaya,Legon Pakis, Cilintang, Solokan Duyung, Cikalejetan Ermokla	1	0	1	0	0	0
5.	Tamanjaya,DAS Cilintang, Ciperepet, Cisimping, Pamanggangan, Cikabembem, cangkeuteuk, Citengah, Citelang, Nyawaan, Citerjun, Talanca, Cidaon, Cibom, Tj Layar, Kp Salam, Peuteuy, Sempur, Tj Girang, Cimenteng, Paniis	1	0	0	o	0	0
6.	Tamanjaya,DAS Cilintang, Ciperepet, Cisimping, Pamanggangan, Cikabembem, cangkeuteuk, Citengah, Citelang, Nyawaan, Citerjun, Talanca, Cidaon, Cibom, Tj Layar, Kp	1	0	0	o	0	0

	Salam, Peuteuy, Sempur, Tj Girang, Cimenteng, Paniis						
7.	Tamanjaya,DAS Cilintang, Ciperepet, Cisimping, Pamanggangan, Cikabembem, cangkeuteuk, Citengah, Citelang, Nyawaan, Citerjun, Talanca, Cidaon, Cibom, Tj Layar, Kp Salam, Peuteuy, Sempur, Tj Girang, Cimenteng, Paniis	1	0	0	o	0	0
8.	Tamanjaya,DAS Cilintang, Ciperepet, Cisimping, Pamanggangan, Cikabembem, cangkeuteuk, Citengah, Cikalejetan, Ciermokla, Cegog, Cimahi, Cipakis,	3	0	0	1	0	0
9.	Tamanjay, P.Handeulem, Cikabembem, Citengah, Cicangketeuken, Cikeuyeup, Cigenter, Balagadigi, Kp Peuteuy, Salam, Cikawung, Cimenteng, Paniis	3	0	0	4	0	0
10.	Tamanjay, P.Handeulem, Cikabembem, Citengah, Cicangketeuken, Cikeuyeup, Cigenter, Balagadigi, Kp Peuteuy, Salam, Cikawung, Cimenteng, Paniis	3	0	0	4	0	0
11.	Tamanjaya, P.Handeuleum, Lg Ajag, P.Peucang, Cidaon, Cibunar, Ciujung kulon, Talanca, Citerjun, Cinogar	2	0	0	0	0	0
12.	Tamanjaya, Lg pakis, Cikalejetan, Ermokla, Cibangkonol, cilintang, Kp Salam	3	0	2	24	1	0

PATROL DATA

Location	Activity	Start Date	End Date	Days	No of Person	Length (Km)	Remarks
Taman jaya, Cikarang, Cigenter, P. Handeulem	Patrol/ Survey	5 Jul	25 Jul	21	4	35,39	Detected sign of rhino. Sign of bird trapping.

Taman jaya Karang ranjang, Bandawoh, Cikeusik, Transek 10, Rorah daon, Cihandeuleum, Cigenter, Cikeuyeup, Cicangketek, Citengah	Patrol/Survey	5 Agust	27 Agust	23	4	87,38	No illegal activity
Cikembang, Cibom, Tj Layar, Cidaon citerjun	Patrol/Survey	5 Sept	25 Sept	21	4	62,535,00	Detected foot-print, food and dung of rhino. Detected tresspasing.
Tamanjaya,Legon Pakis, Cilintang, Solokan Duyung, Cikalejetan Ermokla	Patrol/Survey	5 Jul	25 Juli	24	4	78,53	Detected foot-print, food and dung of rhino. Detected tresspasing.
Tamanjaya,DAS Cilintang, Ciperepet, Cisimping, Pamanggangan, Cikabembem, cangkeuteuk, Citengah, Citelang, Nyawaan, Citerjun, Talanca, Cidaon, Cibom, Tj Layar, Kp Salam, Peuteuy, Sempur, Tj Girang, Cimenteng, Paniis	Patrol/Survey	5 Agust	27 Agust	23	4	87,38	No illegal activity
Tamanjaya,DAS Cilintang, Ciperepet, Cisimping, Pamanggangan, Cikabembem, cangkeuteuk, Citengah, Citelang, Nyawaan, Citerjun, Talanca, Cidaon, Cibom, Tj Layar, Kp Salam, Peuteuy, Sempur, Tj Girang, Cimenteng, Paniis	Patrol/Survey	5 Sept	25 Sept	21	4	62,535,00	Detected foot-print, food and dung of rhino. Detected tresspasing.

Tamanjaya,DAS Cilintang, Ciperepet, Cisimping, Pamanggangan, Cikabembem, cangkeuteuk, Citengah, Citelang, Nyawaan, Citerjun, Talanca, Cidaon, Cibom, Tj Layar, Kp Salam, Peuteuy, Sempur, Tj Girang, Cimenteng, Paniis	Patrol/Survey	5 Jul	25 Jul	21	4	22,00	Detected foot-print of rhino. Detected tresspasing.
Tamanjaya,DAS Cilintang, Ciperepet, Cisimping, Pamanggangan, Cikabembem, cangkeuteuk, Citengah, Cikalejetan, Ciermokla, Cegog, Cimahi, Cipakis,	Patrol/Survey	5 Agust	27Agust	23	4	87,38	No illegal activity
Tamanjaya, P.Handeuleum, Lg Ajag, P.Peucang, Cidaon, Cibunar, Ciujung kulon, Talanca, Citerjun, Cinogar	Patrol/Survey	5 Sept	25 Sept	21	4	23,337,00	Detected foot-print and dung of rhino. No illegal activity
Tamanjaya, Legon pakis, Cilintang, Solokan Duyung, Cikalejetan, Ermokla	Patrol/Survey	5 Jul	25 Jul	21	4	77,86	Detected rhino foot-print and wallow

Tamanjaya, Cilintang, Ciperepet, Cisimping, Pamanggangan, DAS Cikabembem, Cihandeuleum, Cicangketek, Citengah, Cipamageran, Cikarang, Cicangkok, Cikalejetan, Ciermokla, Cegog, Cimahi, Cipakis, Lg Pakis	Patrol/Survey	5 Agust	27 Agust	23	4	50,62	Detected rhino foot-print , food and wallow. Detected tresspasing
Tamanjaya, Lg pakis, Cikalejetan, Ermokla, Cibangkonol, cilintang, Kp Salam	Patrol/ Survey	5 Sept	25 Sept	21	4	51,72	Detected rhino foot-print , food and wallow. No illegal activity.

Location	Activity	Start Date	End Date	Days	No of Person	Length (Km)	Remarks
Taman jaya, Cikarang, Cigenter, P. Handeulem	Patrol /Survey	5 Jul	25 Jul	21	4	35,39	Detected rhino foot-print. Detected bird trapping.
Taman jaya Karang ranjang, Bandawoh, Cikeusik, Transek 10, Rorah daon, Cihandeuleum, Cigenter, Cikeuyeup, Cicangketek, Citengah	Patrol /Survey	5 Agust	27 Agust	23	4	87,38	No Illegal actvity
Cikembang, Cibom, Tj Layar, Cidaon citerjun	Patrol /Survey	5 Sept	25 Sept	21	4	62,535,00	Detected rhino foot-print. Food, dung . Detected tresspasing.
Tamanjaya,Legon Pakis, Cilintang, Solokan Duyung, Cikalejetan Ermokla	Patrol /Survey	5 Jul	25 Juli	24	4	78,53	Detected rhino foot-print. Food, dung. Detected tresspasing.

Tamanjaya,DAS Cilintang, Ciperepet, Cisimping, Pamanggangan, Cikabembem, cangkeuteuk, Citengah, Citelang, Nyawaan, Citerjun, Talanca, Cidaon, Cibom, Tj Layar, Kp Salam, Peuteuy, Sempur, Tj Girang, Cimenteng, Paniis	Patrol /Survey	5 Agust	27 Agust	23	4	87,38	No illegal activity
Tamanjaya,DAS Cilintang, Ciperepet, Cisimping, Pamanggangan, Cikabembem, cangkeuteuk, Citengah, Citelang, Nyawaan, Citerjun, Talanca, Cidaon, Cibom, Tj Layar, Kp Salam, Peuteuy, Sempur, Tj Girang, Cimenteng, Paniis	Patrol/ Survey	5 Sept	25 Sept	21	4	62,535,00	Detected rhino foot-print, food and dung. Detected tresspasing.
Tamanjaya,DAS Cilintang, Ciperepet, Cisimping, Pamanggangan, Cikabembem, cangkeuteuk, Citengah, Citelang, Nyawaan, Citerjun, Talanca, Cidaon, Cibom, Tj Layar, Kp Salam, Peuteuy, Sempur, Tj Girang, Cimenteng, Paniis	Patrol/ Survey	5 Jul	25 Jul	21	4	22,00	Detected rhino foot-print. No illegal activity.
Tamanjaya,DAS Cilintang, Ciperepet, Cisimping, Pamanggangan, Cikabembem, cangkeuteuk, Citengah, Cikalejetan, Ciermokla, Cegog, Cimahi, Cipakis,	Patrol/ Survey	5 Agust	27Agu st	23	4	87,38	No illegal activity.

Tamanjaya, P.Handeuleum, Lg Ajag, P.Peucang, Cidaon, Cibunar, Ciujung kulon, Talanca, Citerjun, Cinogar	Patrol/ Survey	5 Sept	25 Sept	21	4	23,337,00	Detected rhino foot-print, and dung. No illegal activity.
Tamanjaya, Legon pakis, Cilintang, Solokan Duyung, Cikalejetan, Ermokla	Patrol/ Survey	5 Jul	25 Jul	21	4	77,86	Detected rhino foot-print and wallow.
Tamanjaya, Cilintang, Ciperepet, Cisimping, Pamanggangan, DAS Cikabembem, Cihandeuleum, Cicangketek, Citengah, Cipamageran, Cikarang, Cicangkok, Cikalejetan, Ciermokla, Cegog, Cimahi, Cipakis, Lg Pakis	Patrol/ Survey	5 Agust	27 Agust	23	4	50,62	Detected rhino foot-print, food, wallow. Detected illegal activity.
Tamanjaya, Lg pakis, Cikalejetan, Ermokla, Cibangkonol, cilintang, Kp Salam	Patrol/ Survey	5 Sept	25 Sept	21	4	51,72	Detected rhino foot-print, food, wallow No Illegal activity.

GENERAL PERFORMANCE PARAMETERS

Number of general activities	**12**
Number of Patrol and Surveys	**12**
Distance Walked (Kilometers)	**726,66**
Distance Walked for Patrol and Survey	**726,66**
Number of Field Days	**263**
Number of Field Days for Patrol and Survey	**263**
Field Days per-person per-month	**21,92**

A total of 12 activities were patrols / surveys which has conducted during the 3th quarter (July – September), covering 726.66 km and field days of 21.92 days per person per month

PROGRAM PERSONNEL

(Summary of Field Days Per-Person Per-Month 1 July – 31 September 2011)

Name of Personnel	Number of Field Days	Average Field Days/Month
Acep Supriatna	65	21,67 (3 Months)
Andri Duriat	65	21,67 (3 Months)
Diding	68	22,67 (3 Months)
Edi	68	22,67 (3 Months)
Endin	68	22,67 (3 Months)
Hadimi	65	21,67 (3 Months)
Haerudin	65	21,67 (3 Months)
Iin Ruslani	65	21,67 (3 Months)
Jajat Sudrajat	68	22,67 (3 Months)
Mulyani	65	21,67 (3 Months)
Sorhim	65	21,67 (3 Months)
Sunardi	65	21,67 (3 Months)
Tisno	65	21,67 (3 Months)
Ujang Sukri	65	21,67 (3 Months)
Yadi Suryana	65	21,67 (3 Months)
Yusep Hardiana (Staff Database RPU UK)	65	21,67 (3 Months)

Other personnels :

1.	Otong Sontani	Field Coordinator
2.	Agus Darmawan	Ass. FC for Administration and Finance
3.	M. Syamsudin	Ass FC for Database and technical report
4.	Samaun	Boat driver
5.	Elly	Ass. Boat driver /crew
6.	Odah	Cook
7.	Syaiful	Office boy

ANNEX-2 : OFFENSES OR ILLEGAL ACTIVITIES ENCOUNTERED DURING Q3 2011 (January – September 2011)

1. OFFENSES IN BUKIT BARISAN SELATAN NP

No.	Date	Remark • Type of offense • Forest / WL produce recovered • Arm / Amunition recovered • People arrested	Age	Location	Action Taken Legal status / comments
1.	8 - Jan	Illegal logging with evidence 7 pcs timber (Meranti) , no suspect	< 1 year	Talang enam	Documented and recorded
2.	12 - Jan	1 Old camp for bird trapping	< 1 Month	Hulu way mahnai	Documented and destroyed
3.	13 - Jan	Sign of trespassing; 1 camp	< 6 Months	Hulu way rilau	Documented and destroyed
4.	14 - Jan	1 Camp for bird trapping,	< 6 Months	Hulu way rilau	Documented and destroyed
5.	15 - Jan	1 Camp bird trapping	< 6 Months	Hulu way rilau	Documented and destroyed
6.	15 - Jan	1 Old camp bird trapping	< 1 year	Krengseng, way rilau	Documented and destroyed
7.	25 - Jan	1 Camp for bird trapping	< 6 Months	Hulu way tenumbang	Inactivated
8.	27 - Jan	Feathers (bird part) of Kuau (*Argusianus argus*)	< 1 day	km.24	Recorded
9.	29 - Jan	1 Camp for bird trapping (> 5 weeks)	< 1 year	Hulu way mahnai balak	Documented
10.	9 - Feb	Encroachment / opened forest	> 1 year	Bambu kuning	Documented
11.	10 - Feb	1 unit motorcycle evidence. No suspect	< 4 days	Km.32	Documented
12.	13 - Feb	Sign of bird trapping	< 6 Months		recorded
13.	15 - Feb	Illegal Logging; arrested suspects Mr. Sarmin bin Saeran and Mr. Sunarto bin Mahriah, Evidences : 1 unit chain saw, 2 pcs golok and 1 tool bag for chain saw	< 4 days	Talang bamban	Documented for judicial process
14.	15 - Feb	Arrested suspect of bird trapping, Mr. Hartoso, Agus and Radit , from pekon sidomulyo kec.semaka	< 4 days	Hulu way bamban	Documented for judicial process

15.	8 - Mar	1 camp for bird trapping	< 6 Month		Recorded and destroyed
16.	14 - Mar	1 old Camp	< 1 year	Hulu way mengengung	destroyed
17.	14 - Mar	Bird trapping. Traditional equipment.	< 6 Months	Hulu sindalapay, serdang	Documented
18.	14 - Mar	Signs of gaharu theft	< 1 year	hulu way mengengung serdang	Documented
19.	14 - Mar	2 camps of encroachment	< 1 year	Serdang, way mengaku	Documented
20.	15 - Mar	Encroachment		way mengengung, kubu perahu	Documented
21.	16 - Mar	Signs of bird trapping	< 1 week	Peg. liu	Documented
22.	21 - Mar	Arrested 2 suspects (Mr. Suryanto and Mr. Rustam) and its evidences (1 long knife; 1 hand saw; 1 axe) of illegal logging	< 1 day	Talang simpang, Tirom	Documented for judicial process
23.	28 - Mar	Sign of bird trapping	< 6 Months	Pematang kapur, Km.30	Documented
24.	29 - Mar	Signs of bird trapping (singing bird)	< 1 day	Tugu raflesia, kuyung arang	Documented
25.	15 - Apr	Detected an old camp for fishing	< 1 yr	Bamban km.30	Documented
26.	27 - Apr	Old bone of 2 elephant		Anak way ngaras	Documented
27.	28 - Apr	Detected 1 snare	< 1 yr	Krengseng	inactivated
28.	28 - Apr	1 old camp of bird trapping	< 1 week	Anak way ngaras	Documented
29.	28 - Apr	An old camp of bird trapping	< 1 month	Anak way ngaras	Documented
30.	11 - Mei	Old encroachment about 2 ha		Trangging atas	Documented
31.	15 - Mei	Non timber forest product (damar) > 70 kg	< 4 daysi	Way bamban	Destroyed
32.	15 - Mei	Plantation		Way ngambur	Documented
33.	15 - Mei	Abandoned encroachment 1.5 ha.		Way ngambur	Documented
34.	22 - Mei	Encroachment : 31 families; > 75 ha		Umbl.kekuok, Gedau, Pss.utara	Recorded and reported
35.	22 - Mei	Encroachment : 37 families, >75 ha		Umbl.melebui, Gedau, Pss.utara	Recorded and reported
36.	23 - Mei	Encroachment : 58 families > 76 ha		Umbl.lioh, Gedau, Pss.utara	Recorded and reported
37.	24 - Mei	Coffee plantation > 3 ha,		Way ngambur	Recorded and reported
38.	24 - Mei	Coffee plantation > 1 ha		Way ngambur	Recorded and reported

39.	27 - Mei	Coffee plantation > 3 ha,		Way telemak	Recorded and reported
40.	27 - Mei	Coffee plantation > 8 ha,		Mendati	Recorded and reported
41.	31 - Mei	Detected bird trapping	< 1 yr	Hulu selapan, Hulu anak way ngaras	Documented
42.	24 - Jun	Detected camp of bird trapping fishing	< 6 Months	Way tenumbang	Documented
43.	24 - Jun	Detected a camp of fishing	< 1 month	Way tenumbang	Documented
44.	24 - Jun	Detected camp of bird trapping fishing	< 6 months	Way tenumbang	Documented
45.	13 - Jul	Detected camp of bird trapping	< 1 week	Way bamban tengah	Documented
46.	22 - Jul	Detected old elephant poaching	> 1 year	Way ngambur	Recorded and Documented
47.	28 - Jul	Bekas aktifitas pencari burung	< 1 week	Bukit penetoh - suoh	Documented
48.	30 - Jul	1 snare for deer	< 1 month	way pemerihan	Inactivated
49.	11 - Agust	Detected 1 skul of deer.		Anak way mahnay lunik, negri ratu	Documented
50.	11 - Agust	Old camp for gaharu theft	< 1 day	Hulu way biha	Documented
51.	14 - Agust	camp for gaharu theft	< 1 month	Hulu way manhay lunik	Documented
52.	15 - Agust	Old encroachment : coffee	< 1 day	Mahnay tengah - pahmongan	Documented
53.	10 - Sep	Evidence of sawn timbers.	< 4 day	Sugiwaras	Be confiscated

2. OFFENSES IN WAY KAMBAS NP

No.	Date	Remark • Type of offense • Forest / WL produce recovered • Arm / Amunition recovered • People arrested	Age	Location	Action Taken Legal status/ comments
54.	3 - Jan	Poaching; 2 snares for deer.	< 1 Month	Way Anda	inactivated

55.	6 - Jan	Fishing ; 12 suspects. 2 boats	< 4 days	Kali Biru RPTN Way Kanan	Documented and stopped the activity
56.	16 - Jan	Fishing; 6 suspects; 1 boat	< 4 days	Kali Biru RPTN Way Kanan	Documented and stopped the activity
57.	20 - Jan	Bird poaching; air-rifle	< 4 days	RPTN Rawa Bunder	Documented
58.	26 - Jan	Bird trapping; 1 old camp	< 1 year	Sekapok RPTN Kuala Kambas	documented
59.	4 - Feb	Sign of trespassing	< 1 year	RPTN Susukan Baru	documented
60.	4 - Feb	Sign of trespassing	< 1 year	RPTN Rawa Bunder	documented
61.	5 - Feb	Sign of trespassing	< 1 year	RPTN Susukan Baru	documented
62.	5 - Feb	Sign of trespassing	< 1 day	RPTN Susukan Baru	documented
63.	6 - Feb	Illegal grazing.; 13 suspects;	< 1 day	RPTN Kuala Penet	documented
64.	8 - 10 Feb	Poaching; 29 snares for deer and wild boar.	< 4 days	Along the border of RPTN Plang Hijau	Recorded and inactivated
65.	15 - Feb	Sign of trespassing ; 1 bridge	< 1 year	RPTN Plang Hijau	Destroyed
66.	15 - Feb	Sign of trespassing ; 1 bridge	< 1 Month	RPTN RawaBunder	Recorded
67.	15 - Feb	Poaching; snares for deer and wild boar.	< 6 Months	RPTN Rawa Bunder	Recorded and inactivated
68.	16 - Feb	Fishing: 4 suspects; 3 motor cycle; evidence 0.5 kg freshwater fish.	< 4 days	RPTN Rawa Bunder	Recorded and stopped the activity
69.	18 - Feb	Signs of fire; about 10 ha	< 6 Months	RPTN Rawa Bunder	Di data
70.	21 - Feb	Signs of fire ; about 5 ha	< 1 Month	RPTN Susukan Baru	Recorded and documented
71.	23 - Feb	Signs of poaching;	< 1 weeks	RPTN Susukan Baru	Recorded and to be surveillanced
72.	23 - Feb	Sign of fire of about 7 - 10 ha, for poaching	< 1 week	RPTN Susukan Baru	Recorded and documented
73.	3 - Mar	Signs of poaching.	< 4 days	Gambas RI	Recorded and to be surveillanced
74.	7 – Mar	Poaching; 4 suspects; with 3 dogs; 4 deers;	< 4 days	Gambas RI	Unsuccessfully to arrest
75.	24 -	Sign of fire of about 25	< 6	Jalur Babakan	Recorded and

	Mar	Ha	Months	Bambang	documented
76.	24 - Mar	Sign of illegal logging; 1 cutted tree of 20 cm diameter;	< 1 Month	Tegal Yoso	documented
77.	24 - Mar	Signs of trespassing.	< 4 days	Sido dadi, Kuala Penet	Recorded and to be surveillanced
78.	24 - Mar	Signs of trespassing	< 4 days	Karang sari PLG	Recorded
79.	24 - Mar	Signs of trespassing	< 1 Month	Babakan Bambang	Recorded
80.	25 - Mar	Signs of trespassing	< 1 week	Jalur jengkolan RPTN Susukan Baru	Recorded
81.	25 - Mar	Signs of trespassing	< 1 Month	Jalur Rawa Mento RPTN Susukan Baru	Recorded
82.	25 - Mar	Signs of trespassing	< 1 day	Jalur miskam RPTN Susukan Baru	Recorded
83.	26 - Mar	Arrested 1 suspect of illegal non forest wood collection (200 water liche s);	< 4 days	Jalur Permata SPTN Kuala Penet	Submitted for judicial process
84.	27 - Mar	Sign of fire of about 300 ha ; possibly for poaching.	< 1 week	Susukan Baru	Recorded and documented
85.	28 - Mar	Arrested 1 suspect of illegal logging; 1 chainsaw; knifes; 65 pcs sawn timber.	< 4 day	Way Nibung RPTN Umbul Salam	Recorded and to be surveillanced
86.	8 - Apr	Detected old camp of bird trapping burung .	< 1 month	Way Kanan	Recorded and documented
87.	8 - Apr	After fire area	< 1 weeks	Gambas RI	Recorded and documented
88.	9 - Apr	Detected Gaharu tree stealing	< 6 months	RPTN Way Kanan	Recorded and documented
89.	19 - Apr	Detected a bridge of trespasser	< 6 months	Kolam darmaji, Rawa Bunder	Destroyed
90.	20 - Apr	Detected a bridge of trespasser	< 1 yr	Rawa Bunder	Destroyed
91.	20 - Apr	Detected an active snare for deer and wildboar	< 1 month	Rawa Bunder	Inactivated
92.	20 - Apr	Detected illegal activities	< 1 week	Gambas RI	documented
93.	26 - Apr	Detected illegal fishing	< 1 month	Plang Hijau	documented
94.	28 - Apr	suspects of illegal fishing .	< 4 days	Proyek pancasila RPTN Plang Hijau	documented

95.	9 - Mei	After fire area of about 10ha	< 1 month	RPTN Umbul salam	documented
96.	9 - Mei	Detected track of the illegal activity	< 1 month	Barat Ujung RPTN Umbul salam	documented
97.	9 - Mei	Identified a trail of trespassers	< 1 month	Jalur Rasau	documented
98.	9 - Mei	an old after fire area of 1 ha	< 6 month	Rasau	documented
99.	9 - Mei	Forest fire area of about 1ha	< 6 month	Rasau	documented
100.	10 - Mei	A snare for tiger	< 1 month	RPTN Penanggungan	Inactivated
101.	10 - Mei	Signs of trespasser	< 4 days	RPTN Penanggungan	documented
102.	10 - Mei	After fire area of 10 - 15 ha	< 6 months	RPTN Penanggunagan	documented
103.	10 - Mei	A snare for tiger	< 1 month	RPTN Penanggungan	Inactivated
104.	10 - Mei	After fire area of 20-25ha	< 6 months	Rptn Penanggunagan	documented
105.	10 - Mei	After fire area of 10 ha	< 1 month	Wako	documented
106.	10 - Mei	A camp of trespasser	< 1 month	Jalur Dewi RPTN Penanggungan	documented
107.	10 - Mei	After fire area of 20-30 ha	< 1 week	RPTN Penanggungan	documented
108.	11 - Mei	After fire area of 3x4meter	< 6 months	Penanggungan	documented
109.	12 - Mei	A snare for tiger	< 1 month	RPTN Penanggungan	Inactivated
110.	12 - Mei	An old snare for big mammals	< 1 yr	RPTN Penanggungan	documented
111.	12 - Mei	After fire area of 10-20ha	< 1 month	RPTN Penanggungan	documented
112.	12 - Mei	After fire area of 25ha	< 1 month	RPTN Wako	documented
113.	12 - Mei	Track of buffalo to Wako direction	< 1 month	RPTN Wako	Documented
114.	12 - Mei	An old camp of illegal fishing	< 1 yr	Wako	Burned
115.	12 - Mei	An old camp of bird trapping	< 1 week	RPTN Penanggungan	Documented
116.	13 - Mei	An old camp of bird trapping	< 1 week	Wako	Documented
117.	23 - Mei	After fire area of 4 ha	< 4 days	Susukan Baru	Documented
118.	23 - Mei	After fire area of 20ha	< 1 month	Susukan baru	Documented
119.	23 - Mei	2 suspects of illegal grazing	< 4 days	Susukan Baru	Documented

120.	27 - Mei	Track of trespasser	< 1 month	Penanggungan	Documented
121.	27 - Mei	After fire area of 4 ha	< 1 week	Penanggungan	Documented
122.	28 - Mei	Illegal logging (menggris trees)	< 6 months	Resort bungur	Documented
123.	28 - Mei	After fire area of 2-3 ha	< 1 week	RPTN Susukan Baru	Documented
124.	28 - Mei	After fire area of 100ha	< 1 month	RPTN Bungur	Documented
125.	28 - Mei	Track of trespasser	< 1 week	Penanggungan	Monitored
126.	28 - Mei	After fire area of 200ha	< 1 week	Penanggungan	Didata dan didokumentasi
127.	30 - Mei	After fire area of 1km persegi	< 6 months	RPTN Way Bungur	Documented
128.	31 - Mei	After fire area of 50ha	< 6 months	RPTN Bungur	Documented
129.	1 - Jun	8 Jerat biawak yang masih aktive	< 4 days	RPTN Bungur	Documented
130.	1 - Jun	After fire area	< 4 days	RPTN Susukan Baru	Documented
131.	10 - Jun	An old camp of bird trapping	< 1 week	SPTN Way Kanan	Documented
132.	20 - Jun	Illegal fising	< 4 days	Braja Kencana	Documented
133.	21 - Jun	A bridge of trespasser (4meter length)	< 1 yr	RPTN Rawa Bunder	Monitored
134.	21 - Jun	A bridge of trespasser (4meter length)	< 1 yr	RPTN Rawa Bunder	Documented
135.	21 - Jun	A bridge of trespasser (4meter length)	< 1 yr	RPTN Plang Hijau	Monitored
136.	28 - Jun	7 suspects of ikkegal fishing	< 4 days	Permata RPTN Way Kanan	Documented
137.	28 - Jun	Detected illegal fishing	< 1 month	Kali Biru RPTN Way Kanan	Documented
138.	29 - Jun	Detected illegal fishing	< 1 month	Kali Biru RPTN Way Kanan	Documented
139.	29 - Jun	Detected 6 trespassers	< 4 days	Kali Biru RPTN Way Kanan	Documented
140.	12 - Jul	After fire area of 20 ha.	< 4 day	RPTN Susukan Baru	Documented
141.	12 - Jul	After fire area of 10ha	< 4 day	RPTN Susukan Baru	Documented
142.	12 - Jul	After fire area of 30ha	< 1 week	RPTN Susukan baru	Documented
143.	23 - Jul	Detected evidence of 10 m3 Gelam wood.	< 6 month	Sungai bayan RPTN Cabang	Documented
144.	24 - Jul	After fire area of 10 - 15 ha	< 1 week	RPTN Susukan Baru	After fire area
145.	24 - Jul	Illegal grazing of 50 cattles	< 4 day	RPTN Susukan Baru	After fire area

146.	25 - Jul	After fire area of 15 - 20 ha	< 4 day	SPTN Way Kanan	Documented
147.	25 - Jul	A snare for big mammals	< 1 month	RPTN Wako	Inactivated
148.	5 - Agust	Penggembalaan sapi dengan jumlah kurang lebih 30 ekor sapi	< 4 day	RPTN Susukan Baru	Documented
149.	5 - Agust	After fire area of 90ha di duga di gunakan sebagai lokasi pencarian rumput dan berburu	< 4 day	RPTN Susukan Baru	Documented
150.	5 - Agust	After fire area of 10 - 15 ha	< 4 day	RPTN Susukan Baru	Documented
151.	6 - Agust	After fire area of 5 - 10 ha,	< 4 day	RPTN Wako	Documented
152.	7 - Agust	Detected illegal fishing.	< 4 day	RPTN Wako	Unable arrested
153.	9 - Agust	Detected illegal fishing	< 6 month	Kali Biru RPTN Way Kanan	Inactivated
154.	13 - Agust	4 jerat rusa aktif	< 1 month	SPTN Plang Hijau	Inactivated
155.	19 - Agust	After fire area	< 4 day	RPTN Susukan baru	Documented
156.	8 - Sep	Suppressed after fire area of 10 - 15ha	< 4 day	PLG, SPTN III Kuala Penet	Suppressed
157.	9 - Sep	After fire area of 50 ha,	< 4 day	SPTN Bingur	Documented
158.	9 - Sep	1 suspect and 18 cattles	< 4 day	RPTN Susukan Baru	Documented
159.	13 - Sep	Kebakaran hutan dengan luas di perkirakan 100 ha	< 1 week	SPTN Way Kana	Documented
160.	17 - Sep	Detected fish poisoning in a river.	< 1 month	RPTN Bungur	Documented
161.	19 - Sep	After fire area of 20ha	< 4 day	RPTN Susukan Baru	Di padamkan, di data dan didokumentasi
162.	21 - Sep	After fire area of 10-15ha.	< 1 month	Gubug Asbes RPTN Rawa Bunder	Documented
163.	21 - Sep	Detected of mammals poaching.	< 4 day	Gubug Asbes RPTN Rawa Bunder	Documented
164.	23 - Sep	2 pcs of Gaharu wood.	< 1 year	Proyek Pancasila RPTN Plang Hijau	Documented
165.	23 - Sep	3 pcs of gaharu wood	< 1 year	Proyek Pancasila	Documented
166.	23 - Sep	Detected 4 snares for deer or wildpig.	< 6 month	Proyek pancasila RPTN Plang Hijau	Inactivated and Documented

167.	23 - Sep	Detected bird trapping ; 2 nets as evidences.	< 4 day	Proyek pancasila RPTN Plang Hijau	Documented
168.	24 - Sep	Detected signs of illegal fishing.	< 1 week	Wako atas RPTN Wako	Documented
169.	26 - Sep	Illegal grazing of buffalos	< 4 day	Sumpah RPTN Bungur	Documented

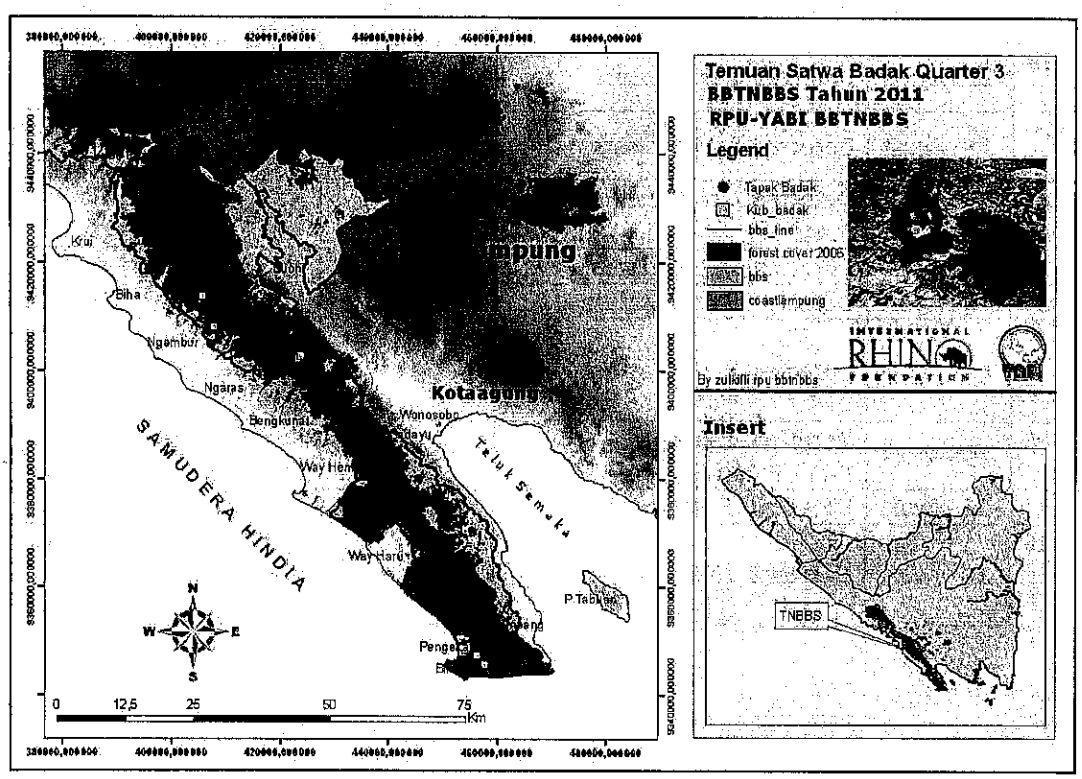
3. OFFENSES IN UJUNG KULON NP

No.	Date	Remark • Type of offense • Forest / WL produce recovered • Arm / Amunition recovered • People arrested	Age	Location	Action Taken Legal status/ comments
1.	12 - Feb	Fishing; 3 suspects.	< 4 day	pantai kalejetan	Stop the activity and destroyed evidence
2.	12 - Feb	Signs of fishing ; no suspects	< 6 Month	Seseupan	Inactivated
3.	12 - Feb	Signs of fishing ; no suspects	< 6 Month	Sodong sero	Inactivated
4.	12 - Feb	Signs of fishing ; no suspects	< 6 Month	Alor gede	Inactivated
5.	12 - Feb	Signs of fishing ; no suspects	< 1 day	Alor gede	inactivated
6.	12 - Feb	Signs of fishing ; no suspects	< 1 Month	Alor gede	Inactivated
7.	12 - Mar	Signs of bird trap. No suspect	< 6 Month	cilintang	inactivated
8.	22 - Mar	Signs of fishing (molusc) ; no suspects	< 6 Month	cibangkonol	Inactivated
9.	12 - Apr	Signs of illegal activities	< 1 Month	soge	Destroyed evidences
10	17 - Apr	Illegal activity to collect marine biota	< 1 Month	alor jangkar	Destroyed evidences
11	10 - Mei	Suspects of illegal activity from Kp.Sumur	< 4 days	Kp.Sumur	Took photo of suspects
12	10 - Jul	Detected of bird trapping.	< 4 day		Inactivated the evidence
13	12 - Jul	Detected of illegal activity	< 4 day		Inactivated
14	12 - Jul	Detected of illegal activity	< 4 day		Inactivated
15	12 - Jul	Bird trapping.	< 6 month	blok Cikarang	Inactivated
16	13 - Jul	Honey collection. Lebah madu di blok Cikarang	< 6 month	blok Cikarang Pelaku	Dihancurkan

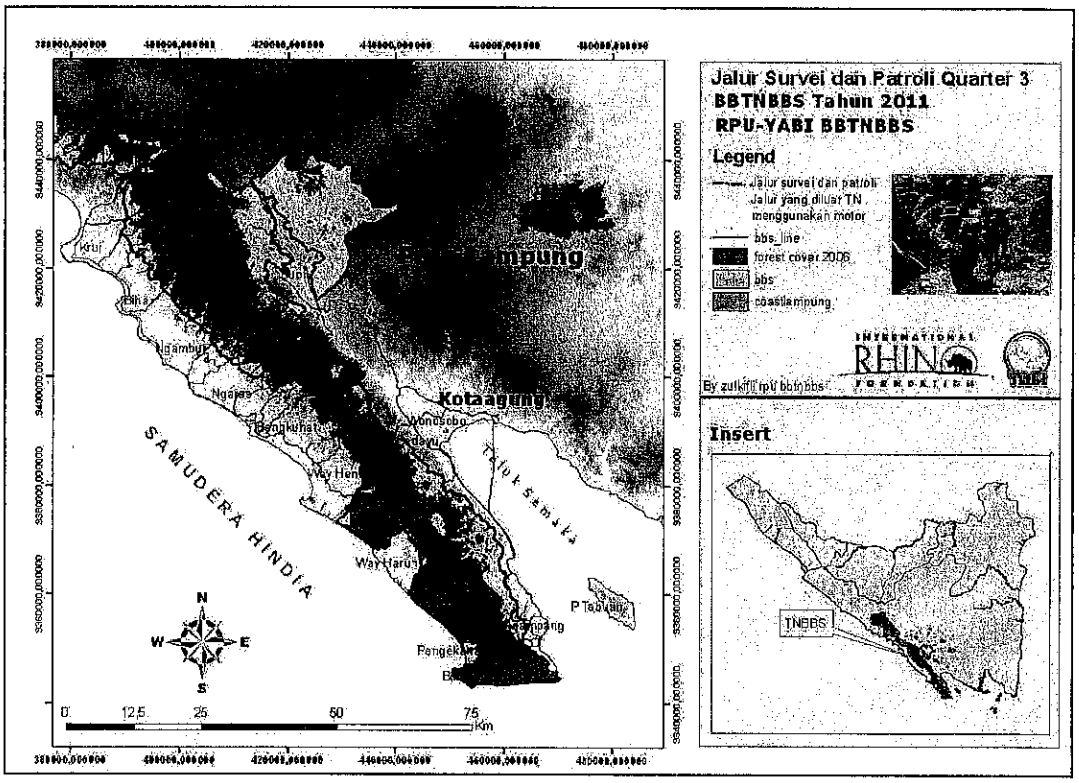
17	9 - Agust	Detected 2 trespassers	< 4 day	Kp Tamanjaya giran	Documented
19	15 - Agust	Detected 6 trespassers	< 4 day	Kp Sidamukti Panimbang	Documented
20	15 - Agust	Detected 3 trespassers	< 4 day	Kp Kiara gondok	Documented
22	15 - Agust	Detected 7 trespassers in 2 boats	< 4 day	Kp Sidamukti	Documented
23	15 - Agust	Detected 6 trespassers:	< 4 day	Kp Sidamukti	Documented
24	15 - Agust	Detected 3 trespassers	< 4 day	Kiara gondok	Documented
25	16 - Agust	Detected 3 trespassers	< 4 day	Kp Cikawung, Ciparay, Kiara gondok	Documented
26	16 - Agust	Detected 2 trespassers: Juhdi, Eman	< 4 day	Kp Cikawung, Cibaliung	Interrogated
27	16 - Agust	Detected 2 trespassers	< 4 day	Kp Cikawung	Interrogated
28	16 - Agust	Detected 23 trespassers	< 4 day	Kp Cikawung, Ciparay, Kiara gondok	Interrogated

ANNEX-3 : Maps

1. Map of rhino foot-print encountered during Q3 2011, in BBSNP.

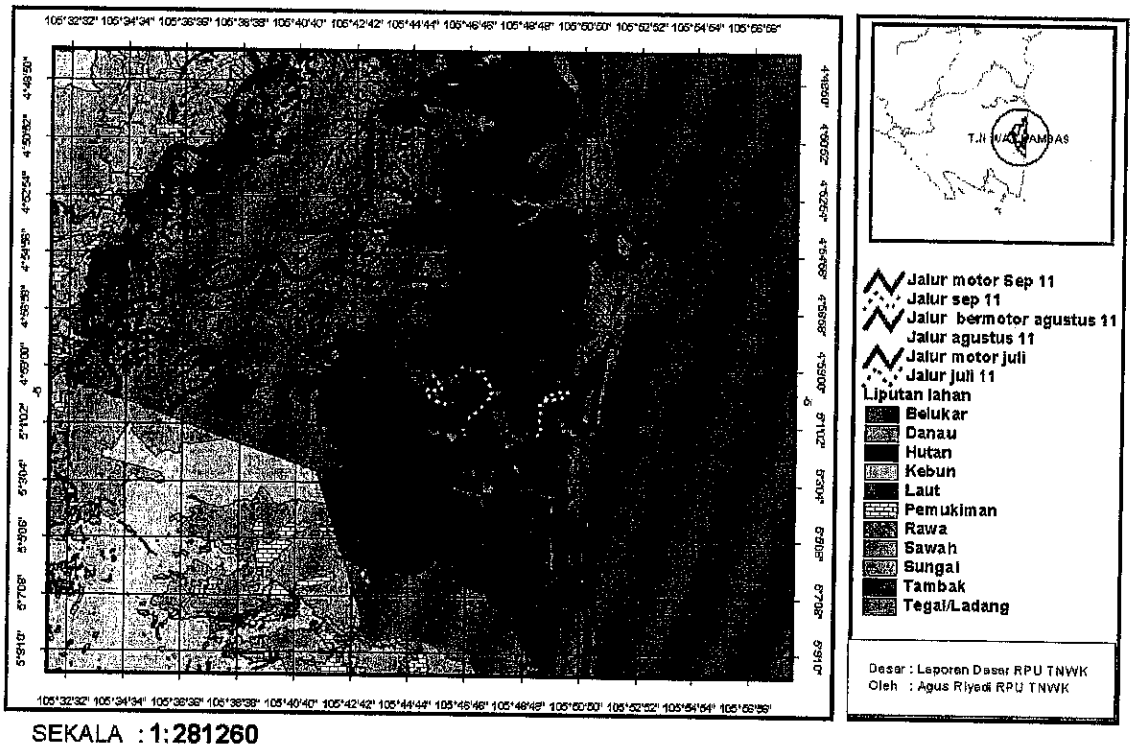


2. Map of patrol route Q3 2011, in BBS NP



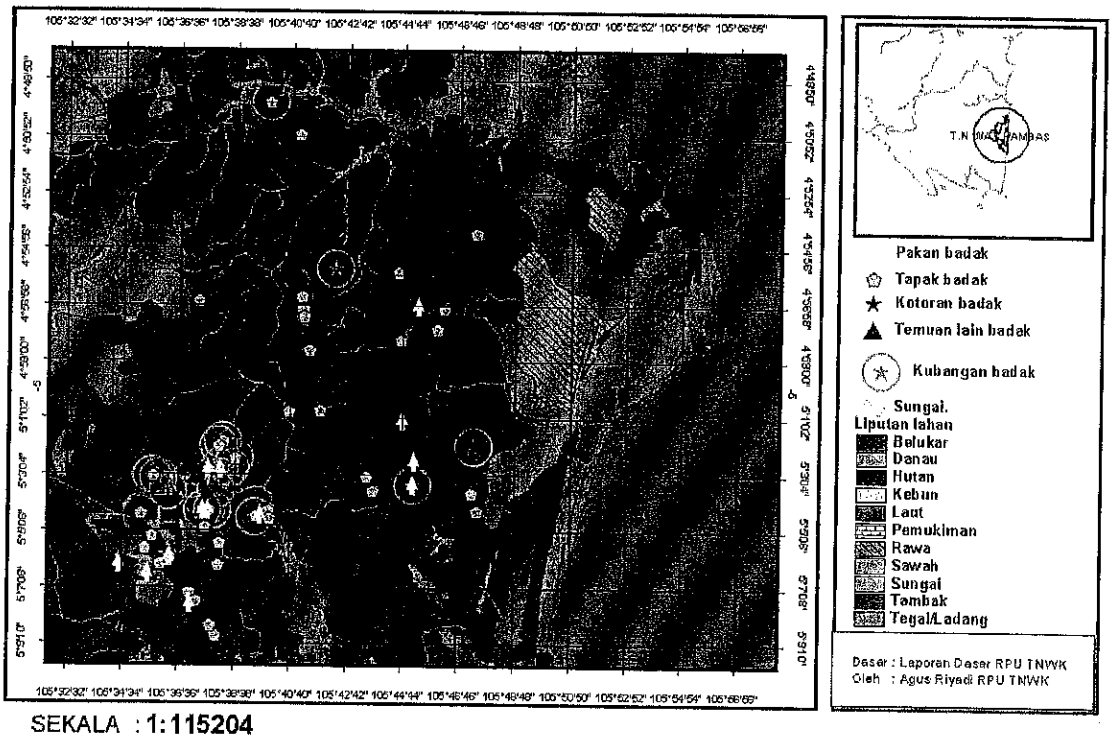
MAP WK NP

3. Map of Patrol route Q3 2011, in WKNP



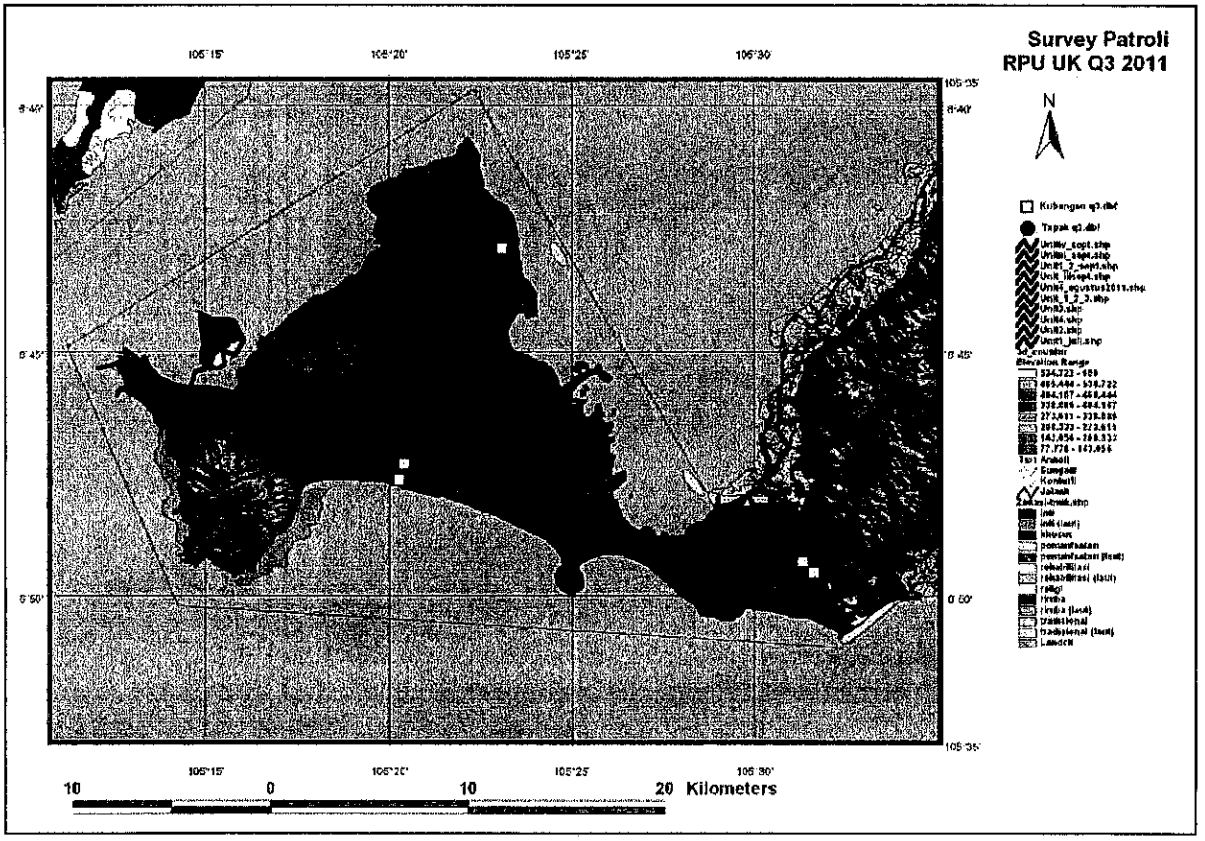
SEKALA : **1:281260**

4. Map of rhino foot-print encountered Q3 2011, in WKNP.



SEKALA : **1:115204**

5. Map of patrol route, rhino foot-print and wallow encountered Q3 2011, in UKNP



海洋研究基金會計畫成果摘要

海洋研究基金會(Marine Research Foundation, MRF)所提綠蠵龜研究計畫，綜合數年資料，摘要如附：

海洋研究基金會為位於馬來西亞沙巴 Kota Kinabalu 地區之非營利研究組織，設立宗旨為經由研究、保育和教育活動，進一步瞭解海洋生態系及其功能，保育海洋動植物之多樣性及豐富度。

沙巴的海龜受法令保護，受威脅的主要原因為居民採集海龜卵、漁船誤捕及棲地消失。40 年來，大部分海龜研究主要重點為協助族群狀況有危機的海龜。沙巴的綠蠵龜可能是全東南亞最大的族群，但相關研究不足。

沙巴是東南亞地區綠蠵龜和玳瑁產卵地最密集的地方，主要集中在 Turtle Islands Park 的三個島，密度最高的是 Selingan Island (x > 3000 nests • year-1)，佔 52%。而 Gulisan Island 和 Bakkungan Island 分別佔 22%和 26%。另外，Sipadan island 也是產卵地密集的地方，但直到最近才發現海龜覓食族群。

東南亞海龜產卵族群的研究不少，但覓食族群的研究很少，缺乏海龜族群動態資料(成長、生存、性別比例)很難瞭解自然或人為的壓力對海龜族群的影響。

研究地點曼丹蘭利島(Mantanani island)位於沙巴西北部海岸外，有許多綠蠵龜。在 Mantanani island 發現當地的未成年海龜，是沙巴地區第一次發現覓食海龜族群。Turtle Islands Park 海龜經營管理計畫已進行 30 年，但因溫度較高，幾乎所有被移到孵化場的海龜卵都孵出雌龜。目前，也只有 20%的孵化場有遮陰。由沙巴離岸的小海龜性別比率懸殊，對未來海龜保育將有不良影響。瞭解 Mantanani island 覓食海龜族群的族群動態，可瞭解偏差的孵化性別比例對野生海龜族群長期的影響。

2006 年計畫成果報告，主要內容如下：

因馬來西亞政府改變申請研究海龜許可制度，因此 2005-2006 年無法取得 Turtle Islands Park 許可，計畫提案人 Dr. Nicolas J. Pilcher 曾來函詢問可否將研究地點改為 Mantanani island，我方同意。Mantanani island 只有 juvenile 海龜，但更合適研究族群動態。原提計畫預定研

究孵育幼海龜死亡原因，更改地點後改研究 juvenile 族群動態，蒐集基本資料供後續死亡率研究之用，並調查性別比例。

總共進行3次野外調查，一次在 Layang Layang 環礁，兩次在 Mantanani island。共捕捉 56 隻海龜，進行檢測。此為本地區第 1 次由海中捕捉海龜並以腹腔鏡檢視，第 1 次有機會瞭解海龜生活史這個階段中的族群結構。本計畫研究報告將以「Population Structure of Green Turtles *Chelonia mydas* from Two Tropical Foraging Sites in Malaysia」為題發表於相關期刊。部分結果如下：

- 所有 Layang Layang 捕捉到的海龜背甲長(CCL)均在 65cm 以下，都是 juvenile，平均 52.0cm (SD = 6.44, range 40.5-63.8, n = 21)。Layang Layang 捕捉之海龜未測重量為。雌雄比為 62:38。
- 第一次取樣，所有 Mantanani 捕捉到的海龜皆為 juvenile，平均 49.2cm (SD = 5.92, range 40.0-61.2, n = 28)，平均重量 12.0kg (SD = 4.44, range 6.4-24.5, n = 28)。雌雄比為 90:10，明顯比 Layang Layang 高。

依據 2007 和 2008 年計畫結果所撰寫之研究報告已被 Journal of Herpetology 接受，標題為「Population Structure at a Foraging Sites off the Coast of Sabah (Borneo), Malaysia」，此為馬來西亞海龜覓食區，首次紀錄的生長和族群結構資料。主要內容如下：

共捕捉到 65 隻新的海龜和 32 隻以前捕捉標記過的海龜。這 32 隻中有 11 隻被捕至少 2-3 次。數據顯示 Mantanani island 附近水域海龜族群可能超過 100 隻。經由腹腔鏡檢視，發現有 52 隻雌龜，13 隻雄龜，性別比為雌：雄 80%：20%，和澳洲 Moreton Bay 1994 年族群結構研究之結果不同，Moreton Bay 性別比為雌：雄 67%：33%。

所有捕捉到的海龜背甲皆未超過 65 公分，都是 juvenile。這些海龜平均背甲長度為 47.5 公分(SD = 5.21, range 36.0-61.4, n = 72)，平均重量為 11.7 公斤(SD = 4.00, range 5.5-24.5, n = 73)

成長率部分，sample size 較小只有 7 隻。兩次捕捉間隔時間由 185 天至 329 天，平均生長率為一年 2.54 公分，比 1979 年調查澳洲南部大堡礁(Southern Great Barrier Reef)較大 juvenile 年生長率(1.43cm)高。與 2001 年美國 Florida 和 1979 年 Hawaii 類似大小海龜調查之年生長率相近。但比 1988 年巴哈馬(8.8cm)和 1981 年美國佛羅里達州(5.3cm)

調查之年生長率低很多。

比較 30 件初次捕捉和再次捕捉的距離，範圍由 34.9 公尺至 1,740.9 公尺，平均 378 公尺。因所有初次捕捉海龜經過腹腔鏡檢視後，均在距離原捕捉處 1,000-1,500 公尺外釋放，由此推測這些海龜由原捕捉點移動之距離並不遠。

海洋研究基金會 2009 年所提「馬來西亞沙巴曼丹蘭利島綠蠵龜族群動態及成長研究計畫」，為延續計畫。計畫目標為經由腹腔鏡和水中研究，瞭解海龜族群基本資料如性別比例、新添族群量等，以更有效保育馬來西亞沙巴地區海龜。

本計畫的預計成果包括：

- 由水中捕捉 20-50 隻各年齡層及不同性別之海龜。
- 紀錄及分析海龜資料，包括標記、GPS 資料、日期、時間、主要特徵等。
- 重新標記之前捕捉到的海龜。
- 以腹腔鏡檢視 20-50 隻海龜成熟度(發育情形)和性別。
- 蒐集和分析 DNA 樣本，以瞭解族群來源。
- 分析海龜成熟度和性別比率。
- 將研究結果提供贊助單位、馬來西亞漁業和國家公園主管部門(分別為 Sabah Department of Fisheries 和 Sahah Parks)、報告發表於相關期刊。
- 為推廣海龜保育研究工作，海洋研究基金會也與 Sabah Department of Fisheries 和 Sahah Parks 合作，進行人才培訓工作。

依據 2006 至 2009 年計畫結果所撰寫之研究報告已刊登於 Journal of Herpetology (Vol. 44, No. 1, pp. 168-171, 2010)，標題為「Population Structure and Growth of Immature Green Turtles at Mantanani, Sabah, Malaysia」，主要內容如下：

幾乎所有東南亞海龜生物學研究都是產卵地相關研究，本研究係針對生活史中不同階段之未成年綠蠵龜覓食族群，地點為馬來西亞沙巴外海。標放研究提供地區性活動、生長和停留期間資料。腹腔鏡檢視提供性別和成熟度資料。結果顯示兩次捕捉間，海龜移動距離平均為 380 公尺，兩年期間捕捉資料顯示海龜大都停留在同一地區(即 exhibited site-fidelity)。所捕捉到者都是未成年海龜，背甲長度為 38-80 公分，平均 47.4 公分，生長率平均每年 3.6 公分。平均重量為 12.1

公斤。腹腔鏡檢視生殖腺(gonads)確定所有被捕海龜尚未成年，雄雌性別比為 1:4。

捕捉八次，每次 3 天，每天約 8-10 小時，共捕捉到 118 隻，75 隻為新海龜，43 隻為以前捕捉標記過的海龜。Catch Per Unit Effort (CPUE)為 1.48-1.84 turtles per hour。被再度捕捉的海龜中，28 隻(37.3%)為被再捕一次，11 隻(14.7%)為被再捕二次，4 隻(5.3%)為被再捕三次。

研究過程中沒法發現其他地區標記的海龜，43 件初次捕捉和再捕捉海龜之距離為 31-1,760 公尺，平均為 359 公尺，顯示有 site-fidelity 現象。雖然每次腹腔鏡檢視結束後，都將海龜載到捕捉地 1,000-1,500 公尺外，海龜都可遊回第一次被捕捉的地區。標放研究估計 Mantanani 淺海地區海龜族群約 187.3 隻。

再捕捉之海龜中，17 隻成長率比較明顯。兩次捕捉間隔時間為 47-661 天，平均生長率為一年 3.60 公分。比 Limpus 1979 年調查澳洲南部大堡礁較大 juvenile 年生長率(1.43cm)高。也比 Bresette and Corham 2001 年調查美國 Florida 類似大小海龜之年生長率(2.3-2.7cm)高。但比 Mendonca 1981 年調查美國 Florida 之年生長率(5.3cm)低很多。

MRF 2010 年所提「衛星追蹤保育馬來西亞綠蠵龜計畫」，為過去數年之延續研究。2011 年 3 月 2 日研究相關報導包括沙巴時報(Sabah Times)、每日快報(Daily Express)和婆羅洲郵報(The Borneo Post)。報導中說明 MRF 於 5 隻海龜裝設衛星發報器，調查重要遷徙路線、近海棲地、經營管理和保育活動。調查發現 Mantanani 有相當大的綠蠵龜族群，也是重要覓食區。遺傳基因研究發現這些海龜大部分源自蘇祿海(Sulu Sea)之海龜群島(Turtle Islands complex)，但也與越南和臺灣海龜有共同之基因來源。這些覓食海龜只在 Mantanani 停留 6-7 年，成年後之活動地區目前仍未知。瞭解海龜活動範圍有助於規劃保護區。3 份報紙都有說明林務局贊助部分計畫經費。提案人另提供 5 隻海龜之行動路線圖。計畫研究成果日後投稿 Journal of Chelonian Conservation and Biology 或 Marine Turtle Newsletter。

海洋研究基金會 2011 年所提「馬來西亞綠蠵龜次要覓食區計畫」，為延續計畫。計畫目標如下：

- 研究瀕臨絕種海龜覓食區之遷徙路線。
- 依據近海海龜移動模式，找出近海棲地。

- 將追蹤海龜資料置於網站，供教育機構運用，協助學生瞭解海龜之行動。

海洋研究基金會將針對當地政府機構、民間團體和當地社區，持續推動人才培訓工作。也與 Sabah Department of Fisheries 和 Sahah Parks 合作，執行 Sulu-Sulawesi Seascape turtle conservation initiative 計畫。

本年計畫預計成果如下：
一、至少進行 2 次野外調查。
二、裝設 4 個衛星發報器，追蹤海龜行動，由電腦網路紀錄結果。
三、計畫報告與建議事項提供贊助及政府單位參考。

MRF 提供兩份報告供我國參考，2011 年 4 月研討會報告為「馬來西亞海龜及海龜脫逃裝置(Turtle Excluder Devices, TEDs)」，主要內容包括 TEDs 簡介、海龜及其生態角色、馬來西亞試用 TEDs 現況和目的、TEDs 之發展和應用。另 2011 年 11 月報告林務局與其他十餘個贊助單位並列，標題為「沙巴 TEDs 計畫—經由減少海龜誤捕改善漁民生計和保育海洋生物多樣性計畫」。

另外，2011 年 10 月駐馬來西亞代表處將捐款交予 MRF，當地華文報紙包括星洲日報、南洋商報、東方日報和中國報等均有報導。



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Cover picture: Larch forest after forest fire, upper reaches of Koppi R, Khabarovsk, the northern margin of Scaly-sided merganser breeding range in Sikhote-Alin Mountains, May 2011 [photo by Diana Solovyeva].

Introduction

The Scaly-sided Merganser (*Mergus squamatus*) is one of the rarest seaducks in the Old World. It breeds in a restricted area in south-east Russia and north-east China and spends the winter in China and North Korea. The majority of the breeding population occurs in the Primorye, Russia (BirdLife International 2001). The Scaly-sided Merganser is included in the Red Data Books of IUCN (endangered), Russia (category 3 – rare), China and South Korea.

The targets of the project are:

- to estimate the number and current status of this globally threatened species in the world;
- to investigate factors affecting the breeding and wintering in order to improve conservation efforts;
- to act toward species conservation worldwide

Field work 2011 was related to primarily first target: our main activity was organizing and conducting surveys for breeding pairs in northern Sikhote-Alin Mountains and in the southern most corner of totally unknown Zeya-Bureya breeding area (left side of Amur R). In addition to the work of our sister project "Surveys and Conservation od Scaly-sided Merganser in China" conducted by Peiqi Liu in 2011 we managed to almost finish drawing of the species current breeding range both in Russia and China (P. Liu unp. report 2011).

Acknowledgements

Project personnel consisted on Dr. Sergey Vartanyan (later in text SLV), Dr. Valery Shokhrin (VPS), Sergey Nemerov (SVN), Gleb Danilov (GKD) and Oleg Voronoy (ONV), whose hard work made all bellow results possible. Survey of the rivers in Jewish Autonomous Okrug was done by Andrey Averin and survey of Arkhara R, Amur Region, was done by Dr. Alexey Antonov with the help of local volunteers. Volunteers helped the project stuff in 2011 as always during previous years.

Special thanks should be addressed to Dr. Baz Hughes and Peter Cranswick at the Wildfowl and Wetlands Trust that were very efficient advisors of the project.

In 2011 field work lasted from 23 March to 7 June and from 23 to 29 July. In 2011 we manage to collect $18,171 for the current project. In addition to $5,000 from Forestry Bureau, COA, Taiwan Government we received $12,721 from Mohamed bin Zayed Species Conservation Fund and we had $450 savings from Wildfowl and Wetlands Trust money of 2010. A part of spring field work as follows, catching of adult birds, survey for breeding pairs along regular routes, checking of AN and wild nests, catching of hens, studies on breeding biology and nest success was supported by the grant from FB. Large-scale surveys of western slope of Sikhote-Alin Mnt. (Pavlovka and Zhuravlevka rivers), of Khabarovsk region and of Zeya-Bureua area and heavy metal analyses in blood and eggs were supported by MBZF grant. A summer survey for broods on the wider area was supported with WWT funds.

We used Bushnell camera traps for recording nest occupation by Scaly-sided merganser. Cameras were kindly provided by Amur Tiger project (PI Dr. Linda Kerly).

Chapter 1. Breeding range and world population estimation

1.1. Sikhote-Alin Mountains, Russia

Scarce historical information from both Northern China and left side of Amur R in Russia makes it quite difficult to draw historical breeding range of Scaly-sided merganser. Very approximately this historical range could be reconstructed as we suggest at Figure 1.

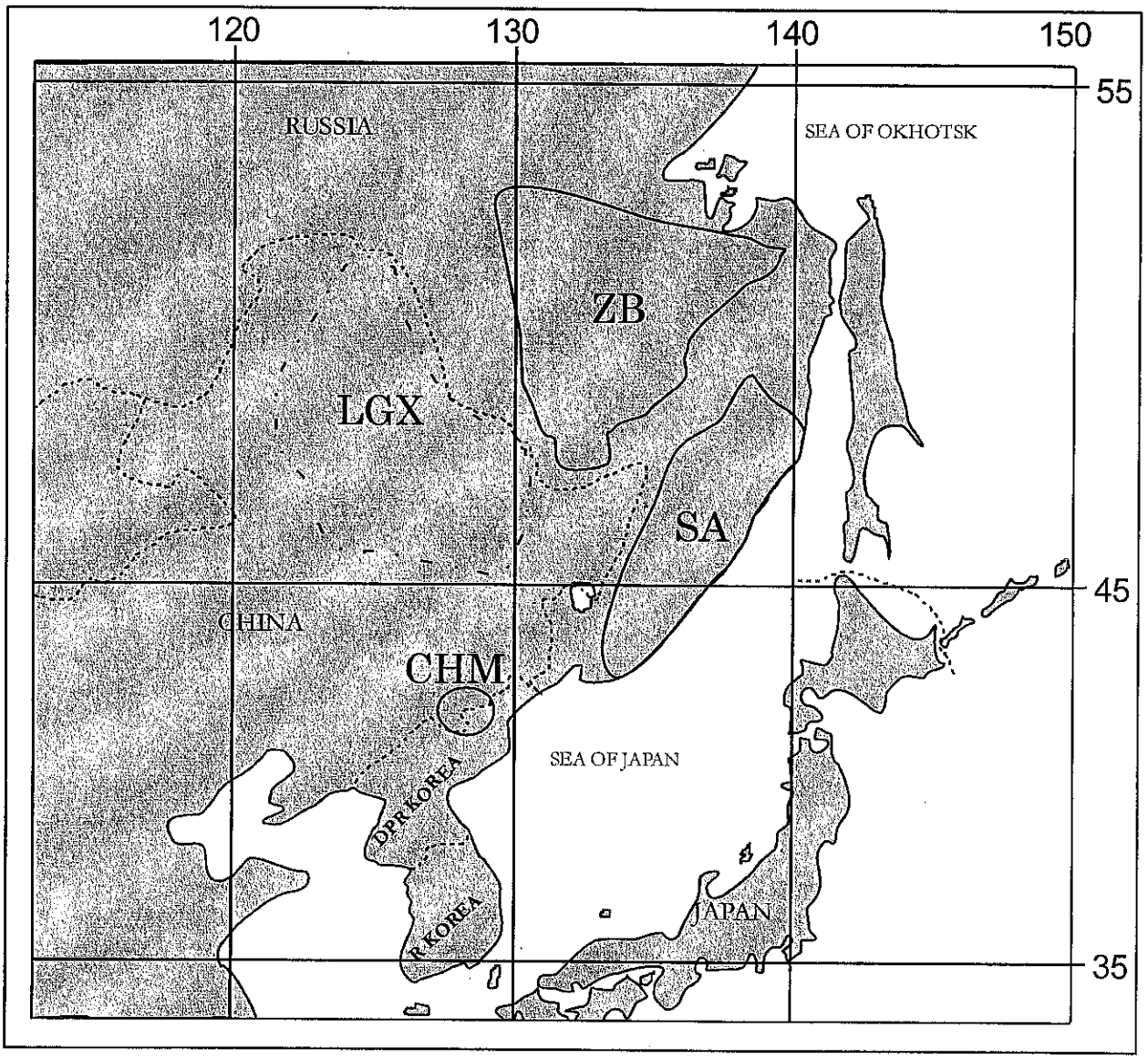


Figure 1. Reconstruction of historical breeding range of Scaly-sided merganser in China and Russia. Isolated breeding populations include: Changbai Mtn (CHM); Lesser and Greater Xingan Mtns (LGX); Sikhote-Alin Mtn (SA) and Zeya-Bureya Upland areas (ZB). Solid lines – almost clear margins of breeding distribution; hairline – more or less clear margins of breeding distribution; dot-and-dash line - almost unclear margins of breeding distribution.

Recently three from four known breeding populations are existing while ZB population seems to be extinct. In May 2011 we surveyed rivers Butu, Khutu, Koppi, Anuy and Gobili in the northern part of Sikhote-Alin Mnt., Khabarovsk, for breeding pairs of Scaly-sided merganser. Selection of these particular rivers was made after personal communication by Sergey Surmach that Scaly-sided merganser

was not recorded on Tumnin R in 1991. Full story of drawing of northern limits of Scaly-sided merganser breeding distribution is presented in Table 1.

Figure 2. Map of Sikhote-Alin Mnt (right bank of Amur R) with proved (solid line) and proposed (dashed line) breeding range of Scaly-sided merganser as resulted from current project surveys 2000-11 and information from other published and unpublished sources.

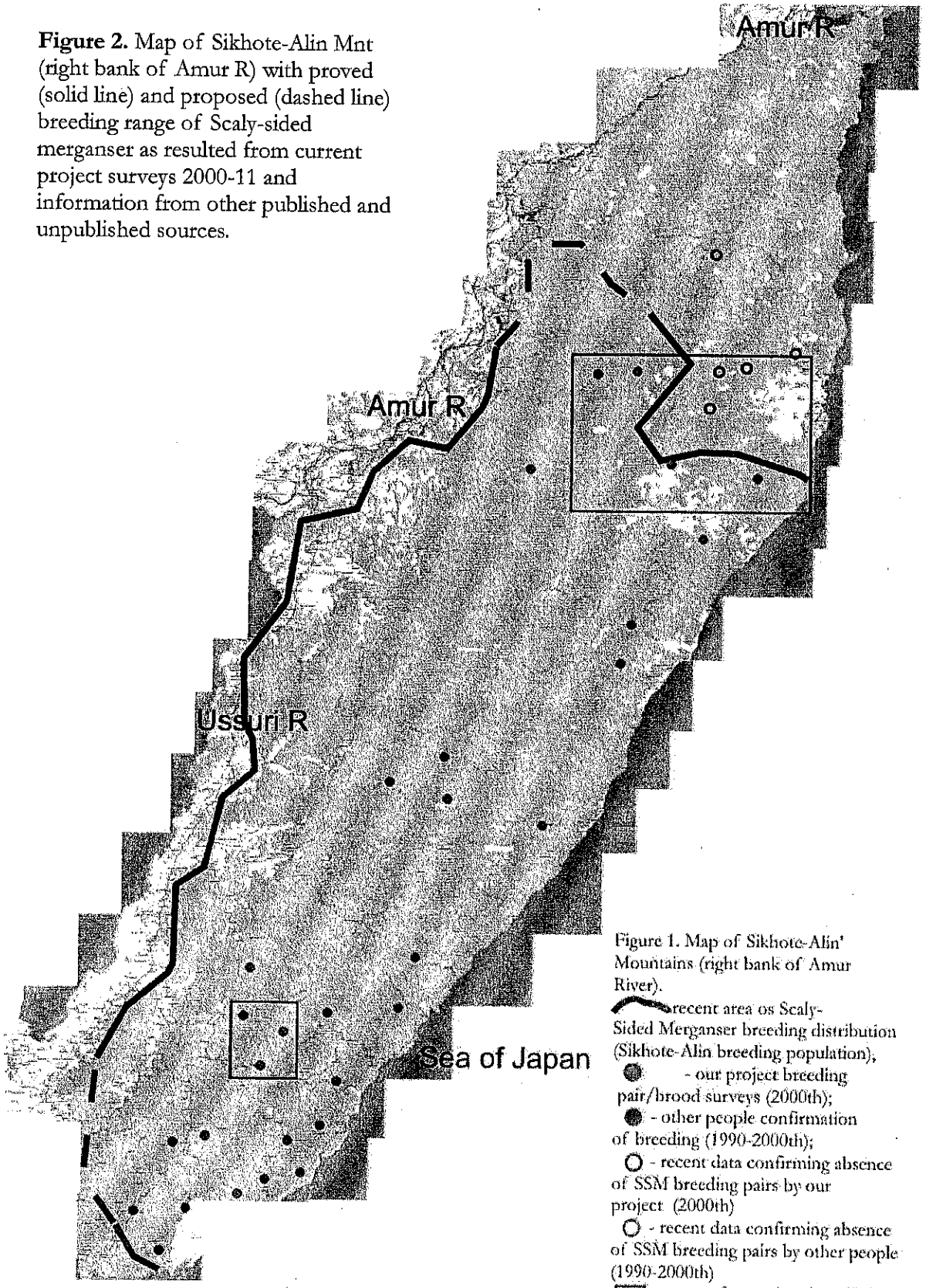


Figure 1. Map of Sikhote-Alin' Mountains (right bank of Amur River).
- recent area os Scaly-Sided Merganser breeding distribution (Sikhote-Alin breeding population),
- our project breeding pair/brood surveys (2000th);
- other people confirmation of breeding (1990-2000th);
- recent data confirming absence of SSM breeding pairs by our project (2000th)
- recent data confirming absence of SSM breeding pairs by other people (1990-2000th)
- surveys for areal under MBZ Fund grant in 2011

Table 1. Basic information for the Scaly-sided merganser northern limits in Sikhote-Alin Mnt.

River	# point on Fig.2	Year of survey	Survey results	Note	Source
Tumnin	1	July 1991	No SSM	Only goosander	S Surmach, per. comm.
Khutu	2	May 2011	No SSM	Only goosander	This report
Butu	3	May 2011	No SSM	Only goosander	This report
Adjalomi	4	May 2011	No SSM	Only MADU	This report
Koppi	5	May 2011	2 pairs SSM	30 pairs of goosander	This report
Gobili	6	May 2011	1 pairs SSM	1 pair goosander	This report
Anuy	7	May 2011	4 pairs SSM	No goosander	This report
Anuy	7	July 2010	Adult and broods SSM	Half and half with goosander	Pronkevich & Oleynikov 2010
Khor	8	June 2010	Numerous adult and broods SSM	SSM predominated over goosander	Pronkevich & Oleynikov 2010
Botche	9	2000th	Presence of SSM	All three merganser species	Botchinskiy SNR Bird Checklist

We are now sure about the Scaly-sided merganser's northern limit on the eastern slope of Sikhote-Alin is Koppi R while on the western slope the species is nesting more to the North. It is common nesting duck on Anuy R (Table 1) and we predict it could be also found as breeding on Gur R. Survey of Gur R is planned for 2012 with Vladimir Pronkevich agree to do this survey. Gur R is the northern most large (>50 km long) mountain river of western Sikhote-Alin, there the Range is ended (blue rectangle on Fihure 2).

1.2. Zeya-Bureya Upland (left bank of Amur R), Russia [compiled with Andrey Averin and Alexey Antonov]

Pompeevka R (1 on Figure 3) in Jewish Autonomous Okrug was known as a river supported high density of Scaly-sided merganser in 0.66 broods/km in July 1976 км (Smirenskiy 1977). In 2007 Andrey Averin [late in Table 2 AA1] visited this river in August and didn't reported any mergansers there (per comm during SSM AP Workshop 2010). Survey of Pompeevka R was highlighted as priority task during Workshop. In addition to Pompeevka Andrey suggested surveying also Bidjan R, the largest river in the area (2 on Figure 3). Alexey Antonov [late in Table 2 AA2] proposed to survey Arhkara R and completed this survey (4 on Figure 3).

Table 2. Basic information for the recent Scaly-sided merganser presence/absence in Zeya-Bureya region.

River	# point on Fig.2	Year of survey	Survey results	Note	Source
Pompeevka	1	Apr 2011	No SSM	No mergansers	This report-AA1
Bidjan	2	May 2011	1 m SSM	3 f goosander	This report-AA1
Bira	3	2000th	No SSM		Averin per comm
Arkhara/Salokachi	4	May 2011	No SSM	Only goosander	This report-AA2
Bureya/s	5	2000th	No SSM	Only goosander	T Atrokhova per comm
Nora	6	2000th	No SSM	Only goosander	Kolbin & Smagina 2008
Amgun'	7	May 2011	No SSM	Only goosander	Pronkevich et al, in press

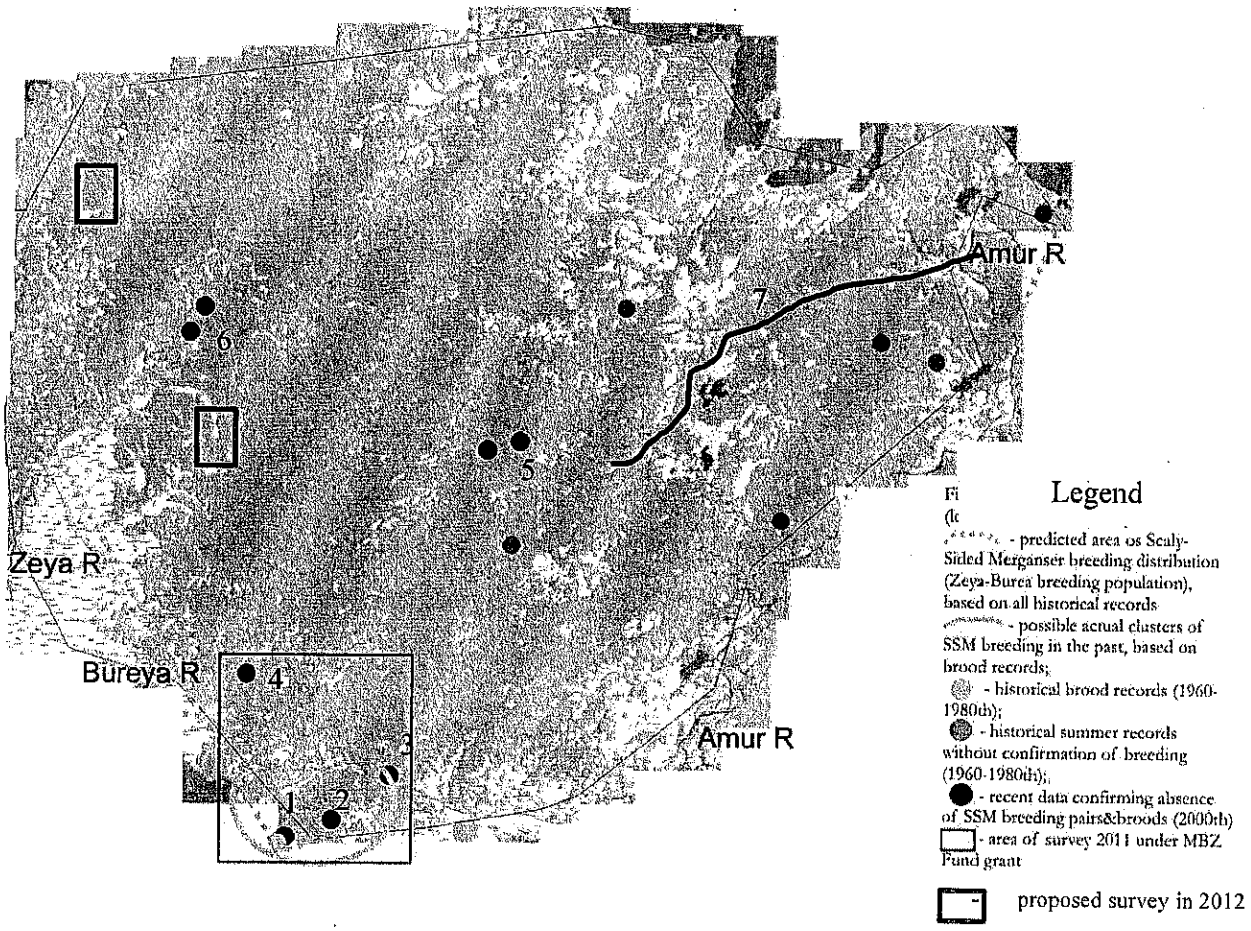


Figure 3. Map of Zeya-Bureya Upland (left bank of Amur R) with historical and recent information on Scaly-sided merganser range.

Table 3. Waterfowl abundance on the rivers of Jewish Autonomous Okrug, spring 2011.

Species	Sex		Total birds			Density ind/km		
			Pompeevka	Bidjan	Arkhara /Salokachi	Pompeevka	Bidjan	Arkhara /Salokachi
Bean goose	0	0	0	48	0	0	0.3	0
Mallard	85	55	6	117	17	0.06	0.73	0.15
Spot-billed duck	2	3	0	5	0	0	0.03	0
Baikal teal	2	2	0	0	4	0	0	0.04
Green-winged teal	16	19	16	18	25	0.16	0.11	0.23
Falcate duck	3	3	0	4	7	0	0.025	0.06
Wigeon	6	6	4	4	4	0.04	0.025	0.04
Northern shoveler	3	2	0	2	5	0	0.013	0.05
Mandarin duck	205	155	16	337	9	0.16	2.11	0.08
Scaly-sided merganser	1	0	0	1	0	0	0.006	0
Goosander	3	10-12	2-4	0	11	0.013-0.026	0	0.1

Survey of Pompeevka R occurred from 27 to 29 April 2011 by Andrey Averin and Sergey Nemerov

from the point with coordinates N 48°21'14.9" E 131°12'29.7" to the point N 48°20'20.9" E 130°49'58.4". Total length 97 km, survey time 19 h 30 m. Same team surveyed Bidjan R on 30 April – 4 May 2011 from the point N 48°37'19.3" E 131°32'01.0" to N 48°15'08.5" E 131°57'30.0"; survey length 160 km, total time 32 h 05 m. Survey of Arkhara and tributaries took place on 10-20 May 2011 and had following schedule: Salokachi R by rubber boat, 45 km, 11 h 20 m; Arkhara R by rubber boat, 30 km, 8 h 30 m; Arkhara R by motor boat, 35 km, 2 h.



Photo 1. Group of Goosanders on Arkhara R, May 2011, by Alexey Antonov.

High density on Scaly-sided merganser broods on Pompeevka R in 1976 was thus not confirmed by presence of pairs in 2011, however we almost didn't report any other mergansers there (Table 3). If we managed to find Goosander in high numbers one can suggest confusion of the species by S Smirenskiy (1977). Now we have no reason to discuss confusion of the species and our only conclusion should be dramatic decline of Scaly-sided merganser in Zeya-Bureya area down to almost disappearance. The last place to check for presence of Scaly-sided merganser in Zeya-Bureya area is Dep R, the western most point of the species historical range (Dymin & Kostin 1977). This work is planned for 2012. In addition to Dep R we are planning to survey Ulma R, situated on our way to Dep R.

Decline or even disappearance of Zeya-Bureya breeding population corresponds well to decline of Lesser-Greater Xingan population in China. Those two populations could be connected as situated close to each other geographically (Figure 1).

1.3. World population estimation

One more year of surveys is necessary to complete Scaly-sided merganser breeding range in Russia and this work was terminated in China by the series of surveys in Greater and Lesser Xingan by Peiqi Liu in 2011. After 2012 we would be able to provide full picture of the species distribution in Russia and world population estimate. At the moment we summarize our results for Russia in Table 4.

Table 4. Breeding pair density of Scaly-sided Merganser on the rivers of Russia and among year dynamics of this density (grey cells – surveys conducted under financial support by Forestry Bureau, COA).

River	density of breeding pairs, pair/km of river												
	00	01	02	03	04	05	06	07	08	09	10	11	average
Sikhote-Alin Mountains													
Alexeevka				0.00									n.a.
Anuy												0.46	n.a.
Arzamazovka				0.03									n.a.

Avvakumovka		0.28	0.29	0.25	0.45	0.25	0.14	0.18	0.29	0.29	0.37	0.28
Benevka	0.16	0.16	0.17	0.08								0.14
Buta											0.00	n.a.
Chernaya		0.07	0.12									0.10
Dal'nyaya								0.53				n.a.
Gobilli											0.13	n.a.
Iman	0.38	0.33	0.50									0.40
Izvilinka			0.17									n.a.
Khutu											0.00	n.a.
Kievka	0.45	0.41	0.62	0.58	0.49	0.79	0.53	0.46	0.61	0.52	0.51	0.54
Krivaya	0.29	0.43	0.80	0.22	0.22	0.90	0.32	0.32	0.56	0.32	0.40	0.43
Koppi											0.09	n.a.
Lazovka	0.10	0.15	0.22	0.22	0.06		0.28	0.11	0.00	0.13	0.00	0.13
Malinovka								0.44				n.a.
Margaritovka		0.27	0.27	0.33	0.12	0.24	0.12	0.06	0.30	0.36	0.06	0.21
Milogradovka		0.08	0.25									0.17
Mineral'naya			0.20									n.a.
Partizanskaya			0.03						0.21	0.36	0.13	0.18
Pavlovka			0.53				0.72				0.45	0.57
Sergeevka			0.29									n.a.
Ussuri		0.16	0.05									0.11
Vasilkovka			0.19	0.31			0.48					0.33
Zerkal'naya			0.13									n.a.
Zhuravlevka											0.39	n.a.
Zeya-Bureya region (left side of Amur R)												
Arkhara											0.00	n.a.
Bidgan											0.01	n.a.
Pompeevka											0.00	n.a.
Salokachi											0.00	n.a.

Based on known densities (Table 4) and with extrapolation of known densities to un-surveyed rivers with similar habitats we can estimate Scaly-sided merganser breeding population in Sikhote-Alin Mnts. in 1,575 breeding pairs. Together with 200 pairs in Changbai Mtn., China (Liu et al 2010), and estimated the same size of North Korean Changbai Mtn. population (200 pairs) and 30-40 pairs in Lesser Xingan (P Liu 2011) the world population could be estimated in 2,000 pairs, or 6,000 birds. This is less than our previous estimation up to 10,000 birds (Shokhrin & Solovieva 2003) and over than 2,500 birds (BirdLife International 2001).

Eighty percent of world population is breeding in Sikhote-Alin Mountains. This is the largest population unit occurring in relatively compact area of one mountain range. We found it possible to suggest and organize effective species management within Sikhote-Alin.



Photo 2. Anuy R and mark of "Anuyskiy National Park" on 5 of [redacted] 2011 [redacted]ce as still moving by the



Photo 3. New highway Sovetskaya Gavan' – Komsomolsk is under construction and passes on the bank of Anuy R remote in a past Road should be completed in 2012. On the right, my team is pumping boat for survey.

1.4. Intergradation with Goosander

All rivers studied recently for merganser species in Zeya-Bureya area were populated with Goosander, but Bidjan R (Table 3). Goosander density on the rivers of Jewish AO (Pompeevka and Bidjan rivers) was very low. It slightly increased in Arkhara and Salokachi rivers (Table 3 and Figure 3). No densities were estimated on upper Bureya R and on Nora R (Table 2). Pictures of Goosander broods and pairs were provided by Tatiana Atrokhova for Bureya R and reliable data on Goosander nesting on Nora R has been published (Kolbin & Smagina 2008). Only Goosander was found for 480 km of survey by Vladimir Pronkevich on Amgun' R in May 2011 (Pronkevich et al in press). There were 31 adult bird and 2 broods recoded there on 12-16 July 2011, so the density could be estimated as low on Amgun' R.

In May 2011 we found Goosander to be the most numerous duck on the rivers Khutu and Koppi on eastern slope ofSikhote-Alin Range (Figure 2). The density was 2.47 and 1.17 pairs/km accordingly. There was an ice-break on Khutu R during our survey on May, 7 and the high density could be related to ducks concentrated on open parts of the river with the later redistribution along the entire river after ice-break. Koppi R was ice free on 9 of May when we surveyed it and Goosander density seems to be real there. Anuy R on the western slope of the range was known to support equal numbers of Scaly-sided merganser and Goosander broods in brood rearing period of 2010 (Pronkevich & Oleynikov 2010) and we found only breeding pairs of Scaly-sided merganser there in 2011 with quite high density of 0.46 pairs/km (Table 4). Khor R was surveyed twice in 2010 and 2011 by V Pronkevich (Pronkevich & Oleynikov 2010; Pronkevich et al. in press). Survey of 2010 was set up in a wrong time of mid-June: it was too late to count pairs and too early to count broods of mergansers. In 2011 the survey was decided for 13-20 May and it showed absolute dominance of Scaly-sided merganser (even absence of Goosander): 91% of mergansers were identified as SSM with 9% being unidentified (Pronkevich et al., in press). Density was 1.19 bird/km with the density of breeding pairs of just 0.15 pairs/km. Most of birds were flocked. Khor and Anuy rivers seem now to be these poorly known moulting sites for male Scaly-sided mergansers (Solovyeva et al., submitted to Ibis). A number of male flocks (with quite a few females) were reported there in May-June (Pronkevich & Oleynikov 2010; Pronkevich et al. in press; our data).

Great survey efforts in the very recent years provided a picture of breeding distribution and numbers of both merganser species in the large area of Far East Russia. Rivers of Sikhote-Alin Range all supported much higher densities of both mergansers, what is better shown for the rivers where only Goosander was recorded (because Scaly-sided merganser was not reported in Zeya-Bureya area). It could be suggested that recent foraging situation [fish abundance] is much better on SA comparing to ZB area; this can explain high densities of breeding and non-breeding mergansers in SA.

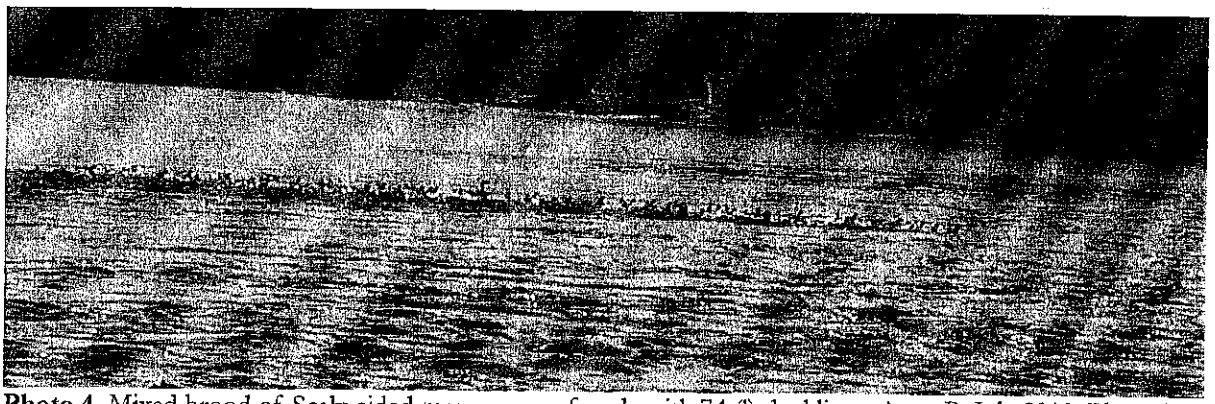
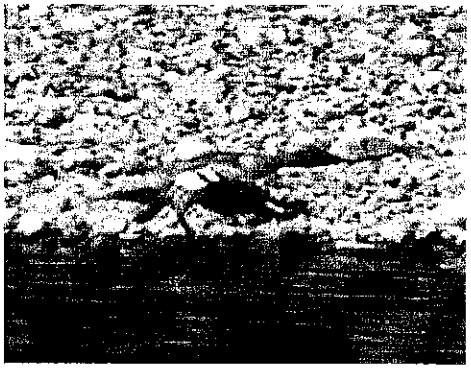


Photo 4. Mixed brood of Scaly-sided merganser: a female with 74 (!) ducklings, Anuy R, July 2010. Photo by Vladimir Pronkevich.



Photo 5. Females Goosander (left) and Scaly-sided merganser (right) are well distinguished even in poor quality pictures. Black stripe on wing mirror is well pronounced in SSM. July 2010. Photo by



Chapter 2. Breeding population dynamics in study area

2.1. Spring surveys for breeding pairs

Traditionally we survey following rivers in Southern Sikhote-Alin for breeding pairs of Scaly-sided Merganser: Avvakumovka, Kievka, Krivaya, Lazovka, Margaritovka and Partizanskaya (Table 5).

Table 5. Dates, distances and density of Scaly-sided Merganser breeding pairs along the rivers of Southern Sikhote-Alin Mnts., Russia, 2011.

River	Dates of survey	Survey length, km	Breeding pair density, pairs/km	Total # of birds observed
Avvakumovka	21 Apr	36.2	0.370	30
Kievka	11-16 Apr	85	0.506	126
Krivaya	15 Apr	12.5	0.399	12
Lazovka	14 Apr	15	0.000	0
Margaritovka	20 Apr	16.5	0.060	1
Partizanskaya	13 Apr	22.5	0.133	6
Average/total		187.7	0.245	175

In 2011 we were able to survey also rivers Pavlovka (26.4 km, 28 April) and Zhuravlevka (33.1 km, 29 April); pair densities on these rivers are presented in Table 4. Pair density of 0.393 pairs/km was quite high and forest quality on the banks was reported as poor with large areas of deserted fields to select Zhuravlevka R as one more "incubator" for the Scaly-sided merganser.

Breeding population in key study area of Kievka catchment was stable in 2000-11 (Figure 4). Three-year cycle is slightly pronounced in this population which is hard to explain. Natal site fidelity is unstudied in Scaly-sided merganser and we miss data on young females return to breed to their native rivers. Recruitment of first year breeding females (3 years old) from the same catchment could explain three-year cycle, however 1) we found females could breed at the age of 2 years old and 2) brood number doesn't show well pronounced cycle similar to breeding pair number (Figure 4).

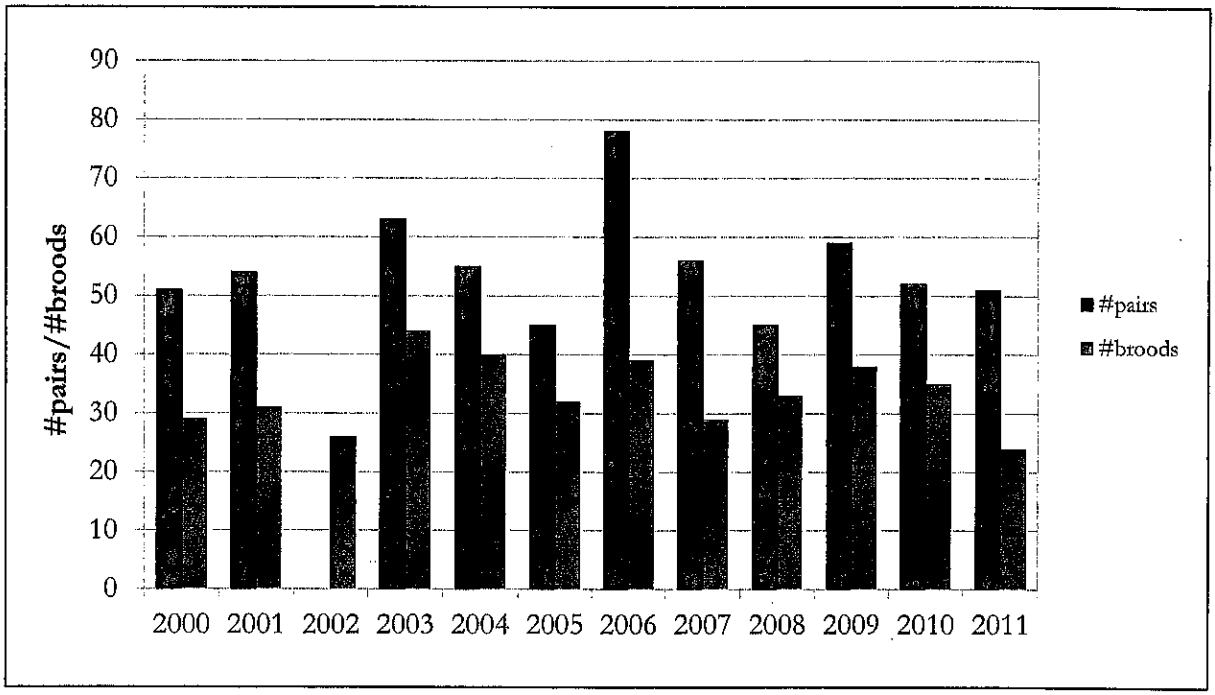


Figure 4. Between year dynamics of Scaly-sided Merganser breeding pair and brood numbers in Kievka catchment, Primorye.

2.2. Brood surveys

Brood surveys were conducted between 23 and 29 July 2011 in Kievka catchment (study area) entirely. Season of 2011 was characteristic with the lowest brood number in Kievka catchment during period of observation (Figure 4). Twenty three broods including two amalgamations of 21 (4 broods) and 18 (4 broods) were recorded in Kievka catchment and 24 broods were estimated there. Brood survey of Benevka R was missing and we estimate 1 brood there. Average brood size was 3.31±0.31 ducklings in the period of survey; limits 1 – 5 ducklings. We consider maximal brood size in amalgamated broods and thus a group of 21 and a group of 18 both composited of 4 broods. This is the lowest average brood size in July ever reported during study period. It seems that predation pressure on Scaly-sided merganser chicks was very high this year. Brood size at hatch was poorly documented in 2011 because a very few clutches hatched.

Chapter 3. Nest sites and artificial nest program

3.1. Wild cavities

In 2011 we were unable to locate new wild nest sites of Scaly-sided merganser because main personnel was busy with surveys in Khabarovsk region (DVS, SLV and ONV) and Jewish Autonomous Okrug (SVN) in late April – early May. None of known wild cavity was occupied by Scaly-sided merganser in 2011 however we missed to check one cavity SVN1. Surprisingly the newly located in 2010 cavity PAC1 wasn't occupied by ducks in 2011; no down was presented and there was no bird in it when we knock the branch. Nest in this cavity was considered as depredated/abandoned because no female has been reported there during our visits in 10 May 2010. May be depredation of nest was the reason for the female didn't come back here in 2011. From eight known wild nest sites five were completely destroyed by 2011 (Table 6). Special time and special efforts should be devoted to wild cavity location in future years.

Table 6. Occupation of wild cavities by Scaly-sided Merganser and other animals, 2003-2011, Primorye.

Cavity ID	2003	2004	2005	2006	2007	2008	2009	2010	2011
DAG1	SSM	SSM	empty	empty	empty	UROW	UROW	destroyed	destroyed
VPS1	-	SSM	UROW	empty	BLSQ	UROW	UROW	UROW	destroyed
SLV1	SSM[1]	SSM	SSM	SSM	destroyed	destroyed	destroyed	destroyed	destroyed
DVS1	-	-	SSM	empty	empty	empty	empty	empty	empty
VPS2	-	-	SSM	SSM	SSM	SSM	destroyed	destroyed	destroyed
VPS3	-	-	-	MADU	SSM	destroyed	destroyed	destroyed	destroyed
SVN1	-	-	-	-	-	-	SSM	SSM[2]	n.c.
PAC1	-	-	-	-	-	-	-	SSM	empty

1 – occupation by SSM is considered because we found last year eggshells and down in spring 2004.
2 - occupation by SSM is considered because a female with typical behavior was observed flying around the cavity in May 2010 however entering was not observed and the cavity wasn't checked for presence of eggs.
n.c. – not checked.

Abbreviations (besides persons mentioned in Acknowledgements):
DAG – Alexey Dondua
PAC – Peter Cranswick

3.2. Artificial nest sites

Artificial nest sites were cleaned in late March – early April 2011 (Tables 1 & 2 Appendix A). Total of 30 nest tubes and 29 nest boxes were cleaned and saw-dust was added if needed. The tube # 119 was displaced and erected to replace destroyed tube # 30 (the most popular tube in Scaly-sided merganser). Three tubes and four boxes were repaired and one box was moved to nearby tree because it's previous position had a close view. We did preparation work on the rivers Avvakumovka, Kievka, Krivaya, Lazovka and Margaritovka. We missed to prepare AN on Partizanskaya and Pavlovka rivers. Selecting of AN to clean, repair and replace is always a hard task under lack of time before merganser arrival to breeding rivers. We are always in a time trap between filed work onset, which is funding dependent, and arrival of target species.

Table 7. History of artificial nest tubes existence and occupation by Scaly-sided merganser along logged rivers/parts of rivers in Primorye, 2002-2011. Rivers of Kievka basin as Benevka, Kievka, Krivaya and Lazovka are combined in Kievka basin. Six tubes on Margaritovka R were considered in this table although only one of them is situated on the logged part of the river; historically we checked all six tubes there when they were active.

Year	Parameter	Avvakumovka R	Kievka basin	Margaritovka R	Partizanskaya R	Pavlovka R
2002	# AN available	10	11	6	-	-
	# AN occupied	0	3	0		
	% AN occupied	0	27.3	0		
2003	# AN available	10	11	6	-	-
	# AN occupied	1	4	0		
	% AN occupied	10.0	36.4	0		
2004	# AN available	8	7	2	-	-
	# AN occupied	0	3	0		
	% AN	0	42.9	0		

	occupied					
2005	# AN available	8	30	6	-	10
	# AN occupied	0	3	1		0
	% AN occupied	0	10.0	16.7		0
2006	# AN available	8	29	5	-	7
	# AN occupied	0	6	0		1
	% AN occupied	0	20.1	0		14.3
2007	# AN available	6	26	3	-	6
	# AN occupied	0	7	0		1
	% AN occupied	0	26.9	0		16.7
2008	# AN available	5	19	4	-	4
	# AN occupied	0	5	0		1
	% AN occupied	0	26.3	0		25.0
2009	# AN available	0	41	2	3	5
	# AN occupied	0	8	0	0	0
	% AN occupied	0	19.5	0	0	0
2010	# AN available	0	35	1	2	n.c.
	# AN occupied	0	8	0	0	n.c.
	% AN occupied	0	22.9	0	0	n.c.
2011	# AN available	0	27	1	2	n.c.
	# AN occupied	0	2	0	0	n.c.
	% AN occupied	0	7.4	0	0	n.c.
Average occupation for all years, %		**1.7**	**20.8**	**2.8**	**0**	**11.2**

Table 8. History of artificial nest boxes existence and occupation by Scaly-sided merganser along logged rivers/parts of rivers in Primorye, 2003-2011. Rivers of Kievka basin as Benevka, Kievka, Krivaya and Lazovka are combined in Kievka basin. Six boxes on Margaritovka R were considered in this table although only one of them is situated on the logged part of the river; historically we checked all six boxes there.

Year	Parameter	Avvakumovka R	Kievka basin	Margaritovka R	Partizanskaya R
2003	# AN available	12	12	6	-
	# AN occupied	0	1	0	
	% AN occupied	0	8.3	0	
2004	# AN available	9	6	2	-
	# AN occupied	0	1	1	
	% AN occupied	0	16.7	50	
2005	# AN available	9	10	4	-
	# AN occupied	0	2	0	
	% AN occupied	0	20	0	
2006	# AN available	9	9	6	-
	# AN occupied	0	2	1	
	% AN occupied	0	22.2	16.7	
2007	# AN available	10	9	3	-

	# AN occupied	1	2	1	
	% AN occupied	10	22.2	33.3	
2008	# AN available	9	10	6	-
	# AN occupied	1	4	0	
	% AN occupied	11.1	40	0	
2009	# AN available	9	22	3	1
	# AN occupied	2	4	0	0
	% AN occupied	22.2	18.2	0	0
2010	# AN available	9	16	5	0
	# AN occupied	2	5	0	0
	% AN occupied	22.2	31.3	0	0
2011	# AN available	10	16	6	1
	# AN occupied	3	6	0	0
	% AN occupied	30	37.5	0	0
Average occupation for all years, %		**10.5**	**24.5**	**7.3**	**0**

With years of the project we realize that usage of artificial nest sites by Scaly-sided merganser is very complicate process. Kievka basin, selected as study area, was in actual fact the unique place in the world where Scaly-sided merganser was trained to nest in artificial sites. Duck nest box history started from 1965 there and great success in attraction of merganser was achieved in 1981-1986 by Nikolay Kolomiytsev (1992). Several from 64 AN submitted by Kolomiytsev were still in good condition in early 2000th when we started our AN program. We think this is the reason why occupation rate was so high in Kievka basin since the first years of our AN program there (Tables 7 and 8). Occupation history was rather different from Kievka in other catchments. One occasional female used nest tube in the second year on Avvakumovka R and then for many years no occupation occurred there. We lost a hope to get AN occupation and we cancelled repairing of destroyed nest tubes on Avvakumovka R (see reduction of nest tubes available to zero in 2009 for Avvakumovka R in Table 7). Nest boxes as being set up later and being better survived with time were still available for duck nesting in 2009-11 (Table 8). In 2007 box was occupied on Avvakumovka R for the first time and since this occupation rate is increasing. In 2011 there were 3 Scaly-sided merganser nests for 10 AN (just boxes) available!

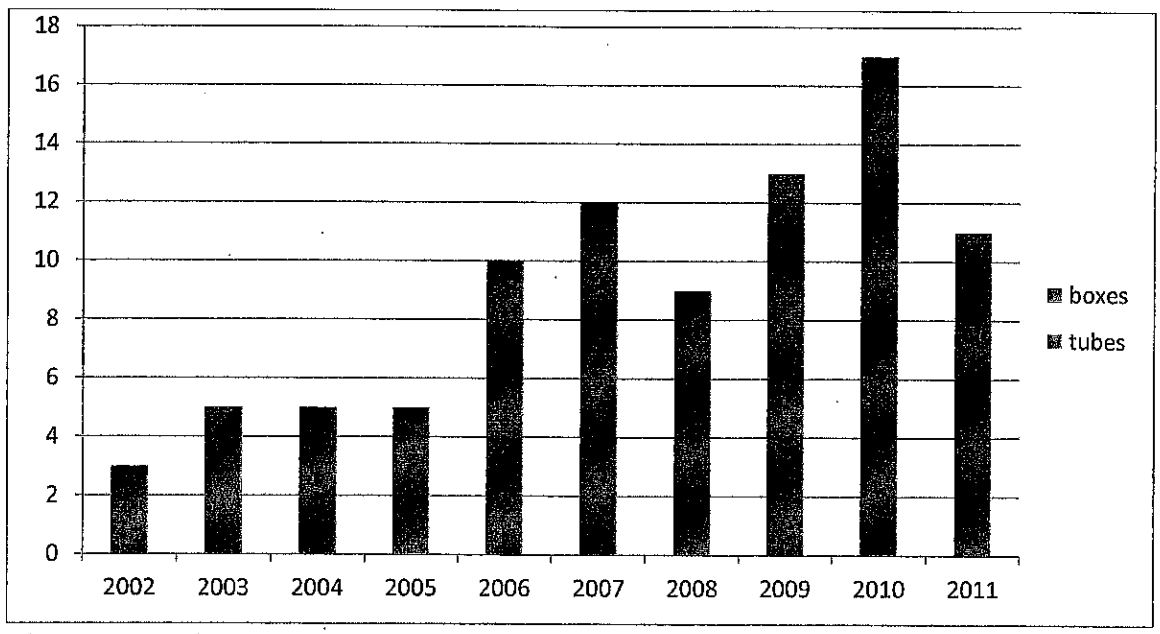


Figure 5. Number of artificial nests used by Scaly-sided Merganser by years and AN types, Primorye, Russia.

There was a site-fidelic hen nesting for 2009-11 at the same box and two of potentially new birds, however they were just not banded previously with no prove they were never nesting in boxes there. We suggest there was an adaptation to AN in females of Avvakumovka R; and now there would be occupation every year when ANs are available. Our task now is to keep existing and to set up more AN on Avvakumovka R to keep the pool of females familiar with AN. Absence of habit to AN in Avvakumovka females could indicate very high degree of isolation and very low exchange between birds from nearby catchments. Distance between Kievka and Avvakumovka is 200 km. Occupation occasionally happened on Margaritovka R; however this results couldn't be comparable to Kievka and Avvakumovka results because a very few pairs (max 5 pairs for this river) and fewer nest boxes (max 12 available once). Interestingly that Margaritovka R is situated in 120 km from Kievka. Potentially females that used AN in Margaritovka could be originating of nesting in Kievka catchment. DNA study can prove degree of isolation or exchange between basins. It is almost clear now that if we aim to have reasonable number of females familiar with AN for conservation purposes, i.e. re-introduction to previously known range or a number of studies, we should have patience to set up and maintain AN on the rivers where occupation is already reached and we have to consider at least 5 years for occupation to start on rivers recently equipped with AN. Under this consideration we recommend to continue AN monitoring and maintenance in China.

Except for historical factors mentioned above the occupation rate is influenced by a number of other factors. We found depredation to be a strong factor of nest site occupation in the next year. After unsuccessful season 2010 when 59% of Scaly-sided merganser nests were depredated by Yellow-throated Martins and Sables in Kievka basin the occupation of AN felt down in 2011 (Tables 7 and 8; Figure 5). This decrease was reported in Kievka basin only (Table 7 and 8); but due to extreme importance of Kievka basin for Scaly-sided merganser reproduction it changed a full picture. Most concern is that almost no old site-fidelic females returned to their nests after clutch depredation in 2010. It affected the proportion of boxes vs tubes used by Scaly-sided Merganser in 2011 (Figure 5; Table 9).

Table 9. Distribution of Scaly-sided Merganser nests among cavity types, Primorye, 2002-11.

Year	# nests in tubes	# nests in boxes	# nests in wild cavities	Total
2002	3	-	-	3
2003	4	1	1	5
2004	3	2	3	8
2005	3	2	3	8
2006	7	3	2	12
2007	8	4	2	14
2008	6	5	1	12
2009	8	6	1	15
2010	10	7	2	19
2011	2	9	0	11
Total	54	39	15	107
Per cent	*50.5*	*36.4*	*14.1*	*100*

From eleven nests only two were in tubes in 2011 (Table 9). However the picture could be changed after AN checking in 2012. In 2011 we recorded two more Scaly-sided merganser nests of 2010 in tubes. These nests were late and started after our AN checking 2010. Both nests were depredated.

From nests in tubes in 2011 one was of female known from 2009 and using the same tube for 2009-11; another one was in t113 the most popular in Scaly-sided merganser since it's building in autumn

2008. This tube was placed on isolated tree in the field river bank. It attracts attention of all mergansers flying over and it was always used by different females since 2009; surprisingly none of previous users come back to this tube. It was a new female again nesting in this tube in 2011.

3.3. Nest site competition

Competition for artificial nest sites is increasing with years of their existence. More and more species are using our nest tubes and boxes (Table 10). There were three nest of Collard scops owl in 2011 (two in boxes and one in tube). Our data on owl nesting contradicts to rodent surveys commenced by Lazovskiy SNR. Number of owl nesting on our AN was incredibly high in 2011: seven Ural owl nests and three Collard scops owl nests, ten in total. Reserve's data indicate moderate density of voles for spring 2011. If owls are so numerous in our AN in the year of moderate rodent densities we should expect all AN to be occupied by owls in peak rodent years! We hope that rodent estimations of the Reserve were wrong as new person was employed to do rodent surveys.

Table 10. Occupation of artificial nests sites by pest species.

Species	Tubes (total 43 tubes available)		Boxes (total 35 boxes available)	
	# nests	Occupation rate, %	# nests	Occupation rate, %
		Previous summer 2010		
Hornet sp	6	14	10	28.6
Wasp sp			1	2.9
		Winter 2010/11		
Flying squirrel	5	11.6	1	2.9
Black squirrel	1	2.3	2	5.7
		Spring 2011		
Black squirrel			2	5.7
Flying squirrel	1	2.3	2	5.7
Ural owl	7	16.3		
Collard scops owl	1	2.3	2	5.7
Mandarin duck			6	17.1

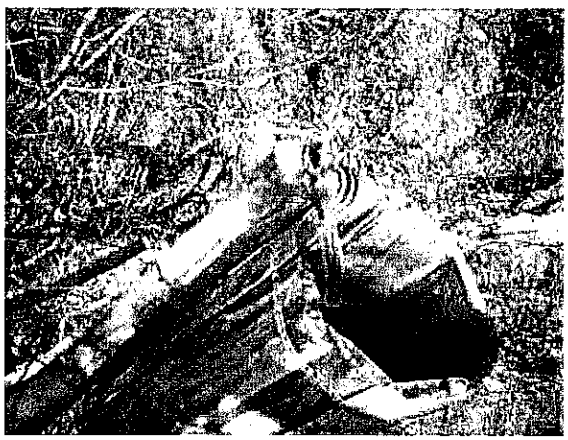


Photo 6. Chipmunk checking tube #131 on 2 May 2011, Kievka R, Primorye.

Chipmunk was a new species starting to use our AN in 2011. Chipmunk was visiting tube #131 equipped with Bushnell camera (Photo 6). Three dead young chipmunks were found in the tube # 25.

We are able to remove competition with summer and winter pest species by cleaning of AN in spring. Squirrels were observed to move their cubs to new cavity after our visit, so spring cleaning can also help against Black squirrel (early breeder). Flying squirrel is breeding about the same time as merganser, so early cleaning isn't working. There is an ethic problem with removing of owl nests from AN. We never did this, but sometimes when old and popular nest site of loggered female merganser is surprisingly occupied by owl there is a strong wish to remove owl nest.

Nest site competition with Mandarin duck was reported in several years of the study. However we never reported of Mandarin duck to win this competition before 2011. Nest in box #9 contained 11 eggs of mandarin duck and 10 eggs of Scaly-sided merganser and it was incubated by Mandarin duck female. Later in season all Mandarin eggs hatched and all but one merganser eggs were left in the nest un-hatched. Clutch in the box #1032 contained of 10 merganser and 5 mandarin eggs, merganser female incubated. Two of merganser eggs and all mandarin eggs were un-hatched in this nest while 8 mergansers hatched. We should include in the field protocol: "Always remove Mandarin duck eggs from merganser nest".

Chapter 4. Breeding

4.1. Nesting chronology

Nest initiation was poorly documented in 2011 because:

- Only one female equipped with geolocating logger was recaptured;
- No hatch dates were available due to low nest success;
- Main team was busy with surveys in Khabarovsk and egg aging wasn't used in many of nests.

From back-dating of eggs with known incubation stage we can say that the first clutch was initiated on 2 of April while the last clutch was initiated on 7 of May and the period between first and last clutch was close to average among years (Table 11).

Table 11. Clutch initiation period in Scaly-sided merganser, Primorye, 2003-11.

Year	2003	2004	2005	2006	2007	2008	2009	2010	2011	average
Days between first and last clutch initiated	41	55	35	38	32	30	27	33	35	36.2

4.2. Nest site selection

In 2011 we got unique pictures illustrating the story of nest site selection/ checking by female Scaly-sided merganser. Thanks to Valery Shokhrin, who would like to record time-budgets of Collard scops owl nesting in tube, and to Linda Kerly kindly provided Bushnell cameras. The comic story is presented in chronological order.

We hope to know the end of this story when check this tube in 2012, it was too late for nest initiation on 1 of June when female realized the tube is free of owls. This observation suggests that nest site checking and probably nest site selection occurs all the time when young or failure females are presenting on breeding river. Ideas on nest site search in autumn after leaf abscission doesn't find confirmation in this particular case, although we should mention that there was a very beginning of leaves vegetation when female located the tube (first slide).



SSM female: What's a nice nest site! What is there inside? Ups, owl brood, sorry guys.



Young owls resting on the sun.



Same female (?): Good they left!



Same female (?) ten days after: I definitely like the site!

4.3. Clutch size

Total of 11 Scaly-sided merganser nests were located in 2011 and clutch size was determined in 8 complete clutches. In 2011 average full clutch numbered 11.9±1.2 eggs, range 9 – 18 eggs (n=8, Figure 6). With switch to newly-nesting females after unsuccessful season 2010 the average clutch size increased again in 2011. We connect this to inter-specific nest parasitism. Average clutches numbered 10.5-11 eggs since 2006 and large average clutches in 11.5-12 eggs with dump eggs were reported previously in 2003-05. Before 2011 we explained this difference by reduction of intraspecific nest parasitism after providing of enough nest sites (tubes and boxes) for all females in study plot in 2004. However we should consider other explanation now: young females are week to fight against conspecific nest parasites. In 2003-05 there were mostly young/new hens involved in reproduction in AN; later in 2006-10 they become older and more experience to avoid nest parasitism. In 2011 new hens were again in the same situation as in 2003-05 and nest parasitism was high again.

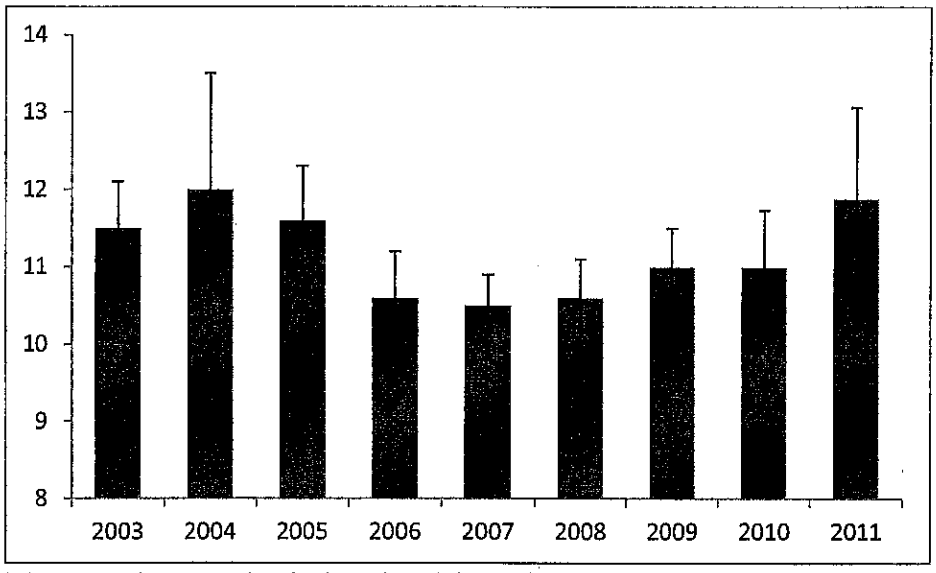


Figure 6. Average clutch size (± SE) in Scaly-sided merganser in different years, Primorye.

One old female, known from 2009 and returning to nest in 2011 had a clutch of 9 [probably] own eggs. And other subadult female known since 2010 had 10 [probably] own eggs and 5 Mandarin duck eggs in her clutch.

4.4. Nest and egg success

Table 12. Egg success in Scaly-sided merganser in 2011, Primorye.

nest #	# eggs laid	# eggs hatched	# eggs depredated	# eggs abandoned	# eggs dead due to female death	# eggs addled	# eggs dead embryo or dead duckling	# eggs destroyed with nest destruction	fate unknown
SSM1-11	10	8					2		
SSM2-11	11			11					
SSM3-11	10			10					
SSM4-11	2			2					
SSM5-11	18								18
SSM6-11	12								12
SSM7-11	9								9
SSM8-11	10			10[a]					
SSM9-11	16	16							
SSM10-11	9	8					1		
SSM11-11	10				10[b]				
sum	117	32	0	33	10	0	3	0	39
% success from eggs with known fate		41.0		42.3	12.8		3.8		

a – clutch incubated by Mandarin duck, we consider female merganser abandon her eggs although it was possible that mandarin hen pushed merganser hen out.

b – story similar to stories of 2006-08 when eggs were covered and no female reported at nest from several visits including first visit. We consider hen died during egg laying or early incubation.

From eight nests with known fate three hatched, four nests were abandoned and one was unsuccessful due to probable death of female (Table 12 and 13). Three nests situated on Avvakumovka R were unchecked for their fate. So, nest success was 37.5%. Egg hatching success

was 41% for the nests with known fate (Table 12). There was no depredation of clutches in 2011 in contrast to 2010. However nest success was low again and the key reason was nests abandonment in this year. Nest abandonment is typical for nests in boxes and 2011 was the season when most of merganser nests were placed in boxes (9 from 11 Table 9). And all four deserted nests were in boxes.

Table 13. Nest fates in Scaly-sided merganser (from nests with known fate), Primorye, 2003-11.

Year	# nests				
	successful	depredated	abandoned	nest site destroyed	female dead
2003	5	0	1	0	0
2004	6	1	1	0	0
2005	6	0	2	0	0
2006	9	1	1	0	1
2007	8	1	2	0	1
2008	9	0	1	1	1
2009	13	0	2	0	0
2010	5	13	1	0	0
2011	3	0	4	0	1
Total (n=100)	64	16	15	1	4
Per cent	64	16	15	1	4

Table 14. Nest fate in Scaly-sided Merganser as dependent on cavity type, Primorye, 2003-11.

Cavity type	# nests					Sum	Nest success by cavity type
	successful	depredated	abandoned	nest site destroyed	female dead		
Tube	38	7	3	1	1	50	0.76
Box	18	5	10	0	3	36	0.5
Wild	10	2	2	0	0	14	0.71

Nest success in boxes was confirmed to be the lowest between cavity types (Table 14). Key factor for the low nest success in boxes is nest abandonment and female death; however this could be also abandonment instead of death in the cases when females didn't come back to their full clutches without reason (no disturbance by us). If suggest disturbance by other agent before our first visit of the nest (predators, other people) it is hard to explain why clutch was always covered with down. When we flash a hen it never covers clutch. Covered clutch is suggesting a hen left a nest for recess and never came back. None of females, whose nests were found covered with no hen, was seen again in following years at the same or other nest site. However they could potentially nest in undiscovered wild cavities. Until opposite proven we will consider such females dead and nests failed due to female death.

Chapter 5. Demography

5.1. Sex-age structure of breeding population from the data of spring surveys

We used survey data from the rivers of traditional survey: Avvakumovka, Kievka basin, Margaritovka and Partizanskaya; and we added data from Pavlovka and Zhuravlevka rivers to

estimate sex-age structure of spring population (Table 15). In 2011 a proportion of flocked (young) birds was 18.8% the highest among years of surveys. This is including a flock of 12 females and a male observing on Zhuravlevka R. With enlarging of survey geography we got more confirmation that female skewed sex ratio is typical for entire world population of Scaly-sided merganser. Similar sex ratio was typical for Changbai Mnts. spring population (Liu et al. 2010).

Table 15. Sex age structure of Scaly-sided merganser spring population, Primorye, 2003-11.

Parameter	2003	2004	2005	2006	2007	2008	2009	2010	2011	*av*
# birds in families (pairs and trios)	308	182	118	176	196	134	166	154	243	
# flocked birds (young flocks)	45	31	17	27	10	5	38	28	54	
% flocked birds from total	12.7	14.6	12.6	13.3	4.9	3.6	18.6	15.4	18.8	*12.7*
# families (pairs and trios)	86	60	44	58	72	57	50	52	64	
# trios	5	9	2	6	6	9	7	5	13	
% trios	5.8	15.0	4.5	10.3	8.3	15.8	14.0	9.6	20.3	*11.5*
# paired males of known age	58	87	17	39	44	50	53	56	55	
# paired subadult males	2	5	2	1	4	3	7	3	2	
% subadult males in families	3.3	5.7	11.8	2.6	9.1	6.0	13.2	5.4	3.6	*6.7*
# nesting females with known age	no	no	no	no	8	10	12	7	7	
# nesting subadult females	no	no	no	no	0	3	4	3	1	
% subadult females	no	no	no	no	0	30	33.3	42.9	14.3	*24.1*

Female skewed ratio was observed on some rivers of Northern Sikhote-Alin: on Khor R (Pronkevich et al 2011) while male skewed ratio was reported on Anuy R both by us in 2011 and by V Pronkevich in 2010 (Pronkevich and Oleynikov 2010). Analyzing the results of surveys 2010-11 on Anuy R we can suggest this catchment is one of the moulting sites for males. Males gather there as early as early May and continue until mid July. No data are available on later times.

Two Scaly-sided merganser females were reported on Koppi R in May 2011, no males of this species was found. However, one of females was paired. And this female had yellow ring on the left leg. Motor boat was moving fast and I couldn't recognize species of male, considering that my attention was attracted to female with ring. This could be one of females ringed by us during spring migration along Kievka R or, what is less possible, it was one of females previously breeding on Kievka or Avvakumovka rivers.

5.2. Individual fate of females

Table 16. Reasons of Scaly-sided merganser female disappearance from the nest site, 2003-11, Primorye.

	Female death	Cavity destruction	Cavity occupation by other animals	Unsuccessful nesting	Disturbance during nesting*	Unexplainable reason
# cases	7	4	4	10	13	3
Per cent	17	9.7	9.7	24.4	31.7	7.3

*- we consider our catching independently successful or not as a disturbance of nesting hen. If hen didn't return to the nest site next season after successful nesting being captured we consider disturbance as a reason.

We are following individual stories of all Scaly-sided merganser females nesting in artificial and in known wild nest sites since 2003 (Appendix B). Several females escaped capturing at nest in the first year of registration and some of them were captured during their second nesting in the same cavity.

We consider them as the same birds escaped in the first year only if they demonstrated specific features (small size, typical behavior). Female Scaly-sided mergansers had moderate site fidelity to previous breeding site. For the nine seasons from 2003 to 2011 we reported four females that switched from one cavity to another, one of them changed nest site for three times; another did one for 2 times.

In 2010 unsuccessful nesting from depredation became one of key reasons for females didn't return to their previous nest sites (Table 16). It seems that cavity nesting Scaly-sided merganser is poorly adapted to nest depredation and switch to other site after this unlucky event. Surprisingly no old females appeared in other AN, it was reasonable to suggest they switch to another but same type of cavity and thus we would be able to see them in another AN. This didn't happen in 2011. As a result only three previously ringed hens were reported in 2011 with one of them ringed in 2010 and two in 2009 (Table 17). The oldest known hen nesting in the tube #30 from 2005 to 2010 didn't come back after her nest depredation in 2010.

Table 17. Recoveries of nesting Scaly-sided Merganser females to the same nest cavity, Primorye, 2003-11.

	# females ringed in								
	2003	2004	2005	2006	2007	2008	2009	2010	2011
Reported in	4	6	4	7	7	4	6	4	4
2004	1								
2005	0	1							
2006	0	1	2						
2007	0	0	0	2					
2008	0	0	1	1	4				
2009	0	0	1	2	2	1			
2010	0	0	0	2	1	0	2		
2011	0	0	0	0	0	0	2	1	n.a

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Appendix A. Occupation and cleaning of artificial nests in 2011.

Table 1. Dates of cleaning and checking of nest tubes in 2011 and their occupation by Scaly-sided merganser and pest species.

tube #	river	year/season of placing	condition	data cleanning	data check	occupation in winter& previous summer	occupation in spring 2011
20[1]	Lazovka	spr 2001		30/03/11	10/05/11	FLSQ	emp
21	Kievka	spr 2001	destroyed				
22	Kievka	spr 2001	destroyed				
23	Kievka	spr 2001		30/03/11		emp	
24	Kievka	spr 2001	destroyed	26/03/11	19/05/11	emp	emp
25	Kievka	spr 2001		26/03/11	10/05/11	CHIP	emp
26	Kievka	spr 2001		26/03/11	08/05/11	emp	emp
27	Kievka	spr 2001	destroyed				
28	Kievka	spr 2001	destroyed				
29	Kievka	spr 2001		28/03/11			UROW1-11
30	Kievka	spr 2001		25/03/11	08/05/11	emp	emp
68	Kievka	aut 2004	felt down				
69	Kievka	aut 2004	destroyed				
70	Kievka	aut 2004	repaired	26/03/11	10/05/11	emp	emp
71	Kievka	aut 2004	displased				
72	Kievka	aut 2004	destroyed	08/04/11		emp	
73	Lazovka	aut 2004		30/03/11	10/05/11	emp	emp
74	Kievka	aut 2004	displased				
75	Kievka	aut 2004		30/03/11		uncl	UROW2-11
76	Kievka	aut 2004	displased				
77	Kievka	aut 2004		28/03/11	09/05/11	emp	emp
78	Kievka	aut 2004		30/03/11	09/05/11	Horn	emp
79	Kievka	aut 2004	displased				
80	Kievka	aut 2004		03/04/11	15/05/11	emp	emp
81	Kievka	aut 2004	displased				
82	Kievka	aut 2004			12/05/11	emp	emp
83	Krivaya	aut 2004	almost destr	27/03/11	12/05/11	emp	emp
84	Krivaya	aut 2004	destroyed				
85	Krivaya	aut 2004	destroyed				
86	Krivaya	aut 2004					
87	Krivaya	aut 2004		27/03/11	12/05/11	emp	emp
88	Krivaya	aut 2004	taken off in 2010				
89	Kievka	aut 2004			10/05/11	FLSQ	emp
90	Kievka	aut 2004			10/05/11	uncl	UROW5-11
571	Kievka	sum 2005	tree fallen in 2010				
517	Margaritovka	spr 2005		04/04/11	17/05/11	emp	emp
111	Lazovka	spr 2008	destroyed				
112	Kievka	spr 2008			09/05/11		UROW4-11
113	Kievka	spr 2008		03/04/11	19/05/11	FLSQ	SSM9-11
115	Kievka	sum 2008			21/05/11		SSM10-11
824	Kievka	spr 2008		26/03/11	19/05/11	emp	emp
827	Kievka	spr 2008		28/03/11	08/05/11	emp	emp
828	Kievka	spr 2008		28/03/11	08/05/11	emp	emp
885	Krivaya	sum 2008		27/03/11	12/05/11	emp	UROW7-11
116	Kievka	aut 2008		06/04/11	08/05/11	emp	emp
117	Kievka	aut 2008		03/04/11	19/05/11	emp	emp

118	Kievka	aut 2008		28/03/11	08/05/11	emp	emp
119	Benevka	aut 2008	taken off in 2011	25/03/11		BLSQ	
120	Kievka	aut 2008		03/04/11	11/05/11	Horn/FLSQ	emp
121	Kievka	aut 2008			11/05/11	emp	emp
122	Kievka	aut 2008			11/05/11	emp	emp
123	Kievka	aut 2008			11/05/11	uncl	FLSQ or CHIP
124	Kievka	aut 2008			11/05/11	uncl	UROW6-11
125	Kievka	aut 2008			11/05/11	emp	ISOW2-11
126	Kievka	aut 2008		12/04/11		emp	UROW3-11
127	Kievka	aut 2008			15/05/11	emp	emp
128	Kievka	aut 2008		12/04/11	15/05/11	Horn/FLSQ	emp
129	Kievka	aut 2008	destroyed				
130	Kievka	aut 2008			15/05/11	Horn	emp
131	Kievka	aut 2008		12/04/11	12/05/11	emp	emp
132	Partizanskaya	aut 2008			23/05/11	emp	emp
133	Partizanskaya	aut 2008			23/05/11	emp	emp
134	Partizanskaya	aut 2008			23/05/11	hornet	emp
135	Partizanskaya	aut 2008			23/05/11	hornet	emp

1 – tubes ## 1-19 were totally destroyed before 2010 and were not considered in 2011.

Table 2. Dates of cleaning and checking of nest boxes in 2011 and their occupation by Scaly-sided merganser and pest species.

box#	river	year/season of placing	condition	data cleanning	data check	occupation in winter& previous summer	occupation in spring 2011
1	Lazovka	spr 2003		30/03/11	10/05/11	emp	emp
2	Kievka	spr 2003			10/05/11	emp	emp
3	Kievka	spr 2003		25/03/11	08/05/11	BLSQ	emp
4	Kievka	spr 2003		28/03/11		HORN /BLSQ	
5	Kievka	spr 2003	replaced in 2010		08/05/11		emp
6	Kievka	spr 2003	disappeared in 2004				
7	Kievka	spr 2003	replaced in 2008				
8	Kievka	spr 2003		26/03/11	10/05/11	emp	emp
9	Kievka	spr 2003		26/03/11	19/05/11		BLSQ /MADU-SSM8-11
10	Kievka	spr 2003		30/03/11	10/05/11	emp	MADU1-11
11	Kievka	spr 2003	n.c.				
12	Margaritovka	spr 2003			17/05/11	emp	emp
13	Margaritovka	spr 2003		04/04/11	17/05/11	emp	emp
14	Margaritovka	spr 2003		04/04/11		emp	emp
15	Margaritovka	spr 2003			17/05/11	emp	emp
16	Margaritovka	spr 2003		04/04/11	17/05/11	emp	emp
17	Margaritovka	spr 2003		04/04/11	17/05/11	emp	MADU2-11
18	Avvakumovka	spr 2003		03/04/11	18/05/11	HORN	emp
19	Avvakumovka	spr 2003		03/04/11	18/05/11	emp	emp
20	Avvakumovka	spr 2003		03/04/11	18/05/11	HORN	MADU3-11
21	Avvakumovka	spr 2003		03/04/11	18/05/11	HORN	emp
22	Avvakumovka	spr 2003			18/05/11	emp	emp
23	Mineral'naya	spr 2003	displaced				
24	Mineral'naya	spr 2003	displaced				
25	Avvakumovka	spr 2003		03/04/11	18/05/11	emp	emp

26	Avvakumovka	spr 2003		03/04/11	18/05/11		FLSQ /SSM5-11
27	Avvakumovka	spr 2003		03/04/11	18/05/11	HORN	SSM6-11
28	Avvakumovka	spr 2003		03/04/11	18/05/11	HORN	emp
29	Avvakumovka	spr 2003		03/04/11	18/05/11	HORN	SSM7-11
30	Lazovka	spr 2003	n.c.				
87	Lazovka	spr 2008	dry tree				
824	Krivaya	sum 2008		27/03/11	12/05/11	FLSQ	SSM11-11
31	Kievka	aut 2008		26/03/11	08/05/11	WASP	SSM2-11
823	Kievka	aut 2008		28/03/11	09/05/11	HORN	emp
32	Kievka	aut 2008	tree fall				
33	Kievka	aut 2008	displaced by natives				
34	Kievka	aut 2008		12/04/11	11/05/11	emp	CSOW1-11/SSM4-11
35	Kievka	aut 2008		30/03/11	10/05/11	HORN	SSM3-11
36	Kievka	aut 2008		27/03/11	12/05/11	emp	CSOW3-11
37	Kievka	aut 2008		27/03/11	15/05/11	emp	emp
38	Krivaya	aut 2008		27/03/11	12/05/11	HORN	BLSQ /MADU6-11
39	Partizanskaya	aut 2008			23/05/11		MADU5-11
1032	Kievka	Spr 2010		25/03/11	08/05/11	emp	SSM1-11
105	Kievka	Spr 2010		28/03/11		uncl	FLSQ
1133	Kievka	spr 2011			09/05/11		emp

Abbreviations:
BLSQ – Black squirrel, wintering or breeding
FLSQ – Flying squirrel, wintering or breeding
CHIP – Chipmunk, wintering or breeding
UROW – Ural owl, wintering or breeding
LEOW – Long-eared owl breeding
CSOW – Collared scops owl breeding
MADU – Mandarin duck breeding
SSM – Scaly-sided merganser breeding
HORN – summer nest of hornets
WASP – summer nest of wasps
Emp – empty
Unc – unclear
n.c. – not checked

Appendix B. Destines of nesting females Scaly-sided Merganser, Primorye, 2003-07.

Ring#	2003	2004	2005	2006	2007
6385	Caught on 8/5/03 at nest SSM5-03 (t26), nest was successful	T26 was occupied by nesting Ural Owl, female 6385 hasn't been reported any more			
6379	Caught by mist-net on 31/3/03 50 m apart from nest, recaptured on 8/5/03 at nest SSM3-03 (t20), nest was successful	T20 was used for wintering of Black Squirrel, female 6379 hasn't been reported any more			
6396	Caught on 20/5/03 at nest SSM4-03 (t30), nest was successful	Recaptured at nest SSM3-04 (t30), nest was successful	Disappeared, t30 was occupied by another SSM female		
7502	Seemingly nested in the same cavity, cavity was occupied by very small female (got through butterfly net)	Caught by mist-net on 5/4/04 100 m apart from nest, recaptured on 12/5/04 at nest SSM2-04 (DAG1), nest was successful, female very small	Disappeared, cavity DAG1 filled with dead wood (table 3.1)		
7507	Seemingly nested in the same cavity, at least cavity was occupied by SSM	Caught on 18/5/04 at nest SSM6-04 (SLV1), nest was successful	Recaptured at nest SSM6-05 (SLV1), nest was successful	Returned to nest to the cavity SLV1, killed by Sable, all eggs depredated	
7508		Caught on 18/5/04 at nest SSM4-04 (t29), nest was successful	T29 empty, female 7508 hasn't been reported any more		T29 occupied by SSM female, nest SSM4-07. Nest was depredated by Sable, female hopefully escaped; female fate is thus unknown.
7509		Caught on 18/5/04 at nest SSM1-04 (t25), nest was successful, left foot has been broken and solid	T25 empty, female 7509 hasn't been reported any more		
7510		Caught on 19/5/04 at nest SSM5-04 (VPS1), nest was	VPS1 was occupied by nesting Ural Owl, female		

		successful	7510 hasn't been reported any more		
ES…		Caught on ./6/04 at nest SSM7-04 (b9), nest was abandoned after catching	B9 empty, female … hasn't been reported any more		
8569			Caught on 4/6/05 at nest SSM4-05 (b1), nest was successful, later in summer got to fishnet 5 km apart from nest, released by fisherman	Recaptured at nest SSM4-06 (b1), dead at nest in mid-incubation (reason unknown)	
6362			Caught on 2/5/05 at nest SSM1-05 (DVS1), nest was abandoned after catching	DVS1 empty, female 6362 hasn't been reported any more	

Appendix B. Destines of nesting females Scaly-sided Merganser, Primorye, 2005-10 (continuation).

Ring#	2005	2006	2007	2008	2009	2010
6371	Caught on 2/5/05 at nest SSM2-05 (b8), nest was abandoned after catching	Recaptured at nest SSM5-06 (t25) 50 m apart from b8, nest was successful. Equipped with logger 2004 (download in 2008).	B8 occupied by nesting Black Squirrel, t25 filled with squirrel winter nest, female 6371 nested somewhere in Kievka basin (logger data). T26 was used by unknown SSM female, it wasn't caught due to nervous behavior.	Recaptured at nest SSM7-08 (t26), 1,5 km from t25, nest was successful. Equiped with logger 2002 (download in 2009)	Recaptured at nest SSM6-09 (t26), nest was successful, female hasn't been reported any more.	
7512	Caught on 17/5/05 at nest SSM7-05 (t15), nest was successful	Recaptured at nest SSM1-06 (b16), nest was successful, distance between t15 and b16 – 50 m	Returned to nest to b16, probably killed by people			
7856		Caught on 7/6/06 at nest SSM7-06 (t85), nest was successful. Equiped with logger	Recaptured at nest SSM5-07 (t85), nest was successful. Equiped with logger 2158	Returned to nest to t85 (SSM10-08), tube was displaced by people, eggs broken, female	Recaptured at nest SSM5-09 (b824) 10 m from t85. Nest was successful.	Returned to nest SSM8-10 (b824), killed at nest by martin. Logger

Ring#	2005	2006	2007	2008	2009	2010
		2002 (downloaded in 2007).	(downloaded in 2009).	escaped.		retrieved.
7854		Caught on 20/5/06 at nest SSM9-06 (t89), nest was successful	T89 fell down, new tube was placed within 30 m, female 7854 hasn't been reported any more			
7852		Caught on 20/5/06 at nest SSM8-06 (t82), nest was successful	T82 empty, female 7852 hasn't been reported any more			
7853		Caught on 27/5/06 at nest SSM3-06 (t20), nest was successful	T20 empty, female 7853 hasn't been reported any more			
7851	Seemingly nested in t30, female hasn't been caught due to nervous behavior, nest was successful	Caught on 18/5/06 at nest SSM6-06 (t30), nest was successful. Equiped with logger 2005 (downloaded in 2007)	Recaptured at nest SSM2-07 (t30), nest was successful. Equipped with logger 2164 (downloaded in 2008)	Recaptured at nest SSM9-08 (t30), nest was successful.	Recaptured at nest SSM1-08 (t30), nest was successful.	Returned to nest SSM1-10, nest was depredated by martin, female survived (video).
7855	Cavity VPS2 was occupied by SSM female, no idea if it was the same female	Caught on 6/6/06 at nest SSM2-06 (VPS2), nest was successful	VPS2 occupied by new SSM female, female 7855 hasn't been reported any more			
7858			Caught on 22/5/07 at nest SSM6-07 (b1), nest was successful	B1 occupied by another female, female 7858 hasn't been reported any more		
7516		Cavity VPS3 used by Mandarin Duck	Caught on 11/5/07 at nest SSM10-07 (VPS3), nest tree was broken at the day of hatch. Several ducklings were	Recaptured at nest SSM5-08 (VPS2), nest was successful. Cavity VPS2 was broken after nesting.	Female 7516 hasn't been reported any more.	

Ring#	2005	2006	2007	2008	2009	2010
			collected and were released near the nest; they were adopted by female with rings, no idea if by the mother. Equipped with logger 2161 (downloaded in 2008).			
7867			Caught on 22/5/07 at nest SSM7-07 (VPS2), nest was successful	VPS2 occupied by another female, female 7867 hasn't been reported any more		
7862			Caught on 19/5/07 at nest SSM3-07 (b3), nest was successful. It lost a brood on 3-4 July and flew NE to marine waters. Equipped with logger 2160 (downloaded 2008)	Recaptured at nest SSM8-08 (b3), nest was abandoned.	Recaptured at nest SSM8-09 (t571) 250 m apart b3. Nest was successful.	Tree with t571 felt down, female 7862 wasn't reported any more.
7860			Caught by mist-net on 4/4/07 on Kievka R near Lazovka mouth. Subadult bird, but may be laid eggs (by bones).	Recaptured at nest SSM4-08 (b1), nest was successful. Still was a subadult bird. Nested in the box in 100 m from initial catch location.	Female 7860 hasn't been reported any more.	
7515		Seemingly nested in t106, female hasn't been caught due to nest was found after hatch.	Caught on 7/5/07 at nest SSM13-07 (t106), nest was successful.	SSM11-08 in t106 either abandoned or female died. Nest was found wet and covered with down, 9 eggs were fresh. Death of female after/during egg-lay is seemingly.		

Ring#	2005	2006	2007	2008	2009	2010
8549			Caught on 11/5/07 at nest SSM14-07 (t70), nest was successful. Equipped with logger 2159 (downloaded in 2008).	Recaptured at nest SSM2-08 (t70), nest was successful.	Female 8549 hasn't been reported any more.	
7870			Caught by mist-net on 3/4/07 on Kievka R near Lazovka mouth. Adult paired bird.	Shot by people 15/5/08 on Iman R near Molodezhka. Egg laying features in oviduct.		
8566				Caught by mist-net on 4/4/08 on Kievka R near Lazovka mouth. Paired subadult bird. Recaptured on 7/5/08 at nest SSM3-08 (b10), 5 km apart from catch location, nest was successful. Later in the season lost a brood. Equipped with logger 2159 (downloaded in 2009).	Recaptured at nest SSM7-09 (b10), still subadult. Nest was successful. Female 8566 wasn't reported any more.	
8568				Caught on 6/5/08 at nest SSM1-08 (b5), nest was successful. Female died or has been killed in fish net in August 2008. Ring was returned to us. No ducklings were reported by fishers with the hen.		
8532			Seemingly nested in t75, female hasn't been	Caught on 6/5/08 at nest SSM6-08 (t75), nest	Recaptured at nest SSM11-09 (t75). Nest	Recaptured at nest SSM9-10 (t75).

Ring#	2005	2006	2007	2008	2009	2010
			caught due to nervous behavior, nest was successful.	was successful. Equipped with logger 2005 (downloaded in 2009).	was successful.	Nest was successful.
8529				Caught on 13/5/08 at nest SSM12-08 (b18), nest was successful.	B18 empty. Female 8529 hasn't been reported any more.	
8528					ASY/AHY female. Caught on 3/5/09 at nest SSM4-09 (b38), nest was successful. Female 8528 hasn't been reported any more.	
8527					ASY female. Caught on 9/5/09 at nest SSM14-09 (t27), nest was successful.	Recaptured at nest SSM12-10 (t27). Nest was successful.
8554					Caught on 26/5/09 at nest SSM9-09 (t115), nest was successful. Equipped with logger (downloaded in 2010).	Recaptured at nest SSM2-10 (t115). Nest was successful.
8557						Caught on 2/5/10 at nest SSM7-10(b1032), nest was depredated
8551						Caught on 13/5/10 at nest SSM4-10(t118), nest was depredated
8523						Caught on 13/5/10 at nest SSM11-10(t113), nest was

Ring#	2005	2006	2007	2008	2009	2010
						depredated
8519						Caught on 15/5/10 at nest SSM14-10(b9), nest was successful

Appendix B. Destines of nesting females Scaly-sided Merganser, Primorye, 2009-11(continuation).

Ring#	2009	2010	2011	2012	2013	2014
6371	Recaptured at nest SSM6-09 (t26), nest was successful, female hasn't been reported any more.					
7856	Recaptured at nest SSM5-09 (b824) 10 m from t85. Nest was successful.	Returned to nest SSM8-10 (b824), killed at nest by martin. Logger retrieved.				
7851	Recaptured at nest SSM1-08 (t30), nest was successful.	Returned to nest SSM1-10, nest was depredated by martin, female survived (video).	Didn't return to t30 after clutch depredation.			
7516	Female 7516 hasn't been reported any more.					
7862	Recaptured at nest SSM8-09 (t571) 250 m apart b3. Nest was successful.	Tree with t571 felt down, female 7862 wasn't reported any more.				
7860	Female 7860 hasn't been reported any more.					

Ring#	2009	2010	2011	2012	2013	2014
8549	Female 8549 hasn't been reported any more.					
8566	Recaptured at nest SSM7-09 (b10), still subadult. Nest was successful. Female 8566 wasn't reported any more.					
8532	Recaptured at nest SSM11-09 (t75). Nest was successful.	Recaptured at nest SSM9-10 (t75). Nest was successful.	T75 occupied by UROW. Female 8532 wasn't reported any more.			
8529	B18 empty. Female 8529 hasn't been reported any more.					
8528	ASY/AHY female. Caught on 3/5/09 at nest SSM4-09 (b38), nest was successful. Female 8528 hasn't been reported any more.					
8527	ASY female. Caught on 9/5/09 at nest SSM14-09 (t27), nest was successful.	Recaptured at nest SSM12-10 (t27). Nest was successful.	Recaptured at nest SSM6-11 (t27). Nest fate unknown.			
8554	Caught on 26/5/09 at nest SSM9-09 (t115), nest was successful. Equipped with logger (downloaded in 2010).	Recaptured at nest SSM2-10 (t115). Nest was successful.	Recaptured at nest SSM10-11 (t115). Nest was successful.			

Ring#	2009	2010	2011	2012	2013	2014
8557		Caught on 2/5/10 at nest SSM7-10(b1032), nest was depredated	Recaptured at nest SSM1-11 (b1032). Nest was successful.			
8551		Caught on 13/5/10 at nest SSM4-10(t118), nest was depredated	Female 8551 wasn't reported any more.			
8523		Caught on 13/5/10 at nest SSM11-10(t113), nest was depredated	Female 8523 wasn't reported any more.			
8519		Caught on 15/5/10 at nest SSM14-10(b9), nest was successful	Female 8519 wasn't reported any more.			

傳遞方式：寄送

檔　　號：
保存年限：

駐馬來西亞代表處　函

地　　址：Level 7,Menara Yayasan Tun Razak,
200 Jalan Bukit Bintang,
55100 Kuala Lumpur, Malaysia
聯 絡 人：
電　　話：60-3-21615508
傳　　真：60-3-21617478
電子信箱：mys@mofa.gov.tw

受文者：　行政院農業委員會林務局

發文日期：中華民國 100 年 10 月 19 日
發文字號：馬來字第 10000008500 號
速別：最速件
密等及解密條件或保密期限：無
附件：如文

主旨：檢送「馬來西亞海洋研究基金會(Marine Research Foundation)」收領貴局補助款 5,000 美元之領據乙份如附件，復請查收。

說明：

一、相關文件：外交部本(100)年 9 月 2 日條法第 0123 號電；貴局 8 月 24 日林保字第 1001701041 號函副本；本處 10 月 18 日呈外交部第 MYS0744 號電抄本。

二、本處劉副代表已於本年 10 月 14 日上午會見該基金會執行主任 Dr. Nicolas Pilcher，並將貴局上揭補助款 5,000 美元支票面交 P 主任。

三、隨函檢附本案捐助儀式馬國華文媒體報導 4 則如附件，請查收。

正本：行政院農業委員會林務局
副本：外交部(無附件)

行政院農業委員會林務局總收文
1001621873 100/10/24

MARINE RESEARCH FOUNDATION
136 Lorong Pokok Senya 2, Taman Khidmat
88450 Kota Kinabalu, Sabah, Malaysia
Tel ++ 60 88 244089 Fax ++ 60 88 367196
Website: http://www.mrf-asia.org Email: npilcher@mrf-asia.org

OFFICIAL RECEIPT

Date: 14th October 2011

Received from Forestry Bureau, COA the sum of USD 5,000 (USD Five thousand) only in the form of Check No. 040285 .

Signed:

Name: Nicolas J. Pilcher
Designation: Executive Director

媒體名稱：星洲日報　日期：15 OCT 2011　版面：第M2-26版

15/15

保育海龜

台捐沙海洋基金1.5萬

（吉隆坡14日讯）台湾行政院农业委员会继续履行其保护海洋生物的责任，今日通过马来西亚台北经济暨文化办事处捐助5千美元（约1万5千令吉）给大马沙巴海洋研究基金会。

台北经济暨文化办事处副代表刘广平说，这笔捐款将有助于执行大马沙巴海洋研究基金会在大马的“马来西亚绿蠵龟次要觅食计划”。

他今日移交5千美元支票给该基金会主任尼古拉斯皮尔哲时说，台湾自2006年以来，每年均捐助海洋研究基金会执行保育海龟相关计划，以有效保育大马沙巴地区海龟，更彰显出台湾对海洋环保的重视与贡献。

他指出，他对于该基金会在海龟保护计划上，拥有令人鼓舞的成绩表示赞赏，并希望该基金会能在未来扩大对其他海洋生物保护的研究工作。

“我们非常希望海洋生物的保护工作能够永续经营，同时现在沙巴海洋研究基金会所做的工作，对于年轻一代，将会是一个很好的教育模式。”

沙海域海龟数量增

另外，尼古拉斯皮尔哲表示，该基金会配合沙州政府在展开一系列的海龟追纵工作、鉴定及保护海龟的栖身之所后，沙巴海域附近的海龟数量已有增加，但登嘉楼海边的海龟数量则一直在减少。

“现在必须做很多保护海龟的工作，才能阻止海龟数量一直减少，我们也不能一直只是在看着数字，必须即刻展开保护工作。”



刘广平（左）移交5千美元支票给尼古拉斯皮尔哲。

5海龟装卫星追踪器

他也说，目前共有5只海龟装上卫星追踪器的装备，当海龟进行迁移时，该卫星追踪器会趁海龟浮上海面时，通过卫星将海龟的所在地传送给他们。如此一来，他们就能清楚的知道，海龟的迁移路线及迁移后的所在地。

“海龟不会长久留在同一个地点，最多2至3年，而我们也必须确保当海龟离开沙巴海域时，会到甚么地方，以尽一切可能去保育它们。”

mys 0744 - 1

媒體名稱：南洋商報　　日期：15 OCT 2011　　版面：第A8版

台湾农委会捐1.5万助保护绿蠵龟觅食区

（吉隆坡14日讯）台湾行政院农业委员会捐助5000美元（约1万5000令吉）予马来西亚沙巴海洋研究基金会，作为“马来西亚绿蠵龟次要觅食区计划”费用。

台北驻马来西亚经济文化办事处副代表刘广平指出，台湾自2006年以来，每年都捐助海洋研究基金会，以协助他们进行保育海龟以及海洋计划。

他说，台湾向来支持海洋及海洋生物保育计划，希望这些经费能协助研究员了解海洋生态系统，推动全球生态保育。

刘广平今日代表台湾行政院农业委员会移交支票予马来西亚沙巴海洋研究基金会主席尼古拉斯后，这样说。

卫星追踪器每个6千元

尼古拉斯指出，海龟卫星追踪器非常昂贵，每个为2000美元（约6000令吉），不过，为保护海龟的生存环境，他们会继续使用这种方式保护海龟生存的环境。



刘广平（左）移交5000美元支票给尼古拉斯。

“当背负卫星追踪器的海龟浮上水面时，追踪器自动打开后就向卫星发出信号，转发到地面接收器，还可以测出水温、水压、水深，跟踪人员就可推断海龟的生存环境。”

沙巴海洋研究基金会是一个非营利研究组织，希望经由研究保育及教育活动，了解海洋生态系统和功能，保育海洋动植物之多样性和丰富度，对推动全球生态保育作出贡献。

媒體名稱：東方日報　　日期：15 OCT 2011　　版面：第A36版

台湾捐1万5保育海龟



刘广平（左）移交支票给尼可拉斯（右），作为协助推广沙巴海洋研究基金会保育海龟的活动。

（吉隆坡14日讯）台湾行政院农业委员会捐助1万5000令吉给马来西亚沙巴海洋研究基金会，以助该基金会继续推动保育海龟计划，包括执行「马来西亚绿蠵龟次要觅食区计划」。

马来西亚台北经济暨文化办事处副代表刘广平今日在移交支票给基金会后表示，台湾自2005年以来，每年均捐助基金会，以有效保育沙巴地区海龟，也彰显出台湾对海洋环保的重视。

他说，整个海洋生态的保护不仅只是海龟，其它海洋生物也需获得关注及保育，才能确保整个生态持续循环。

另外，沙巴海洋研究基金会主任尼可拉斯表示，该基金会将与国立台湾海洋大学进行「交换生计划」，即让该大学的学生到我国，并从基金会的研究活动中学习保育知识，而我国的学生也可到台湾实习及吸取不一样的经验。

他说，其基金会计划在沙巴开辟新的海龟保育区，并希望用这笔捐款来支持此计划，而去年台湾农业委员会所捐助的基金则已用来资助2只海龟。

「一只海龟的卫星追踪及接受器，价格2000令吉，但这比人工追踪海龟来得方便、省时及不受天气等其他因素影响。」

他说，除了在沙巴，基金会也在丁加奴进行海龟保育，并与其他9个国家互相合作。

他补充，大马的海龟数量比多年前减少许多，这是对政府及相关单位的警告，因此更多的研究需进行以了解减少原因及做出改善。

沙巴海龟数量增

无论如何，他透露，沙巴的海龟数量近年有增加，而沙拉越则是平稳的数量。

「海龟的成长很缓慢，因此繁殖数量也慢，因此需要很多年，甚至是100年的时间，才能提高海龟的数量。」

尼可拉斯也表示，海龟是海洋的健康指标，若一片海洋有很多海龟，这代表那片海洋的生态是健康的。

媒體名稱：中國報　　日期：15 OCT 2011　　版面：第A18版



■刘广平（左）将捐助的支票移交给尼克勒史，协助保育海龟计划发展。

台灣捐助1.5萬

綠蠵龜覓食區計劃

（吉隆坡14日讯）大马沙巴海洋研究基金会（MRF）执行总监尼克勒史说，由台湾行政院农业委员会所捐助的1万5000令吉，将充作支持大马绿蠵龟次要觅食区计划。

他说，希望通过研究保育及教育活动，深入了解海洋生态系统，也对全球生态保育献上一分力。

觀察海龜動向

他说，该组织目前设立一套完整的海龟卫星追踪仪器，观察海龟动向，确保海龟数量能继续增升及栖息地受保护。

尼克勒史今日出席一项台湾捐赠大马海龟计划仪式上，如是指出。

出席者包括大马台北经济暨文化办事处副代表刘广平。

尼克勒史说，断定海龟数量处于稳定水平与否，则是从其总数量作为标准，即是海龟数量也多，代表其生态达到健康水平，无须担心面临绝种危机。

他说，大马海域区的海龟虽处于稳定状态，但与20及30年代相较，海龟数量却有很大差距，因此，该会不仅会扛起维持海龟数量，也将转注增加海龟生产量计划。

他说，增加海龟数量并非在10至20年之间可完成，而是需要超过100年时间。

他说，为了加强海龟保育活动，将与台湾海洋大学保持密切合作，包括进行交换学生活动，以及举办各型研讨会，以更有效达致增加海龟数量的目标。

NEW SABAH TIMES
Sabah's First Established Paper
Number 10605 Wednesday March 2, 2011
PPH 223/08/2010(025835) Sabah RM1.20



A Sabah sea turtle [illegible] on Page [illegible]



Dr Pilcher (left) showing how a satellite transmitter is placed on a turtle



Dr Pilcher releasing one of the turtles

Scientists studying migration patterns of sea turtles in Sabah

KOTA KINABALU: The Marine Research Foundation (MRF) has deployed satellite transmitters on five juvenile turtles from Mantanani Island near here to identify the critical migration routes and near-shore habitats favoured by the turtles.

The study will eventually drive management and conservation activities for the turtles.

This work is funded in part by the Shell Malaysia Sustainable Development Grants programme, the Forestry Bureau of Taiwan, and the Mohammed bin Zayed Species Conservation Fund, said Dr Nicolas Pilcher, executive director of MRF, a non-profit conservation agency based in Sabah.

"Marine turtles in SE Asia are threatened through habitat loss and indirect capture in fisheries, and are in dire need of conservation action. With long maturation periods and low survival, they have extremely slow replenishment rates, and a population which has been depleted can take several centuries to recover.

"Understanding the needs of the turtles depends heavily on an understanding of the extent of habitat use and distribution, which can only be determined through complex research projects involving at-sea population dynamics, genetics, and satellite tracking," he said.

By tracking marine turtles through the SE Asian region, MRF aims to raise the collective awareness of their plight and to provide the concrete linkages at an international level on which Malaysia may develop conservation agendas linked with other neighbouring countries to which turtles migrate, including Indonesia, the Philippines, Taiwan and Vietnam.

Juvenile green turtles were captured during two recent research trips to Mantanani, and Sirtrack PT102 Satellite transmitters were affixed using a silicone base secured with fibreglass matting and resin following capture, measurements, laparoscopic examination and genetic sampling.

"The measurements allow us to determine growth rates, while the laparoscopic examination allows us to determine whether the turtle is male or female, along with reproductive development stage. The genetic sampling allows us to identify which nesting grounds these turtles came from in the first place," said Dr Pilcher.

The transmitters will send signals to an orbiting satellite each time the turtle surfaces for air, and the satellite will re-transmit the data to a receiving station on earth, which can then be accessed through computer and Internet.

Dr Pilcher also noted that "turtles rarely remain on the surface for very long, so their surfacing must coincide with the satellite passing overhead, and because of this it is uncommon to receive a location from a turtle every day."

The tracking data will be uploaded to a database daily and tracking software will output graphic positioning data for management and education activities. (Check out the daily progress at www.seaturtle.org/tracking/?project_id=593).

Recent findings as part of MRF's work determined Mantanani was home to sizeable and immensely important foraging population of green turtles.

"Through genetics we know that many of these originate from the Turtle Islands complex in the Sulu Sea, but they also share genetic stock origins with turtles from Vietnam and Taiwan," said Dr Pilcher.

These foraging turtles only spend 6-7 years of their lives at Mantanani, and it is unknown where they spend the rest of their developmental years.

"It is critical that we know this so that we can develop networks of protected areas which are based on the true biology of the species.

"Without a clear understanding of the migration paths taken by sea turtles, and the habitats they require, conservation efforts will not be able to protect needed developmental and foraging habitats. More importantly however, is the need to determine if the current protected area schemes in place in varying SE Asian countries are sufficient to protect all life stages of marine turtles.

"Understanding the migration routes taken by juvenile turtles can enable the authorities to establish protected areas, and develop fishing and shipping zones to increase turtles' overall chances of survival," he added.

For further information contact Dr Pilcher on npilcher@mrf-asia.org

Study on sea turtle migration patterns

KOTA KINABALU: The Marine Research Foundation (MRF) recently deployed satellite transmitters on five juvenile turtles from Mantanani island to identify critical migration routes and nearshore habitats favoured by the turtles, management and conservation activities.

The work is funded in part by the Shell Malaysia Sustainable Development Grants programme, the Forestry Bureau of Taiwan, and the Mohammed bin Zayed Species Conservation Fund.

Recent findings as part of MRF's work determined Mantanani was home to sizeable and immensely important foraging population of green turtles.

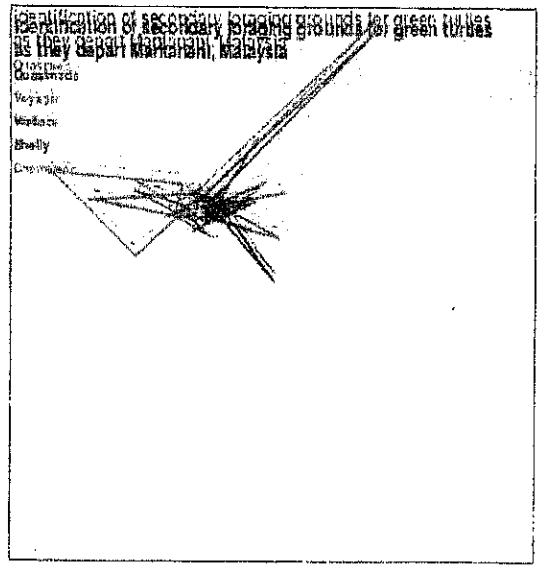
"Through genetics we know that many of these originate from the Turtle Islands complex in the Sulu sea, but they also share genetic stock origins with turtles from Vietnam and Taiwan" said Executive Director Dr Nicolas Pilcher.

These foraging turtles only spend 6-7 years of their lives at Mantanani, and it is unknown where they spend the rest of their developmental years.

"It is critical that we know this so that we can develop networks of protected areas which are based on the true biology of the species", he said.

"Without a clear understanding of the migration paths taken by sea turtles, and the habitats they require, conservation efforts will not be able to protect needed developmental and foraging habitats.

"More importantly however, is the need to determine if the current protected area schemes in place in varying SE Asian countries are sufficient to protect all life stages of marine turtles. Understanding the migration routes taken by juvenile turtles can enable the authorities to establish protected areas, and develop fishing and shipping zones to increase turtles' overall chances of survival.



What the satellite trackings reveal near Mantanani.



A marine turtle.

Marine turtles in SE Asia are threatened through habitat loss and indirect capture in fisheries, and are in dire need of conservation action.

With long maturation periods and low survival, they have extremely slow replenishment rates, and a population which has been depleted can take several centuries to recover.

By tracking marine turtles through the SE Asian region, MRF aim to raise the collective awareness of their plight and to provide the concrete linkages at an international level on which Malaysia may develop conservation agendas linked with other neighboring countries to which turtles migrate, including Indonesia, the Philippines, Taiwan and Vietnam.

Juvenile green turtles were captured during two recent research trips to Mantanani, and Sirtrack PT102 Satellite transmitters were affixed using a silicone base, and secured with fiberglass matting and resin following capture, measurements, laparoscopic examination and genetic sampling.

"The measurements allow us to determine growth rates, while the laparoscopic examination allows us to determine whether the turtle is male or female, along with reproductive development stage.

"The genetic sampling allows us to identify which nesting grounds these turtles came from in the first place" said Dr. Pilcher.

The transmitters will now send signals to an orbiting satellite each time the turtle surfaces for air, and the satellite will re-transmit the data to a receiving station on earth, which can then be accessed through computer and modem.

Dr Pilcher also noted that "turtles rarely remain on the surface for very long, so their surfacing must coincide with the satellite passing overhead, and because of this it is uncommon to receive a location from a turtle every day".

The tracking data will be uploaded to a database daily and tracking software will output graphic positioning data for management and education activities.

You can check out daily progress at http://www.seaturtle.org/tracking/?project_id=583

Scientists studying migration patterns of sea turtles in Sabah

KOTA KINABALU: The Marine Research Foundation (MRF), a non-profit conservation agency based in Sabah, recently deployed satellite transmitters on five juvenile turtles from Mantanani island to identify the migration routes and nearshore habitats favoured by the turtles, which can then drive management and conservation activities.

This work is funded in part by the Shell Malaysia Sustainable Development Grants programme, the Forestry Bureau of Taiwan and the Mohammed bin Zayed Species Conservation Fund.

Marine turtles in South East Asia are threatened through habitat loss and indirect capture in fisheries, and are in dire need of conservation action.

With long maturation periods and low survival, they have extremely slow replenishment rates, and a population which has been depleted can take several centuries to recover. Understanding the needs of the turtles depends heavily on an understanding of the extent of habitat use and distribution, which can only be determined through complex research projects involving sea population dynamics, genetics, and satellite tracking.

By tracking marine turtles through the South East Asian region, MRF aims to raise the collective awareness of their plight and to provide the concrete linkages at an international level on which Malaysia may develop conservation agendas linked with other neighbouring countries to which turtles migrate, including Indonesia, the Philippines, Taiwan and Vietnam.

Juvenile green turtles were captured during two recent research trips to Mantanani, and Sirtrack PTT02 Satellite transmitters were affixed using a silicone base, and secured with fiberglass matting and resin following capture, measurements, laparoscopic examination and genetic sampling. "The measurements allow us to determine growth rates, while the laparoscopic examination allows us to determine whether the turtle is male or female, along with reproductive development stage. The genetic sampling allows us to identify which nesting grounds these turtles came from in the first place," said Dr Nicolas Pilcher, Executive Director of MRF.



Dr Pilcher and his team fixing a satellite transmitter on the back of a sea turtle.



A sea turtle fixed with a satellite transmitter.

The transmitters will now send signals to an orbiting satellite each time the turtle surfaces for air, and the satellite will re-transmit the data to a receiving station on earth, which can then be accessed through computer and modem. Dr Pilcher also noted that "turtles rarely remain on the surface for very long, so their surfacing must coincide with the satellite passing overhead, and because of this it is uncommon to receive a location from a turtle everyday".

The tracking data will be uploaded to a database daily and tracking software will output graphic positioning data for management and education activities. Daily progress can be checked at http://www.seaturtle.org/tracking/?project_id=593 Recent findings as part of MRF's work determined Mantanani was home to sizeable and immensely important foraging population of green turtles.

"Through genetics we know that many of these originate from the Turtle Islands complex in the Sulu sea, but they also share genetic stock origins with turtles from Vietnam and Taiwan," said Dr Pilcher.

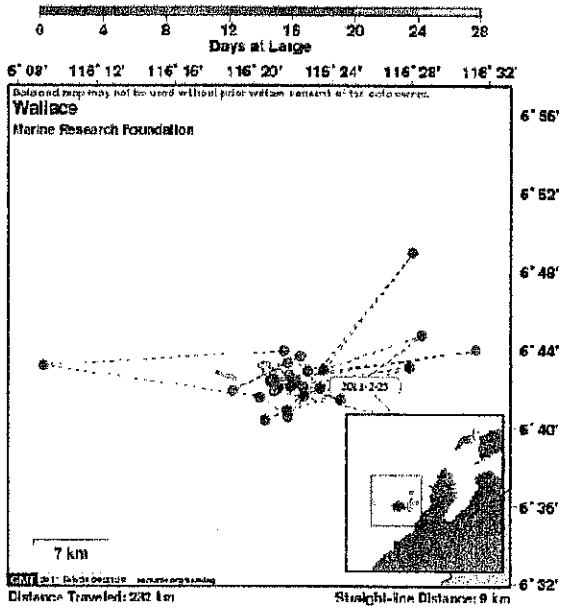
These foraging turtles only spend six to seven years of their lives at Mantanani, and it is unknown where they spend the rest of their developmental years.

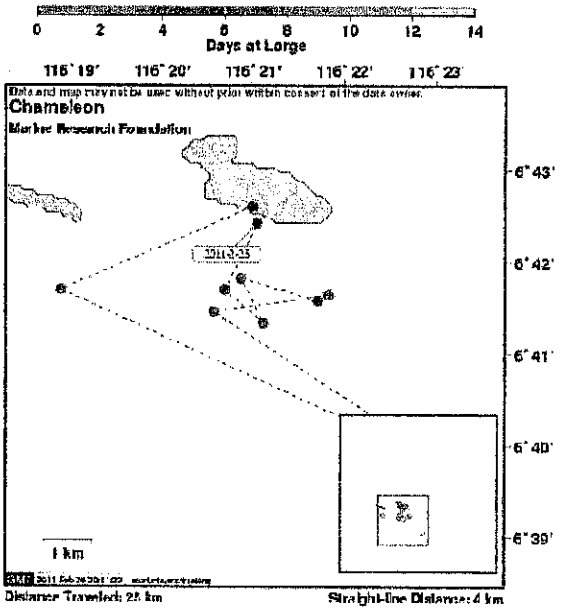
"It is critical that we know this so that we can develop networks of protected areas which are based on the true biology of the species," he said.

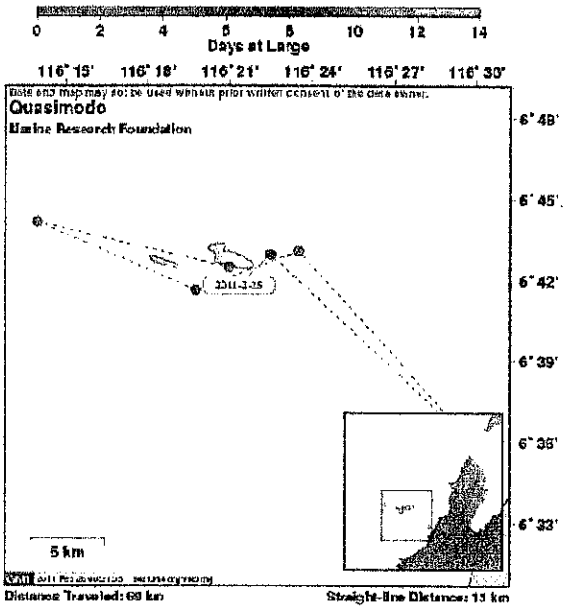
Without a clear understanding of the migration paths taken by sea turtles, and the habitats they require, conservation efforts will not be able to protect needed developmental and foraging habitats.

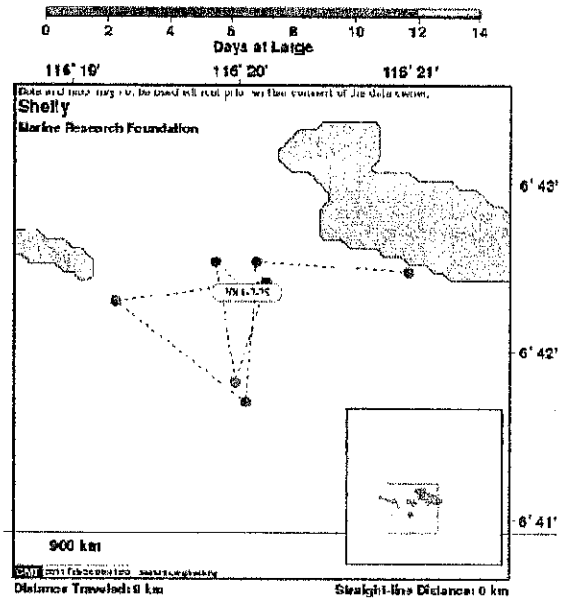
More importantly however, is the need to determine if the current protected area schemes in place in varying South East Asian countries are sufficient to protect all life stages of marine turtles.

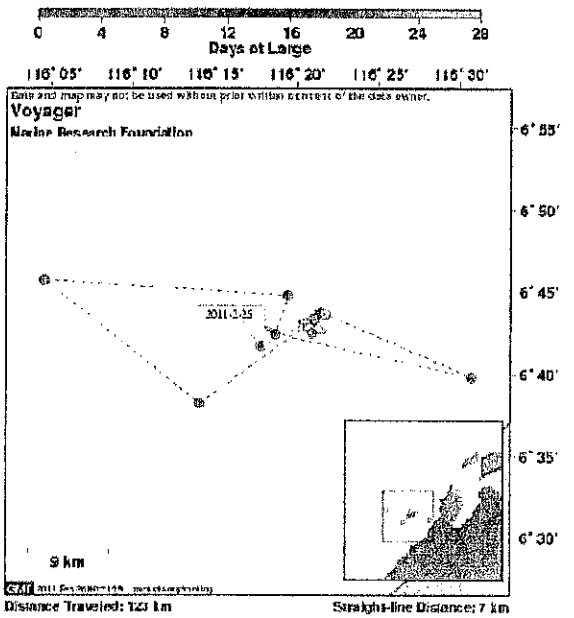
Understanding the migration routes taken by juvenile turtles can enable the authorities to establish protected areas, and develop fishing and shipping zones to increase turtles' overall chances of survival.











Tracks from turtles deployed with satellite transmitters off Mantanani island as at 27 February 2011 as part of the Marine Research Foundation's turtle conservation studies.

SEA TURTLES AND TEDs IN MALAYSIA

Proceedings of a Turtle Excluder Device (TED) and Sea Turtles Workshop conducted in Terengganu, April 4-5 2011

A project by the

MARINE RESEARCH FOUNDATION, SABAH, MALAYSIA

and the

DEPARTMENT OF FISHERIES MALAYSIA

"Jabatan "Perikanan "Malaysia



April 2011

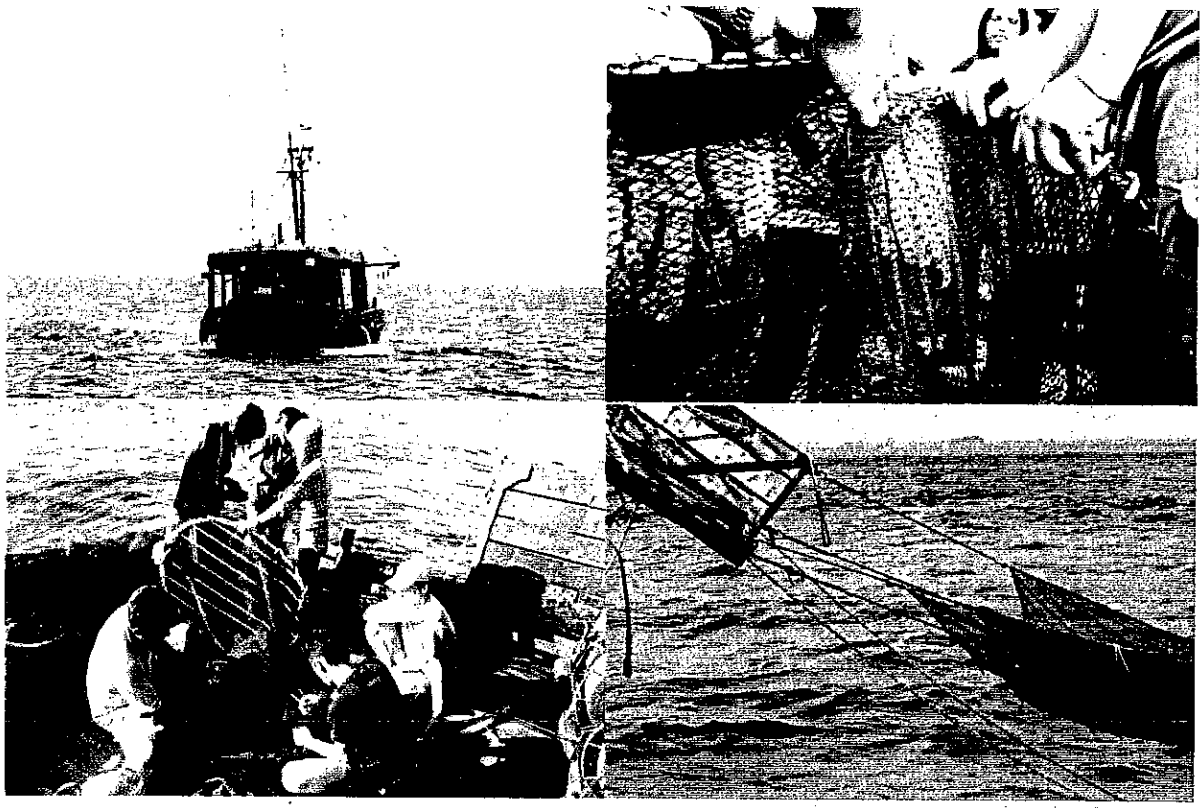


MARINE RESEARCH FOUNDATION

and the

SABAH DEPARTMENT OF FISHERIES

JABATAN PERIKANAN SABAH



November 2011

俄羅斯唐秋沙保育計畫成果摘要

野鳥和濕地信託(WWT)俄羅斯唐秋沙保育計畫，摘要如附：

野鳥和濕地信託為英國唯一以濕地保育為宗旨之民間團體，經營管理全國濕地遊客中心。WWT 以前的成功事蹟包括：

- 1962 年首次於夏威夷野放人工飼育之黃頸黑雁(Nene)，開啟全球族群復育契機。黃頸黑雁 1951 年，只剩 30 隻。
- 1969 年成功遊說冰島放棄在 Pink-footed Geese 主要繁殖地 Thjorsarver 蓋水壩的計畫。
- 1975 年復育 Martin Mere 濕地，該濕地於 1985 年被列入 Ramsar site (濕地公約指定保護區)。
- WWT 與土耳其合作研究 White-headed Duck，之後促成主要渡冬區 Burdur Golu 於 1993 年公告為保護區。
- WWT 與其他組織長期保護 Caerlaverock 地區的 Barnacle Geese。1948 年只有 300 隻，1999 年族群成長至 25,000 隻。
- 2000 年設立倫敦濕地中心(WWT London Wetland Centre)，為全球首都最大人造濕地保護區。
- WWT 的研究顯示 Carmarthen Bay 對保護黑鳧(Common Scoters)很重要， 因而促成 2003 年 Carmarthen Bay 被劃為英國第一個海洋特別保護區(Special Protection Area)。
- 2004 年 WWT 成為 Real World Learning Partnership 的創始會員，該組織宗旨為鼓勵政府允許教室外之教學活動。
- 2004 年倫敦濕地中心開始有學生來參加免費戶外教學活動，學習保護濕地之重要性。

2006 年「俄羅斯唐秋沙之調查及保育：教育宣導計畫」之緣起係因發現唐秋沙繁殖地附近居民偶而有射殺唐秋沙之情形，許多雌鴨誤觸漁網後淹死。漁民發現漁網上的唐秋沙，通常都是殺死後丟棄，很少將之釋放。因此，推動教育宣導工作，保育唐秋沙。計畫目標包括：

- 找出海上唐秋沙(雄鳥和亞成鳥)聚集地點，紀錄海洋棲地現況，估計每一地點之族群量，以及總數量。
- 捕捉無法飛行雄唐秋沙，並上腳環的可能性研究及選擇地點。
- 製圖列出調查路線中的污染源和有設刺網地區。
- 調查 Primorye 沿岸其他雁鴨，如鴛鴦(Mandarin Duck)、鳳頭潛鴨(又稱澤鳧、Tufted Duck)、斑背潛鴨(Greater Scaup)、長尾鴨(Long-tailed Duck)、絨鴨(Eiders)、鵲鴨(Common Goldeneye)、黑海番鴨(Common Scoter)、斑臉海番鴨(Velvet Scoter)、斑頭秋沙鴨

(Smew)、海秋沙(Red-breasted Merganser)、川秋沙(Goosander)等。

本計畫預計成果包括：

- 製作唐秋沙海洋分佈圖。
- 紀錄唐秋沙海洋棲地現況，包括人類帶來的壓力。
- 規劃唐秋沙換羽期捕捉計畫。
- 製圖列出俄羅斯 Primorye 沿岸雁鴨主要停留地點，並撰寫報告。
- 執行 Primorye 地區 Asia-Pacific flyway 經營管理計畫。
- 撰文刊登於 WWT 刊物 Wildfowl and Wetlands Bulletin。

2006 年工作報告摘要如下：

- 本計畫製作的保育唐秋沙海報上，有以俄文和英文列出林務局為贊助者，海報上其餘文字都是俄文。另與 10 個政府機構及民間團體合作分送海報，共計分發或張貼 283 張海報。40 張海報先由 Lazovskiy State Nature Reserve 收藏，以供未來簡報或演講時使用。其餘 177 張將分送到 Dalnegorskiy 等五個區域的城鎮。海報張貼之處包括政府單位、商店、餐廳、學校、大學、警察局和加油站。海報之發放有特別針對唐秋沙繁殖地附近的鄉鎮。
- 本計畫執行團隊，也與其他重要物種保育計畫(如 Eagle Owl、Amur Tiger 等)合作及交換經驗，也因此與一些地區的保育團體建立合作關係。Eagle Owl、Amur Tiger 等計畫都已運作多年，唐秋沙保育宣導計畫的推動才剛起步，因此學得了許多寶貴經驗。
- Primorye 的水鳥狩獵季由 3 月 26 日至 4 月 8 日，計畫執行團隊到主要獵區訪談部分獵人，得到被獵鳥種資料。另訪談漁民，蒐集漁網誤捕唐秋沙資料。
- 執行團隊到 Lazovskiy 等區域的學校，演講唐秋沙保育共 6 次。
- 草擬文稿給 Lazovskiy 的 Sinegor'e Newspaper，完成 WWT 文章。

2007 年計畫進度報告摘要如下：

由 2001-07 年，俄羅斯唐秋沙調查河流時間和調查河段長度，如下表。

Surveys for breeding pairs of Scaly-sided Merganser, Primorye, Russia.

River	**Survey period**	**Survey length, km**
Avvakumovka	Late April	41,9
Kievka	Mid-April	85
Krivaya	Mid-April	12,5
Lazovka	Mid-April	18
Margaritovka	Late April	16,5
Pavlovka	Early April	23,5
Vasil'kovka	Late April	40

我國贊助經費大都用來準備第 1 次日本海沿岸的調查工作，購買了調查船隻(Fregat-390 M)和所有須要的器材，研究人員防水制服外套和 logo。穿制服調查是為了吸引一般民眾對鳥類調查團隊的注意，進而進行宣導。

2008 年秋季調查俄羅斯唐秋沙密度和性別比例詳如下表：

Date	River	Survey length, km	Sex ratio M:F	Density, birds/km
1/10/08	Kievka	6.2	1.17:1	4.17
2/10/08	Kievka	16.5	3:1	0.49
2/10/08	Krivaya	7	unknown	0.71
13/10/08	Avvakumovka	6.7	unknown	0
14/10/08	Vasilkovka	4.2	0:15	3.57
21/10/08	Kievka	11.8	0.67:1	1.27
25/10/08	Kievka	14.2	1:1	0.14
2/11/08	Kievka	7.5	2.3:1	2.40
3/11/08	Kievka	10.4	1:1	2.88
5/11/08	Kievka	15.6	0.63:1	0.83

2008 年 4 月 1-8 日開放雁鴨狩獵，很遺憾發現有獵人偷打俄羅斯唐秋沙，以前製作的海報已讓大家瞭解俄羅斯唐秋沙受法令保護，但獵人將所有獵得雁鴨羽毛拔除，以防被警察發現。因此，教育保育宣導仍須繼續加強。

2000-2009 年主要成果包括，共調查 24 條河流，估計俄羅斯唐秋沙繁殖對數約有 1,300 對。2000 年開始人工巢箱計畫，於 13 條河流設置 180 個人工巢箱，由人工巢箱孵育出之幼鳥逐年增加。另調查 78 個巢之繁殖成功率，上腳環的鳥有 41 雌鳥，17 雄鳥，47 隻幼鳥。另有 24 之雌鳥配戴地理標誌系統，研究遷徙路線。蒐集 40 件樣品， 進行 DNA 分析等。

2009 年贊助「俄羅斯唐秋沙國際物種行動計畫研討會」，計畫報告摘要如下：

研討會之目的為研擬俄羅斯唐秋沙保育策略，初稿內容包括一般性物種描述，各國保護此物種之國家報告，族群分佈、數量、使用棲地、面臨的威脅，以及保育措施等。2010 年 3 月，已受邀國家包括澳洲、北韓、韓國、中國大陸、中華民國、日本、英國和俄羅斯等，包括研究人員、調查人員和保育界人士等。

俄羅斯唐秋沙國際物種行動計畫研討會於2010年4月27至5月3日於俄羅斯海參威(Vladivostok)附近召開，共同研議唐秋沙國際行動計畫。由 Lazovskiy State 自然保護區、WWT 與 IUCN-SSC/Wetlands International Threatened Waterfowl Specialist Group 主辦。前三天於 Vlad Motor Inn Hotel, Vladivostok 進行行動計畫研討會。後兩天於 Lavozovskiy State Nature Reserve 內的 Kievka 河野外考察。

共有21位專家學者參與研討會，其中包含超過20年經驗的保留區管理者。東亞澳洲遷徙路線夥伴團體(East Asian Australasian Flyway Partnership, EAAFP)的首長與科學家也來參加。此外，俄羅斯的自然管理官方代表與 Lazovskiy State 自然保護區官員也都代表開場致詞。俄羅斯籍計畫執行人 Dr. Diana Solovyova 來函請林務局推薦人選參加，我方推薦臺灣大學方偉宏老師參加。

此次研討會由林務局和野鳥和溼地信託贊助。唐秋沙國際物種行動計畫為第一個由 EAAFP 領導下實行的計畫。此次研討會指出唐秋沙所面臨的關鍵性威脅因子，主要的知識缺口，以及列出針對這些問題所需採取的行動之優先順序。這對解決唐秋沙繁殖地所面臨的主要威脅(獵捕及溺斃)的前景看好。然而主要越冬地的危害(汙染和水壩)屬地景層次，將很難減少。

針對族群分佈擴及數個原產國的物種，主要的保育方法就是國際物種行動計畫。方能確認主要威脅、最主要的物種消失因素以及減少或減輕對族群威脅的可能行動。其中重要的關鍵為邀請專家與有興趣的國家舉行研討會。這能確保得到最新的數據、對最主要威脅及保育行動達成共識，使各國能達成協調方法。

行動計畫之研擬預計2011年定稿，草案將請所有參加研討會人員表示意見，也將徵詢受邀但無法參加者之建議，另外相關國家和國際保育團體或專家意見也將納入考量。2010年12月 EAAFP 會議中決定設立由原產國組成之國際工作小組(International Task Force)，負責監督此行動計畫之執行。EAAFP 將正式採納本計畫以確保此物種在其他國家的有關當局也受到相當重視。

研討會參加者一致認為研討會成果豐碩，籌辦過數次行動計畫會議之 WWT 職員也讚許研討會運作順暢。此為各國唐秋沙專家第一次齊聚一堂交換意見和資料。行動計畫之研擬，對唐秋沙保育工作有重大影

響。雖然 EAAFP 也採納其他三個計畫，但本行動計畫為第一個由 EAAFP 體系完成者，EAAFP 認同此程序，未來研擬計畫也將採取此模式。

2011 年「保育瀕臨絕種俄羅斯唐秋沙計畫」計畫報告摘要如下：

2011 年贊助本計畫者包括林務局 US$5,000、Mohamed bin Zayed Species Conservation Fund US$12,721 和 WWT 2010 年計畫節餘款 US$450，總計 US$18,171。另外，西伯利亞虎計畫(Amur Tiger project, Dr. Linda Kerly)提供自動照相機供唐秋沙巢穴監測使用。

計畫報告標題為「俄羅斯唐秋沙之調查及保育 Survey and Conservation of Scaly-sided Merganser (*Mergus squamatus*) in Russia」詳細列出多年唐秋沙基本資料、調查結果及圖表，包括：

- 重建唐秋沙歷史分佈圖。
- 俄羅斯 Sikhote-Alin 山脈(Amur River 右岸)確認及預測的唐秋沙繁殖區圖。
- Sikhote-Alin 山脈唐秋沙分佈北界資料表(包括 8 條河流，1991-2011 年九次調查資料)。
- 俄羅斯 Zeya-Bureya 高地(Amur River 左岸)唐秋沙存在與否資料表(包括 8 條河流，2000-2011 年七次調查資料)。
- Zeya-Bureya 高地唐秋沙分佈圖(包括歷史和最近蒐集之資料)。
- 1976 調查資料顯示，Zeya-Bureya 高地之 Pompeevka River 有高密度之唐秋沙繁殖，但 2011 年針對 3 條河流之 11 種水鳥族群調查，僅發現 1 隻唐秋沙(其他水鳥族群量，列於報告表 3)。
- 依據俄羅斯河流唐秋沙繁殖對數密度表(包括 31 條河流調查資料)，推估 Sikhote-Alin 山脈繁殖唐秋沙約有 1,575 對，加上其他國家資料，全球約有 2,000 對(或約 6,000 隻)。此數據比 2003 年估計之 10,000 隻少，但比國際鳥盟 2001 年估計值 2,500 隻高。全球約 80%唐秋沙在 Sikhote-Alin 山脈繁殖。
- Sikhote-Alin 山脈 2011 年唐秋沙繁殖對數密度表(包括 6 條河流調查資料)。
- 俄羅斯 Primorye 地區，2000-2011 年唐秋沙繁殖對數和窩數對照表。
- Primorye 地區，2003-2011 年唐秋沙和其他動物使用天然巢穴調查表。
- Primorye 地區，2002-2011 年唐秋沙使用人工巢管(artificial nest tube)調查表(包括 5 條河流調查資料)。

- Primorye 地區，2003-2011 年唐秋沙使用人工巢箱(artificial nest box)調查表(包括 4 條河流調查資料)。
- Primorye 地區，2002-2011 年唐秋沙使用人工巢管和巢箱數量表。
- Primorye 地區，2002-2011 年唐秋沙使用天然和人工巢穴比較表(總計巢管 54 件、巢箱 39 件、天然巢穴 15 件)。
- 其他動物(蜂、松鼠、貓頭鷹、鴛鴦等)佔用人工巢穴比較表。
- Primorye 地區，2003-2011 年唐秋沙繁殖窩數比較表。(2011 年有 11 個巢、8 窩，每窩 9-18 顆蛋)。
- Primorye 地區，2011 年唐秋沙巢蛋孵化率比較表。(2011 年 41%)。
- Primorye 地區，2003-2011 年唐秋沙巢穴結果比較表。(9 年總計 64 巢成功、16 巢被獵食、15 巢被放棄、1 巢被毀、4 隻母鳥死亡；2011 年 3 巢成功、4 巢被放棄、1 隻母鳥死亡)。
- Primorye 地區，2003-2011 年唐秋沙巢穴型態和結果比較表。(巢穴成功率為巢管 0.76、巢箱 0.5、天然巢穴 0.71)。
- Primorye 地區，2003-2011 年唐秋沙春季族群性別和年齡比較表。
- Primorye 地區，2003-2011 年唐秋沙母鳥消失原因統計表。(母鳥不見主要原因為母鳥死亡、巢被毀、巢被其他動物佔用、築巢失敗、築巢期間被干擾及不明原因)。
- Primorye 地區，2003-2011 年唐秋沙雌鳥重複使用巢穴統計表。
- 2011 年檢視唐秋沙巢管和巢箱紀錄表(附件 A 表一和表二)。
- Primorye 地區唐秋沙雌鳥巢穴結果說明表(附件 B 含 2003-2007 年和 2005-2010 年二個明細表)。

非洲保育基金會巨猿保育計畫成果摘要

非洲保育基金會(African Conservation Foundation, ACF)保護大猩猩和黑猩猩計畫數年成果，摘要如附：

本計畫在喀麥隆環境暨森林部(Ministry of Environment and Forestry)支持下，由非洲保育基金會和環境和鄉村發展基金會(Environment and Rural Development Foundation, EruDeF)合作執行。喀麥隆森林暨野生動物部(Ministry of Forestry and Wildlife) 2005 年曾經提供支持本計畫執行之信函。

非洲保育基金會設立於 1999 年，在英國、坦尚尼亞和喀麥隆設有辦公室，該基金會主要宗旨包括：

一、 執行野外計畫，支持非洲當地之保育行動。
二、 尋求生物多樣性保育與當地社區人民生計結合的方式。

上述計畫執行方法或活動包括：

一、調查和生物監測。
包括調查設計和執行，蒐集和分析資料等。
二、引進野生動物農場，作為替代生計策略。
依據本計畫之前的調查和分析，野生動物農場(Wildlife Farming)是建立小型產業的可行方法，不但可提供村民食物，也可創造收入來源。ACF 和 EruDeF 將提供相關訓練協助村民，並協助設立社區基金。
三、以鼓勵參與策略擬定方式，研擬以社區為主之土地利用計畫。
主要目的為保護巨猿棲息地和生態敏感區，並區隔農業用地，經由社區參與尋求保護、保育、傳統利用、人民生計和經濟發展間之平衡。ACF 和 EruDeF 將運用 GIS 資料，協助村民擬定土地利用計畫。
四、經由教育宣導提倡巨猿保育。
辦理環境教育相關會議或活動，協助學校成立野生動物相關社團，出版巨猿相關海報、摺頁或其他宣導品。

2005 年所提「喀麥隆西部巨猿研究和保育計畫」是先驅計畫，包括族群調查，教育及訓練當地社區永續經營森林資源，尋求替代謀生方式，擬定永續經營和保育計畫等。ACF 網站有列出贊助者，林務局 logo 也列在上面。我國贊助此計畫之後續正面發展包括：

- 研究調查成果促使IUCN於2006年將研究地點納入喀麥隆和奈及利亞保育克羅斯河大猩猩地區性行動計畫(Regional Action Plan for the Conservation of Cross River Gorillas in Cameroon and Nigeria)。
- 喀麥隆政府規劃研究 Lebialem 高地納入保護區系統之可行性。
- 與美國 University of Maryland 商討合作研究黑猩猩族群基因。

2005 年至 2006 年計畫主要成果包括：

- 2005 年 12 月和 2006 年 10 月間，紀錄 120 個巨猿巢區(40 gorilla nest sites, 80 chimpanzee nest sites)。
- Bechati-Fossimondi-Besali 森林區，平均每群隻數(gorilla: 13.05, chimpanzee: 6.78)，Mak-Betchou 森林區，平均每群隻數(chimpanzee: 16.72)。
- 在研究區發現 11 個巨猿頭骨、2 根大腿骨。
- 採集到 15 份毛髮 sample、8 份糞便 sample。
- 調查期間數次觀察到黑猩猩和大猩猩，例如近距離遇到 35 隻 chimpanzee，遠距離看到一群 chimpanzee (包括 3 隻 infant)，近距離追蹤 4 隻大猩猩等。
- 除黑猩猩和大猩猩外，另紀錄到其他 10 種大型哺乳類動物。
- 人類活動部分，發現 560 個陷阱、29 個獵人、28 段獵徑、60 個彈殼、67 個農場，另聽到 25 次槍聲。
- 紀錄研究地區之植被及棲地類型，另與英國皇家植物園(Royal Botanic Gardens, KEW)和喀麥隆植物標本館(National Herbarium of Cameroon)合作，採集 141 份植物標本。
- 擬定森林經營管理策略，研擬保育巨猿行動計畫。
- 人才培訓方面，辦理 GIS/GPS 訓練班，調查人員參加各類訓練課程。針對當地機構或社區，辦理 4 次相關研討會和訓練班。
- 教育宣導方面，辦理 30 次社區會議，共 3,218 人參加。到 5 個學校辦理保育宣導活動，共有 1,050 位學生參與。協助 5 個學校設立保育社團。
- 替代性謀生方式部分，召開 35 次會議，協助設立兩個社區基金(Community Funds)，2006 年 9 月起，召開 11 次基金管理會議。

2007-2008 年是第 2 階段計畫，研究調查地區為 Mak-Betchou 森林區、Upper Nkongho-Mbo 森林區和造林租借地(UFA11002)。計畫執行有助於保護這兩種瀕臨絕種猿類，2007 年至 2008 年初計畫主要成果包括：

- 於 Bechati-Mone Forest Corridor 發現 4 個新的大猩猩可能分佈區。
- 經由實驗室 DNA 測試，證實 Lebialem forest 有大猩猩。
- 於 Lebialem highlands 2 處受干擾棲息地，進行巨猿築巢生態學比較研究。
- 製作 Bechati 和 Mone 兩處 Forest Reserve 間之巨猿遷徙路線圖。
- 附近共有 10 個村莊，已於 9 個村莊設立森林管理委員會。
- 於 4 個村莊建立永續發展計畫及社區財務機制。
- Bechati-Fossimondi-Besali 森林區，開始進行社會經濟研究。
- 經由社區會議和至學校宣導方式，提升 Bechati-Fossimondi-Besali 森林區居民對保育議題之瞭解。

2008 年計畫成果包括：

- Bechati-Fossimondi-Besali 森林區，發現 5 個大猩猩巢區，7 件大猩猩覓食遺跡，4 個大猩猩腳印，2 次黑猩猩叫聲，1 件黑猩猩覓食遺跡。大猩猩和黑猩猩的目擊率(encounter rate)分別為 0.3 signs per/km 和 0.06 signs per/km。另發現 3 塊農田，顯示林區有部分人為干擾，目擊率為 0.06 signs per/km。
- UFA11002 森林區，沒有發現大猩猩。發現 1 處黑猩猩巢區，有 4 個巢。目擊率為 0.2 signs per/km。此區以前有大猩猩之記錄，因族群很小，有可能已遷移至附近森林，需再進一步調查才能確認。另發現 22 條打獵小徑和 16 個陷阱，顯示打獵活動頻繁，目擊率為 2.5 signs per/km。
- Mak-Btchou 森林區，沒有發現大猩猩。黑猩猩部分，發現 4 個地面巢，54 個樹上巢，1 個很新的腳印，2 次叫聲。目擊率為 2.03 signs per/km。另記錄到叢林象 8 件新排遺，2 個新腳印，2 次叫聲，目擊率為 0.4 signs per/km。總共記錄到 10 種動物。記錄到的人類活動主要是狩獵，包括陷阱、彈殼、槍聲、獵人小屋、獵徑、彎刀痕跡，目擊率為 1.6 signs per/km。另農業活動目擊率為 0.4 signs per/km。
- Nkong 和 Bangang 森林區，Nkong 林區沒有發現大猩猩和黑猩猩。Bangang 林區發現數件大猩猩覓食遺跡。黑猩猩部分，發現 7 個巢區(7 個地面巢，21 個樹上巢)。此 2 林區均發現密集農業活動，主要栽植物種為棕櫚、可可和大焦，也有發現伐木行為。
- 2009 年 12 月 5 至 10 日，辦理巨猿追蹤研究訓練班。
- 在 Bechati-Fossimondi-Besali 森林區附近 9 個村莊設立森林經營管理機構(Forest Management Institution, FMI)。

- 替代性謀生方式部分，在 Mmockbie 和 Mmockgie 新設兩個社區基金(Community Funds)。
- 在 Fossimondi、Andu 和 Menji 辦理保育教育宣導課程或活動。

2009 年「Lebialem-Mone 地區克羅斯河大猩猩和奈及利亞-黑猩猩保育計畫」，計畫報告，摘要如附：

- 社區參與計畫共 9,540 人參加。
- 辦理各類訓練班，包括生物監測和 GPS 使用、資料分析、GIS 製圖、社會經濟學研究方法、野外調查等。
- 針對不同地區及對象，辦理 3 次大猩猩保育教育宣導活動。
- 完成村莊資源圖，標示黑猩猩和大猩猩棲地和土地利用型態等，此地圖將森林分區，包括
  1. Primary Forest (大猩猩棲地核心區)
  2. Secondary Forest (緩衝區，靠近 Primary Forest 的廢棄農地)
  3. Tertiary Forest (人類居住區)
  4. Intensive agroforestry (農田)
- 於 Bechati 規劃設立保護區，並完成保護區全圖、分區規劃圖及 3-D 地圖。
- 保護區初步劃定界線之範圍約有 8,000 餘公頃，另外將有 5,000 公頃緩衝區。
- 建立社區發展模式，設立諮詢委員會。
- 完成「我們的森林和社區的未來(The Future of Our Forests and Communities)」報告。
- 大猩猩分佈和生物監測調查發現 Bechati-Lebialem 森林和 Ashukem-Bokwa 山區為大猩猩密集活動區。大猩猩面臨的主要威脅為野味(bushmeat)貿易、森林變更為農地、年青人高失業率、村民對森林和野生動物相關法規認知不足等。
- UFA11002 和 Mak-Betchou 林地調查結果顯示有相當數量之黑猩猩，但沒有發現大猩猩出現的證據。
- 於 Lebialem-Mone 林地設立森林保護基金(Forest Protection Fund)。
- 辦理替代謀生方式訓練，例如訓練 Lebialem 地區 120 名獵人養蜂。
- 完成 Mak-Betchou 和 Upper Nkongho-Mbo 兩處林地之社會經濟調查。

本計畫主要目標為經由研究、保育、教育計畫和研擬生物多樣性經營管理策略，保育喀麥隆西南部 Lebialem-Mone 地區稀有的大猩猩和黑

猩猩亞種，並持續進行長期教育宣導、鼓勵社區參與推動保育計畫等。

Lebialem 高地，面積 1,323 km^2，平均年雨量超過 2,000mm，本區 2 個主要氣候型態包括雨季(4-9 月)和旱季(10-3 月)。Lebialem 有 355 種以上鳥類棲息於此，其中約有 50 個特有種，15 種為面臨威脅物種。棲息於中海拔的瀕臨絕種哺乳類包括大猩猩、黑猩猩、鬼狒(Drill)和 Preuss's monkey (*Preuss guenon*)。2004 年的調查，記錄到以前未被發現且極稀有的大猩猩和黑猩猩亞種，即克羅斯河大猩猩(另譯跨河大猩猩或十字河大猩猩 Cross River gorilla, *Gorilla gorilla diehli*)和奈及利亞-喀麥隆黑猩猩(Nigeria-Cameroon chimpanzee, *Pan troglodytes vellerosus*)。此項發現顯示大型猿類動物並非僅限於 Sunderland-Groves 地區，故有必要進一步調查這兩種亞種的現況、族群數量、分佈及基因組成。兩種動物稀有的原因包括棲地破碎化及人類造成的壓力。大猩猩和其他哺乳類受威脅的原因包括森林惡化、商業伐木、棲地破碎化、非法獵捕和野味貿易。Cross River gorilla 族群量不到 300 隻，是全球面臨最大危機的靈長類動物。Nigeria-Cameroon chimpanzee 族群量不到 6,000 隻，是最受威脅的黑猩猩亞種，分佈地區最少，族群量也最小。

2005 年至 2008 年計畫目的包括：

一、評估大猩猩和黑猩猩亞種之現況、分佈、目擊率(encounter rate) 相對豐富度等資料，作為保育措施之參考。主要調查區包括 Mak-Betchou、Upper Nkongho-Mbo、UFA11002 forest blocks 和 Bechati-Mone Forest Corridor。
二、經由訓練和社區基金方式，為村民尋求替代性謀生方式。
三、研擬以社區為基礎之土地利用計畫。
四、加強環境教育，於當地社區宣導巨猿保育觀念。
五、繼續與喀麥隆森林暨野生動物部協商，將這些森林區之保護位階提升至社區經營之保護區。

依據前 3 階段之成果，2009 年計畫重點地區為 Lebialem-Mone Forest Landscape (前稱 Bechati-Mone Forest Corridor)，執行工作包括：

一、與喀麥隆森林暨野生動物部和當地相關人士合作，設立由社區經營管理之法定保護區。
二、發展以社區為基礎之土地利用計畫。
三、提升社區居民對保育大猩猩和黑猩猩的瞭解和認知。

四、支持替代謀生方式，包括野生動物農場和生態旅遊。

經過多年努力，計畫進入另一階段，2010 年所提為「喀麥隆西部 Lebialem-Mone 地區建立大猩猩保護區計畫」，摘要如下：

克羅斯河大猩猩名列全球面臨最大危機的 25 種瀕臨絕種靈長類動物之一，過去數年的調查發現奈及利亞和喀麥隆邊界克羅斯河大猩猩僅有 250-300 隻，分佈在 12,000 平方公里範圍內，棲地破碎化造成有發現大猩猩出沒的地區分為 11 處，且每地相隔 10 公里以上。最近新發現 Bechati 地區克羅斯河大猩猩次要族群有 40-60 隻，本計畫預定建立 Bechati-Mone 森林廊道(Bechati-Mone Forest Corridor)，連結 Bechati 地區和主要族群 Takamanda 地區，設立大猩猩保護區(Bechati Gorilla Sanctuary)。

2010 年計畫執行成果摘要如下：

一、推動社區野生動物保護區 Tofala Hill Wildlife Sanctuary 之公告設立。

- 辦理地區性推動保護區設立研討會，並邀請政府單位參加。
- 2010 年 7 月設立保護區推動小組。
- 2010 年 8 月至 2011 年 1 月，召開 4 次技術研討會，草擬技術報告，此為喀麥隆設立保護區之第一要件，已完成報告初稿。
- 派出 3 組人員，於 2010 年 12 月製作完成保護區範圍圖。
- 預定保護區正式取名為 Tofala Hill Wildlife Sanctuary (前稱 Bechati-Lebialem forest)。

二、社區野外調查人員於 Bechati -Fossimondi-Besali、Bokwa-Etoko Mile 22、Andu 等森林，支援政府人員執法和大猩猩監測工作。

- EruDeF 成功遊說政府單位於 2010 年 10 月派駐 6 位工作人員，補足已懸缺 2 年之職務，並於保護區預定地辦理 2 次查緝和教育活動。
- 2010 年 1 月起，每月進行生物監測，並辦理訓練班。
- 記錄到 7 群大猩猩，每群分別有 1,2,3,4,5,7,8 隻，總計 30 隻。另外，多數黑猩猩群約有 1 至 21 隻，最大的一群有 35 隻，總計 285 隻。

三、辦理教育宣導活動

- 草擬巨猿保育教育課程教材，並送政府單位審查，為當地學校編纂之大猩猩和黑猩猩保育教育手冊正撰寫中。
- 於保護區預定地附近 10 個村莊設立環境教育社團，並推動學

校相關社團之設立。

- 與喀麥隆主要報紙 The Post Newspaper 談妥，於 2011 年每月刊登計畫執行相關報導。
- 2010 年 2 月與 Lebialem 社區電台簽訂 MOU，每週播放 30 分鐘保育巨猿和其他環境保育議題之節目。
- 雇用人員自 2010 年 7 月起，每月出版電子通訊，並接受網站設計和管理訓練。同時每月撰文刊登於全國性報紙 The Sun and Post Newspapers。

四、加強保護 Bechati-Mone Forest Corridor。

- 進行生物監測和森林調查。
- 於 Bokwa 和 Etoko mile 222 辦理教育宣導活動。
- 於政府單位討論 UFA11002 租地未來之經營管理方向。
- 2011 年 2 月完成本區全面性之生物多樣性和森林資源調查。

五、於 Bechati-Lebialem 森林附近 13 個社區，運用森林保護基金，訓練及支援微經濟，改善人民生計。

- 為 13 個村莊的替代生計方式排定優先順序，包括家畜、漁業養殖、改善小農之產量、改善棕櫚油生產、非林木森林副產品之交易、養蜂等。
- 重組當地社團朝永續生計方向發展，主要包括 Tofala Hill 婦女會、Tofala Hill 獵人協會、Tofala Hill 農會、鄉鎮森林經營管理委員會等。上述社團將與該鄉鎮主管單位簽訂 MOU 保護大猩猩和黑猩猩。
- 強化 Menji 和 Anya-Lewoh 森林保護基金功能，於 Buea 設立上開基金。
- 為生態守護員(eco-guard)建造豬舍養豬，終結打獵和設陷阱行為。
- 截至目前共訓練 Lebialem 149 名獵人改行養蜂，提供 321 個巢箱。

2011 年計畫執行成果摘要如下：

一、公告預定設立社區野生動物保護區 Tofala Hill Wildlife Sanctuary 及經營管理

- 喀麥隆森林暨野生動物部於 2011 年公告將於 Bechati-Lebialem forest 設立保護區(Tofala Hill Wildlife Sanctuary)。
- 於 Besali 和 Egumbo 設立鄉鎮森林經營管理委員會(Village Forest Management Committees)。
- 針對各種團體辦理訓練，課程包括組織、財務、計畫和衝突

管理，和森林保護基金之運作及支援社區保育和經濟發展之角色。

- 於 Bechati 設立森林保護基金辦公室。

二、支援執法行動和大猩猩生物監測計畫

- 於保護區預定地執行執法和野生動物保育教育行動共 10 次。
- 於保護區預定地進行森林監測，並評估人類對黑猩猩和大猩猩造成之衝擊，以及這兩種野生動物所面臨之威脅。
- 提升生物監測團隊之能力，已訓練 2 為碩士執行監測計畫。
- 於三個地點進行生態監測，包括 Mak/Betchuo forest、Tofala Hill Wildlife Sanctuary 預定地和 Tofala-mone forest corridor。結果如下：

Tofala Hill Wildlife Sanctuary 預定地

- 在 Tofala forest 記錄到 74 筆大猩猩痕跡，包括 13 個築巢地點(nest sites, 以下簡稱巢區)，其中有 10 個樹巢(tree nest)和 55 個地面巢(ground nest)、33 個覓食痕跡(feeding signs)、1 份排遺(dung)、6 個休息區(resting sites)、26 處動物走道(trails)。在 5 個巢區記錄到大猩猩群，每群分別有 7,6,5,4,3,2,1 隻，總計 28 隻斷奶(weaned)大猩猩。
- 黑猩猩記錄有 426 筆，包括 46 次叫聲(vocalizations)、140 trails、49 個覓食痕跡、43 處遊戲地點(play grounds)、17 個休息巢區(resting nest sites)中有 83 個巢、6 份排遺、69 個睡眠巢區(sleeping nest sites)中有 819 個巢(136 ground nests, 708 tree nests, 樹巢平均高度約 13-16 公尺)。在巢區記錄到黑猩猩群，每群 1-21 隻，每個巢區約有 25 個巢(約 256 隻斷奶黑猩猩)。有記錄到巢區和巢重複使用之情形。
- 人類活動部分，記錄到 10 座草屋(bush hut)、73 處人造林(plantation)、126 個陷阱(snare)、91 個彈殼(gun shell)、3 個獵人椅(hunters' seat)、16 處獵徑(hunters' trail)、4 處 30 公尺長之圍籬陷阱(fence trap)和 8 次槍聲(gunshot)。
- Fossimondi forest area 自動照相機 1 月記錄到 11 隻黑猩猩(包括 4 隻雌黑猩猩帶小猩猩)、數隻樹蹄兔(Western Tree Hyrax)、1 隻豪豬和 1 隻 rat mole。Bechati forest 自動照相機 3 月記錄到 14 隻黑猩猩(包括 2 隻雌黑猩猩帶小猩猩)和一些其他動物。在 Nkando forest 沒有記錄到黑猩猩，但有其他動物以及獵人和獵犬的影像紀錄。

Mak-Betchou forest range

- 1-3 月黑猩猩痕跡記錄有 122 筆，33 個巢區中有 114 個巢(113 tree nests, 1 ground nest)，包括 1 次叫聲(call)、2 個覓食野生果

子和白蟻的痕跡、3 個足跡(tracks)、2 處遊戲地點。依據調查結果推估，Andu Forest 黑猩猩密度約為每平方公里 0.075 隻。

- 4-6 月黑猩猩痕跡記錄有 598 筆，包括 61 trails、9 play grounds、25 個覓食痕跡、2 個腳印(foot prints)、2 堆排遺、482 個巢包括 18 ground nests (3 個休息巢、15 個睡眠巢)和 468 個 tree nests。另外非洲象痕跡記錄有 152 筆，包括 45 堆排遺、4 trails、1 次直接觀察到大象、65 個腳印和 37 個覓食痕跡。人類活動部分，包括 16 處短劍砍痕(Cutlass cuts)、2 隻受傷動物(hunting hurts)、23 處獵徑、8 次槍聲、19 個獵人椅。
- 9-11 月黑猩猩痕跡記錄有 149 筆，包括 78 個巢區中有 378 個巢(370 tree nests, 8 ground nests)、5 個休息巢、20 個覓食痕跡、1 堆排遺、32 trails 中有 4 個腳印、6 處遊戲地點和 3 次叫聲。非洲叢林象痕跡記錄包括 8 堆排遺、6 個腳印、1 trail 和 4 個覓食痕跡。另有紀錄到數種其他動物。人類活動部分，包括 3 處獵寮、3 個彈殼、6 處獵徑和 1 處休息區。

Tofala-Mone Forest Corridor

- 1 月黑猩猩痕跡記錄有 14 筆，包括 1 次直接觀察到黑猩猩 1 群 6 隻、5 個巢區中有 17 個巢(全部為樹巢)、1 個覓食痕跡、7 個足跡。人類活動部分，包括 8 個彈殼、5 次槍聲、3 個陷阱和 3 處打獵痕跡。
- 3 月記錄到黑猩猩 7 個巢區中有 27 個巢、2 次叫聲、1 個覓食痕跡。全部為樹巢，平均高度約 12-18 公尺。每個巢區約有 2-7 個巢。另有紀錄到數種其他動物。人類活動部分，包括 2 處可可人造林、12 次槍聲、7 處獵徑、4 隻受傷動物、1 群獵人 5 人正在曝晒獵到的動物和 5 個彈殼。

三、推動教育宣導計畫

- 辦理 19 次社區保育教育活動，約有 2,000 人參加。
- 於 31 個學校推動設立環境或保育社團，共有 800 位學生參與，每個社團約有 20 位學生，社團於校內推動各類活動，提升保育認知。
- 與來自捷克和法國之團隊，共同製作影片宣導克羅斯河大猩猩保育議題，捷克團隊已先將 2 分鐘影片「Animals of Lebialem」放在 You Tube 網站。並與當地電視台合作製作紀錄片「A Journey across the Lebialem Highlands: A Forgotten Biodiversity Hotspot in the Gulf of Guinea」。
- 於 Lebialem 社區廣播電台 2 個節目中推動 Tofala Hill Wildlife Sanctuary 之設立。另有 5 個節目宣導社會經濟、鳥類保育、保護森林等議題。

- 於當地報紙刊登 4 篇保育相關文章，例如「Nigeria-Cameroon chimpanzees facing extinction」。
- 製作宣導海報。

四、提升 Tofala-Mone Forest Corridor 保育位階，2011 年重點工作為巨猿監測、教育和生物多樣性熱點評估，將於 2012 年完成評估工作。

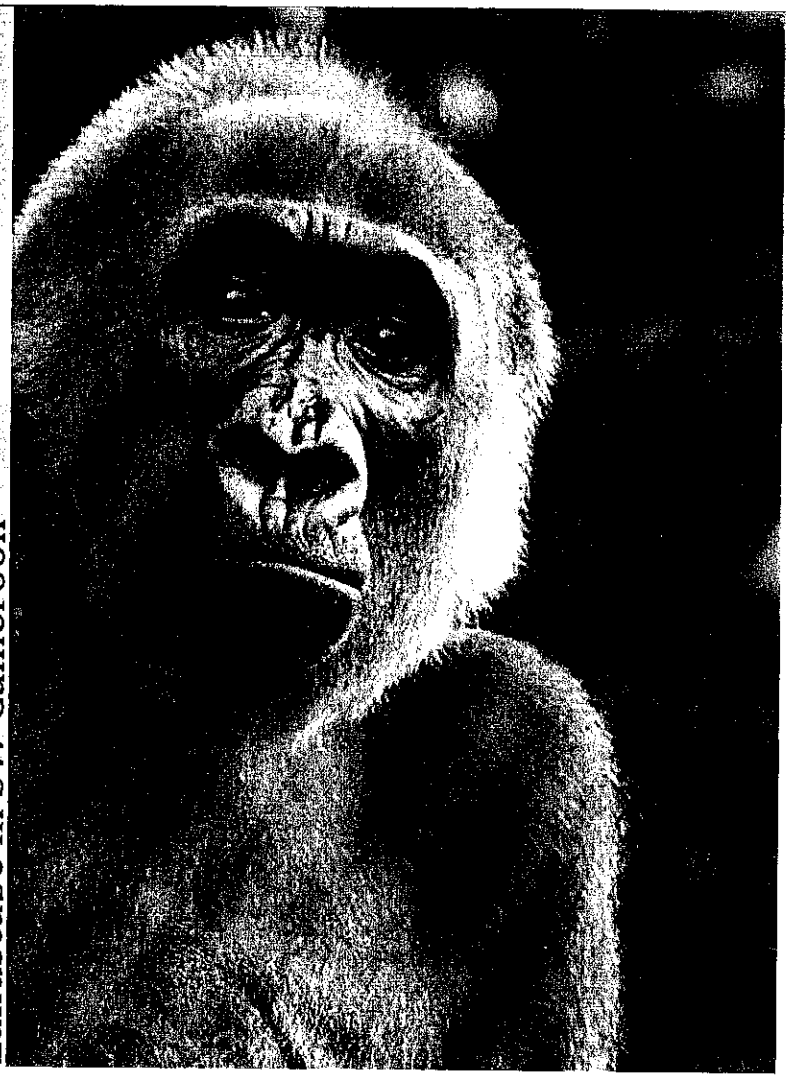
五、於 Tofala Hill Wildlife Sanctuary 預定地森林附近 13 個社區，運用森林保護基金，訓練及支援微經濟，改善人民生計。

- 為 13 個村莊的替代生計方式排定優先順序，包括家畜飼養、魚類養殖、改善小農產量、改善棕櫚油產量和煉油過程、開發非林木森林副產品市場、養蜂等。最受社區歡迎的是家畜飼養(尤其是養豬、羊)和小型貿易。非林木森林副產品主要是 red kola, bitter kola。數量有限的包括 Njangsan, eru, bush pepper, bush mango, bush onion, bush pepper, bush plum。
- 組織當地社區建立社團朝永續生計方向發展，主要包括 Tofala Hill 婦女會、Tofala Hill 獵人協會、Tofala Hill 農會、鄉鎮森林經營管理委員會等。上述社團加入森林保護基金運作前，均有接受相關訓練。
- 接受輔導參與棕櫚油計畫之鄉鎮，需與 MINFOF 簽訂備忘錄，保護大猩猩和黑猩猩。
- 於 8 個社區訓練 149 名獵人改行養蜂，共有 121 個巢箱。目前 6 個社區已開始採收蜂蜜。

2012 Program Report

Western Cameroon Great Apes Research and Conservation Program

Consolidating the Management of the Cross River Gorillas and Nigeria-Cameroon Chimpanzees in the Lebialem-Mone Forest Landscape in SW Cameroon



Western Cameroon Great Apes Research and Conservation Program

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ACKNOWLEDGEMENTS

The program partners wish to thank those who assisted in the implementation of the project activities in South West Cameroon.

The Western Cameroon Great Apes Conservation Program has been supported since 2004 by the Conservation Division of the Forestry Bureau, COA, Taiwan and other partners including the government of Cameroon.

We also want to thank the indigenous communities in the project areas for their continuous and relentless efforts in supporting the great apes conservation program.

PROGRAM SUMMARY

The program for the conservation of the great apes in the Lebialem-Mone Forest Landscape has focused in 4 main forest areas since 2004 namely the Bechati-Lebialem forest (now proposed Tofala Hill Wildlife Sanctuary), Mak/Betchou forest, Nkingkwa Hills and Bechati-Mone forest corridor (now Tofala-Mone Forest Corridor). The main goal of the program is to provide a long term security to the subpopulations of the Cross River gorillas and Nigeria-Cameroon chimpanzees and their habitats located in this landscape through research and the implementation of a community management strategy.

From 2010, the government of Cameroon expressed the wish to move these areas into permanent protection through the technical assistance of the Environment and Rural Development Foundation, African Conservation Foundation and Fauna and Flora International. In the 2011reporting year, the program focused on several key objectives namely i) strengthening the capacity of the proposed areas to conserve the Cross River gorillas and Nigeria-Cameroon chimpanzees subpopulations, ii) implement an improved environmental education strategy, iii) Support the development of livelihoods and economic development initiatives, iv) support the bio-monitoring of the great apes subpopulations in the main forest areas and v) support the development of the public information system to increase local, national and international awareness on the conservation of these species.

The main program outputs in 2011 included the process for the creation and management of the proposed Tofala Hill Wildlife Sanctuary (THWS) advanced considerably, further the bio-monitoring and forest surveillance of apes, support the implementation of the livelihoods and economic development initiatives with focus on livelihoods, development of rural financial mobilization scheme known as the forest protection fund and reorganization of the rural marketing framework around the proposed Tofala Hill Wildlife Sanctuary known as the Lower Mundani Farmers Cooperative Society. Focus was also placed on environmental education and public information system development.

The main challenges faced in 2011 included the need to solve conflicts arising from the process of creating the proposed THWS with one of the 10 village communities and addressing their concerns; inadequate support for livelihoods and economic development activities; limited funds to run activities; limited means of transport and staff support.

Core funding for this program came from the Conservation Division of the Forestry Bureau, COA, Taiwan, the Arcus Foundation, French Fund for Global Environment and Fauna and Flora International.

The main program actions for 2012 will include the final creation of the proposed Tofala Hill Wildlife Sanctuary and development of its management structures as well as strengthening of conservation actions in the other 3 great apes subpopulations, further conservation education, livelihoods and economic development support, reorganize and capitalise the forest protection fund, intensify wildlife education, bio-monitoring and provide support to the community forest governance structures and the public information systems.

1 INTRODUCTION

From 2004, the Forestry Bureau, Conservation Division, Government of Taiwan and other partners have been assisting the government of Cameroon to put into place a system of protected areas for the conservation of Cross River gorilla and Nigerian-Cameroon chimpanzee subpopulations in the Lebialem Highlands of South West Cameroon. Their long-term commitment has led to the designation of a new proposed system of protected areas in this part of South West Cameroon and caused ERuDeF and its partners (ACF, FFI and others) to establish a conservation presence. This has also ensured that the gorilla and chimpanzee subpopulations living there receive as much attention as other populations in the Cameroon-Nigeria border region.

Major successes at this site include since 2010:

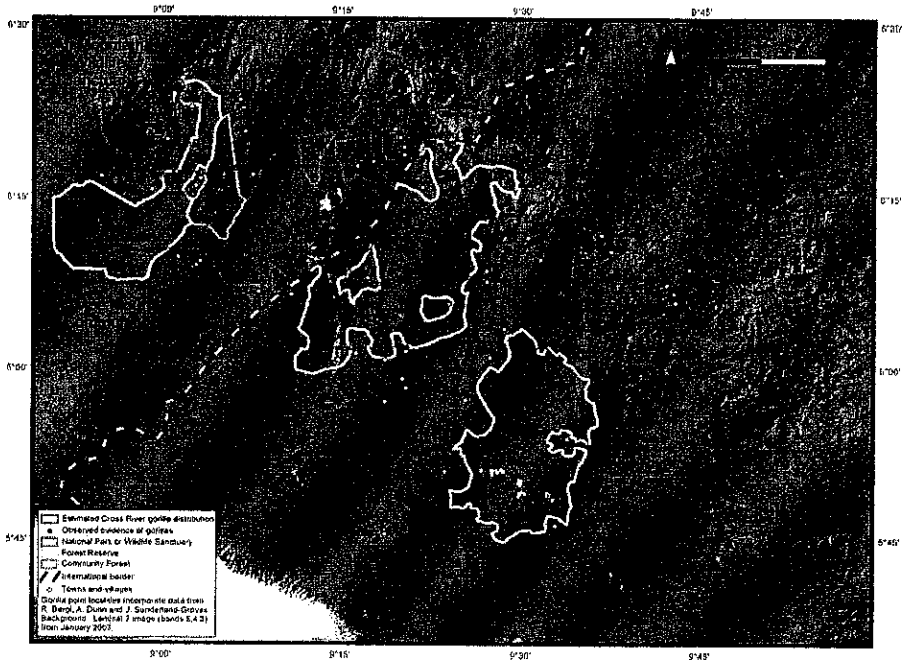
1. Designation of a new system of proposed protected areas with the production of the conservation map of the Lebialem Highlands;
2. Establishment of a bio-monitoring system for gorillas and chimpanzees in 3 key sites of Mak/Betchou forest (proposed Ellioti Chimpanzee Sanctuary), proposed Tofala Hill Wildlife Sanctuary and Tofala-Mone Forest Corridor at Ashukem-Bokwa Hills with the introduction of camera traps;
3. Creation and strengthening of community management structures around the proposed THWS;
4. Launching of the biodiversity assessment and land-use assessment of the Lebialem-Mone Forest Landscape;
5. Creation of the proposed Tofala Hill Wildlife Sanctuary in process
6. Launching of the Livelihoods and Economic Development initiative for the local communities;
7. Establishment of a holistic environmental education program.
8. Increased awareness and commitment of the state and general public to the process of long term management of these great apes.

In 2010, conservation actions focused on i) the creation of the planned wildlife sanctuary at Bechati-Fossimondi-Besali forest, ii) research and biomonitoring, and iii) great apes conservation education.

2 THE PROGRAM AREA

2.1 Map of distribution of Cross River subpopulations in the Nigerian-Cameroon Border Region

Distribution map of Cross River subpopulations known in 2006 (R. Bergl, 2006) with the Bechati-Lebialem subpopulation in the Southeastern corner (Figure 1).



Approximate distribution of the Cross River gorilla in Nigeria and Cameroon.

2.2 Relief and Climate

The Lebialem Highlands (2740m) located in SW Cameroon constitute the third most important ecosystem in Cameroon after Mt Oku (3000m) and Mt Cameroon (4100m) in terms of high biodiversity value. The Lebialem Highlands comprise of Mt Bamboutos, Mt Magha, Nyi-tebong/fuagonkem Hills, Nkingkwa Hills, Tofala and Nyi-bonquah Hills all covering a surface area of 1323 sq km. In terms of ecological services, the Lebialem Highlands is the most important water tower in Cameroon providing over 40% of water needs in the country. While a National Park has been created protecting Mt Cameroon, a Plantlife Sanctuary and several community forests have been created over Mt Oku to ensure some form of protection to these two montane ecosystems, Lebialem Highlands are yet to receive any form of permanent protection.

The Lebialem Highlands are within the equatorial rainforest zone characterized by two (2) major seasons; the dry season (which runs from November to February) and the wet season (which runs from March to October). The annual rainfall recorded in the area is as high as 3500mm (Gartlan, 1989). The climate is characterized at high altitudes by low

temperatures, low rainfall, high relative humidity and the mountain is often covered in clouds.

2.3 Fauna

The Lebialem Highlands forms part of the Cameroon Mountains which harbours wide variety of important biodiversity species. It harbours the Cross River gorilla (Gorilla gorilla diehli), which is the most critically endangered primate in Africa with just 300 individuals remaining in the wild, classified by IUCN as one of the 25 most endangered wildlife species in the world. This subspecies is believed to be found only in 11 isolated sub populations located between the Cameroon and Nigerian border region.

Lebialem Highlands, though a key site of very high biodiversity value and ecological importance, still remain unprotected. additionally, the Nigeria-Cameroon chimpanzee (P.t ellioti), is the most endangered African chimpanzee with a population of between 6000-9000 remaining in the wild (IUCN 2001). These highlands also lodge an important population of the critically endangered Bannerman's Turaco, Banded Wattle-eye and other 16 globally threatened bird's species as well as an increasing number of plants rare to science. The area also lodges the endangered Drill endemic only to SW Cameroon and SE Nigeria. With about 60 of the last 300 Cross River gorillas as well as close to 600 of the 6000 Nigeria-Cameroon chimpanzees found in the Lebialem Highlands, the challenge in terms of conservation is at the world's level.

2.4 Vegetation

The forest at the piedmont is similar to lowland forest in structure with a closed canopy, limited under storey with many dense vine tangles in the mid-storey. On the steeper slopes above the piedmont the canopy becomes more open and the diversity of trees appears lower, whilst the under storey remains relatively clear.

Its altitude ranges from 200 to 2740 m a.s.l, which gives rise to two broad vegetation types; the lowland forest and the montane forest. This accounts for the huge floral diversity of the area, which in turn determines the variety of habitats and the corresponding distribution and diversity of fauna in this area.

2.5 Population

The population living in the Lebialem-Mone Forest Landscape is over 150,000 people in about 40 villages. The population density at the proposed Tofala Hill Wildlife Sanctuary is estimated at 2.8 persons/ha while it is estimated at 0.36 in the Tofala-Mone forest corridor. In the Mak/Betchou forest area, the population density is about 0.48 persons/ha and 1.2 person/ha for the Nkingkwa area. The local inhabitants are principally involved in farming, hunting, fishing and collection of non-timber forest products. Palm oil production is the main source of income at the piedmont level of the

highlands, while at the montane level market gardening is the main source of the economy.

3 PROGRAM RESULTS AND OUTPUTS

3.1 Creation and management of the proposed Tofala Hill Wildlife Sanctuary as a Community Wildlife Sanctuary

In 2011, the most significant achievement was the signing by the Minister of Forestry and Wildlife of Cameroon of the "Public Notice" declaring the government of Cameroon's intention to create a wildlife sanctuary in the Bechati-Lebialem forest and now known as the proposed Tofala Hill Wildlife Sanctuary. A copy is attached. Prior to the signing of the Public Notice, several meetings were held with the Divisional and Regional officials of the Ministry of the Forestry and Wildlife for the South West to prepare the "Technical Note" and this was followed by several visits to Yaounde to follow up the signing of the Public Notice. The Technical Note is also attached.

Besides pursuing the signing of the Public Notice at the level of government, the project team also sought to obtain community consensus and validation of the project. In this perspective, a series of community meetings were organized for the communities of Fossimondi, Egumbo, Folepi, Bangang, Bechati, Nkong, Besali, Banti and Bamumbu. These meetings also involved elites of the villages concerned.

To support the collaborative management process around the proposed Tofala Hill Wildlife Sanctuary the following results were obtained:

Formation of Forest Management Institutions:
Village Forest Management Committees (VFMC) were formed in two villages, i.e Besali and Egumbo.



VFMC in Besali



VFMC installation Process in Besali

Institutional strengthening of community based institutions
Meetings were held with the various village institutions, (i.e Women Associations, Hunters and Trappers Associations, Farmers Associations, VFMC and CIGs present in the various villages. All these institutions were trained on technical and organisational management, financial and project management and micro-financing as well as conflict resolution. They were also trained on the functioning of the Forest Protection Fund and its role in supporting community conservation and local economic development. A building was chosen in Bechati for the office of the Forest Protection Fund.

The formation of the Women's Association of Tofala was initiated
Meetings were held with the various women groups in the various villages. This led to the formation of the following respective village women associations; The Nkong Women Association (NkoWA), The Bangang Women Association (BaWA), The Besali Women Association (BeWA), The Bechati Women Association (BecWA), The Folepi Women Association (FoWA), The Banti Women Assocition (BanWA) and The Association Of Egumbo Women (ASEW). This process will continue for the northern villages of Fossungo, M'mockbie, Fossimondi and Bamumbu.
All these women associations will be linked to the other women associations in the other villages within Tofala and they will all join to form the Tofala Women Association (ToWA), which will be included in the management board of the Tofala Hill Wildlife Sanctuary and that of the Tofala Forest Protection Fund.

3.2 Supporting law enforcement by the Ministry staff and bio-monitoring of gorillas through community field assistants in the proposed Tofala Hill Wildlife Sanctuary, Tofala-Mone Forest Corridor and Mak/Betchou forest

3.2.1 Law enforcement

With support from the project, both the Regional and Divisional MINFOF teams carried out 10 major law enforcement and wildlife education field missions around the proposed Tofala Hill Wildlife Sanctuary. Furthermore, the Divisional MINFOF team joined bio-monitoring teams to the proposed Tofala Hill Wildlife Sanctuary to conduct forest surveillance and evaluate the impact of human pressure on the gorillas and chimpanzees as well as the threats they face.

3.2.2 Strengthening the capacity of the Bio-monitoring team

Throughout 2011, we continued to build the capacity of Field Assistants (Bio-monitors) in both quality and quantity of data collected from the field. We hired and trained one MS graduate in wildlife biology to reinforce the bio-monitoring programme. She was trained in camera trapping methods in wildlife monitoring uptill June 2011 in the proposed Tofala Hill Wildlife with support from the Czech Republic based Diehli Initiative. Two cameras were installed in the proposed Tofala Hill Wildlife Sanctuary area to monitor the gorillas and chimpanzees. One other MS graduate was hired in November 2011 to be trained and to subsequently reinforce the biomonitoring team working across the key sites.

3.2.3 Bio-monitoring Results

The biomonitoring in 2011 was conducted in three key sites namely the Mak/Betchou forest, proposed Tofala hill wildlife sanctuary and Tofala-mone forest corridor. All ape nest sites observed were recorded and tagged to prevent double counting. The age of the nest was estimated and construction of nest documented as follows:
A: Fresh – vegetation green or not wilted
B: Recent – vegetation dry and changing colour
C: Old – vegetation dead but nest still intact
All human signs or direct encounters were recorded including; roads (used or disused), old village sites (used or disused), Cutlass cut, regularly used human trails, honey extraction, snare line (active or abandoned; number of snares), shot gun shells, gun shots, camp sites (active or abandoned), fire places, current or past agricultural activity, sites where nuts such as Panda oleosa have been cracked open, hunting, fishing, tree cutting (logging) etc.

The following results were obtained.

Proposed Tofala Hill Wildlife Sanctuary

In the Tofala forest site, three bio-monitoring surveys were conducted in the Nkong and Nkandu while in the Bechati-Fossimondi-Besali forest area, monitoring was conducted throughout all the months of January to May apart from February which was dedicated for mapping. During September-October that corresponded to the peak rainy season, monitoring was stopped as a data quality and quantity control measure.

In the Tofala forest 74 gorilla signs including: 13 nest sites (with 10 tree nest, 55 ground nests each), 33 feeding signs, 1dung, 6 resting sites and 26 trails were recorded. A total of 5 gorilla nest site group sizes of 7,6, 5,4, 3, 2 and 1 were recorded (about 28 weaned individuals)

For chimpanzees, 426 observations were made. These included 46 vocalizations, 140 trails, 49 feeding signs, 43 play grounds, 17 resting nest sites (with 83 nests), 6 dung and 69 sleeping nest sites with 819 nests (136 ground nests and 708 tree nests with average height range of 13 – 16 m). There were nest groups of 1 – 21 and a group of 25 nests per nest site (about 256 weaned individuals). Evidence of nest site/nest reuse was also observed.

As for human activities, the following were recorded: 10 bush huts, 73 plantations, 126 snares, 91 gun shells, 3 hunter's seats, 16 hunters' trails, 4 fence trap about 30 metres long and 8 gunshots.

Trail cameras

Trail cameras placed in Fossimondi forest area in January recorded 4 animal species; 11 chimpanzees with 4 females carrying young ones, several hyraxes – Western Tree Hyrax, 1 porcupine, 1 rat mole. In March in the Bechati forest, trail camera recorded 14 chimpanzees including 2 females carrying young ones, 1 duiker and 2 squirrels and in Nkando forest red river hogs, duikers, Mona monkeys, palm civet as well as several hunters with their dogs were recorded.

Field pictures



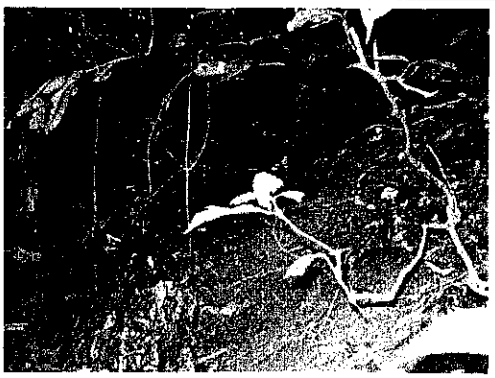
Staff observing a gorilla nest in Bechati forest

Decaying gorilla nest in Besali forest



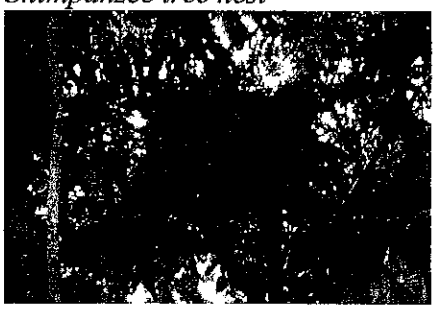


Signs of chimpanzees digging termites



Chimpanzee trail (track) in the forest floor

Chimpanzee tree nest



Local bio-monitors recording GPS point of a gun shell



Wild fruits eaten by apes





Mak-Betchou forest range

From January to March, the following results were recorded; 122 chimpanzee signs of which we had 33 nest sites of 114 nests (113 tree nests and 01 ground nest); 01 call; 02 feeding signs on wild fruits and termites; 03 chimpanzee tracks; and 02 play grounds for chimpanzees. Following the results obtained from the survey, the density of chimpanzee in the Andu Forest site was estimated to be 0.075 per km sq.

From April to June Chimpanzee signs included; 598 signs – 61 trails, 9 playgrounds, 25 feeding signs, 2 foot prints, 2 dung piles, 482 nests; 18ground nest (of which 3 are resting nest and 15sleeping nest) and 468 tree nests. Elephant (*Loxondonta africana*) signs observed included; 152 signs – 45dung piles, 4 trails, 1 direct observation of animal, 65 footprints, and 37 feeding signs. Signs of human activity included 16 cuts, 2 hunting hurts, 23 hunting trails, 8 gun shots, and 19 sites of hunters with seats.

From September to November, a total of 149 signs were recorded for chimpanzees. These included 78 nest sites with 378 nests (370 tree nests and 8 ground nests), 5 resting nest site, 20 feeding signs, 1 dung pile, 32 trails with 4 foot prints, 6 play grounds and 3 vocalizations. Signs of the African forest elephant observed were; 8 dung piles, 6 foot prints, 1 trail, 4 feeding signs. Other mammal signs observed were signs of Mona monkey (*Cercopithecus mona*), white nose monkey, civet, hyrax, porcupine, Blue duiker (*Cephalophus monticola*), and Red river hog (*Potamoecherus Porcus*) or bush pig. Signs of human activity were mainly hunting signs which included: 3 hunting huts, 3 gun shells, 6 hunting trails and one resting site.



Chimpanzee nest



Chimpanzee nest



Elephant feeding sign

Elephant dungs



Tofala-Mone Forest Corridor

The following observations were made in January; 14 signs of *P. t ellioti* chimpanzee activities including; 01 direct observation of a group of about 06 chimpanzees, 5 nest sites of 17 nests (all tree nests), 01 feeding sign, 07 tracks were recorded in this forest range and most of these observations were made in the hilly rocky parts of the forest. Signs of human activity included 8 gun shells, 5 gun shots, 3 wildlife snares and 03 hunting tracks.

In March, 7 chimpanzee nest sites with a total of 27 nests, 2 vocalizations and 01 feeding sign were recorded. There were all tree nests with an average nest height range of 12 m – 18 m. Nest group sizes ranged from 2 – 7 nests per site. There was a direct sighting of 3 Mona monkeys and the vocalization of a duiker and a duiker sleeping site with dung were recorded. Signs of human pressure recorded included 2 cocoa plantations, 12 gun shots, 7 hunting trials, 4 hunting hurts, a group of 5 hunters drying hunted animals and 5 gun sh*ells*

Chopped Bush deer found in a hunters hut



Chimpanzee tree nests



Field ranger observing an ape feeding sign



A hunters' hut in the forest



3.2.4 Human Pressure

Human pressure is a very big issue in this landscape given that the number of law enforcement staff is still very limited and the designated conservation units are not yet protected, providing full opportunity for the indigenous communities to exert the maximum pressure on both the biological species and habitats. There is also the phenomenon of increasing rural population boom with most homes having an average of 10 children. Forest conversion to farms is one of the greatest threats at this moment.

Human pressure in terms of forest conversion to farmlands was considerably high in the Tofala forest area. During monitoring, encountered snares were destroyed to discourage further laying of snares. Gun shells and shots were registered at regular intervals in the Mak-Betchou and in the Tofala-Mone forest corridor, indicating that gun hunting is still high and mostly carried out at night, with the assistants of dogs, making it difficult to track down the hunters.
The regular tracking and monitoring of gorillas/wildlife in the landscape will help curb down human pressure. The presence of bio-monitors in the forest has also discouraged hunting (trapping and gun shutting of animals during the day) as they destroy all snares encountered and educate hunters about protected species when they come across them. Bio-monitoring in some months have involved MINFOF staff with the objective of carrying out forestry/wildlife law education and anti-poaching. The constant presence of local eco-guards in the forest has also reduced the level of hunting of protected species as the hunters are aware they shall be reported to the appropriate authorities.

3.3 Conducting public information and education programs

3.3.1 Community conservation education

Nineteen community meetings were organized with 2000 people present and educated on wildlife conservation and their expected community engagements highlighted in achieving this objective. The communities were also educated on the Cameroon wildlife law and species such as Cross River gorilla and the Nigeria-Cameroon chimpanzee were on focus. Lectures during these meetings duelled more on wildlife harvesting in these communities. Njoagwi area has been noted for extensive sales of bush meat harvested from the Mak-Betchou forest. The disadvantages of the various anthropogenic activities that affect conservation of species and that are practiced in the area were also highlighted during meetings.





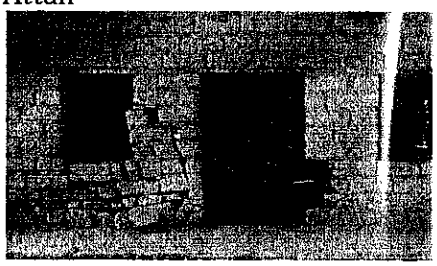
Community meetings in the local communities

3.3.2 CONSERVATION EDUCATION IN SCHOOLS

Thirty one schools were visited in the landscape with main aim to create awareness on the conservation of rare/threatened wildlife and birds of the landscape. Thirty one environmental/conservation clubs are in place with about 800 students/pupils involved and an average of 20 students/pupils per club. The clubs created constituted principally of students/pupils in the age range of 8-15 years who are interested in issues of the environment especially birds and wildlife.

Three environmental club networks have been created in schools around three core conservation units (Nkingkwa, Tofala and Mak-Betchou). The network is designed such that it serves to nurse and encourage the exchange of ideas and activities amongst the clubs. Some of the main functions of the networks include but not limited to coordinating exchange and study visits, competitions, tree planting, drama, story writing, drawings, songs, cleaning of their environment and articles. Exchange visits and/or organized competitions were organized in the entire project area to increase interest and impact.

Government School (GS), Essoh Attah



Picture of broken class rooms walls, dilapidating roof





Campus of GS EssohAttah



Broken class room roof of GS Essoh-Attah



Library of Government School Essoh-Attah

3.3.3 Public Education and Communication

Work with communication teams from home and abroad on gorilla publicity.

Throughout the year, three partner teams joined the program team produce short documentaries on the Cross River gorillas. These teams came from France and Czech Republic. Following the work of the team from the Czech Republic, a two minute video on the 'Animals of Lebialem' has been posted on u-tube over the internet.





The Diehli Initiative team from Czech Republic



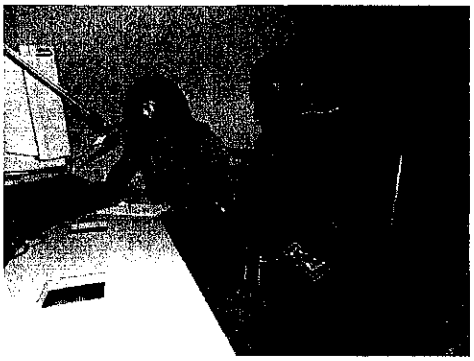
France Television Team

The program team also worked with a local TV station to start the production of a local documentary named "A Journey across the Lebialem Highlands: A Forgotten Biodiversity Hotspot in the Gulf of Guinea".

Run Radio programmes on Activities in both National and Local Radio

Two programmes were run on the Lebialem Community Radio, on the process of creation of the proposed Tofala Hill Wildlife Sanctuary.

Five radio programmes were broadcast namely two over "brunchtime" with the participation of the socio economics and birds programme. A third programme on the international year of forests and two others done over the Lebialem Community Radio.



Louis with Presenter Helen Ngoh on 'Planet Watch' at Cameroon Radio Television



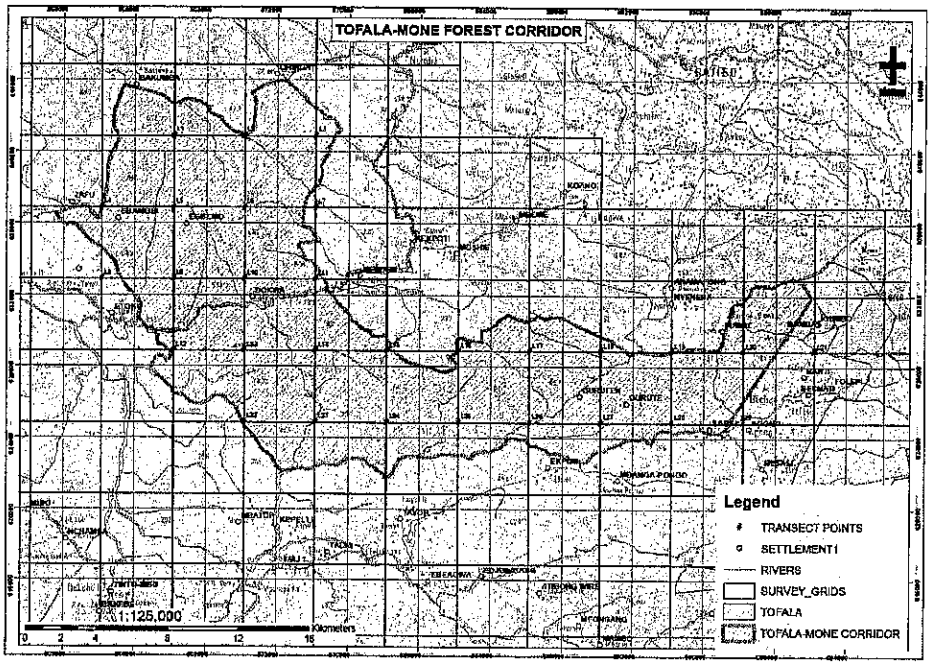
Ita, presenting a programme on Lebialem Community Radio

Work with Media houses to produce articles on activities in local newspaper.
Four articles have been produced with the Post Newspaper including 'Nigeria-Cameroon chimpanzees facing extinction', 'Wabane communities offered alternative sources of livelihood' and an advertisement on the publication of the essay contest to celebrate the international year of forest.

Production of posters
Posters were produced to educate about the different project interventions.

3.4 Enhancing the protection status of the Tofala-Mone Forest Corridor

The main activities in 2011 continue to focus on biological monitoring of the great apes, education and assessment of biodiversity hotspots/high conservation value forests and land-use across the landscape. This assessment will be completed in 2012. The program team completed the mapping of the proposed Tofala-Mone Forest Corridor as shown in the Figure 6 below.



3.5 Training and supporting targeted micro-businesses in order to enhance the livelihoods of the 13 forest adjacent communities around the proposed Tofala Hill Wildlife Sanctuary through the proposed Forest Protection Fund.

3.5.1 Livelihood Support Initiatives

The key outcomes during this period included:

1. **Prioritization of livelihoods in 13 villages**. The main ones included livestock, fish farming, improved agricultural production in small holder farms, improved oil palm production and processing, marketing of non-timber forest products and beekeeping.
2. **Reorganization of the local communities into organized associations towards sustainable livelihood development**. The key ones formed included the Tofala Hill Area Women's Association, the Tofala Hill Area Hunters' Association, Tofala Hill Area Farmers' Association and Association of the Village Forest Management Committees (the Forest Management Council of the proposed Tofala Hill Wildlife Sanctuary). Each one of these associations are being provided with training and support as a prerequisite to joining the Forest Protection Fund.
3. The **Forest Protection Fund** is being strengthened through community mobilization and emphasis focused during this period on two of its units at Menji and Anya-Lewoh as well as at the pilot unit in Buea.



Reorganization of the Women's groups



Reorganization Forest Protection Fund



Annual Meeting of the Forest Protection Fund

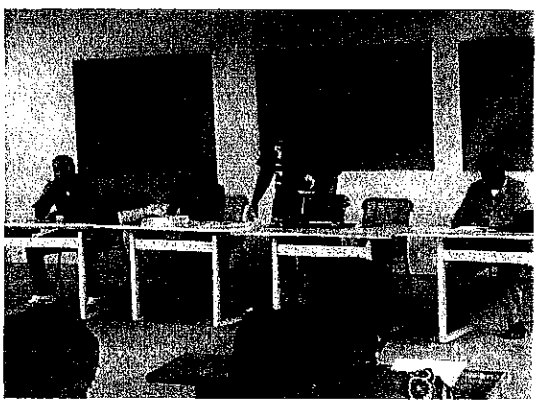


Participants at Biodiversity Community Trust (BCT) launching

The Forest Protection Fund plays two essential roles in supporting community based conservation namely providing seed support to groups and helping groups to mobilize savings. The savings and microcredits are then managed by a subunit of the fund called the Biodiversity Community Trust.



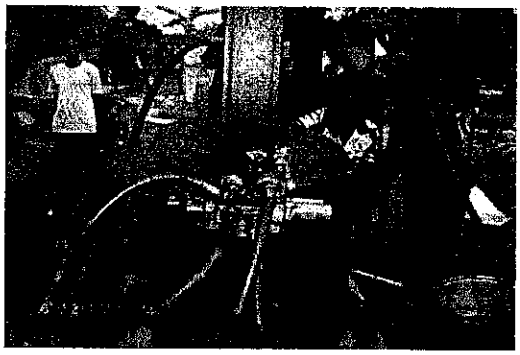
Women groups with ERuDeF team



Louis addressing a meeting of women

groups

4. One of the key livelihood and income generating initiatives that received greater attention was the launching of the **oil palm regeneration and processing project** with funding from the Man and the Environment, a France-based charity. Over 10 ha of small holder oil palm farms will be regenerated and 2 palm oil processing mills with capacity to produce over 3000l of improved palm oil daily under construction in two of the key villages of Nkong and Besali around the proposed Tofala Hill Wildlife Sanctuary.



Testing the Oil Mill in Nkong



The Giant Oil Mill installed in Besali

5. Each village administration involved with the oil palms project will sign an **MoU** with the local MINFOF administration to increase their effective commitment and engagement towards the protection and conservation of gorillas and chimpanzees.
6. Furthermore, the local **eco-guards are further being supported** with piggery units to enable them put a final stop to hunting and trapping.

3.5.2 Lebialem Hunters' Beekeeping Initiative

The Lebialem Hunters' Beekeeping Initiative (LHBI) is one of the program's ongoing locally-led alternative livelihood programs around the proposed Tofala Hill Wildlife Sanctuary and Mak/Betchou forest. The initiative focuses on the hunters and trappers living around the key conservation units. The aim of the LHBI is to reduce financial dependence on bush meat and the volume of species harvested by providing hunters with an alternative income source through beekeeping. The objectives of the initiative are to: (i) train hunters in beekeeping and supply them with the necessary equipment and technical support, (ii) establish a Lebialem beekeeping cooperative to enable collective marketing of honey and by-products, (iii) implement a conservation education programme using films to explain to communities why emphasis is being placed on reducing reliance on bush meat and why the harvesting of threatened species is being discouraged and (iv) evaluate the effectiveness of beekeeping as an economic alternative to bush meat hunting.

To date the initiative has trained 149 hunters as beekeepers and established Common Initiative Groups (CIGs) in eight communities. An estimated of 121 hives and harvesting equipments have been provided.

Table 1: Number of hives provided and colonised per Common Initiative Group (CIG)

Name of Community/CIG	No. of hives provided	No. colonised
1)MEHUBEE (Menji)	16	6
2)ATOHUBEE (Atongeh)	20	7
3) BEFOBA (Bechati, Folepi, Banti)	17	11
4) ANHUBEE (Andu)	19 (1 destroyed by ants)	4
5)BANHUBEE (Bangang)	10	6
6)FOTRABEE (Fossimondi)	10	8
7) BEHUBEE (Besali)	21	17
8) EHUBEE (Egumbo)	6	*nil
Total		

*A zero rate of colonisation in Egumbo was as a result of poor management

3.5.3 Honey harvesting

Harvesting of honey combs took place in 6 communities, notably Bechati, Besali, Andu, Atongeh, Bangang and Fossimondi. Hunters effectively took the lead while the trainer, David Amingu played a supervisory role to ensure that unripe combs were not harvested.

Honey harvesting in Besali by BEHUBEE CIG



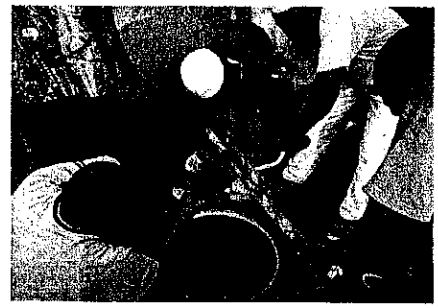
3.5.4 Honey Processing

The hunting groups were trained in the processing of honey, beewax and honey drink.

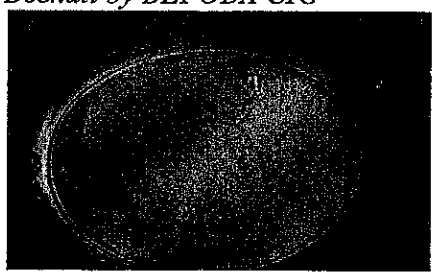
Processed organic honey in Bechati by BEFOBA CIG



Beeswax processing in Bechati by BEFOBA CIG



Solidified beeswax to be heated in Bechati by BEFOBA CIG



3.5.5 Other Livelihoods Initiatives

Survey of livelihoods in the Mak-Bechou Forest area

Mak- Bechou forest landscape forms part of the forest blocks within the Lebialem Highlands. This area is made up of about 10 000 inhabitants distributed as follows:
This forest block is made up of 8 different communities namely Nkeh, Andu, Lechotaw/Minka, Alimoah, Atongeh, Fotabong II (for Lebang fondom), Fotabong III, and Essoh-Attah fondoms.

Prioritization of Alternative Livelihoods;

Alternative livelihoods were prioritized in villages in the Mak-Bechou area. The most preferred by all the communities were livestock farming (most especially pigs, goats, gary making) and petty trading. However some communities preferred bee keeping and wildlife domestication. The food crops included cocoyams, yams and cassava while cash crops include cocoa and coffee.

Non Timber Forest Products surveyed included red kola and bitter kola. Njangsang, Eru, bush pepper, bush mango, eru, bush onion, bush pepper and bush plums were also present but in limited quantities.

Prioritization of development needs per community;
The main development needs for all the communities in the Essoh-Attah and Njoh'Ngwi villages were centered around limited access to a good road network to help transport farm produce to the market, limited access to farm inputs, no access to electricity and frequent landslides.

Survey of livelihoods in Nkingkwa Hills forest area
This area is made up of 7 villages namely Fonki, Nzeleted, Njungo, Ngentu, Mbemfeh, Lebeh and Lebock with a population of about 6 500 inhabitants.
Communities in this forest block are made up of 60% women and 35% men.

Non Forest Timber Products (NTFP);
The most common NTFP in this area are red kola and bitter kola. There exist limited quantities of bush pepper, bush mango, ngansanga and monkey kola.

Prioritization of development needs per community;
The main development needs for all the communities in the Nkinghwa hill area included limited access to a good road network to help transport farm produce to the market, limited access to farm inputs, no access to electricity and frequent landslides.

4.0 Conservation Challenges and Opportunities

General Discussions

The implementation of the planned project activities will lead to the following results:

1. Complete the creation of the Tofala Hill Wildlife Sanctuary as a community wildlife sanctuary by the government of Cameroon;
2. Provide the long term conservation of the great apes populations and their habitats in the Lebialem-Mone Forest Landscape;
3. Increased awareness from the local through national to international levels for the protection of the Cross River gorillas and Nigeria-Cameroon chimpanzees;
4. Enhanced operational capacity of the program team;
5. Increased the economic capacity of the local people and reduce their dependence on the forest;
6. Assist the government of Cameroon in the management of biodiversity in the Lebialem-Mone Forest landscape;
7. Improved the international constituency of support for these great apes.

Constraints

- The Tofala-Mone forest corridor is too vast to be monitored by one local guard, added to the fact that the Mamfe-Bamenda Road permanently partitions this forest into two blocks
- The field bio-monitors lack the necessary field equipment especially during the rainy season
- Bio-monitoring has not been very regular due to financial constraints.
- The new bio-monitors are still acquainting themselves with the monitoring techniques.
- Ineffective communication between field monitors and office staff made work sometimes inefficient as most communication requires to be done over the phone, with spotted network coverage in the field area.

Recommendations

- The increased number of observations of Cross River gorillas and chimpanzees with increasing forest conversion into farmlands increases the need for the urgent protection of the forest blocks for the Cross River gorilla/chimpanzee conservation.
- Field rangers should be provided with field equipments like field booths, rain coats and digital cameras to boost their work.
- Two bio-monitors should be recruited to work in the Tofala-Mone forest corridor as this forest area is vast.
- Monitoring should also be extended to cover the whole month so as to stop breakages in data collected. This will give a clearer idea about what happens in the forest throughout a given period
- Conservation education should be strengthened in these areas to create conservation awareness that will go a long way to reduce poaching.
- Bio-monitors should be provided with alternative livelihoods especially animal domestication as they no longer hunt, but still have the same household protein requirements.
- Field rangers be provided with basic medical supplies and a salary

5.0 Conclusions

Through our project it became clear that human pressure is the biggest single threat to great apes conservation in the Lebialem-Mone Forest Landscape. This threat needs to be addressed to ensure the continuous presence of this fragile but important population of great apes in this forest landscape.

A community based integrated conservation and development approach, as outlined in this report, will be the most successful approach to the long term sustainable management of biodiversity in the Lebialem-Mone Forest Landscape in South West Cameroon.

Previous support from COA/Forestry Bureau of Taiwan and other partners has been helpful in moving ahead the process of creating a system of protected areas in the Lebialem-Mone Landscape.

Finally previous support from COA/Forestry Bureau of Taiwan and other partners has helped to establish a conservation presence in this landscape and increased the implementation and management capacity of the local implementation NGO, the ERuDeF.

4 FINANCIAL REPORT

	Jan	Feb	March	April	May
Gazzetement of Bechati-Fossimondi-Besali Forest			467,140		
Bio-monitoring in Bechati Mone Forest Corridor			466,965		
Education	73,445			425,650	
Livelihood assesment/Socio-economic survey	141,150			396,800	73,000
GIS-Mapping		412,250			497,500
Office cost and Public information	150,000				
Staff cost	114,000	114,000	114,000	114,000	114,000
Total expenses	**478,595**	**526,250**	**1,048,105**	**936,450**	**684,500**

June	July	Aug	Sept	Oct	Nov	Dec	Total	Total (US$)
			41,600		719,600		**1,228,340**	**2,349**
							466,965	**893**
							499,095	**954**
							610,950	**1,168**
							909,750	**1,739**
							150,000	**287**
114,000	114,000	114,000	114,000	114,000	114,000	114,000	**1,368,000**	**2,616**
114,000	**114,000**	**114,000**	**155,600**	**114,000**	**833,600**	**114,000**	**5,233,100**	**10,006**

生而自由基金會吉力馬札羅西部(West Kilimanjaro)保育計畫
支援坦尚尼亞野生動物及社區計畫報告摘要

生而自由基金會(Born Free Foundation, BFF)為國際性民間團體，主要關切議題為野生動物保育和動物福利。生而自由基金會保育計畫，報告摘要如附：

生而自由基金會「支援坦尚尼亞社區保育計畫」，2009 年 10 月至 2010 年 3 月計畫執行情形摘要如附：

一、氣候

- 10 月涼爽多風且非常乾燥(雨量很少)，風大到可將屋頂和表土吹走。
- 11 月炎熱，旱象解除(部分保護區有降雨)。
- 12 月雨量較多，範圍較大。
- 1 和 2 月持續下雨，唯次數減少。
- 3 月雨量加大，大地轉綠。

二、食物和水

- 10 月食物和水稀少，11 月匱乏情形稍緩，12 情況改善，1 和 2 月繼續改善，3 月植被繁茂。

三、遷徙和植物

- 10 月牛群通常留在南方，計畫地區幾乎無綠色植被。羊群通常留在原地。
- 12 月大部分家畜都遷回北方。因本月牧草豐盛，南部牛群也大都北遷，南部植生也有因而有更新機會。

四、人和野生動物之衝突

- 乾季時，多數野生動物死亡，家畜被襲次數較少。1 月開始，食肉動物(尤其是大型貓科動物)開始獵食家畜。3 月期間，Engasurai、Embonget 和 Sinya 地區牛隻被獅子侵擾或被殺害案件頗多。
- 大象數量很少，住家附近作物也少，此地野生動物和農業無衝突情形。

五、巡邏人員(conservation fieldmen)

- 旱季時人員流動性較高。
- 發現的動物屍體平均年齡由 2.9 日降低至 1.8 日。改善主要原因是有 16 人負責巡邏 70,000ha 地區。林務局贊助了半數巡邏人員經費，因而保護野生動物豐富的 Sinya village，保護範圍也擴充到肯亞邊界和 Amboseli National Park。

六、訓練和方法論

- 原訂巡邏人員教育訓練計畫延至 2010 年 7 或 8 月，原因如下：
  1. 盜獵案增多，巡邏人員需加強警戒。
  2. 為維持遷移家畜及家庭不遷居的傳統，為提供充足糧食和維護健康，巡邏人員已疲於奔命。
- 於 Sinya、Leremeta 和 Oldepessi 設立兩個巡邏區。資料顯示這段期間整個保護區野生動物數量減少，唯有 Tingatinga 和 Engasurai 兩地野生動物接近長期的平均值。

七、野生動物

- 大象數量減少，可能因為太乾旱而移至他處。這兩年長頸鹿、eland 和獵豹數量維持穩定，比其他東部非洲地區較佳。
- 獅、花豹、鬣狗、胡狼族群數量接近紀錄數量。獅子增加情形尤其明顯。
- 耐旱草食動物東非長頭羚羊(gerenuk)、彎角羚(Kudu)和劍羚(oryx)族群數量破紀錄，其他草食動物數量也比平均值高。

八、動物屍體和盜獵

- 發現破紀錄的 39 件動物屍體，不過只有 3 案是蓄意殺害。除少數幾例原因不明外，其餘原因大都是乾旱造成的營養不良。此 6 個月期間只發現 3 案大象屍體，上 6 個月發現 8 案大象屍體。
- 39 件動物屍體詳情列於報告第 7 頁，包括 13 件溺斃斑馬(掉進居民挖掘的井裡)、初生數天的 11 頭斑馬和 1 頭長頸鹿因乾旱而死、3 天大的幼象被盜獵者殺害、一歲大的 gerenuk 被食肉動物獵殺等。

九、未來 6 個月計畫

- 再設立 2 個巡邏區。
- 辦理巡邏人員教育訓練計畫。
- 提供書籍和文具箱給 3 個國小的保育社團。
- 提供巡邏用腳踏車(目前腳踏車數量不足，以共用方式處理)。
- 提供巡邏人員至 West Kilimanjaro village 服務。

生而自由基金會「吉力馬札羅西部(West Kilimanjaro)保育計畫-支援坦尚尼亞野生動物及社區」，2010 年 4 月至 9 月計畫執行情形摘要如附：

此段時間，人和野生動物衝突案件有限，動物屍體和盜獵部分：

- 發現 2 天大之斑馬屍體，係被獵食動物殺死。
- 發現 1 具 hyena 屍體，已開始腐爛，死因無法判斷。
- 發 3 天大之斑馬屍體，因骨骼都還在，非盜獵者所為。

- 發 3 天大之 gerenuk 屍體，死因不明。
- 9 月發現 2 天大長頸鹿屍體，現場只發現頭和下肢，應係被盜獵。

生而自由基金會「吉力馬札羅西部(West Kilimanjaro)保育計畫-支援坦尚尼亞野生動物及社區」，2010 年 10 月至 2011 年 3 月計畫執行情形摘要如附：

一、氣候

- 10 月炎熱、乾燥、灰塵多，11 月有少量降雨，12 月雨量較大，1 月停止下雨，造成今年短雨季更短。
- 3 月長雨季開始，雨量不大，但各地分佈均勻。

二、食物和水

- 農業主要為小型灌溉蔬菜田，產量不多但對社區有益。3 月開始準備耕作，此時牛奶產量高於平均值，牛群雖少，但很健康且生出許多小牛。
- 如果節省使用，水資源通常都夠用， 3 月的雨量使水資源變豐沛。

三、遷徙和植物

- 9 月水和草地有限，牛群被移到離聚落很遠的地方。
- 12 月當地水和牧草充足，3 月牧草豐盛，足夠所有家畜使用，不需遷移至遠處。

四、人和野生動物之衝突

- 當家畜至遠離聚落處尋覓牧草時，家畜被襲案增多，但沒有特別不正常情況。1 月 Ildoinyo 小隊發現 2 頭獵豹殺死 2 頭羊。
- 大象數量很少，沒有發現破壞農田作物情形。
- 3 月狀況良好，野生動物分散各地，可在聚落附近放牧家畜，野生動物和人的衝突減少。

五、巡邏人員(conservation fieldmen)

- 巡邏人員健康良好，不需雇用替代人員。每月約巡邏 2 次。
- 發現的動物屍體平均年齡為 2.5 日，發現 4 具動物屍體。

六、訓練和方法論

- 原訂巡邏人員教育訓練計畫原訂 9 月，因選舉延期。
- 12 月 WMA 和 WKCP 簽訂 MOU，紙本工作內容提供相關人員。新購 7 部巡邏用腳踏車。

七、野生動物

- 大象數量持續減少，可能移至環境狀況較好的肯亞 Amboseli 地區。4 年來長頸鹿和 eland 族群數量多，維持在接近最高紀錄量。

- 獵豹數量維持穩定，但不是最多。獵豹經常獵食小型家畜，但社區沒有採取報復行動。
- 18 月來獅、花豹、鬣狗、胡狼族群數量穩定，沒有多大變化。鬣狗數量增多。此段期間，獵食性野生動物和放牧人員的衝突很少。
- 沒發現河馬，可能 Amboseli 濕地有足夠覓食區。野水牛遷徙到高地，草食動物數量維持在最高紀錄數量，但牛羚數量減少 30%。
- 穿越線資料和巡邏資料比較大致相符，黑斑羚(impala)、東非長頭羚羊和彎角羚(Kudu)族群數量穩定，劍羚(oryx)、牛羚和象族群數量減少。

八、動物屍體和盜獵

- 動物屍體發現次數創新低，沒有盜獵事件，環境狀況良好。
- 10 月 2 日發現 1 具死了 1 天的長頸鹿屍體，死因不明，已被獵食動物咬食，可能是被花豹殺害。
- 12 月發現死了數天的 eland 屍體，死因不明，沒有盜獵的跡象。
- 1 月發現死 3 天的斑馬屍體，死因不明，沒有盜獵跡象，認定自然死亡。
- 2 月發現死了 3 天的黑斑羚屍體，死因不明，認定自然死亡。

九、未來 6 個月計畫

- 2011 年 8 月前辦理教育觀摩。
- 與國小的保育社團討論保育活動事宜。
- 與 West Kilimanjaro 其他村落就安排巡邏案交換意見。
- 請 WMA 說明執行 MOU 的情形。
- 巡邏人員每月參與社區獵物巡邏(village Game Scouts)一次，加強其工作能力。
- 鼓勵所有贊助者到計畫區視察。

生而自由基金會「吉力馬札羅西部(West Kilimanjaro)保育計畫-支援坦尚尼亞野生動物及社區」，2011 年 4 月至 2011 年 9 月計畫執行情形摘要如附：

一、氣候

4 月雨量少結束也較往年早，造成 5 至 9 月長期乾旱。4 和 5 月溫度高，之後變涼爽。

二、食物和水

6 月農作物收成，因雨量少收穫較少也較小。6 月居民開始有營養不良症狀。

三、遷徙和植物

- 4 月當地水和牧草充足，5 月牛群被移到低地。
- 7 月草地數量減少和質量惡化。因需長途移動覓食及糧草品質不好，9 月牲畜狀況普遍不佳。

四、人和野生動物之衝突

此段期間相當平和，只有少數羊隻被野生動物捕食。

五、巡邏人員

- 巡邏人員通常早上七時起開始工作約 6 至 8 小時，所有巡邏人員均有完成所需巡邏時數，監管人員抽查率為 18%。
- 報告有附巡邏資料記錄表，每人巡邏時數，觀察到之野生動物或發現之動物屍體等。

六、訓練和方法論

- 籌辦訓練計畫。
- 比較五個類似的社區保育計畫資料，增進學習和交流機會。

七、野生動物

- 兩年來非洲象、長頸鹿和 eland 族群數量穩定。大象數量比幾年前少，但沒有再度減少。
- 獵食動物(Predators) 族群穩定正常，獅子數量有上揚之趨勢。
- 草食動物數量龐大，黑斑羚(impala)更是破紀錄的多。但乾旱地區草食動物明顯減少，例如 4 月時牛羚很多，9 月數量接近記錄中的最低數。非洲野牛族群穩定，不受乾旱影響。過去數年乾旱期野牛即消失。河馬於濕季出現，乾季遷移他處。
- 穿越線資料和巡邏資料大致相符，穿越線記錄到動物資料較不樂觀，僅野牛和黑斑羚(impala)數量較多，牛羚和東非長頭羚羊(gerenuk)明顯減少。將持續監測乾旱對動物族群之影響。

八、動物屍體和盜獵

- 動物屍體發現次數維持在最低紀錄，沒有發現盜獵事件。
- 4 月發現死了 3 天的 hyena 屍體，已開始腐敗，認定自然死亡。
- 7 月 18 日發現 1 具死了 1 天的東非長頭羚羊屍體，沒有盜獵的跡象，可能是被獵食動物咬食。
- 9 月發現死了 1 天的斑馬屍體，可能是被獵食動物殺害。

生而自由基金會「吉力馬札羅西部保育計畫-支援坦尚尼亞野生動物及社區」，2011 年 10 月至 2012 年 3 月計畫執行情形摘要如附：

一、氣候

10 月初乾燥、灰塵多、少量降雨，10 月末炎熱、潮濕，11 月至 12 月雨量較大且各地都有雨，12 月至 2 月氣溫仍高但雨量稀疏，

停止下雨，造成今年短雨季更短。3 月雨量大且各地分佈均勻。

二、食物和水

因雨量充足，居民沿水道種植季節性作物。

三、遷徙和植物

- 10 月草地有限，牛群被移到聚落短距離外。
- 11 月家畜遠離村莊以充分利用遠處豐盛牧草。
- 3 月村莊雨量充足，家畜移回附近放牧。

四、人和野生動物之衝突

- 因食物缺乏，且野生動物和家畜較為分散，10 月至 11 月衝突事件很少。
- 12 月大型野生動物捕食家畜件數增多，有兩次獅子被村民追蹤撲殺，巡邏人員來不及勸說。
- 3 月雨量大，野生動物分散各地，沒有衝突事件。

五、巡邏人員

- 巡邏人員健康狀況良好。
- 僅發現少數動物屍體，平均年齡為數日。

六、訓練和方法論

- 因雨量大幅影響野生動物分佈情形和整體環境狀況，巡邏人員希望能記錄雨量，未來將提供簡單雨量計。
- 安排巡邏人員教育訓練，預計 4 月辦理。

七、野生動物

- 觀察到的大都為公象，而非家庭族群。大象和獵豹數量少，但族群穩定。長頸鹿和 eland 族群接近最高紀錄數量。
- 胡狼數量連續三年都最低，原因不明。鬣狗和其他獵食動物都有健康族群。每月平均觀察到獅子 10 次，接近新高記錄。每月平均觀察到 28 次花豹，也是接近記錄的 33 次。
- 乾旱期沒記錄到河馬和非洲野牛。河馬 12 月回來，非洲野牛於 3 月出現。所有草食動物皆有健康族群，但都不是記錄最高量。黑斑羚(impala)下雨時間短時數量最多。遷移性之牛羚和斑馬 3 月雨量多時數量最多。
- 穿越線資料和巡邏資料大致相符，觀察到非洲象和胡狼減少至 1.2 次和 0.4 次，5 年平均分別為 2.1 次和 1.1 次。長頸鹿由 8.6 次增至 10 次，黑斑羚由 3.8 次增加為 4.4 次。

八、動物屍體和盜獵

- 12 月發現數起長頸鹿和 eland 被盜獵，事件發生在計畫地區外，但仍在野生動物經營管理區內。
- 發現 1 具死了 2 天的長頸鹿屍體，可能是盜獵事件。
- 2 月 11 日發現 1 具幼斑馬屍體，可能是被鬣狗殺害。

THE WEST KILIMANJARO CONSERVATION PROJECT

24th BI-ANNUAL REPORT

April to September 2011



Unlikely success: Lion is king again

Supported by:
Born Free Foundation, UK
Humane Society International, Australia
Taiwanese Forestry Bureau, Conservation Division

Compiled by Nicholas Martyn

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Overview and Comment

Weather

Light April rains finished much earlier than usual making this a long dry period with no significant rain from May to September and compounding the very limited short rains at the end of 2010. Both pastoralists and agriculturalists should be alert to the likely problems that this may bring and start taking precautionary measures. Temperatures were high in April/May but cooled after that, first at night and then in the day too. Conditions remained clear and as the area dried the wind picked up and carried a large amount of dust and other debris.

Food and Water

The crops were harvested in June but low rainfall meant they were stunted and small in quantity. The residue was used as livestock feed. By June some of the community, particularly the young and old, were showing early signs of malnutrition. Toward the end of this period relief food started to arrive but it was irregular and insufficient to maintain health.

Although there was no rain, ground and river water remained sufficient for household and livestock use.

Migrations and Vegetation

Pasture and water was abundant in April but by the end of May most livestock had migrated from the permanent settlements and onto the lowlands to utilize the dry but nutritious grazing. Pasture quality and quantity declined in July. By September most livestock was in poor condition due to the long distances travelled and lower quality grazing.

Human-Wildlife Conflict

The period was very peaceful with only minor incidences of conflict mostly involving sheep and goat predation during the day. This is a major achievement for the community and their traditional practices when considering the large wildlife population, including elephant, leopard, cheetah and the recent return of lion and buffalo, plus the diverse human activities.

Fieldmen

All fieldmen completed the required number of patrols and the assistant coordinators were able to check over 18% of these to ensure understanding and quality of work. Typical patrols last between 6 and 8 hours and started around 7 in the morning.



Sinya fieldmen on patrol

Patrol routes were selected to ensure attention to either community reports or likely areas of wildlife activity while considering the need for overall coverage. Coverage is monitored by the coordinator through a written report detailing the route followed on each patrol.

Record low numbers of carcasses make average carcass age an unreliable measure of patrol effectiveness but this is a quality problem and all indicators are that the work of the fieldmen is as productive as ever.

Training and Methodology

The WKCP fieldmen have continued to work closely with the Village Game Scouts by patrolling together and the sharing of information although this is yet to become a formal description in the job description of a VGS.



Inter-agency cooperation improves outcome

The planned trip for the fieldmen and a few officials of Enduimet WMA to another WMA and possibly a National Park was modified to become a joint training together with scouts from Simanjiro. The logistics and venue are yet to be concluded but the strain of the drought on the fieldmen, as they try to care for their livestock, together with the anticipated illegal pressure on the natural resources is likely to influence the timing. The end of year, long school holidays could still be a possibility because the short rains should have fallen and there will be more labor in the homes from the school children.

The compilation of data and sharing of good practice between similar community conservation projects in Northern Tanzania has continued to develop with documentation of strategies and outcomes for 5 projects. All report to have found the forum useful although it was appreciated that not all areas had the same needs. For example, 2 of the groups are armed but WKCP does not feel this would be productive at present. WKCP continues to be a leading player in the cost effective integration of conservation and community activities.

Conservation Clubs

There is still no solution to the timing of Conservation Clubs in the project's 3 Primary Schools due to the new national curriculum. This is disappointing because it has been a successful and important activity that is popular with the students. A possible solution would be to organize the activity at the weekend but for day students this would need support from both parents and the schools. Ultimately, if the activity is to continue, it appears that it may be simpler and easier to organize the clubs independently of the schools as part of the WKCP. Deciding a way forward will be a priority for Project Coordinator Joseph Lendiy during the next 6 months.

Visits Made

The project coordinator visited Arusha each month to collect honorariums and to submit the monthly report. Other than this no visits were made outside of the project area.

Visitors Received

Simon Peterson of Nature Conservancy visited the Sinya fieldmen and village game scouts in July to observe the different biological field date collection protocols and further the cooperation of community conservation projects in Northern Tanzania

Tourism

In addition to the usual visitors attracted by wildlife the Orpopong'I Cultural Boma in Tingatinga received a steady but low volume of visitors.



Grants gazelle

Environmental Monitoring Data and Analysis

Key Species

Patrol data suggests that the key species of elephant, giraffe, eland and cheetah have maintained steady populations over the last 2 years. Elephant numbers had been declining but have not dropped further and although they are now fewer than a few years ago the project area does support mixed family groups with young, as well as the expected small groups of males. During this period the elephants were most frequently seen near to Amboseli in Endoinyo Mali.

Curious giraffe



Predators

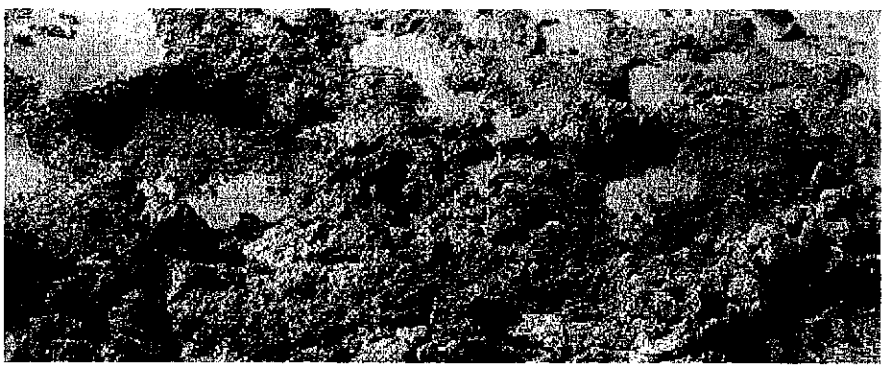
Predator populations have been healthy and in August the Ildoinyo team were fortunate enough to observe a female leopard with 3 young cubs in the Elwai/Engusero area. They left them undisturbed.

The lion population continues to show an upward trend with observations every month covering 6 of the 8 villages and with minimum conflict or worry. This is a scenario that was unthinkable when the project started and 2 lions that strayed into the area were immediately hunted down and killed. It is also a rare contradiction of the trend of rapidly reducing lion range across Africa.

Herbivores

Almost all of the herbivore populations remain high, with impala at record levels, but there was a noticeable drop in exclusive grazer populations as the area dried out. This was particularly true for migratory wildebeest that were numerous in April but close to record lows by September. It was also noticed that the wildebeest concentrated in the extreme north and south of the project area while virtually disappearing from the central section.

The almost continuous presence of buffalo in the southern section of the project area despite the drought was a major change from the past when they only appeared occasionally and during very wet conditions.



Hippopotamus (see spoor left) were again observed in the Endoinyo Mali region of Sinya village but left when it became too dry.

Transects

The transect data is generally consistent but slightly less positive than the patrol data with only the buffalo and impala counts averaging higher than usual and a few species, such as wildebeest and gerenuk, showing a marked decline. The changed movement and dispersal of wildlife due to the dry conditions is the likely cause but it will continue to be monitored.

Carcasses and Poaching

The observation of carcasses remains at a record low for the third consecutive period and there has not been a single observation of poaching over the last 6 months which is testament not only

to excellent work from the fieldmen but also to support from the local community and central government. The only carcasses observed are from suspected predation although this may change if the drought conditions continue for many more months.

In summary, the carcasses found are listed below:

- A 3 day old hyena carcass found in Ngereyiani in April was partially decomposed. Assumed cause of death natural
- A day old gerenuk carcass found on 18th July in Ngereyiani was complete suggesting that the cause of death was not poaching and was probably predation.
- A day old zebra carcass found in Endoinyo Mali in September was also suspected predation.



Lendiy (right) with fieldmen

Charcoal

Charcoal burning was under control. As the dry weather intensified a few stoves were observed in Tingatinga but there was no indication of sale or export of the product and no need to take action.



Local wood is almost the only source of building material, lighting, dry season fodder and heat for cooking. It's conservation for sustainable use is therefore vital.

Raw Data Summary - Overview

	April to September '99						Average Data and Totals from September 1999																			
	Apr	May	Jun	Jul	Aug	Sep	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th	15th	16th	17th	18th	19th	20th	21st	22nd	23rd	24th	Total
Patrols, total	64	64	64	64	64	64	36	34	33	32	33	33	32	30	32	32	48	48	48	56	60	64	64	64	64	64	6148
Patrols, checked	11	12	11	13	13	12	9	8	8	8	9	9	8	9	10	9	15	15	12	11	11	12	14	13	12	12	1407
Fieldmen																											
Salaon Oyoko	8	8	8	8	8	8								8	8	8	8	8	8	8	8	8	8	8	8	8	612
Mbao Lormarai	8	8	8	8	8	8																	8	8	8	8	176
Koreka Morijoi	8	8	8	8	8	8								8	8	8	8	8	8	8	8	8	8	8	8	8	591
Kele Paangu	8	8	8	8	8	8								8	8	8	8	8	8	8	8	8	8	8	8	8	591
Mapii Kisheyan	8	8	8	8	8	8								8	8	8	8	8	8	8	8	8	8	8	8	8	592
Kiria Mukanda	8	8	8	8	8	8								8	8	8	8	8	8	8	8	8	8	8	8	8	592
Lekilaloi	8	8	8	8	8	8															8	8	8	8	8	8	288
Tikiorian Naigwana	8	8	8	8	8	8	9	9	9	8	8	9	8	8		8	8	8	8	8	8	8	8	8	8	8	1126
Osekei Nairoua	8	8	8	8	8	8											8	8	8	8	8	8	8	8	8	8	494
Kayongo	8	8	8	8	8	8															8	8	8	8	8	8	264
Koreka Morijoi	8	8	8	8	8	8															8	8	8	8	8	8	264
Ngoye Ngashukoni	8	8	8	8	8	8											8	8	8	8	8	8	8	8	8	8	494
Koikai Ngirimbish	8	8	8	8	8	8											8	8	8	8	8	8	8	8	8	8	494
Ringoine	8	8	8	8	8	8															8	8	8	8	8	8	264
Kiambwa	8	8	8	8	8	8															8	8	8	8	8	8	264
Nkodikod Lemusae	8	8	8	8	8	8											8	8	8	8	8	8	8	8	8	8	494
Key Species																											
Elephant, seen	37	75	27	17	27	28	55	38	40	74	82	112	91	99	117	113	122	162	155	108	94	80	62	41	31	35	11797
spoor	25	56	31	46	34	31	145	150	170	192	221	237	281	233	254	171	96	94	69	49	46	44	43	36	33	37	18486
Giraffe, seen	370	340	461	421	402	373	141	124	102	103	183	191	170	158	203	244	387	382	410	455	469	451	467	465	406	395	37830
Spoor	36	37	35	56	34	62	146	206	183	151	283	287	285	226	275	231	164	92	81	60	59	62	43	15	49	43	19861
Eland, seen	162	81	152	140	91	105	89	74	82	65	131	97	90	77	104	145	194	91	121	141	134	130	120	109	99	122	15600
Spoor	30	27	27	40	48	48	69	90	95	89	144	136	123	113	145	163	87	51	52	39	41	35	41	19	37	37	10760
Cheetah, seen	3	3	1	7	12	4	4	2	1	2	4	3	1	2	14	20	13	9	8	9	9	7	8	8	6	5	868
Spoor	20	15	22	23	19	21	14	11	12	8	9	11	9	12	30	33	24	17	15	15	17	22	16	22	24	20	2169
Carcases																											
Hours old	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	1	1	1	1	0	0	0	0	0	79
Days old	1	0	0	1	0	1	3	1	1	1	1	2	3	0	1	0	2	1	1	2	3	5	6	1	1	1	223
Weeks old	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	19
Months old	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7

Raw Data Summary (cont)

	April to September 11						Average Data and Totals from September 1999																			
	Apr	May	Jun	Jul	Aug	Sep	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th	15th	16th	17th	18th	19th	20th	21st	22nd	23rd	24th	Total
Visitors																											
Photographic	0	0	0	0	0	0	3	12	21	9	4	9	0	10	0	8	13	3	6	1	1	1	1	2	1	0	54
Hunting	0	0	0	0	0	0	7	1	1	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14
Camping	0	0	0	0	0	0	0	4	0	0	6	6	6	4	14	0	0	1	0	0	0	0	0	0	0	0	3
Driving	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	2	0	0	0	0	0	4	0	0	31
Unknown/other	0	0	0	0	0	0	0	2	1	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	8
Environmental																											
Charcoal	0	0	4	0	0	2	0	0	39	25	7	9	11	10	0	0	3	6	0	9	9	5	5	0	3	1	152
Other Wildlife																											
Buffalo	0	12	13	20	12	12	0	0	0	0	0	0	0	5	0	1	17	0	9	4	0	0	0	2	0	12	334
Bushbuck	1	2	0	0	0	0	0	1	0	0	0	0	0	0	0	4	2	3	5	3	2	2	3	2	2	1	256
Gerenuk	137	158	175	142	113	91	115	104	127	117	120	181	139	87	162	163	232	181	156	165	160	147	177	192	158	136	20682
Grants gazelle	542	624	647	563	577	422	394	351	213	234	258	312	350	326	325	461	695	712	716	701	683	624	626	591	527	563	65722
Hippo	4	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	2	0	1	55
Hyena, seen	4	0	3	1	2	3	1	1	1	2	1	0	2	1	8	9	8	2	2	1	1	1	2	3	2	2	308
Spoor	43	87	67	68	66	76	79	49	47	41	39	25	37	49	53	38	43	42	39	56	62	53	64	78	68	68	6750
Impala	265	304	233	225	264	211	138	161	218	208	243	249	237	180	210	199	321	248	193	214	223	236	224	221	241	250	29875
Jackal	54	51	68	72	44	54	19	17	11	9	7	10	11	5	28	41	47	20	25	42	48	48	57	69	59	57	4057
Kudu, lesser	81	64	79	64	72	56	67	67	58	48	65	51	57	43	54	61	46	39	38	49	50	56	63	64	70	69	7534
Leopard, seen	7	11	9	3	15	7	2	2	2	1	1	1	0	1	3	3	6	6	5	4	5	4	6	8	9	9	528
Spoor	16	21	30	14	24	23	5	4	5	3	2	5	4	4	7	13	16	14	16	13	13	14	16	25	24	21	1489
Lion, seen	0	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	1	0	0	0	2	2	2	1	66
Spoor	3	4	7	25	12	14	0	0	1	1	0	0	1	2	2	1	2	5	3	3	3	4	8	17	8	11	474
Oryx	52	44	42	61	41	30	8	24	17	13	15	14	5	6	45	56	39	53	56	53	46	41	72	63	43	45	4638
Thompsons g.	564	663	645	602	541	517	493	541	303	281	435	525	581	399	364	438	698	741	878	909	921	869	871	819	622	589	81325
Warthog	38	51	54	40	38	43	23	9	10	9	12	13	10	25	35	32	31	37	37	43	48	48	45	50	50	44	3780
Wildebeest	751	742	506	302	365	241	671	432	202	173	447	329	298	360	563	611	1110	1016	1086	1032	1022	858	946	1066	699	485	92439
Zebra	1098	1103	1106	1063	933	924	1057	866	652	594	1093	1171	1196	820	831	848	1217	1464	1380	1212	1196	1101	1179	1173	963	1038	148998

Raw Data Summary - Transects

	Total - Oct 10 to Mar11								Av per patrol Oct 10 to Mar 11									Total - to Mar 11								Av per patrol Apr 07 to Mar 11								
	Ti	En	Ng	Em	Il	Le	Ol	Ma	Ti	En	Ng	Em	Il	Le	Ol	Ma	Total	Ti	En	Ng	Em	Il	Le	Ol	Ma	Ti	En	Ng	Em	Il	Le	Ol	Ma	Total
Buffalo									0	0	0	0	0	0	0	0	0.0	24	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.1
Bushbuck			3						0	0	1	0	0	0	0	0	0.1	0	0	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
Bush pig									0	0	0	0	0	0	0	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Caracal									0	0	0	0	0	0	0	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Cheetah, seen					3	3			0	0	0	0	1	1	0	0	0.1	9	3	3	0	7	3	0	0	0	0	0	0	1	0	0	0	0.1
spoor		4	2		3	4			0	1	0	0	1	1	0	0	0.3	5	9	9	0	6	7	1	3	0	0	0	0	1	1	0	0	0.2
Eland, seen	38	19	4	3	26			18	6	3	1	1	4	0	0	3	2.3	376	156	100	25	33	0	7	20	8	3	2	1	3	0	0	2	2.3
spoor	11	10	9	8	7				2	2	2	1	1	0	0	0	0.8	82	65	89	22	7	0	3	1	2	1	2	0	1	0	0	0	0.8
Elephant, seen			13		17			9	0	0	2	0	3	0	0	2	0.8	177	72	139	0	17	0	0	9	4	2	3	0	1	0	0	1	1.3
spoor	4		6	6	3	6	7	2	1	0	1	1	1	1	1	0	0.7	69	49	74	20	6	11	9	4	1	1	2	0	1	1	1	0	0.8
Gerenuk	8	19	37		51	3	42	42	1	3	6	0	9	1	7	7	4.3	63	213	332	26	85	15	64	55	1	4	7	1	7	1	4	5	3.8
Giraffe, seen	73	58	41	65	76	27	37	35	12	10	7	11	13	5	6	6	8.8	469	386	504	195	153	64	66	77	10	8	11	4	13	5	4	7	7.6
spoor	8	7	7	3	4		4	5	1	1	1	1	1	0	1	1	0.8	62	81	108	6	4	3	6	5	1	2	2	0	0	0	0	0	0.8
Grants gazelle		79	47	50	123	49	70	73	0	13	8	8	21	8	12	12	10.2	168	441	885	143	187	147	107	123	4	9	18	3	16	12	6	11	9.9
Hippo									0	0	0	0	0	0	0	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Hyena, seen						3			0	0	0	0	0	1	0	0	0.1	0	0	0	1	0	3	0	0	0	0	0	0	0	0	0	0	0.0
Spoor		10	16	2	19	10		3	0	2	3	0	3	2	0	1	1.4	35	51	95	15	30	26	7	9	1	1	2	0	3	2	0	1	1.2
Impala	23	57		5	28	26	11	66	4	10	0	1	5	4	2	11	4.5	273	253	117	13	28	26	23	80	6	5	2	0	2	2	1	7	3.3
Jackal	4	6	9	6	6	3	1	4	1	1	2	1	1	1	0	1	0.8	14	41	66	18	24	6	2	7	0	1	1	0	2	1	0	1	0.8
Kudu, lesser		9	19	11				1	0	2	3	2	0	0	0	0	0.8	8	29	116	22	4	0	1	1	0	1	2	0	0	0	0	0	0.5
Leopard, seen		1							0	0	0	0	0	0	0	0	0.0	0	6	4	1	0	0	0	1	0	0	0	0	0	0	0	0	0.0
spoor		1	1	1	8	1		3	0	0	0	0	1	0	0	1	0.3	6	18	17	5	12	7	0	4	0	0	0	0	1	1	0	0	0.4
Lion, seen									0	0	0	0	0	0	0	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
spoor								2	0	0	0	0	0	0	0	0	0.0	4	0	0	0	0	3	0	6	0	0	0	0	0	0	0	1	0.1
Oryx			8						0	0	1	0	0	0	0	0	0.2	0	52	231	8	15	0	0	0	0	1	5	0	1	0	0	0	0.9
Serval									0	0	0	0	0	0	0	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Thompsons g.	38	38	36	118	150	27		47	6	6	6	20	25	5	0	8	9.5	427	686	234	373	250	184	20	111	9	14	5	8	21	15	1	10	10.4
Warthog		5	5				5	13	0	1	1	0	0	0	1	2	0.6	60	73	69	12	0	0	5	17	1	2	1	0	0	0	0	2	0.8
Wildebeest	44		72	80	72	45		88	7	0	12	13	12	8	0	15	8.4	330	533	1005	399	136	139	79	106	7	11	21	8	11	12	4	10	10.5
Zebra	150	89	116	64	138	68	103	87	25	15	19	11	23	11	17	15	17.0	1144	1069	1606	439	303	189	159	168	24	22	33	9	25	16	9	15	19.2

Ti is Tingatinga
En is Engasurai
Ng is Ngereyiani
Em is Embonget

Il is Ildoinyo
Le is Leremeta
Ol is Oltepessi
Ma is Endoinyo Mali

Plan for the Next Six Months

- Project Coordinator to start up the young people's Conservation Clubs again either through the Primary Schools or separately.
- Continue to work closely with the Enduimet WMA by keeping open an offer of fieldmen to another West Kilimanjaro village, if they can justify the need, and to request feedback from the WMA on the implementation of the MOU.
- To further strengthen ties between the WKCP and other nearby, similar community conservation projects so as to have a greater overall impact on wildlife and natural resource conservation in Northern Tanzania
- Encourage all the sponsors, especially TFB, to visit the project and see the excellent conservation they are facilitating with their generous donations. Such trips are also usually excellent to educate and motivate the fieldmen in their important work.



Fieldmen try to look ahead and think ahead

Tanzania Accounts

Inflation across the whole of East Africa remains high at around 20% p.a. This is driven by scarcity of food and high fuel costs and has a disproportionate effect on the spending power of low wage earners such as the WKCP fieldmen. It would be difficult to increase the dollar rate of the honorarium at this time but as the Tanzania shilling has depreciated considerably (presently £1 = $1.6 = Ksh155 = Tsh2550) the honorariums and salaries paid will be increased by about 10% from the end of October. The new figures are therefore:

Fieldman	Tsh39000 p.c.m.
Assistant's allowance	Tsh39000 p.c.m.
Coordinator's salary	Tsh370000 p.c.m.
Operational budget	Tsh280000 p.c.m.

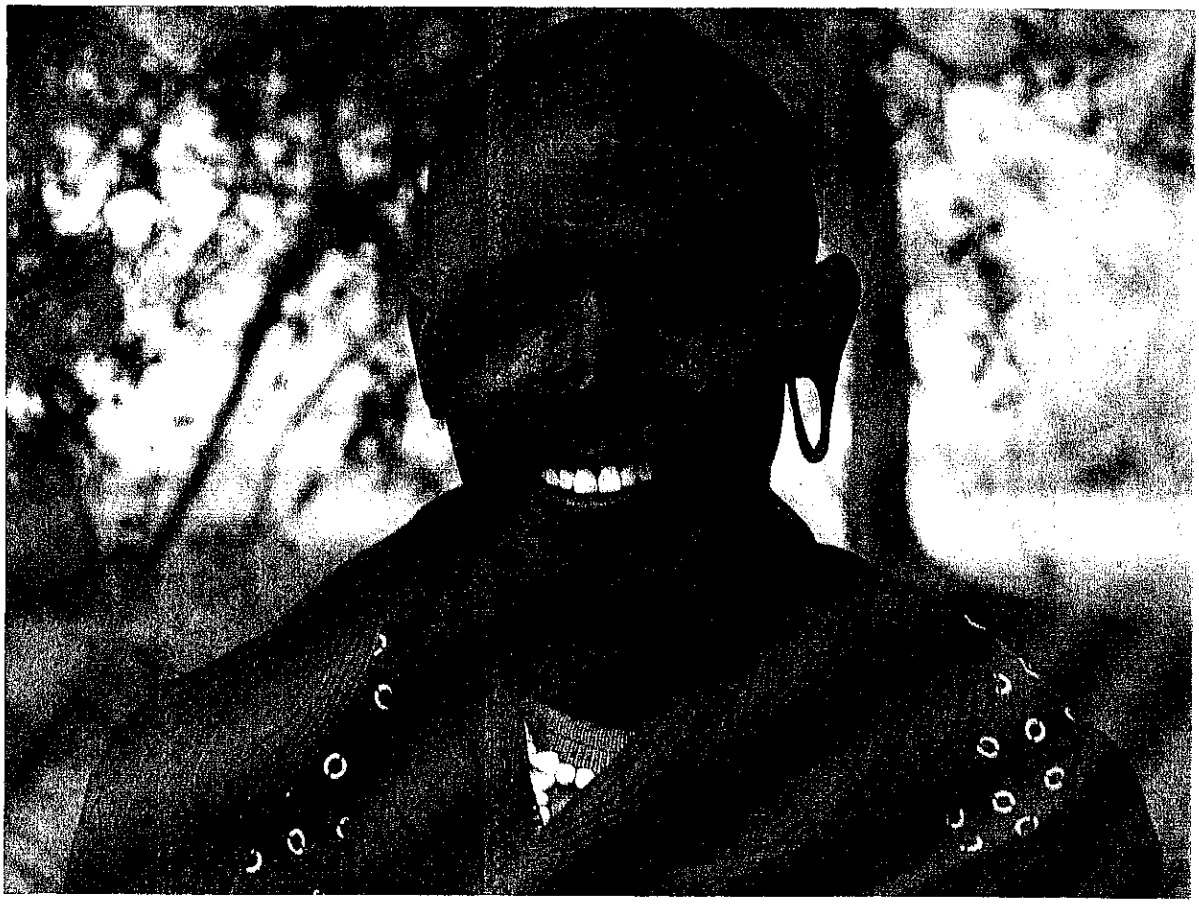
The monthly budget collected from African Environments remains unchanged at £540 ($865)



THE WEST KILIMANJARO CONSERVATION PROJECT

25th BI-ANNUAL REPORT

October 2011 to March 2012



WKCP brings constructive employment to the grass roots

Supported by:
Born Free Foundation, UK
Humane Society International, Australia
Taiwanese Forestry Bureau, Conservation Division

Compiled by Nicholas Martyn

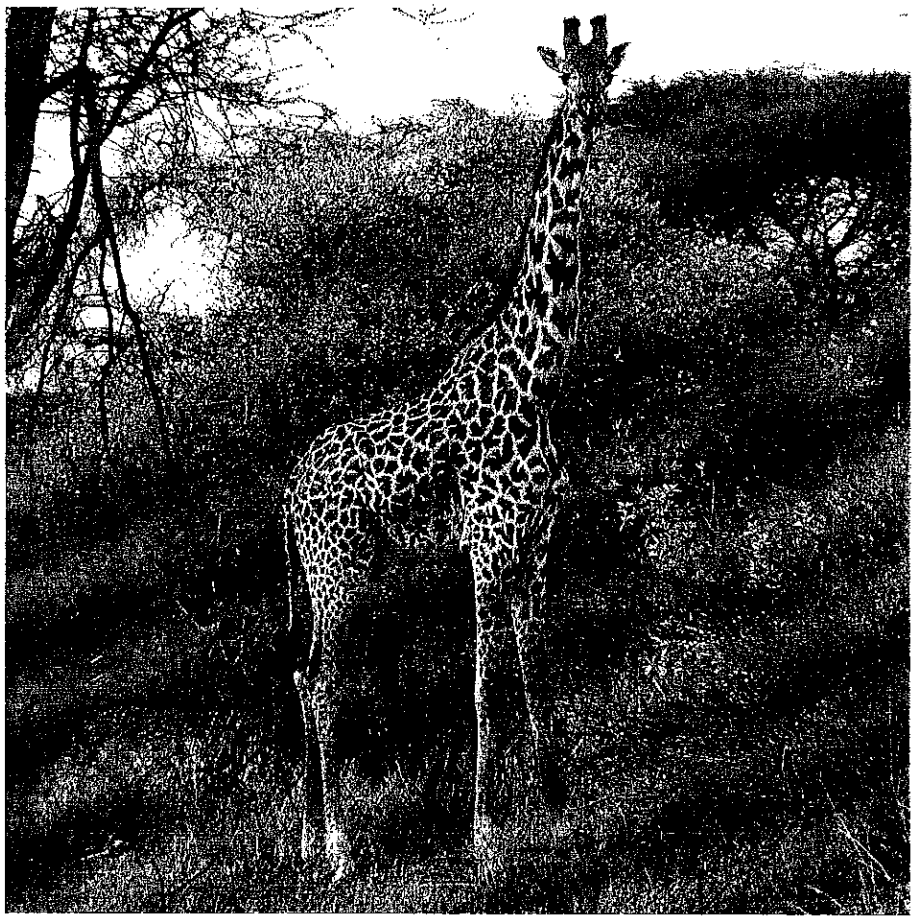
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This period saw the 40 000th observation of an amazing creation of evolution, the giraffe

Overview and Comment

Weather

This period started dry and dusty with just a few light showers in October but there were signs of further rain because it was hot and humid. November through to December saw widespread and heavier than usual short rains. Temperatures remained high but the showers became sporadic through December to February. As expected heavier and more widespread rain fell in March

Food and Water

Water was initially scarce but the short rains ensured all areas had plenty by November. This rain encouraged the planting of seasonal crops along the watercourses in Tingatinga and Ngereyani where irrigation is possible. Irrigation in this area is a little unpredictable because sometimes, during dry spells, much of the water is diverted nearer to the source and it becomes insufficient for the lowland farmers. Rain was sufficient during March for crops to grow without irrigation in the wetter, southern parts of the area.

Migrations and Vegetation

Pasture was scarce in October and most domestic livestock migrated short distances to temporary settlements. The situation improved considerably in November and there was plenty of fresh vegetation but the livestock generally remained away from the villages and to enjoy the good conditions. It remained this way until March when the long rains produced sufficient water and vegetation for the livestock to return home.

Human-Wildlife Conflict

Initially there were few reports of conflict because there was no food in the gardens and both wildlife and domestic livestock had dispersed. However, from December there were increasing numbers of incidents between large predators and livestock of all kinds. In two cases lions were tracked and killed before the fieldmen could intervene but in a number of other cases the fieldmen were able to calm those who had lost livestock and persuade them not to retaliate.

Most kraals in this area are poorly fenced because there are limited local materials and often the residents move after a short time. This makes it easy and very tempting for a hungry lion to attack livestock. There are increased populations of large cats in the project area and longer term it would seem that the best solution would be some well-constructed 'lion proof' kraals for demonstration and then assistance for others to build their own.



Lendiy with fieldmen

The heavier rains in March allowed wildlife to disperse away from the villages and hence there were no incidents of conflict during this month.

Fieldmen

The health of the fieldmen and livestock was good this period allowing the project work to continue without distraction. Assistant coordinators have continued to develop their skill levels and grow in authority. Almost 20% of patrols were checked and the quality of reporting monitored.

There continue to be record low numbers of wildlife carcasses observed. The average age is low at just a few days suggesting good coverage but the low frequency of data makes this conclusion unreliable.

Training and Methodology

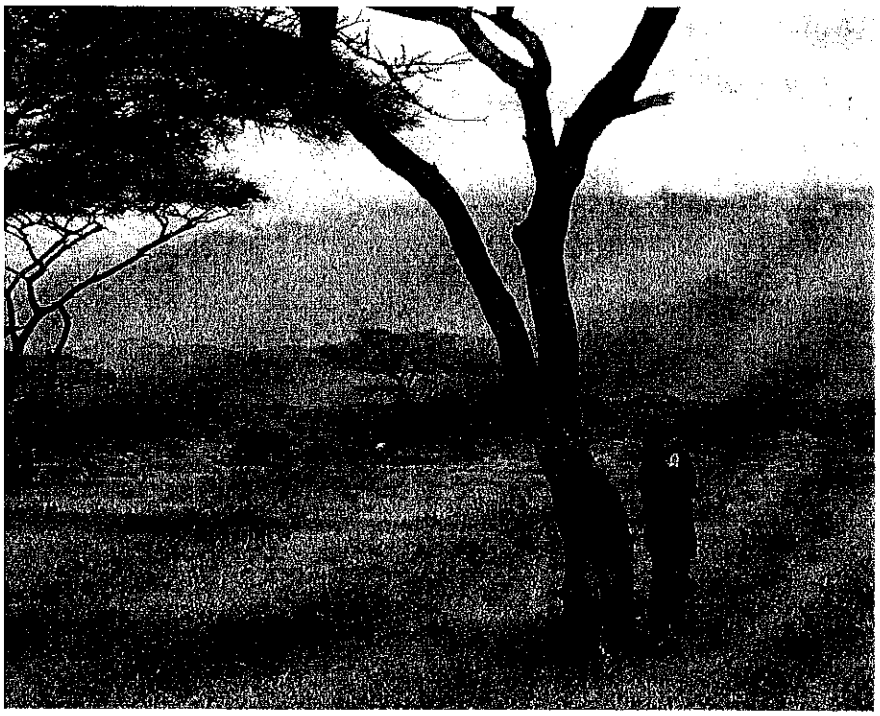
It has been noticed that rainfall greatly influences the distribution of wildlife and the environment as a whole. The fieldmen have stated that they would like to keep rainfall records if each pair can be supplied with a simple rain gauge. This has been approved and the necessary equipment will be sought.

The two project assistants continue to develop their leadership skills and now have taken on most of the responsibility for checking patrols.

Cooperation between WKCP and the WMA has also continued to develop and grow despite the different methods employed because all are local people and all have a common goal of conserving the wildlife and environment.

Arrangements for the educational trip were completed near the end of this period and all of the fieldmen, assistants and coordinator went to Burunge WMA and Tarangire National Park from the 5th to 8th of April. The party totaled 22 people because 4 Enduimet WMA CBO members and an EWMA employed village game scout were also invited to attend. The intended budget for this educational trip of Tsh2 million was exceeded by about 8% giving a total cost of Tsh2,163,500 or £940. The AWF Maasai Steppe Heartland Program also helped organize the logistics and communication.

This field trip was very informative not only to our fieldmen but also to the EWMA members and the hosts. There was excellent interaction with the hosts who are now eager to make a return visit to West Kilimanjaro Conservation Project to understand better how we achieve out goals. All involved would like to give a very big 'thank you' to the sponsors who made this inspiring learning experience possible.



On the lookout in Embonget

Conservation Clubs

The conservation clubs again did not meet within the school timetable. The conservation clubs will now attempt to reform themselves into a weekend activity either using the school premises or otherwise. This may be difficult and time consuming but environmental education of the young generation is vital for the future.

Visits Made

The major visit made was the educational tour, detailed in Training and Methodology. Other than this the usual monthly trips to Arusha were made by the project coordinator to collect honorariums and submit his monthly report.

Visitors Received

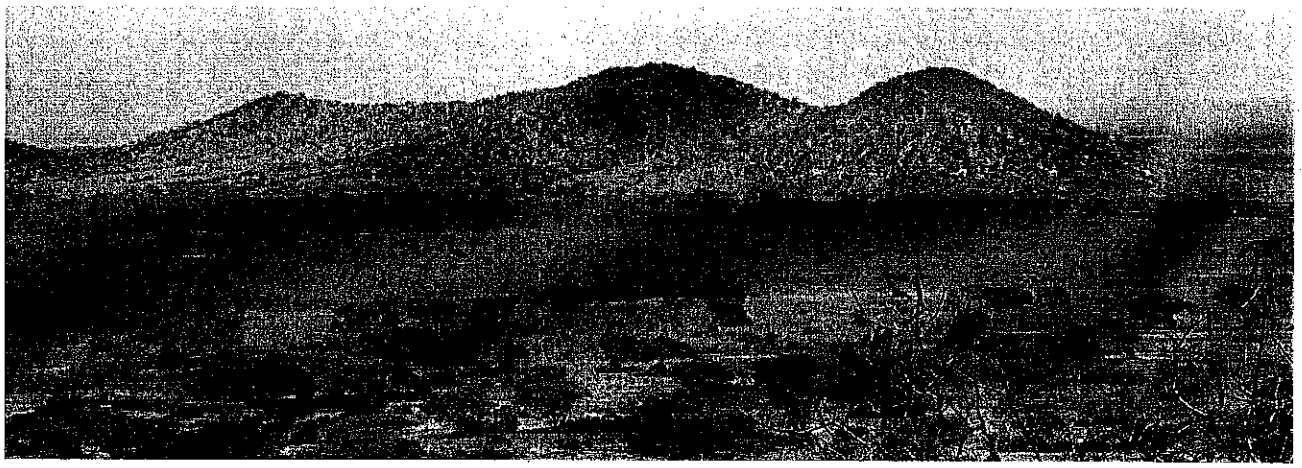
An unofficial group of well-wishers visited the project area in November and WKCP facilitated local community development work with them.

In February the WMA received a number of paying visitors who stayed in tented camps.

In March some SIT students who had done fieldwork attached to the fieldmen returned to share their progress and catch up with the project.

Tourism

There was continued low-level tourism in the project area. Developing tourism is not in the WKCP remit and it would not be productive to have very high levels of tourism but this area is clearly under-developed and could easily generate much more income from tourism.



Sinya Hills after the rain

Environmental Monitoring Data and Analysis

Key Species

Most of the elephants observed this period were males rather than family groups. The total number observed was approximately stable although at a low level. The same can be said of the cheetah population but the giraffe and eland numbers are both at, or very close, to record highs. In the past these species have been frequent targets for poachers but the present low poaching levels and good environmental conditions have now allowed them to thrive.

Although all key species are found in all parts of the project area, elephant generally prefer the areas near Amboseli to the north and Mt Kilimanjaro to the east. Cheetah prefer the planes towards Longido in the west. Giraffe and eland are common everywhere but especially in the central section.

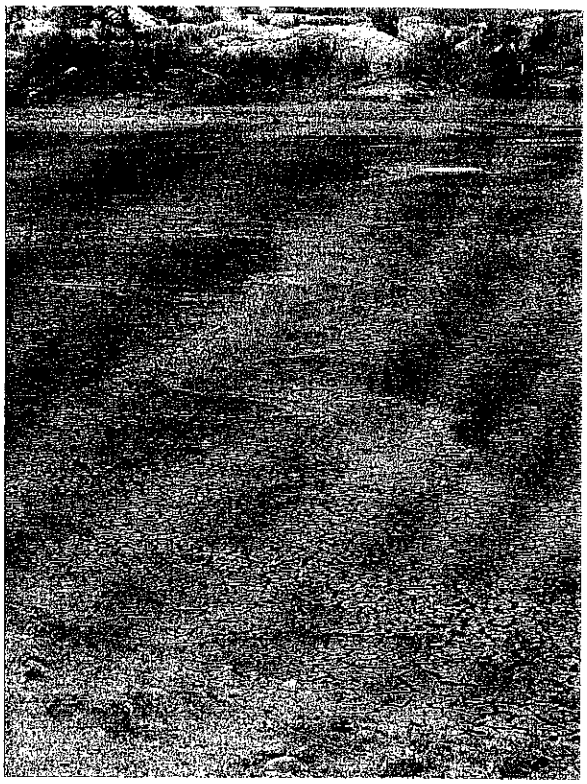
Predators

Jackal numbers were at their lowest for 3 years. The reason for this is unclear. By contrast the number of hyena observations and all other predator were healthy. Despite the conflict there were an average of 10 lion observations per month that is close to the record high. Leopard observations show a similar trend with 28 observations per month compared to a record high of 33.

Herbivores

No buffalo or hippopotamus were reported during the dry first part of this period but first the hippo returned in December and then the buffalo in March. They both seem to need sufficient green vegetation to stay.

All other herbivore populations were at healthy levels but none were at record levels. Impala were most numerous during the green flush brought on by the short rains while the migratory wildebeest and zebra became most numerous during the heavier March rains



Hippo tracks in drying Sinya pools

Transects

Transect data supports general patrol data with elephant and jackal observations down to 1.2 from a 5-year average of 2.1 and 0.4 from 1.1 respectively. Giraffe observations are up to 10 from 8.6 and impala have risen from 3.8 to 4.4

Carcasses and Poaching

In December there were a number of poaching incidents west of Ngereyiani and therefore outside of the project area but still inside the WMA. They involved giraffe and eland and were initially reported by the hunting company rangers then later confirmed by the fieldmen. This is a sign of poaching pressure for bush meat and also an indication of the success the fieldmen have had at discouraging the activity.

News was not all good though because in November, after two incidents of lions invading kraals, a cow and a donkey were killed in Sinya village. Unfortunately, the old lion was then immediately tracked and killed by the local people. This was a negative incident for some members of the community but others took it as part of life and did not make a judgment. There were other similar incidents in both Sinya and Tingatinga villages in February and again a lion was killed.

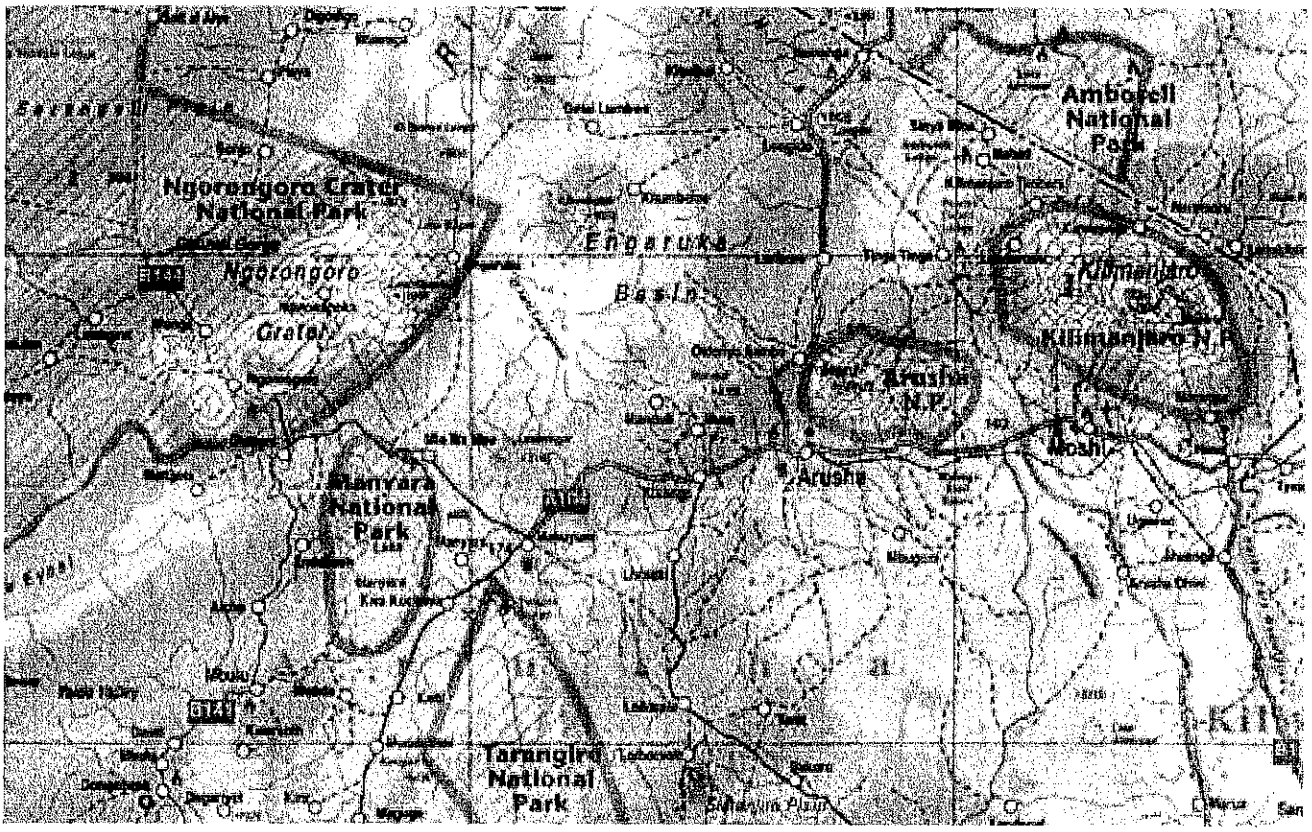
In summary, the carcasses found are listed below:

- A giraffe found in the Oltepesi area of Sinya village was about 2 days old and poaching was suspected.
- On 11th February a zebra foal carcass was found in Ngereyiani village. Cause of death was predation probably by hyena

It should be noted that the carcasses observed this period were the lowest since the project began over 12 years ago. This, combined with the excellent environmental conditions, may lead to increased wildlife populations in the project area and surrounds over the next year or two.

Charcoal

Almost all of the charcoal stoves found were in Tingatinga where there is a sizable local population and sufficient demand to make this an attractive business. At the present time this is tolerated because it is seen as sustainable and to prevent it would leave few alternatives other than to cut firewood which is not so different.



West Kilimanjaro Conservation Project covers most of the area bounded by Amboseli to the north, Kilimanjaro to the east and Arusha National Park to the south

Raw Data Summary - Overview

	Data up to 5th March 1998						Average data and totals from 5 September 1997																				
	Oct	Nov	Dec	Jan	Feb	Mar	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th	15th	16th	17th	18th	19th	20th	21st	22nd	23rd	24th	25th	Total
Patrols, total	64	64	64	64	64	64	36	34	33	32	33	33	32	30	32	32	48	48	48	56	60	64	64	64	64	64	64	8532
Patrols, checked	11	10	11	11	13	10	9	8	8	8	9	9	8	9	10	9	15	15	12	11	11	12	14	13	12	12	11	1473
Fieldmen																												
Saisoin Oyoko	8	8	8	8	8	8								8	8	8	8	8	8	8	8	8	8	8	8	8	8	660
Mbao Lomarai	8	8	8	8	8	8																	8	8	8	8	8	224
Koreka Marijoi	8	8	8	8	8	8								8	8	8	8	8	8	8	8	8	8	8	8	8	8	639
Kele Pasingu	8	8	8	8	8	8								8	8	8	8	8	8	8	8	8	8	8	8	8	8	639
Mapii Kisheyan	8	8	8	8	8	8								8	8	8	8	8	8	8	8	8	8	8	8	8	8	640
Kirla Mukanda	8	8	8	8	8	8								8	8	8	8	8	8	8	8	8	8	8	8	8	8	640
Lekilalol	8	8	8	8	8	8															8	8	8	8	8	8	8	336
Tikonian N.	8	8	8	8	8	8	8	8	8	8	8	8	8	8		8	8	8	8	8	8	8	8	8	8	8	8	1174
Koreka Marijoi	8	8	8	8	8	8															8	8	8	8	8	8	8	312
Ngoya N.	8	8	8	8	8	8											8	8	8	8	8	8	8	8	8	8	8	542
Kaikai N.	8	8	8	8	8	8											8	8	8	8	8	8	8	8	8	8	8	542
Ringaine	8	8	8	8	8	8															8	8	8	8	8	8	8	312
Kiambwa	8	8	8	8	8	8															8	8	8	8	8	8	8	312
Nkodikod L.	8	8	8	8	8	8											8	8	8	8	8	8	8	8	8	8	8	542
Key Species																												
Elephant, seen	35	27	7	22	27	53	55	38	40	74	82	112	91	99	117	113	122	162	155	108	94	90	82	41	31	35	29	11968
spoor	54	40	33	16	23	37	145	150	170	192	221	237	281	233	254	171	96	94	69	49	46	44	43	36	33	37	34	18689
Giraffe, seen	429	462	401	439	403	399	141	124	102	103	193	191	170	169	203	244	397	392	410	455	469	451	467	465	406	395	421	40383
Spoor	50	25	31	34	0	41	146	206	183	151	283	287	285	226	275	231	164	92	81	60	59	62	43	15	49	43	30	20042
Eland, seen	192	150	135	134	132	194	89	74	82	65	131	97	90	77	104	145	194	91	121	141	134	130	120	109	99	122	155	16527
Spoor	33	31	46	18	28	33	89	90	95	89	144	136	123	113	145	163	87	51	52	39	41	35	41	19	37	37	32	10949
Cheetah, seen	3	3	5	2	6	6	4	2	1	2	4	3	1	2	14	20	13	9	8	9	9	7	8	8	6	5	4	893
Spoor	24	19	21	21	19	25	14	11	12	8	9	11	9	12	30	33	24	17	15	15	17	22	18	22	24	20	22	2298
Carcases																												
Hours old	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	1	1	1	1	0	0	0	0	0	0	79
Days old	0	0	0	1	1	0	3	1	1	1	1	2	3	0	1	0	2	1	1	2	3	5	6	1	1	1	0	225
Weeks old	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	19
Months old	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7

Raw Data Summary (cont)

	October to March						April to September																			
	Oct	Nov	Dec	Jan	Feb	Mar	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th	15th	16th	17th	18th	19th	20th	21st	22nd	23rd	24th	25th	Total
Visitors																												
Photographic	0	0	0	0	0	0	3	12	21	9	4	9	0	10	0	9	13	3	6	1	1	1	1	2	1	0	0	54
Hunting	0	0	0	0	0	0	7	1	1	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14
Camping	0	0	0	0	0	0	0	4	0	0	6	6	6	4	14	0	0	1	0	0	0	0	0	0	0	0	0	3
Driving	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	2	0	0	0	0	0	4	0	0	0	31
Unknown/other	0	0	0	0	0	0	0	2	1	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	9
Environmental																												
Charcoal	0	2	6	6	3	2	0	0	39	25	7	9	11	10	0	0	3	6	0	9	9	5	5	0	3	1	3	171
Other Wildlife																												
Buffalo	0	0	0	0	0	24	0	0	0	0	0	0	0	5	0	1	17	0	9	4	0	0	0	2	0	12	4	358
Bushbuck	1	2	1	0	0	2	0	1	0	0	0	0	0	0	0	4	2	3	5	3	2	2	3	2	2	1	1	262
Gemsbuk	127	99	101	133	85	85	115	104	127	117	120	151	139	87	162	163	232	181	156	165	160	147	177	192	158	136	107	21322
Grants gazelle	556	506	386	425	500	426	394	361	213	234	258	312	350	326	325	461	695	712	716	701	683	624	626	591	527	563	467	68521
Hippo	0	0	4	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	2	0	1	1	63
Hyena, seen	0	0	1	2	0	1	1	1	1	2	1	0	2	1	5	9	5	2	2	1	1	1	2	3	2	2	1	312
Spoor	42	66	61	63	76	72	79	49	47	41	39	25	37	49	53	35	43	42	39	56	62	53	64	78	68	68	64	7132
Impala	170	189	207	299	219	161	135	181	218	208	243	249	237	180	210	199	321	248	193	214	223	236	224	221	241	250	211	31140
Jackal	30	35	29	47	33	39	19	17	11	9	7	10	11	5	28	41	47	20	25	42	45	48	57	69	59	57	38	4270
Kudu, lesser	45	60	55	59	59	54	67	67	55	48	65	51	57	43	54	61	45	39	35	49	50	56	63	64	70	69	55	7866
Leopard, seen	5	5	6	10	4	5	2	2	2	1	1	1	0	1	3	3	6	6	5	4	5	4	6	9	9	9	6	563
Spoor	24	14	19	24	30	21	5	4	5	3	2	5	4	4	7	13	15	14	16	13	13	14	16	25	24	21	22	1821
Lion, seen	0	0	1	4	0	0	0	0	0	0	0	0	0	0	0	0	2	1	1	0	0	0	2	2	2	1	1	71
Spoor	13	5	9	13	13	3	0	0	1	1	0	0	1	2	2	1	2	5	3	3	3	4	8	17	8	11	9	529
Oryx	42	42	58	39	52	60	8	24	17	13	15	14	5	5	45	56	39	53	56	53	46	41	72	63	43	45	49	4929
Thompsons g.	694	595	487	599	624	676	493	541	303	281	435	525	581	399	384	438	698	741	878	909	921	869	871	819	622	589	614	85010
Warthog	36	49	43	28	39	46	23	9	10	9	12	13	10	25	35	32	31	37	37	43	45	48	45	50	50	44	39	4012
Wildebeest	334	455	547	466	251	728	671	432	202	173	447	329	288	380	560	611	1110	1016	1038	1032	1023	959	946	1066	699	485	463	95219
Zebra	1132	886	922	916	983	1141	1057	886	652	564	1093	1171	1196	829	831	848	1217	1464	1360	1232	1196	1101	1179	1173	963	1039	997	154979

Raw Data Summary - Transects

	Total - Oct 11 to Mar 12								Average per patrol Oct 11 to Mar 12									Total - to March 12								Av per patrol April 07 to Mar 12								
	Ti	En	Ng	Em	Il	Le	Ol	Ma	Ti	En	Ng	Em	Il	Le	Ol	Ma	Total	Ti	En	Ng	Em	Il	Le	Ol	Ma	Ti	En	Ng	Em	Il	Le	Ol	Ma	Total
Buffalo									0	0	0	0	0	0	0	0	0.0	36	7	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.1
Bushbuck									0	0	0	0	0	0	0	0	0.0	0	2	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
Cheetah, seen									0	0	0	0	0	0	0	0	0.0	0	3	3	0	9	6	0	0	0	0	0	0	0	0	0	0	0.1
spoor	2				9	9			0	0	0	0	2	2	0	0	0.4	9	9	9	0	20	18	1	3	0	0	0	0	1	1	0	0	0.3
Eland, seen	51	10	34		25	3	13	2	9	2	6	0	4	1	2	0	2.3	465	171	155	32	90	3	20	22	8	3	3	1	4	0	1	1	2.4
spoor	8	8	7	3			3	4	1	1	1	1	0	0	1	1	0.7	104	89	108	26	11	0	6	5	2	1	2	0	0	0	0	0	0.8
Elephant, seen					4	1		8	0	0	0	0	1	0	0	1	0.3	182	72	146	0	21	2	0	34	3	1	3	0	1	0	0	1	1.2
spoor	6	4		8	4	5	8	7	1	1	0	1	1	1	1	1	0.9	78	55	77	33	19	19	18	11	1	1	1	1	1	1	1	0	0.9
Gerenuk	9	5	17	1	15		7	17	2	1	3	0	3	0	1	3	1.5	72	223	385	39	120	15	100	72	1	4	7	1	5	1	3	3	3.1
Giraffe, seen	33	83	55	42	74	60	40	57	6	14	9	7	12	10	7	10	9.1	542	419	586	290	295	141	116	180	9	7	11	5	12	6	4	6	7.7
spoor	7	6	11	9					1	1	2	2	0	0	0	0	0.7	80	88	125	19	29	10	6	6	1	1	2	0	1	0	0	0	0.9
Grant's gazelle		81	27	62	48	39	79	61	0	14	5	10	8	7	13	10	8.7	198	490	990	234	308	233	261	271	3	8	18	4	13	10	9	12	9.6
Hippo									0	0	0	0	0	0	0	0	0.0	0	12	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0.0
Hyena, seen					1				0	0	0	0	0	0	0	0	0.0	0	0	0	1	1	3	0	0	0	0	0	0	0	0	0	0	0.0
Spoor	8	8	8		14	11		5	1	1	1	0	2	2	0	1	1.1	45	59	112	15	52	53	7	22	1	1	2	0	2	2	0	1	1.2
Impala		64	10		44		38	56	0	11	2	0	7	0	6	9	4.4	273	339	134	13	76	65	83	195	5	6	2	0	3	3	3	8	3.8
Jackal		2	4	8	2			3	0	0	1	1	0	0	0	1	0.4	14	240	75	38	28	6	2	25	0	4	1	1	1	0	0	1	1.1
Kudu, lesser		8	10	1	6				0	1	2	0	1	0	0	0	0.6	8	187	138	36	13	0	4	1	0	3	3	1	1	0	0	0	0.9
Leopard, seen		4							0	1	0	0	0	0	0	0	0.1	0	9	5	1	2	0	0	2	0	0	0	0	0	0	0	0	0.1
spoor	4	2	2		2		3	2	1	0	0	0	0	0	1	0	0.3	14	22	21	5	16	7	8	6	0	0	0	0	1	0	0	0	0.3
Lion, seen									0	0	0	0	0	0	0	0	0.0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.0
spoor	3							4	1	0	0	0	0	0	0	1	0.1	7	0	0	0	0	3	0	15	0	0	0	0	0	0	0	1	0.1
Oryx			8		15				0	0	1	0	3	0	0	0	0.5	0	52	279	8	30	0	0	0	0	1	5	0	1	0	0	0	0.9
Thompsons g.	15		18	105	125	75	26	34	3	0	3	18	21	13	4	6	6.9	476	710	252	573	474	326	46	204	9	12	5	10	20	14	2	9	9.1
Warthog		11						8	0	2	0	0	0	0	0	1	0.4	63	79	73	14	0	0	9	31	1	1	1	0	0	0	0	1	0.7
Wildebeest	5			29	36	18	29	121	1	0	0	5	6	3	5	20	7.6	343	533	1080	428	172	157	144	311	6	9	20	7	7	7	5	14	9.2
Zebra	134	114	118	60	139	89	103	93	22	19	20	10	23	15	17	16	18.2	1371	1203	1690	535	596	406	369	395	23	20	35	9	24	17	12	17	19.7

Ti is Tingatinga
En is Engaeurasi
Ng is Ngeeyiani
Em is Emborget
Il is Ildoinyo
Le is Leremeta
Ol is Oltepessi
Ma is Endolnyo Mali

Plan for the Next Six Months

- Maintain the present tight control on poaching activity and the fieldmen's high moral.
- Invite representatives from the Burunge WMA and Tarangire National Park to visit WKCP during the next year.
- Investigate the possibility of constructing a 'lion proof boma' in an area of frequent conflict.
- Start a Wildlife Club independently of the school timetable in Tingatinga
- Purchase and distribute rain gauges. Start recording rainfall using an appropriate format.
- Encourage all the sponsors, especially TFB, to visit the project and see the excellent conservation they are facilitating with their generous donations.

Tanzania Accounts

This period inflation eased from about 20% to 10% and the exchange rates stabilized. Also the good rains helped the fieldmen, who are largely agricultural producers, to spend less on food. For these reasons the budget must remain fixed at

Fieldman Tsh39000 p.c.m.
Assistant's allowance Tsh39000 p.c.m.
Coordinator's salary Tsh370000 p.c.m.
Operational budget Tsh280000 p.c.m.

This means that the monthly budget collected from African Environments also remains unchanged at £540 ($865)

	Half year total to Sep '11 £	Oct '11	Nov '11	Dec '11	Jan '12	Feb '12	Mar '12	Half year total to Sep '11 £
Fees								
Salary, co-ordinator	882	147	147	147	147	147	147	882
Honorarium, assistant x2	378	63	63	63	63	63	63	378
Honorarium, fieldmen x14	1308	218	218	218	218	218	218	1308
Admin. Fee, Tazama!	282	47	47	47	47	47	47	282
Operational Budget								
Monthly expenses	672	112	112	112	112	112	112	672
One-off Expenses								
Item							Trip	
Cost							822	
Total cost	3522	587	587	587	587	587	1409	4374
One off payments							822	
Standing Order Paid	4274	2137			2137			4274
Balance £	752	8232	7645	7058	8608	8021	6612	70

Average exchange rates:
$1 = Ksh73 = Tsh1400
£1 = $1.60 = Tsh2300

Note: I request that both Born Free and Tazama check them and send me an email either confirming them or detailing any necessary changes. (£1 = $1.6 = Ksh130 = Tsh2400)

Consultant's Operational Budget - Oct 11 to Mar 12

Item	Quantity	Cost	Cost, £
Oct			
Nov			
24th report	6	Ksh3600	26
Dec			
Car hire	3 days	Ksh19200	130
Car insurance	2 weeks	Ksh5000	**27**
Diesel	120L	Ksh13800	**80**
Lunch	2	Ksh1000	7
Food, mixed	3 days	Ksh3500	17
Visa, Tz	1	$50	**31**
Jan			
Feb			
Mar			
Total Cost, £			**318**

Note: 1 Receipted items are in bold
2. These costs exclude electronic communication and wear and tear on equipment such as tents etc

Coordinator's Operational Budget - Oct 11 to Mar 12

Item	Tsh/month	$/month	Quantity	Total Cost, £
Transprot to Arusha	82250	59	6	**220**
Transport within Arusha	16450	12	6	**44**
Office rent	25000	18	6	**67**
Monthly meeting	22000	16	6	**59**
Mobile phone credit, coordinator	37600	27	6	**101**
Mobile phone credit, 8 fieldmen @ $5 each pm	56000	40	6	**150**
Stationary and printing	7000	5	6	**19**
Total Cost£	246300	176		**660**

These costs are unchanged from the last period

生而自由基金會所提「支援當地非政府團體海洋意識協會(Sea Sense)協助坦尚尼亞濱海社區保護瀕危海洋物種計畫」，計畫報告摘要如附：

Sea Sense 2011 年年度報告摘要如下：

一、儒艮保育

- 2004 年設立儒艮網以來，共觀察到 51 隻儒艮，2011 年觀察到 11 隻。
- 2011 年 Sea Sense 未發現儒艮死亡案件。
- 2011 年 3 月、6 月和 9 月，共召開 4 次儒艮保育教育宣導研討會。
- 執行儒艮族群和誤捕調查。

二、海龜保育

- 2011 年記錄到 379 個海龜產卵巢，375 個屬綠蠵龜，4 個屬玳瑁，產卵高峰期為 4 月。綠蠵龜和玳瑁孵化成功率分別為 74%和 80%，共有 33,453 小海龜安全抵海。
- 34 巢未孵化，其中 8 巢腐敗、3 巢被盜獵、8 巢被潮水淹沒、15 巢被天敵獵食，此地區最常見之獵食動物為巨蜥(monitor lizard)。
- 2001 年開始執行海龜監測計畫以來，共紀錄及監測 3,052 個海龜巢，224,870 小海龜安全抵海。
- 2011 年 4 和 5 月，開始進行海龜標記計畫，共標記 8 隻海龜。2012 年將繼續此計畫。
- 2011 年於坦尚尼亞海岸發現 166 具海龜屍體，分別為綠蠵龜 156 隻、玳瑁 8 隻、欖蠵龜 1 隻，另有 1 隻無法確認。
- 發現 2 隻海龜有纖維乳頭瘤(fibropapilloma)。
- 以海龜為主之生態旅遊，對當地五個社區經濟有貢獻，包括旅社、觀察海龜行程、T 恤等。其中 3 個社區收入 US$5,528，2011 年 9-12 月 T 恤收入 US$1,615。半數收入將納入鄉鎮環境基金供日後運用。
- Sea Sense 與社區建立機制，例如每位旅客提供小額經費(成人 US$10，小孩 US$5)或旅遊業者提供 40%海龜觀察之旅收入供 Sea Sense 海龜保育基金運用。並另有募款活動購置巡邏船等。
- 推動認養海龜巢活動，每巢 US$50，2011 年有 51 巢被認養，共收入 US$2,550。
- 2011 年 6 月辦理海龜生態旅遊研討會。

三、2011 年 Sea Sense 保育人員發現發現 7 具鯨豚類動物屍體。

四、社區參與

- 2011 年 Sea Sense 於 6 個沿海鄉鎮共有 34 位保育人員，負責巡邏、蒐集瀕臨絕種海洋生物資料、監測和通報違法行為、社區保育宣導等。
- Sea Sense 推動海龜巢通報獎助計畫，村民通報海龜產卵巢位，每巢 TSh5,000，每個成功孵化卵 TSh100，未孵化卵 TSh50。此計畫相當成功，2011 年共支付 TSh5,645,500 給當地社區。
- 定期舉辦社區會議，討論海洋保育議題。

五、針對教師、漁民、鄉鎮菁英人士、學生、旅館工作人員等，辦理訓練班和教育宣導活動等。主題包括反炸魚、環境教育、草編籃和皮夾、海龜之旅解說訓練、誤捕監測、海龜保育措施等。

六、教育宣導

- 2011 年 6 月 5 日世界環境日，辦理淨灘活動。
- 6 月 16 日辦理世界海龜日活動。
- 辦理廢棄物處理教育計畫，提倡 4R (Refuse, Reduce, Reuse, Recycle)。
- 辦理海洋保育研討會。
- 於 8 個地區辦理海洋保育影片播放活動。
- 辦理種植紅樹林活動。
- 於雜誌發表 13 篇海洋保育文章。
- 2011 年 4 月，Sea Sense 於國際海龜研討會(31st International Sea Turtle Symposium)發表 2 份報告。10 月參加西印度洋海洋科學學會研討會，並發表 2 份報告。
- 2011 年啟動網站和 Facebook，內容包括 Sea Sense 各項計畫、瀕臨絕種海洋生物保育議題等。
- 編纂完成「坦尚尼亞發展海龜生態旅遊指南」。
- 於二鄉鎮辦 Theatre for Development (TFD)訓練及表演計畫。

七、2011 年 Sea Sense 發現 314 次炸魚事件，記錄到 922 次爆炸。並與相關單位討論此議題及商討解決之道。



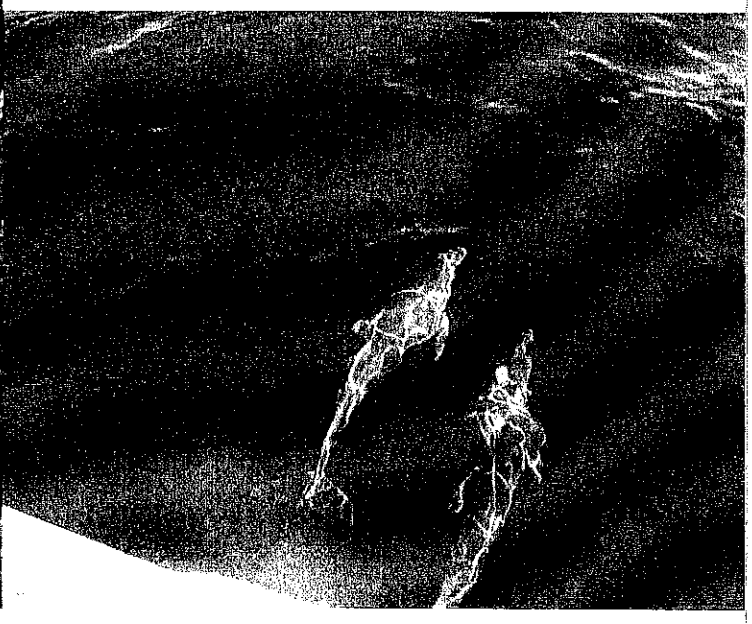


COMMUNITY BASED ENDANGERED MARINE SPECIES CONSERVATION IN TANZANIA

SEA SENSE ANNUAL REPORT 2011

Prepared by
Lindsey West
Coordinator





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Executive Summary

Between January and December 2011, 379 sea turtle nests were recorded by Sea Sense and 33,453 sea turtle hatchlings safely reached the sea. Peak nesting was in April and the hatching success rate was 74% for green turtles and 80% for hawksbill turtles. 166 dead turtles were recorded (either slaughtered or caught in nets) along the coast. Two cases of fibropapilloma were documented in Tanzanian waters. Sea turtle ecotourism activities generated revenue in Mafia, Temeke and Pangani Districts. Four Turtle Tour Guides guided visitors to nesting beaches. 11 live dugongs were sighted by local fishers in Rufiji and Mafia Districts and reported to Sea Sense. Seven dead cetaceans were recorded by Conservation Officers. Four dugong awareness workshops were held in Rufiji District targeting CFMA committee members. World Environment Day and World Sea Turtle Day events were held in Mafia District. Training, education and awareness were provided to teachers, fishers, village leaders, school pupils and hotel staff. 13 magazine articles were published and two presentations made at the 31st International Sea Turtle Symposium. A new website was launched together with a Facebook page. Two UDSM students completed an eight week placement with Sea Sense. Sea turtle slaughter, live coral mining, mangrove harvesting and dynamite fishing continue to be practiced despite efforts to curb them.

1. Introduction

The Tanzania coastal region supports a diverse array of marine habitats, many of which are critical for the survival of coastal communities. There is significant pressure on marine and coastal resources related to high human settlement in the coastal zone coupled with high levels of poverty. High dependency on coastal resources has led to resource utilization at unsustainable levels and threatens the marine biodiversity of Tanzania and the livelihoods of coastal communities.

In recognition of this, Sea Sense, a community-based Tanzanian NGO, was set up in 2001 and currently operates in six coastal districts in Tanzania. Sea Sense targets the conservation and promotion of flagship species (e.g. sea turtles, dugongs, whales, dolphins), whose continued survival is implicitly linked with the protection of the wider coastal and marine ecosystem. Sea Sense works closely with coastal communities to deliver tangible conservation benefits, improve understanding and knowledge of natural resource management and develop sustainable livelihoods that bring positive economic outcomes for impoverished rural communities who depend solely on natural resources for their survival.

Activities started in Mafia District and in 2004, the scope of the NGO was scaled up to cover key districts on the mainland coast of Tanzania.

This report highlights activities and progress by Sea Sense during 2011.

2. Objectives

The overall objective is to enhance the conservation status of sea turtles, dugongs, whale sharks and other species of conservation interest, as well as their habitats in Tanzania by assessing population abundance, distribution and threats, raising awareness and helping communities to find alternatives to unsustainable activities.

The specific objectives are to:

- conserve dugongs by implementing the Conservation and Management Plan of the UNEP/CMS Memorandum of Understanding on Dugongs; incorporate conservation measures into Collaborative Fisheries Management Area action plans and disseminate results to communities through awareness-raising activities;
- protect endangered sea turtles through a programme of community-based nest protection and monitoring; conducting community awareness-raising; and promoting sea turtle ecotourism;
- contribute to protection of whale sharks and cetaceans through community awareness-raising;
- increase public awareness and education about the status and threats to marine resources in Tanzania;
- enhance multilevel national capacity for monitoring, research and management; and
- disseminate results to national and regional partners and the wider scientific community.

3. Implementation & Results

3.1 Dugong Conservation

3.1.1 Live Dugong Sightings

In 2004, Sea Sense established a community dugong monitoring network in the Rufiji Delta to provide data on the distribution and abundance on dugongs. The network has confirmed the presence of a small, breeding population in the Rufiji Delta and has raised awareness of the plight of the dugong in Tanzanian waters. The majority of dugong sightings are reported to Sea Sense Conservation Officers by members of the local fishing community.

There have been 11 live dugong sightings in 2011. Ten of the observations were reported in Rufiji District, in the southern Delta. Sightings were concentrated between Pombwe and Mbwera. Sightings were reported in May, June, July, October, November and December.

A lone dugong has been sighted several times near to Tumbuju on the west coast of Mafia Island since 2009 and was observed again in July 2011.

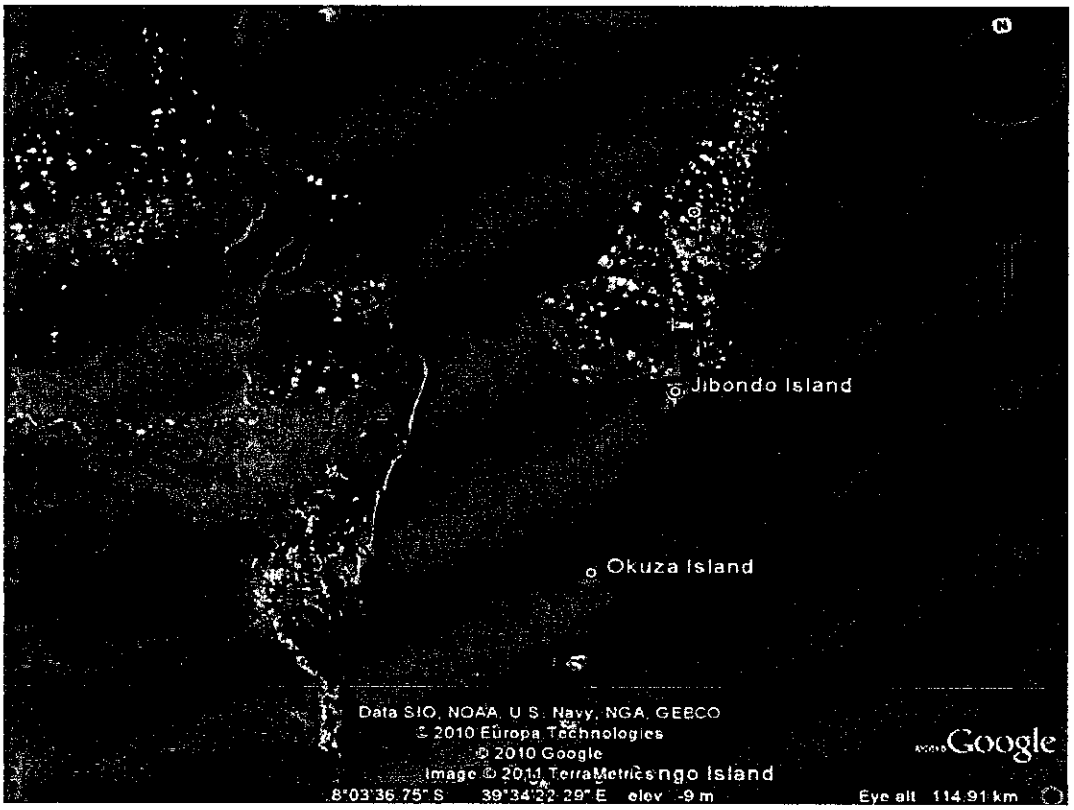


Figure 1: Live dugong sightings, 2011

3.1.2 Dugong Mortalities

There were no reported dugong mortalities in 2011.

Since the establishment of a dugong monitoring network in the Rufiji Delta in 2004, 51 dugong sightings have been reported to Sea Sense. Of these, 37 were live sightings (including two mother/calf pairs), 13 had drowned from capture in gillnets (including one mother/calf pair) and one was stranded on a beach. Even though sightings are still rare, there is clear evidence that a small, breeding population exists in the Rufiji Delta. There has been a steady increase in the number of reports of dugong sightings since 2004 (Figure 2) which can most likely be attributed to recent Sea Sense dugong awareness workshops.

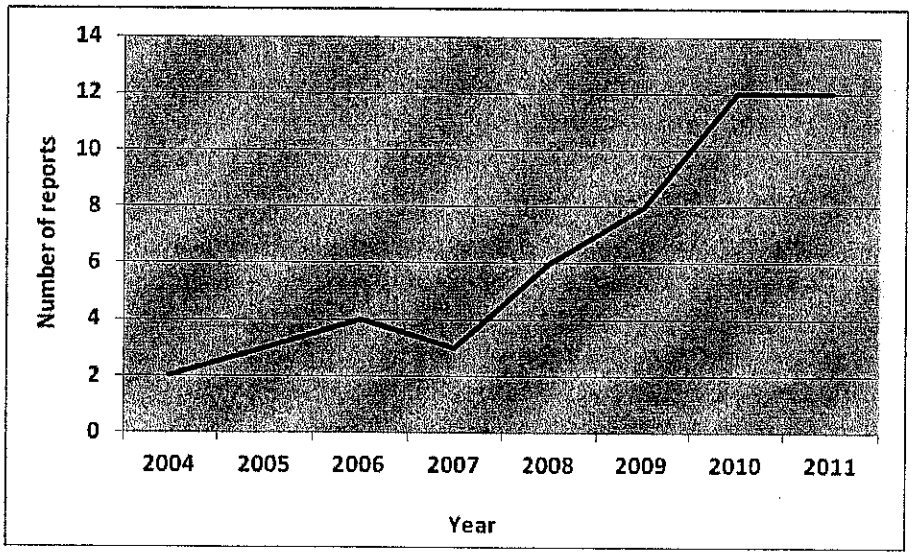


Figure 2: Number of reported dugong sightings in the Rufiji Delta, 2004 - 2011

Sea Sense is using data collected by the monitoring network to develop mitigation measures aimed at reducing gill net mortality eg, promotion of temporal and spatial closures in key dugong habitat and to ensure community training and education programmes are targeted effectively. It is critical that conservation efforts are directed at reducing mortality from gill nets as the current rate of gill net capture is not sustainable for a population that is thought to be less than 100 individuals.

3.1.3 Dugong Survey

In June, Sea Sense visited Tumbuju on the west coast of Mafia where a live dugong has been observed and reported regularly since the end of 2009. Sea Sense met informally with fishers at the fish landing site in Tumbuju to discuss the dugong sighting and assess the level of awareness of dugong biology and conservation. Most of the fishers were unwilling to admit they had seen the dugong and claimed to know nothing about the presence of a dugong in their local area. This was most likely due to the fear of the establishment of a protected area and the loss of traditional fishing rights.

Following discussions with the fishers, Sea Sense met with the Chunguruma Beach Management Unit (BMU) secretary who agreed to discuss the issue further with the fishers and provide feedback to Sea Sense.

Sea Sense then conducted a boat survey on Tumbuju reef, near to Mbarakuni Island where the dugong had been sighted. The survey lasted for four hours but the dugong was not observed. This may have been due to the presence of six fishing boats on the reef causing the dugong to seek refuge elsewhere.

Sea Sense maintained regular contact with BMU leaders in the area to ensure sightings were reported and to raise awareness of the need to protect dugongs. Sea Sense staff visited Tumbuju fish landing site again in October to gather updated information on sightings of the dugong and encourage cooperation from the fishing community. The BMU secretary from Chunguruma met with Sea Sense and reported that there had been no further sightings since July but was confident that local fishers were ready to cooperate and provide information.

3.1.4 Dugong Workshops for CFMA Members

The increased degradation of coastal and marine ecosystems and decreases in yield of important fish stocks in Tanzania has led to the development of Collaborative Fisheries Management Areas (CFMA's) as a vehicle for achieving sustainable marine resource use and engaging coastal communities in their conservation. In March and June, Sea Sense held dugong awareness workshops targeting the statistics and monitoring/surveillance committees of two CFMA's (NJISOPOJA and MBEWKIEKI) in Rufiji and Kilwa Districts. The objectives of the workshops were:

- To determine the level of understanding of roles and responsibilities within a CFMA
- To share historical knowledge of dugongs in Tanzania.
- To improve understanding of the current status of dugongs in Tanzania and across their global range
- To raise awareness of natural and anthropogenic threats faced by dugongs and other endangered marine species.
- To facilitate incorporation of dugong protection measures into CFMA action plans
- To raise awareness of the Tanzania Fisheries Regulations 2009 that incorporate new legislation protecting dugongs
- To raise awareness of the establishment of the national Tanzania Turtle and Dugong Conservation Committee

Each workshop followed the same format. Participants were invited to form small groups to discuss a number of topics relating to their roles within the CFMA, threats to dugongs and the relevance of dugong conservation. Following the group discussions, one member from each group presented their findings to the rest of the workshop participants while other participants were invited to comment on

the presented topic. Sea Sense also added further information during the discussions and clarified misinformation relating to several of the topics.



Plate 1: Dugong awareness workshop, NJISOPOJA CFMA

Based on the presentations, there were varying degrees of knowledge and understanding of dugong biology, distribution and current status. The surveillance and monitoring committees were more familiar due to the nature of their duties and were able to identify specific dugong feeding grounds. They were aware that dugong populations were declining and cited human activities that threaten dugongs including gillnet fishing, drift nets, prawn trawlers, dynamite fishing and pollution of the Rufiji River.

In contrast, the statistics committees were less familiar with the current status of dugongs and several committee members admitted that they did not know if dugong abundance was increasing or decreasing. Most participants knew that dugongs were reported to be caught in the Rufiji Delta but there was no connection made between an increase in human activities and decreasing dugong populations.

The workshops gave the participants a greater understanding of their roles within the CFMA and helped to create a new attitude towards endangered marine species conservation. Both committees recognised that CFMA's had a specific role to play in relation to dugong protection in the Rufiji Delta and agreed to incorporate dugong monitoring and protection into their daily work programmes.

Two follow up workshops were held in September 2011 to assess the progress of dugong monitoring and protection activities within NJISOPOJA and MBWEKIEKI CFMA's and determine the longer term impact of Sea Sense endangered marine species awareness workshops.

22 members from NJISOPOJA CFMA attended the workshop held in Jaja and 26 members from MBWEKIEKI CFMA attended the workshop held in Mbwera East. At the beginning of both workshops, each BMU sub-committee was asked to present a report of their activities and progress since they had attended a Sea Sense training workshop. At the end of each presentation, the rest of the participants were given the opportunity to ask questions to the presenting committee and provide suggestions on how the activities could be improved in the future.

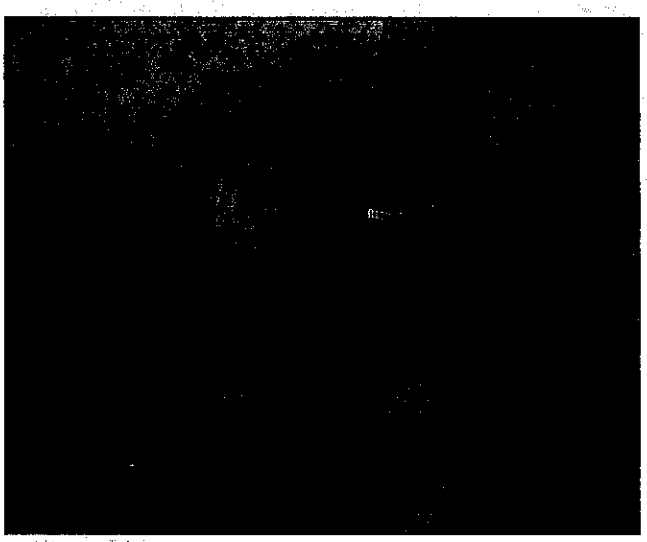


Plate 2: BMU progress report at MBWEKIEKI workshop

The progress reports generated extensive discussions at both workshops as the participants were extremely interested to hear about activities and progress within their neighbouring BMU's. The reports revealed which BMU's were the most active and provided guidance to less active members who were able to recognise the need to improve their performance.

Most of the reports were of a good standard and committee members were able to elaborate on the details of their work activities when requested by other committee members. It was evident that many of the challenges faced by the CFMA committees were common to all committees and hence the participants were very keen to get clarification on how these challenges had been overcome. There were only two committees that did not produce a report: MBWEKIEKI Central Coordinating Committee and the statistics committee from Mbwera West BMU.

Following the progress reports, each of the committees was asked to provide feedback on how they had applied the knowledge and information from Sea Sense training workshops into their daily work programmes. The feedback was positive and committees agreed that Sea Sense training workshops had helped them to organise and manage their daily work schedules more effectively, improve relations with their communities and address challenges associated with CFMA implementation.

Both CFMA statistics committees stated that they had broadened the types of data they were collecting and improved their data collection techniques. There was a greater understanding of the

impact of illegal activities and the role of data collection in the monitoring of resource depletion. Many BMU's were able to determine the status of illegal activities in their area due to the collection of data on mangrove harvesting, coral mining and dynamite fishing. Data collected by the BMU's indicated that the frequency of illegal activities was higher in Pombwe and Somanga than in other villages. This may be due to the higher concentration of migrant fishers in Pombwe and Somanga who are often reported to be involved in illegal activities.

The surveillance committees stated that Sea Sense training workshops had helped them to improve their patrolling schedules and control information leakage more effectively. Furthermore, the committees admitted that their relationships with fishers had improved due to their changed approaches to eliciting information. Information was collected through discussions with fishers rather than through the use of force and cooperation had increased. Participants also agreed that collaboration between CFMA committees and village leaders had improved since the training and there was a greater understanding of the need to share information and cooperate in the planning of CFMA activities.

Following the Sea Sense workshops, the CFMA committees had incorporated monitoring of endangered marine species into their work programmes. Both the statistics and monitoring and surveillance committees had recorded data on sea turtle mortalities and reported sightings of humpback whales in the Rufiji Delta near to Pombwe, indicating that capacity to collect a variety of data had increased. There was also improved understanding of the important role of endangered marine species in the wider marine ecosystem. Kiechuru BMU had closed one seasonal fisher camp due to the persistent use of illegal fishing gears which posed a threat to sea turtles and dugongs.

Further training and education for CFMA leaders on the conservation of marine resources, particularly endangered marine species, is planned for 2012. Capacity building within CFMA's is a top priority for Sea Sense to improve understanding of the role of sea turtles and dugongs in the wider marine ecosystem and ensure the sustainability of sea turtle and dugong conservation strategies at a local level.

3.1.5 Dugong Workshop for Village Leaders in SOPOJA.

The objective of the workshop was to improve knowledge and understanding of conservation efforts related to endangered marine species and to highlight the importance of strong leadership and frequent communications with BMU and CFMA committees. The workshop involved a series of lectures and discussions on sea turtle and dugong biology, their role in the marine ecosystem, their historical and current status, conservation initiatives and the impacts of human activities on their survival. The leaders were also provided with examples of how endangered marine species have the potential for income generation through ecotourism.



Plate 3: SOPOJA village leaders awareness workshop

Many of the leaders were aware that slaughter, nest poaching and illegal fishing threatened the survival of sea turtles but they had not considered any long term impacts of these activities. The issue of waste management was also introduced with particular reference to plastic waste and its impacts on endangered marine species.

There was a positive response to the workshop and leaders agreed to cooperate with Sea Sense and provide information whenever possible.

3.1.6 Dugong Bycatch Surveys

Efforts to protect remaining populations of dugongs in Tanzania have been hampered by limited resources and capacity to conduct sophisticated surveys to determine their distribution and abundance. Some areas, known to support large populations of dugongs in the past, are data deficient and the true status of dugongs in Tanzania remains unknown.

To address these data gaps, a dugong questionnaire-based survey was developed under the auspices of the CMS-UNEP Dugong Memorandum of Understanding. The survey protocol was specifically designed to enable rapid implementation at low cost, to be implemented by non-specialised personnel following a brief training course and to capture data on other endangered marine species including sea turtles and dolphins. The survey incorporated a strong spatial component to enable identification of specific locations where potential threats from fisheries interactions persist.

The overall objective of the surveys was to determine the distribution and abundance of dugong population in data deficient areas. Specific objectives were to:

- Identify and map fishing effort in targeted areas
- Identify and map dugong critical habitat

- Determine dugong characteristics within targeted areas
- Identify and quantify threats to dugong habitat
- Identify the level of community awareness of dugongs
- Identify interaction between dugong sites and fishing areas

Surveys were conducted at two sites: Mkinga District which is located at the border with Kenya and in Mtwara District which is located at the border with Mozambique (Figure 3).

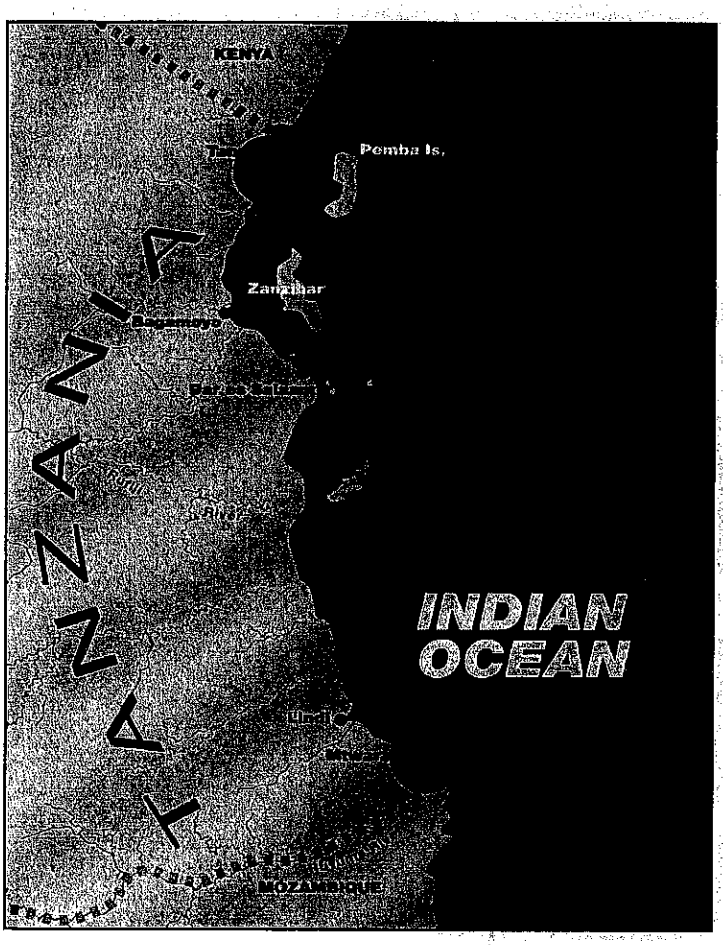


Figure 3: Location of dugong survey sites in Tanzania

Mkinga District was a previous stronghold of the dugong in Tanzania and was therefore a priority location for the survey. Dugongs have been occasionally sighted in this area and may be part of a population moving between Tanzania and Kenya.

Mtwara District was included in the survey due to the presence of extensive seagrass beds bordering Mozambique. Mozambique is known to support the largest population of dugongs in east Africa and there may be some movement between dugong populations in Mozambique and the Rufiji Delta, via Mtwara.

Mtwara and Mkinga Districts were considered to be data deficient in relation to current dugong populations. Interview surveys with fishers were conducted in Mkinga and Mtwara Districts in 2003 but since then no further data has been collected.

The surveys were conducted in collaboration with the Ministry of Livestock Development and Fisheries. The choice of survey sites was based on advice from officers of the Fisheries Development Division (FDD) and Marine Parks and Reserves Unit (MPRU). Selection criteria included:

- known presence of fishing communities

- high level of gill net use (source: 2009 Tanzania Marine Fisheries Frame Survey)
- presence of dugongs in previous years
- lack of up to date information on dugong distribution and abundance

Prior to the surveys, all surveyors attended a training session on the design and use of the questionnaire. Additional officers from MPRU and FDD also participated to build capacity for dugong conservation and protection in Tanzania. Topics covered in the training sessions included dugong and sea turtle biology and life history, historical and current status of dugongs in Tanzania and across their range, design of the questionnaire, interview techniques and data recording and management. The training consisted of a variety of learning media including presentations, DVDs, map reading skills, role plays and interview practices. A number of field pre-tests were also carried out at selected locations to identify any issues with the survey methodology prior to implementation.

Surveys were conducted in five villages in Mkinga District (Yasini, Moa, Boma Subutini, Zingibari and Dumbani) and six villages in Mtwara District (Msimbati, Tangazo, Litembe, Kilambo, Ngwale and Msangamukuu). Fishers were randomly selected in each village and interviewed using the standardized questionnaire. Interviewees were asked to mark fishing grounds, dugong, turtle and dolphin observations and distribution of seagrass habitat on pre-prepared maps. A total of 172 questionnaires were completed in Mkinga District and 201 in Mtwara District.



Plate 4: Interviewing a fisher in Mkinga District

Results of the surveys conducted in Mkinga District indicated that dugongs were no longer present in the area in large numbers. 62% of respondents had never seen a dugong and many believed dugongs to be already extinct. 63 respondents (37%) had seen a dugong in their lifetime. The average age of respondents that had seen a dugong was 52 which correlated with the historical abundance of dugongs in this area. Most of the younger fishers had only heard of dugongs through conversations with older members of their family. Only one respondent had seen a dugong in the previous year.

Similar results were recorded in Mtwara District. 65% of respondents had never seen a dugong. 67 respondents (33%) had seen a dugong in their lifetime and their average age was 50. Three respondents had seen a dugong in the previous year. At both locations, dugongs were most frequently observed entangled in nets (Figure 4).

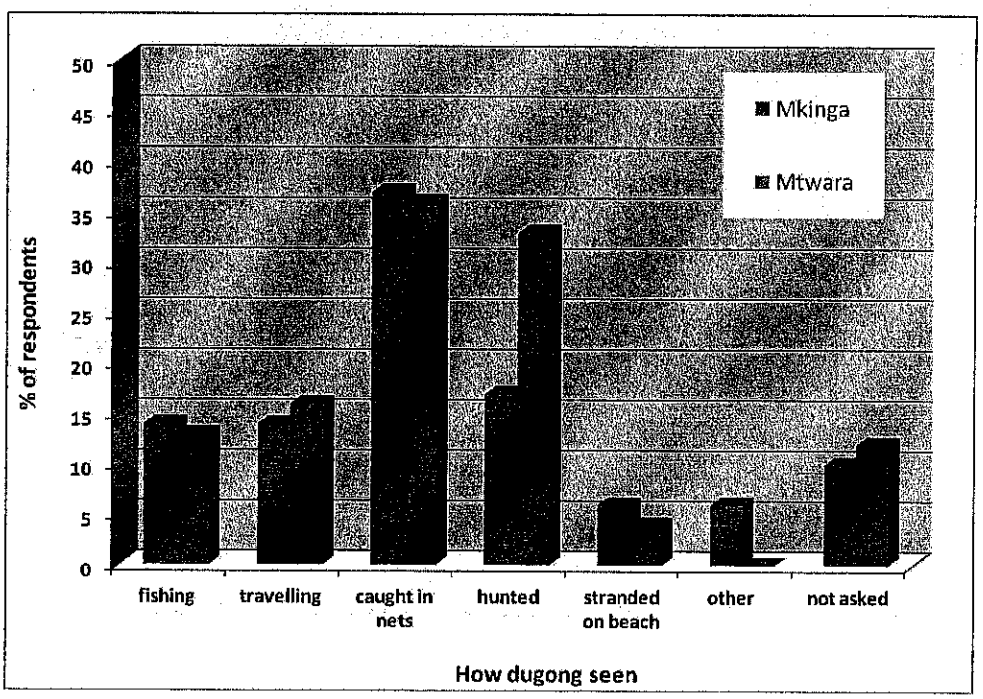


Figure 4: Response to question "how do you get to see dugongs?"

Six respondents in Mkinga District claimed to have caught a dugong in their nets during the previous year. In Mtwara District, seven respondents caught a dugong in the previous year. It is possible that individual animals pass through waters in both Mkinga and Mtwara areas but they are unlikely to support viable populations.

Figure 5 shows the potential fate of captured dugongs at both survey sites. 40% of respondents claimed that they would release a captured dugong. However, the true figure is likely to be much lower as dugongs are considered a valuable source of protein and their meat can fetch a high price. Fear of apprehension for failing to release a captured dugong may have been driving the response to that particular question.

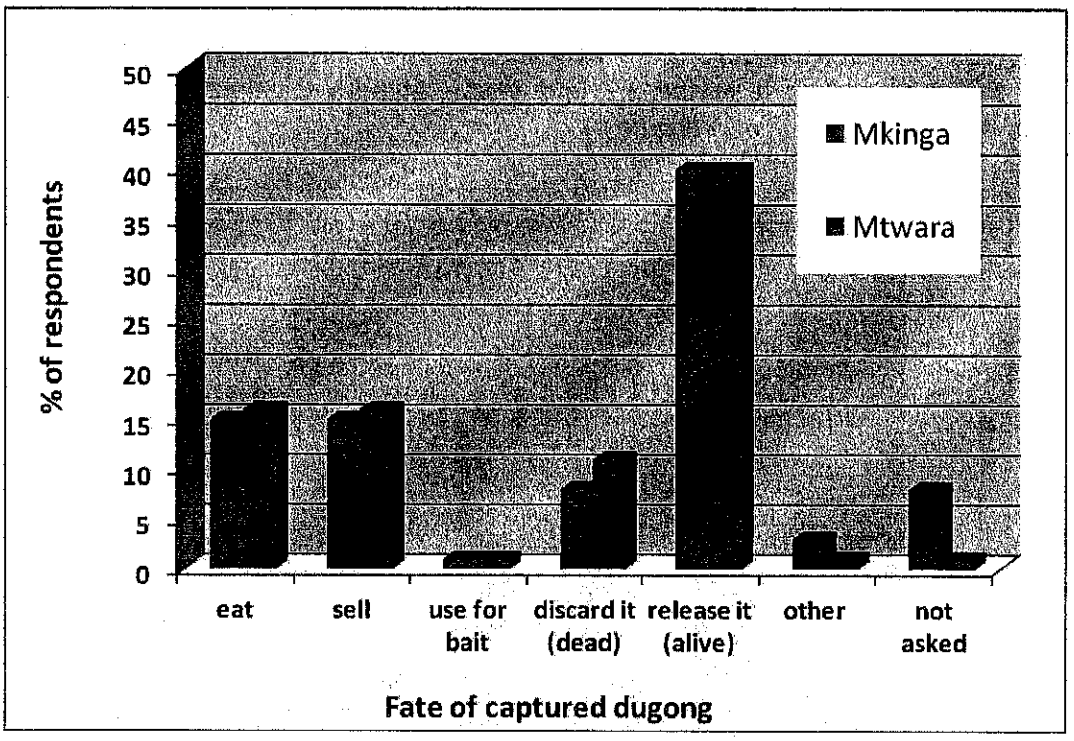


Figure 5: Response to the question "What would you do with a dugong if you caught one?"

There were similar myths and cultural beliefs about dugongs at both sites. Many of the respondents believed that dugongs were partly human and that a fisher must take an oath in front of village elders if a dugong is accidentally caught in his net.

A detailed report on the bycatch survey is currently being compiled by Sea Sense and the Fisheries Division and will be available directly from Sea Sense.

3.2 Sea Turtle Conservation

3.2.1 Sea Turtle Nest Monitoring and Protection

A total of 379 nests were recorded in 2011. 375 nests were laid by green turtles and four by hawksbill turtles.

338 hatched successfully and produced 31,541 hatchlings. The average hatching success rate for green turtle nests was 74% and for hawksbills nests was 80%.

In addition, 22 green turtle nests that were laid in 2010 hatched in early 2011, producing 1,912 turtle hatchlings.

Seven nests were still incubating at the end of 2011 and were due to hatch in early 2012.

34 nests did not hatch. Eight nests rotted, three were poached (all in Mafia District), eight were inundated by the high tide and 15 were predated. Monitor lizards were the most common predator and are known to target incubating eggs. They were responsible for all predation events in Mafia Island (n: 9) and partially predated one nest in Temeke District. Red ants pose a considerable threat to emerging hatchlings and predated six nests in Temeke District.

Mafia Island continues to be the most important nesting site for green and hawksbill turtles in Tanzania. More than half (n: 205) of all nests recorded in 2011 were laid there. Temeke and Pangani Districts also support significant nesting populations. Figure 6 shows the distribution of nests laid in 2011.

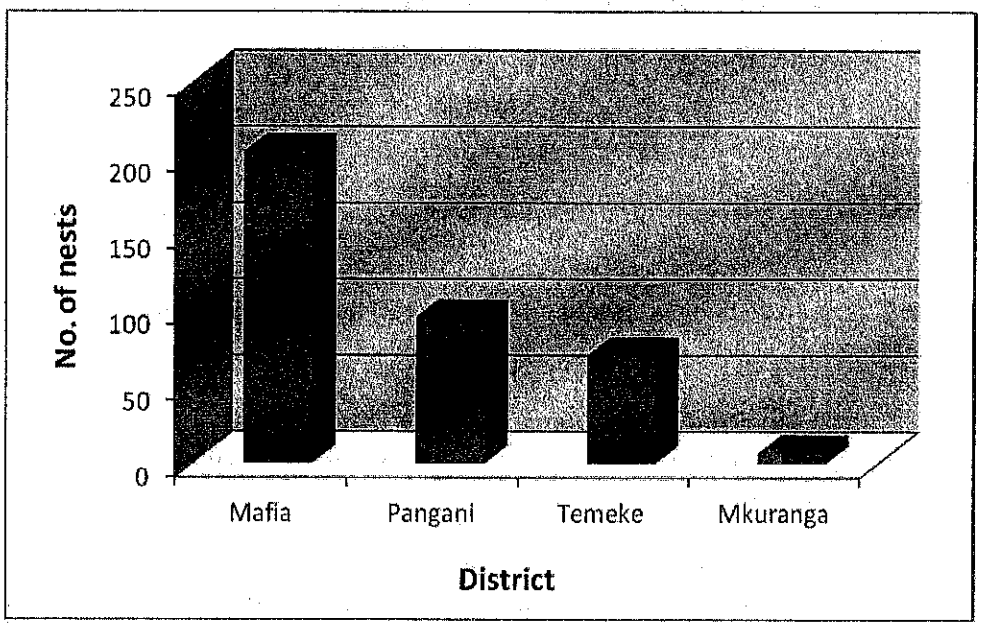


Figure 6: Location of sea turtle nests recorded by Sea Sense in 2011.

Green turtles nest on Tanzania's beaches all year round. In 2011, peak nesting activity was in April. 81 nests were recorded. Figure 7 shows the seasonality of green turtle nesting (data taken from all sites monitored by Sea Sense).

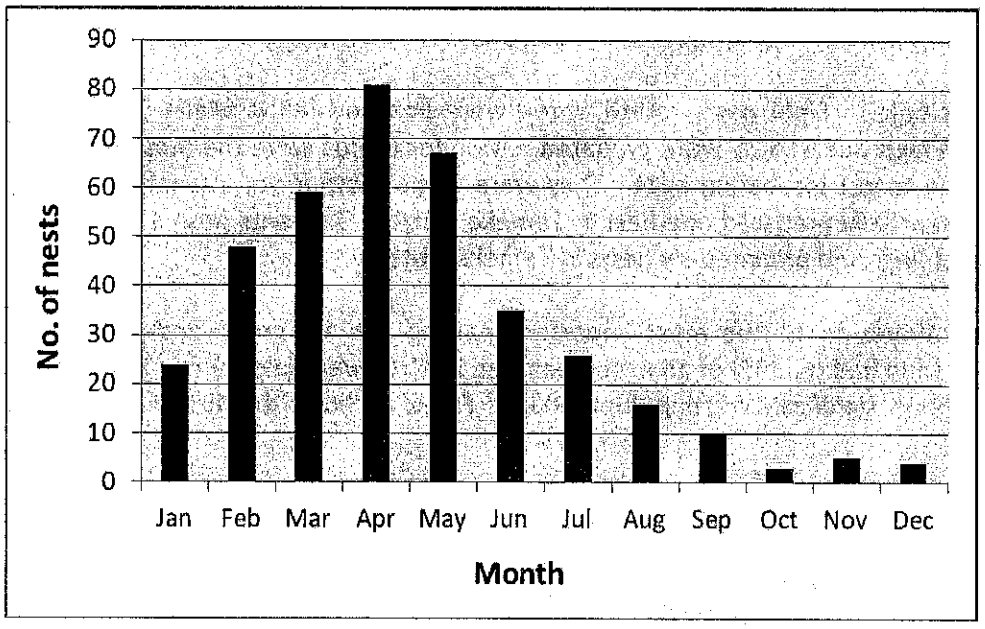


Fig 7: Seasonality of green turtle nesting in Tanzania, 2011

Since 2001, 3,052 nests have been recorded and monitored by Sea Sense and 224,870 hatchlings have safely reached the sea.

In 2011, the sea turtle monitoring programme in Mafia District celebrated its 10th year. Since the monitoring programme began in 2001, 1,179 nests have been recorded in Mafia with an average of 175 (SD±55) nests laid per year.

Two thirds of all recorded nests were laid in Juani Island, a small island to the southeast of Mafia. Over the past ten years, seven nesting beaches averaging 200 metres in length have been actively monitored in Juani. There was a significant increase (ANOVA test, $p<0.001$) in the annual number of nests recorded in Mafia Island between 2002 and 2010 (Figure 8).

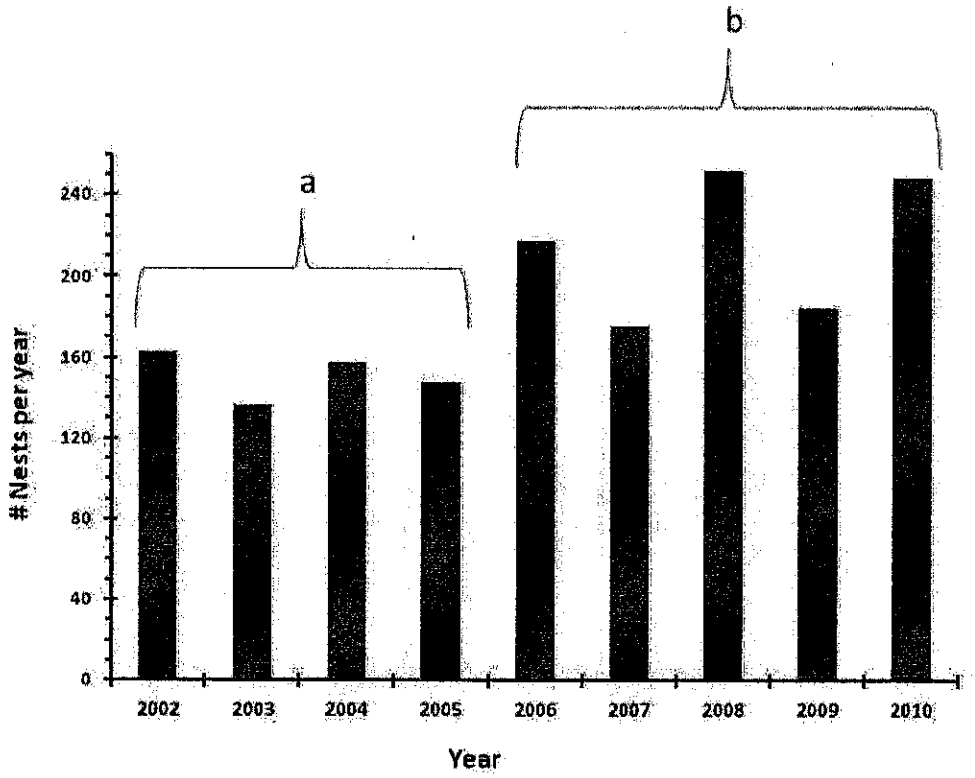


Figure 8: Number of nests recorded per year, 2002 – 2010 in Mafia Island. a and b represent significant differences (ANOVA test, p<0.001)

Levels of poaching decreased dramatically following implementation of the nest monitoring programme. In the first year of monitoring, 47% of nests were poached. This figure decreased to 20% in year two and 2% in year three. The rate of poaching has remained at 3-4% for the past seven years (Figure 9).

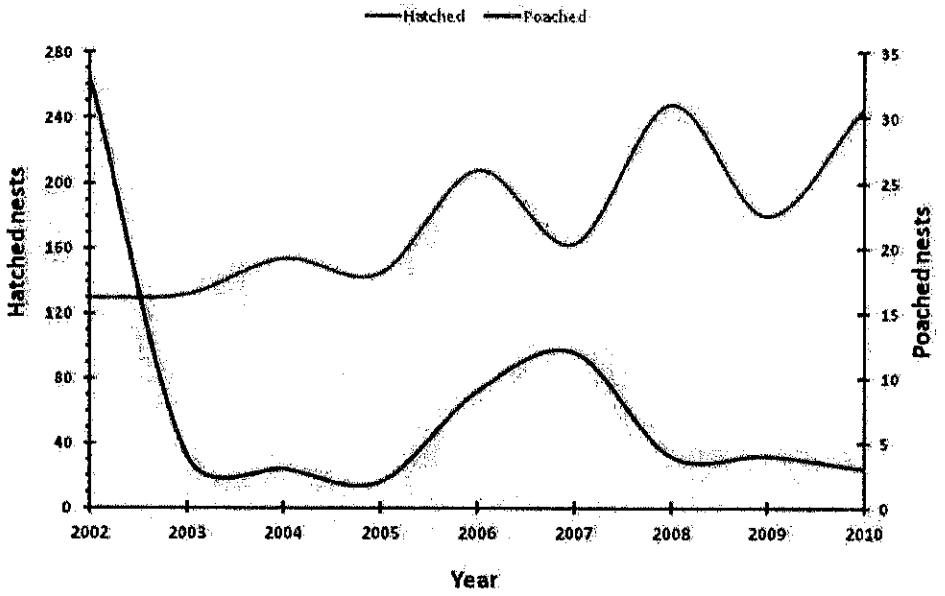


Figure 9: Number of hatched and poached nests in Mafia Island, 2002 - 2010

Hatching success rates increased over time (Figure 10). This increase can most likely be attributed to the reduction in poaching and improved nest translocation techniques.

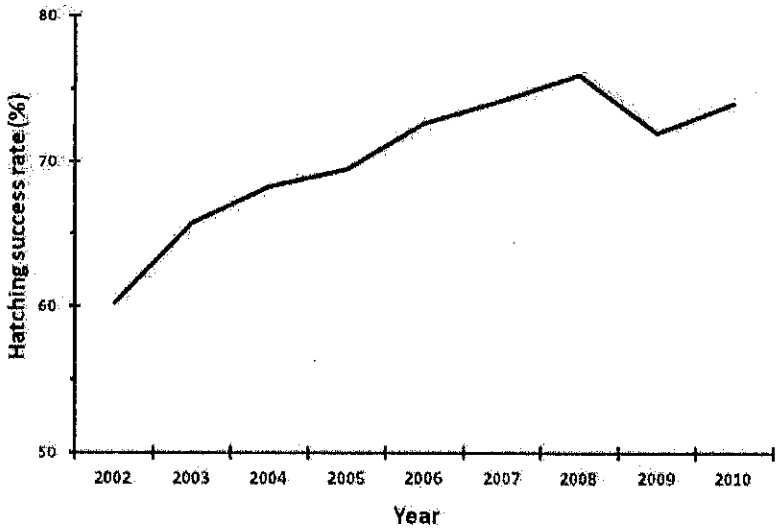


Figure 10: Hatching success rates in Mafia Island, 2002 - 2010

3.2.2 Sea Turtle Tagging

An intensive flipper tagging programme was planned for April and May 2011, during the peak nesting season. However due to delays with funds and the production of tags in Australia, tagging was only conducting during the last 20 days of May.

Six Sea Sense Conservation Officers and four members of Juani community attended a tagging training workshop. The training consisted of a one day theoretical training session focusing on sea turtle biology and handling and tagging protocols followed by a one day practical session in Juani.



Plate 5: Flipper tagging training, Mafia District

The four most important nesting beaches in Juani (Kishiko Kikubwa, Jiwe la Mzungu, Mvinjeni and Yuyuni) were targeted for the tagging programme. A team of two people, comprising one Conservation Officer and one community member, patrolled the beach during the hours of 7pm and 6am. Each team was issued with the necessary field equipment including flipper tags and a tag applicator, a disposable camera, tape measure, torch, bucket, towel, gloves, rain coats and a tent. Turtles were tagged following egg deposition and covering of the nest to prevent any disturbance during the nesting process. The curved carapace length (CCL) and curved carapace width (CCW) were taken and the turtle examined for any evidence of previous tagging. Each tagged turtle was photographed to show the tag numbers and confirm that tagging had been completed.

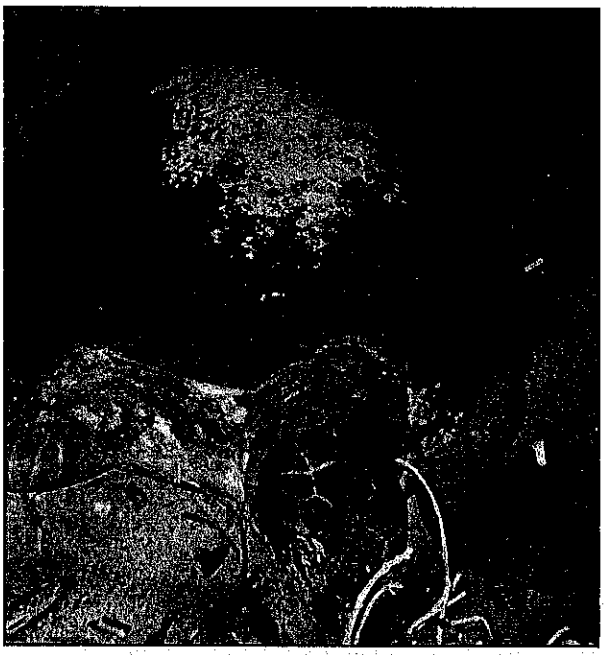


Plate 6: Green turtle showing location of flipper tag

Table 1 shows tagging data collected in May. Eight sea turtles were tagged (t), each with two tags to take account of tag loss.

Species	Date	Location	Tag Numbers	CCL	CCW	Status	Remarks
Green	12/05/2011	Mvinjeni	TZ009 & TZ010	103	93	T	Nesting
Green	15/05/2011	Mvinjeni	TZ011 & TZ012	102	98	T	Nesting
Green	15/05/2011	Yuyuni	TZ017 & TZ018	108	97	T	Nesting
Green	17/05/2011	Yuyuni	TA 153	109	99	S	False crawl
Green	17/05/2011	Yuyuni	TZ019 & TZ020	109	99	T	Nesting
Green	18/05/2011	Mvinjeni	TA153	109	99	S	False crawl
Green	18/05/2011	J. Mzungu	TZ001 & TZ002	104	97	T	Nesting
Green	18/05/2011	J. Mzungu	TZ003 & TZ004	110	104	T	Nesting
Green	19/05/2011	Yuyuni	TA153	109	99	S	Nesting
Green	21/05/2011	J. Mzungu	TZ005 & TZ006	105	101	T	Nesting
Green	21/05/2011	J. Mzungu	TZ007 & TZ008	107	109	T	Nesting
Green	23/05/2011	Mvinjeni	TZ009 & TZ010	130	93	S	Nesting

Table 1: Tagging data, May 2011

One previously tagged turtle was sighted (s) nesting. TA153 was first tagged on 11th May 2004 when she nested on Kishiko Kikubwa beach.

An intensive tagging programme is planned in Juani Island, Mafia District, during the eight week nesting peak in 2012. The objective of the intensive tagging programme is to collect data on the

status of the nesting population in Juani, identify intra-nesting durations, clutch frequencies, levels of nest site fidelity and post nesting migratory periods. Such information is vital to the development of effective sea turtle management strategies.

3.2.3 Sea Turtle Mortalities

In 2011, 166 dead turtles were recorded washed up on Tanzania's beaches or found floating at sea. Based on carapace determination, 156 mortalities were green turtles, eight were hawksbill, one was an olive ridley and one was unidentified. Table 2 shows sea turtle mortality data collected by Sea Sense in 2011.

Location	Green	Hawksbill	Olive ridley	Unidentified	Total
Temeke	52	1	0	0	**53**
Mkuranga	3	1	0	0	**4**
Rufiji	54	6	1	0	**61**
Kilwa	4	0	0	0	**4**
Mafia	2	0	0	0	**2**
Pangani	41	0	0	1	**42**
Total	**156**	**8**	**1**	**1**	**166**

Table 2: Sea Sense Turtle Mortality Data, 2011

The curved carapace length (CCL) of the stranded green turtles ranged from 15cm to 115.5 cm with an average of 62.3cm (SD±23). Figure 11 shows the size - frequency distribution of CCL's amongst the stranded green turtles.

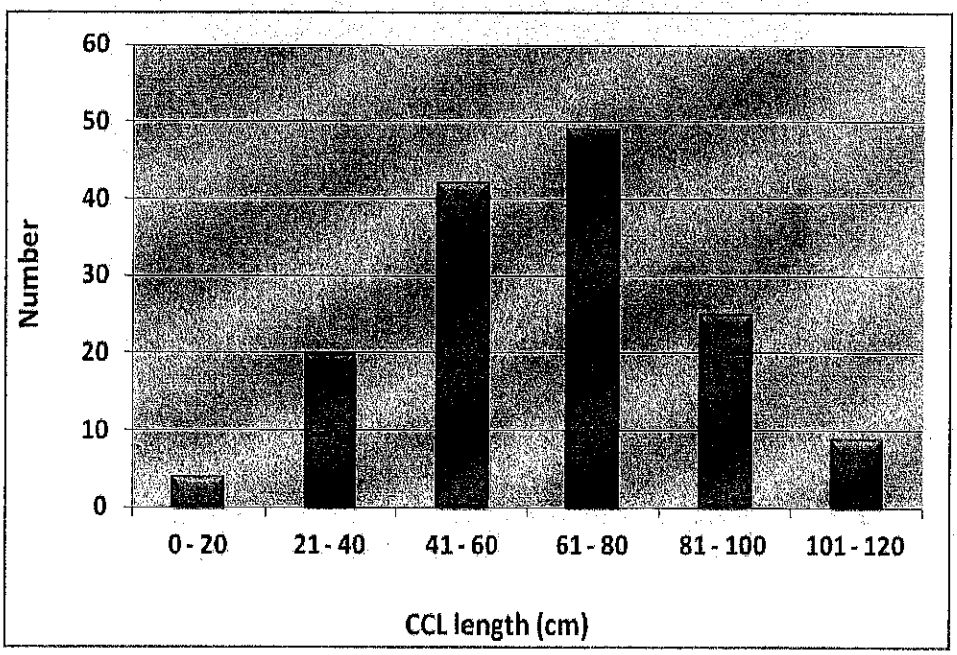


Figure 11: Size frequency distribution for stranded green turtles in 2011

The majority of CCL measurements were well below average carapace length for breeding green turtles (CCL 95cm) which suggests that Tanzanian waters are an important foraging ground for juvenile green turtles but pose a significant threat to their survival.

It is only possible to determine the sex of adult sea turtles (CCL>95cm). Of the adult mortalities (n: 16), nine were female, six were male and in one case the sex was indeterminable.

Many of the stranded turtles showed evidence of knife injuries to the head and some had had their flippers cut off. Many of the mortalities were the result of deliberate slaughter and only the carapace remained.

The first reported case of fibropapilloma in Tanzania was recorded in October 2011. The disease is caused by a virus and is commonly found in juveniles and sub-adults. Green turtles are the most commonly affected species. Afflicted turtles develop benign cauliflower-like tumours on their soft and hard tissues, both internally and externally. The tumours are highly variable in size, ranging from small spots to large growths weighing upwards of three pounds. The growths may become so large that they obstruct the turtle's eyes and mouth. Large growths on flippers can impede swimming.

A green turtle in Temeke District was reported stranded on the beach and had numerous tumours around the neck region and fore flippers.

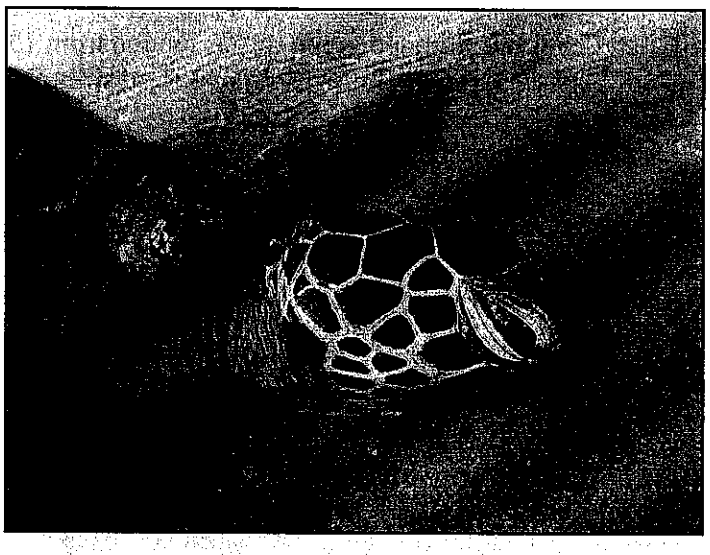


Plate 7: Fibropapilloma in a stranded green turtle, Temeke District, October 2011

Sea turtle stranding data is being used to identify communities who frequently slaughter sea turtles so that details can be reported to the appropriate authorities for action. Data is also helping to ensure education and awareness programmes target those communities who repeatedly participate in this illegal activity.

3.2.4 Sea Turtle Ecotourism

Due to the presence of a number of hotels in the vicinity of sea turtle nesting beaches in Mafia, Pangani and Temeke Districts, Sea Sense has developed a sea turtle ecotourism initiative to generate a sustainable source of revenue for sea turtle conservation and local community development projects. Visitors are guided to nesting beaches by Turtle Tour Guides who have been recruited from the local community and received training in sea turtle biology, communication skills and visitor management. Visitors are able to witness sea turtle hatchlings emerging from their nest and learn about sea turtle conservation efforts in Tanzania.

Ecotourism Infrastructure

Access routes were cleared to Mvinjeni and Jiwe la Mzungu nesting beaches in Juani, Mafia Island, with the help of the local community. Members of Juani community also assisted Sea Sense in the construction of a beach shelter at Kishiko Kikubwa beach. Construction of the shelter took three days.

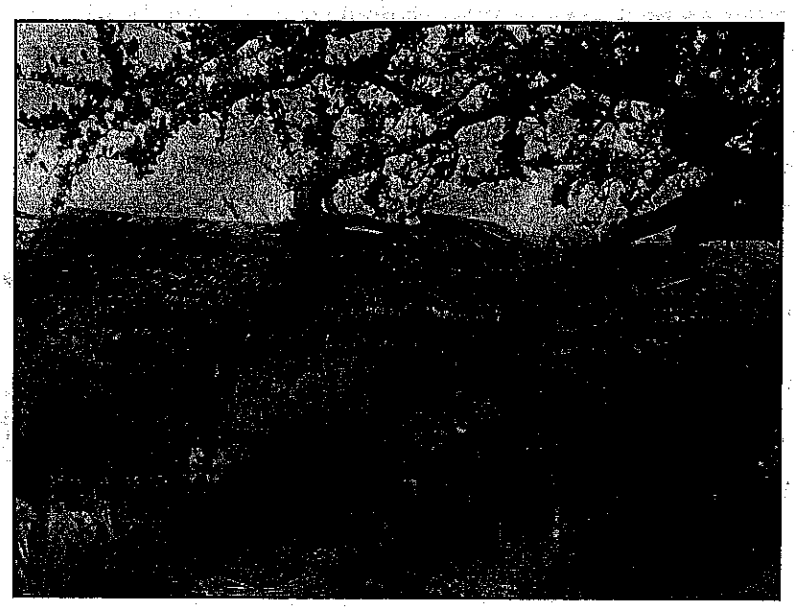


Plate 8: Shelter construction, Juani Island

On completion of the shelter, Sea Sense staff visited each of the hotels to inform hotel managers that a shelter was available for their guests to rest and picnic.

Large amounts of litter and plastic debris continued to be a problem on nesting beaches in Juani. Visitors to Juani complained repeatedly about the amount of litter and plastic waste on both the access routes and on the turtle nesting beaches. To address this issue, a meeting was held between Juani village council, Mafia Island Marine Park and Sea Sense. Juani leaders were reminded that the community were stakeholders in the sea turtle ecotourism initiative and had a duty to assist in delivering a professional and quality experience. The council agreed to mobilise the community and keep nesting beaches clear of litter and plastic debris. It was also agreed that if Juani failed to keep

their commitment then a proportion of the sea turtle ecotourism revenue would be withheld to fund a regular beach clean-up team.

Income Generation

During 2011, sea turtle ecotourism generated important revenue in five coastal communities in Tanzania: Mafia (1), Temeke (2) and Pangani (2). The mode of revenue collection was agreed with key stakeholders at each location.

Hoteliers in Mafia District agreed to donate $10 per adult and $5 per child to Sea Sense for each excursion to a sea turtle nesting beach. The revenue is collected by each hotelier and then transferred to Sea Sense on a six monthly basis.

Many visitors to turtle nesting beaches in Temeke were residents of Dar es Salaam undertaking a day trip to witness a turtle hatching event. Sea Sense formed a link with a local safari operator, Authentic Tanzania, in Dar es Salaam to promote sea turtle ecotourism in Temeke District. Authentic Tanzania offer trips to watch turtle hatchings and donates 40% of the cost of each excursion to Sea Sense. Sea Sense and Authentic Tanzania produced a flier to promote sea turtle viewing which was distributed widely in Tanzania. Their staff received training from Sea Sense in turtle biology and conservation and were issued with the Sea Sense Endangered Species Training Manual. In 2011, Authentic Tanzania raised $1,350 for Sea Sense.

A number of guests participated in sea turtle ecotourism in Temeke District independently. In such cases, payment was made at the Sea Sense office prior to the hatching event.

In Pangani District, Sea Sense is collaborating with a dive operator near to Ushongo village to promote sea turtle ecotourism. Many visitors made voluntary donations which were collected by the dive operator and used to fund a patrol boat and fuel to Maziwe Island to translocate the nests which would otherwise have been inundated by the high tide.

Table 3 shows total income generated from sea turtle ecotourism at each location during 2011.

Village	District	Income ($)
Amani Gomvu	Temeke	2,268
Kimbiji	Temeke	430
Juani	Mafia	2,830
Ushongo	Pangani	N/A
TOTAL		**5,528**

Table 3: Ecotourism income generation, 2011

Half of all revenue from sea turtle ecotourism was donated to 'Village Environment Funds' established by Sea Sense in villages close to turtle nesting beaches. Village leaders were requested to communicate this information to the wider community to ensure that the community was aware of

the economic benefits of sea turtle conservation. In 2011, TSh 3,975,000 was donated to villages in Mafia, Temeke and Pangani Districts.

To raise further income through ecotourism, a local artist designed a turtle t-shirt for Sea Sense. The t-shirt is now on sale at several outlets including lodges in Mafia and a dive centre in Dar es Salaam. Adult t-shirts are sold for $15 and children's t-shirts are sold for $10.

Since September 2011, t-shirts sales have raised $1,615.

Marketing of Sea Turtle Ecotourism

Sea Sense produced a document entitled 'Sea Turtle Ecotourism: Guidelines for Development'. The document sets out the key objectives of sea turtle ecotourism in Tanzania and identifies opportunities and challenges for the initiative. The document was circulated to several stakeholders for comment including Tanzania Tourist Board, local tour operators, tourism marketing consultants and WWF.

The document formed the basis of a one day sea turtle ecotourism workshop held in Arusha in June 2011 to coincide with the annual Karibu Tourism Fair. Sea Sense invited six experts in the field of ecotourism and marketing to attend and discuss sea turtle ecotourism with a view to providing advice and guidance for the long term success and sustainability of the initiative.

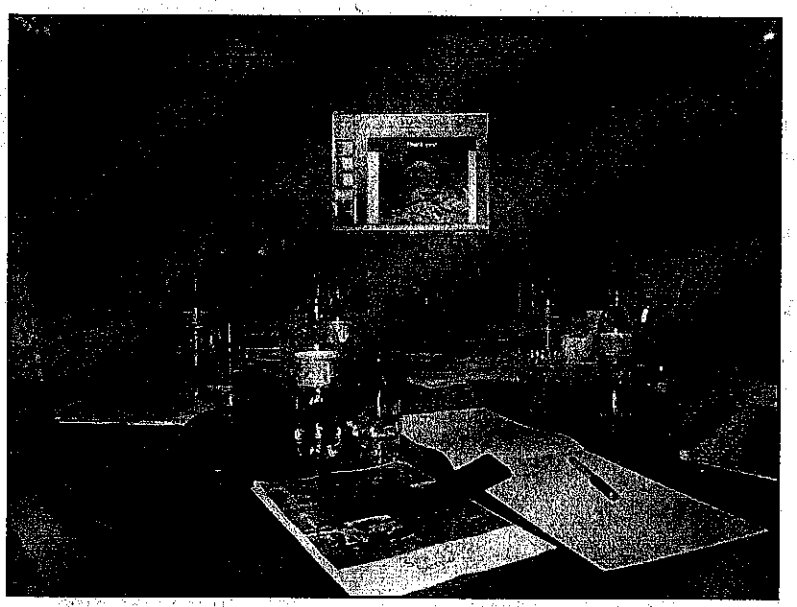


Plate 9: Sea turtle ecotourism workshop, Arusha

The workshop was extremely valuable and the participants provided some very important feedback and ideas to help Sea Sense market sea turtle ecotourism more effectively.

The Sea Sense Coordinator attended a one day training course entitled 'E-Tourism' which covered all aspects of marketing tourism online. E-marketing is widely regarded as the most effective form of marketing and enables tourism providers to access potential visitors while still in the planning phase of their trip.

Sea Sense met with the Sales and Marketing Manager of the www.mydestination.com Tanzania franchise. The manager generously donated a years' worth of advertising (worth USD 1,700) on the Tanzania section of the www.mydestination.com website. The promotional article can be found at: http://www.mydestination.com/tanzania/travel-articles/72356/sea-sense

Sea Sense has developed working relations with several members of the tourism sector who have helped to publicise sea turtle ecotourism. Mafia Island Lodge included a detailed article about sea turtle ecotourism opportunities in their latest newsletter and a tour operator called 2Tanzania has also promoted sea turtle ecotourism in their newsletter and website.

3.2.5 Turtle Nest Adoption Scheme

Sea Sense promotes a sea turtle nest adoption scheme to generate further revenue to support sea turtle conservation activities. A sea turtle adoption pack has been produced which contains an adoption certificate, a sea turtle poster, photographs of hatchlings, a children's puzzle page and a bookmark. The pack provides information on sea turtle biology and life history, sea turtle conservation in Tanzania and the role of communities in sea turtle protection.

A sea turtle adoption costs $50. During 2011, 51 nests were adopted, generating $2,550.

3.3 Whale Shark Conservation

There have been no specific conservation activities related to whale sharks during 2011 due to availability of funds.

3.4 Cetacean Conservation

3.4.1 Cetacean Mortalities

Sea Sense Conservation Officers collect data on cetacean mortalities during their daily patrols. During 2011, seven mortalities were recorded, as shown in Table 4.

Date	District	Location	Species	Length (cm)	Width widest point (cm)	Sex	Comments
06/02/2011	Rufiji	N/A	Unidentified dolphin	203	52	F	Stranded
04/03/2011	Rufiji	N/A	Unidentified dolphin	244	58	F	Stranded
04/04/2011	Rufiji	Mbwera	Whale (humpback)	450	195	N/A	Stranded
04/05/2011	Rufiji	Jaja	Unidentified dolphin	256	62	M	Stranded
23/05/2011	Rufiji	N/A	Unidentified dolphin	320	56	F	Stranded
04/08/2011	Rufiji	Kipeta Msala	Whale (humpback)	455	188	N/A	N/A
14/08/2011	Rufiji	Pombwe	Unidentified dolphin	355	71	F	Stranded

Table 4: Cetacean mortalities recorded by Sea Sense in 2011

3.5 Community Participation

3.5.1 Conservation Officers

During 2011 the Sea Sense Conservation Officer (CO) network comprised 34 CO's in six coastal districts. CO's operated in Mafia (6), Temeke (13), Mkuranga (4), Pangani (5), Rufiji (4) and Kilwa (2). Their duties included conducting daily patrols to collect data on endangered marine species, monitoring and reporting illegal activities and raising awareness in their communities.

In September 2011, a further two CO's were recruited in Stahabu and Kipumbwi villages in Pangani District.

A refresher training session was held with CO's in Rufiji and Kilwa in June. Topics covered included sea turtle and dugong biology, threats to endangered marine species, procedures for conducting Sea Sense patrols, monitoring and reporting of illegal activities, ecotourism opportunities, data collection strategies, feedback to village councils and waste management.

There were also extensive discussions on strategies to engage CFMA members in dugong conservation. CO's were reminded about the significance of their role in the wider community and the importance of developing good working relationships with village councils so that regular feedback can be given to the community during village assembly meetings.

3.5.2 Sea Turtle Nest Incentive Scheme

Sea Sense operates a nest incentive scheme whereby small financial incentives are given to villagers who report sea turtle nests. Incentives consist of a founder incentive of TSh 5,000 together with TSh 100 for every egg that hatches successfully and TSh 50 for every egg that fails to hatch. The scheme has proven to be a successful way of involving local communities in sea turtle conservation and enhancing perceptions of the value of live sea turtles.

During 2011, a total of TSh 5,645,500 was paid to local communities through the nest incentive scheme.

3.5.3 Village Meetings

Regular meetings were held in all villages where Sea Sense is currently conducting marine conservation activities to elicit support for project activities and ensure that communities remain fully aware of and engaged in Sea Sense activities. Issues relating to endangered marine species conservation, illegal fishing, coral mining, mangrove cutting and sea cucumber exploitation were discussed.

Meetings in Somanga and Kilwa Kivinje (Kilwa District) focused on providing an overview of Sea Sense aims, objectives and projects since many of the members were newly elected and did not have any knowledge of Sea Sense work. There was also limited understanding of the term 'endangered marine species' with many members asking why there was a need to conserve sea turtles and dugongs. Sea Sense gave detailed explanations about the historical and current status of these species and answered several questions about Sea Sense efforts to conserve them. Sea Sense t-shirts were distributed to each council member.



Plate 10: Village council meeting in Kilwa Kivinje

Sea Sense also introduced the subject of waste management and explained how poor disposal of waste can impact the marine environment. Council members were extremely interested in this topic; particularly the effects of plastic waste on human health and asked for further advice on how waste could be managed.

At the end of the meeting in Kilwa Kivinje, the village chairperson read a village report regarding progress in marine protection and strategies they had implemented to fight against illegal activities. From his report it showed that they had managed to make some progress in the fight against dynamite fishing by holding regular awareness meetings with fishers. However, there was little progress in relation to curbing illegal slaughter of sea turtles.

Almost all of the village council members at the Somanga meeting stated that they were unaware of the 2009 Fisheries Regulations, although this is unlikely to be true considering the level of training and awareness already undertaken by WWF and Sea Sense. Sea Sense reminded the members that BMU implementation is part of the Fisheries Regulations so cooperation is needed. However, members would not agree and stated that they would hold their own discussions on the matter.

Sea Sense held a village council meeting in Jibondo Island in Mafia District together with the Ward Representative. Jibondo Island is within Mafia Island Marine Park (MIMP) but the community does

not cooperate with MIMP or engage in any conservation activities. It is a known nesting site for sea turtles but there are thought to be high levels of sea turtle slaughter and consumption.

Sea Sense provided background information on project activities and explained the importance of conserving and protecting endangered marine species. However, Jibondo village council leaders had a poor attitude towards protection and conservation of marine resources and were unwilling to engage in discussions about conserving sea turtles in Jibondo. Some council members admitted that they themselves were involved in sea turtle slaughter and nest poaching and stated that they were usual activities within the Jibondo community. They stated that they were not interested in laws and regulations which protect endangered marine species and their products.

After embarking on long discussions with lots of examples, some of the village leaders became more aware and began to understand the conservation significance of sea turtles. Council members assured the Ward Representative that they would discuss the issue at their monthly village assembly meeting and provide feedback on their decision as a whole village community after 30th June 2011. However, despite repeated follow ups, Jibondo village council refused to enter into any further discussions regarding participation in a sea turtle conservation project.

3.6 Training

3.6.1 Participatory Video on Dynamite Fishing
In February, Sea Sense joined forces with Sand County Foundation, WWF and Youth Vision Kigamboni to make a documentary about the impacts of dynamite fishing in Buyuni village, Temeke District. The film was produced using a technique called 'Participatory Video' whereby villagers were trained in the use of cameras, tripods and microphones, interviewing, filming and editing. In this way the villagers were able to explore issues relevant to them and document their own stories.

10 village leaders in Buyuni were trained and conducted numerous interviews and discussions with members of their community who had been affected by dynamite fishing including an interview with a fisherman who had lost both his arms in a dynamite fishing accident. The material was edited and the final version was shown to the community during an evening awareness raising event. Sea Sense has since shown the film in several other villages along the coast to encourage communities to take action against dynamite fishing.

3.6.2 Teacher Training Workshop
Environmental education is non-existent in many schools along the coast due to limited knowledge amongst education providers. In April, Sea Sense conducted a teacher training workshop for primary school teachers in Pangani District to equip them with skills and knowledge to take back to their classrooms.

32 teachers from 16 schools attended the three day workshop which included a series of lectures, presentations, environmental games and field trips. The teachers learnt how to design their own lessons plans and deliver creative and interactive education programmes with only minimal resources.

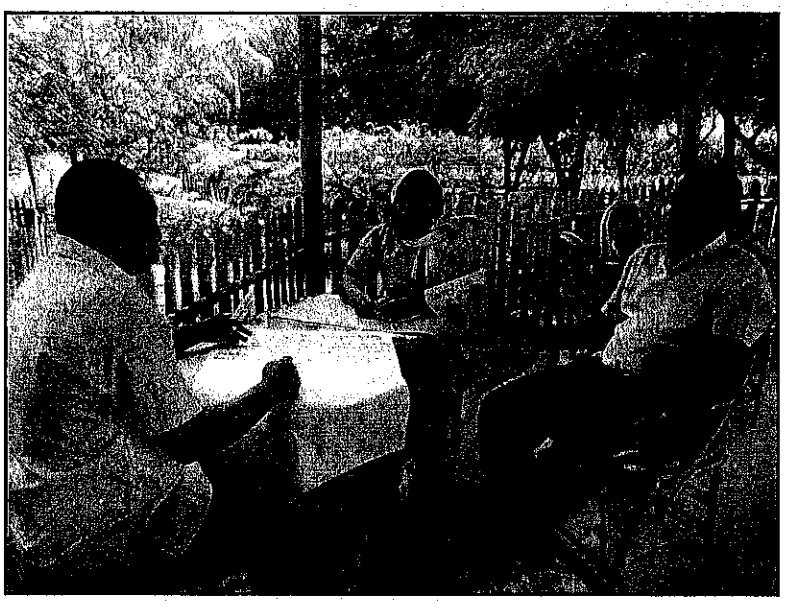
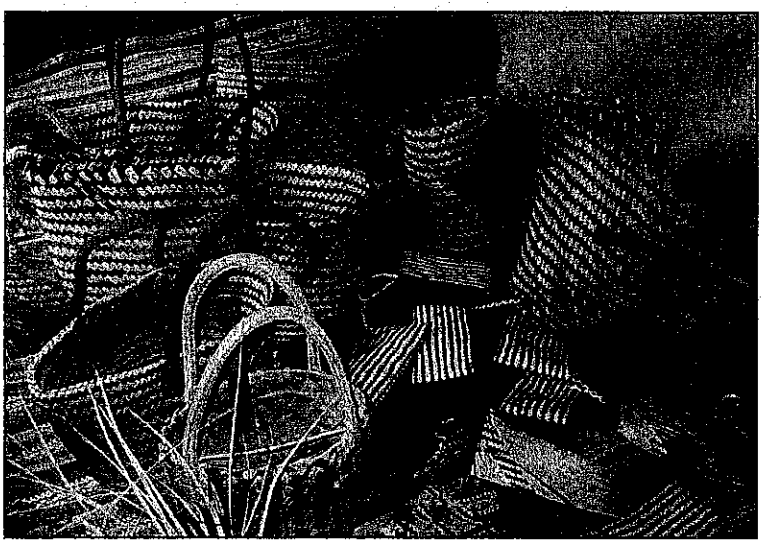


Plate 11: Teachers share ideas during a lesson planning exercise

Each school will be visited by Sea Sense staff in 2012 to assess the impact of the training workshop and provide support for the teachers to continue delivering environmental education programmes.

3.6.3 Handicrafts Training

To reduce pressure on critical marine resources, Sea Sense works closely with local communities to develop alternatives to unsustainable fishing practices that threaten the survival of endangered sea turtles and dugongs. In November 2010, a group of 40 women were trained in grass cutting, dying and weaving to develop local handicrafts for sale to visitors participating in sea turtle ecotourism.



A follow up training workshop was held in April 2011. The women were trained in the use of a wider range of handicrafts materials and taught how to produce additional products including baskets and purses. Some of the products have been sold to other families in the village. The project is helping to generate important revenue for the community and is supporting Sea Sense efforts to engage the wider community in marine conservation and protection.

Plate 12: A sample of the products being produced in Juani

After the training session the handicrafts group were invited by Mafia District Council to attend a 'Women's Day' celebration in Kilindoni where they were able to sell some of their products. They were awarded a certificate by the District Commissioner for the best handicrafts group in Mafia District. The women have since received training from Mafia District Council in entrepreneurial skills including marketing, pricing and management of revenue.

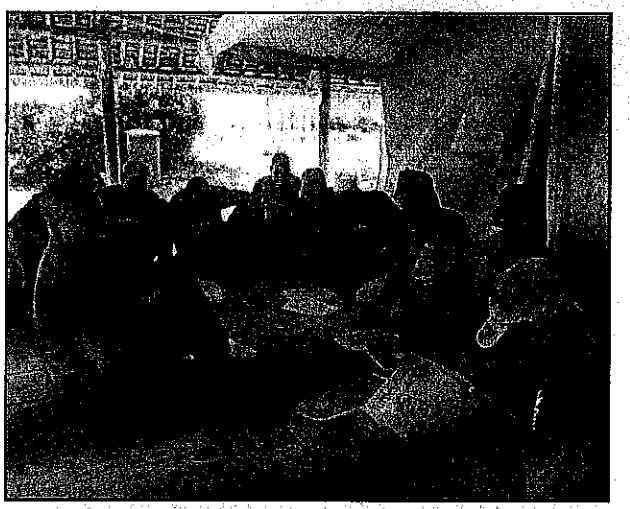
In October, Sea Sense invited Mafia Island Marine Park (MIMP) staff and the Mafia Community Development Officer to meet with Juani women's handicrafts group. The aim of the visit was to monitor their progress and to encourage them to continue producing quality handicrafts for sale to local communities and visitors to Mafia.

The group reported that they had produced a large range of woven products many of which had already been sold and they were also receiving additional orders. The group produced and sold baskets for TSh 7,000 to 10,000 and small purses for TSh 3,000 to 5,000. The group requested a dedicated area to display and store their materials and products.

3.6.4 Sea Turtle Training for the Tourism Sector

In March, Sea Sense visited Fanjove Island in Kilwa District, following notification that a number of green turtle nests had been laid there during 2010. The island is currently being developed by a tour operator and there were a number of security guards present on the island who had reported the nests. Due to their low level of knowledge and understanding of sea turtle biology, several of the nests that they reported in 2010 had failed due to inundation by the tide.

To improve survival rates of future nests, Sea Sense provided practical training sessions to develop skills in nest identification, translocation protocols, post hatching excavations, and hatching Codes of Conduct. This training was backed up by theoretical training in sea turtle biology and life history. The trainees were provided with a number of ID charts, fact sheets and turtle posters. 10 guards participated in the training.





Plates 13 & 14: Theoretical training (left), practicing nest translocation techniques (right)

Sea Sense will continue to conduct routine visits and communicate with staff to support the progress of sea turtle monitoring in Fanjove Island.

In March, Sea Sense also provided training for eight staff at *Mnemba Island Lodge* in Zanzibar which supports an important population of nesting green turtles. Staff at Mnemba have monitored the sea turtle population since 2001 which makes it one of the longest running sea turtle monitoring programmes in Tanzania. Training in nest identification, nest translocation protocols, flipper tagging, nest excavations and sea turtle viewing Codes of Conduct was provided to new staff.

In July, 15 staff at *Saadani Safari Lodge* received both theoretical and practical training in sea turtle biology and conservation. Efforts were focused on the management of sea turtle ecotourism since green turtles nest near to the lodge and managers were interested in providing sea turtle watching experiences.

In November, six staff at *A Tent With A View* in Saadani also received training in sea turtle conservation and ecotourism.



Plate 15: Training for staff in the tourism sector

3.6.5 Bycatch Awareness Training

Bycatch in artisanal and commercial fishing gears poses the single biggest threat to sea turtle survival on a global scale. In Tanzania, entanglement in artisanal gill nets is a significant threat to foraging and migrating sea turtles.

Sea turtle stranding data shows that there is a high incidence of gill net entanglement around Sange in Pangani District. In July, Sea Sense held a bycatch awareness training session for a group of gill net fishers from Sange village with the aim of raising awareness of the threat to sea turtles from fisheries interactions and providing training in simple techniques to release live sea turtles from fishing nets.

The group requested the training from Sea Sense because they had already participated in Sea Sense endangered marine species awareness activities and therefore had a good understanding of the need to conserve sea turtles. However, many were afraid of being taken to court if they reported an entangled sea turtle and some confessed to killing entangled sea turtles immediately.

10 fishers participated in the training and were provided with basic information about sea turtle biology to improve understanding of how net entanglement can kill sea turtles. They were then advised on how to release an entangled sea turtle depending on the size of the turtle and the number of boat crew available to assist.

3.6.6 Mnazi Bay-Ruvuma Estuary Marine Park (MBREMP)

The Mnazi Bay – Ruvuma Estuary Marine Park (MBREMP) is located to the south of Mtwara town in southern Tanzania, including the last 45 kilometres of coastline to the Ruvuma River forming the border with Mozambique. MBREMP provides important foraging grounds for all five species of sea turtle found in the Western Indian Ocean: green *(Chelonia mydas)*, loggerhead *(Caretta caretta)*, olive ridley *(Lepidochelys olivacea)*, hawksbill *(Eretmochelys imbricata)*, and leatherback turtles *(Dermochelys coriacea)*. There is also a small but critical population of nesting green turtles within MBREMP which utilise beaches in the southern part of the Park.

WWF Tanzania Country Office (WWF-TCO) has been implementing a project *'Community Development and Sustainable Management of Marine Resources"* in MBREMP since 2007 and identified an opportunity to improve sea turtle conservation and protection within the park and increase community participation in a sea turtle monitoring programme. Sea Sense was engaged on a consultancy basis to provide training and strengthen capacity for sea turtle monitoring within MBREMP.



Plate 16: Msimbati village assembly meeting

Sea Sense, in collaboration with MBREMP staff, held village council meetings in three villages: Msimbati, Tangazo and Litembe which were all considered to be key stakeholders in sea turtle conservation within MBREMP. Following the village council meetings, full village assembly meetings were held in each village to gain a clearer understanding of community perceptions of sea turtles, improve understanding of the critical role of sea turtles in the wider marine ecosystem and strengthen relations between the communities and MBREMP.

A three day training session focusing on sea turtle conservation was held in November 2011 and included both theoretical and practical components. Community Turtle Officers (CTO's) and village leaders from Msimbati, Litembe and Tangazo were invited to attend together with relevant MBREMP staff. 17 people attended the training: four CTOs from Msimbati and Litembe villages, five newly elected CTOs from Msimbati (two), Litembe (two) and Tangazo (one) villages, five village leaders from Msimbati, Litembe and Tangazo villages and three MBREMP staff members. The training was delivered by the Sea Sense Education Officer and Field Officer.

The Sea Sense team gave a presentation on marine ecosystems and explained the interdependency between species and habitats. The role of endangered marine species such as sea turtles and dugongs within the marine ecosystem was also discussed. The participants were given detailed information on sea turtle biology and life history including species names, local and common names, habitats, diets and life cycles (nesting, foraging and migration patterns).

With a clearer understanding of the sea turtle life cycle, participants were able to understand the importance of an effective nest monitoring programme. Practical field conservation techniques were introduced which included locating a sea turtle nest, species identification from nesting tracks, techniques to establish the location of the nest chamber, nest translocation protocols, post hatching excavations and flipper tagging. Participants were given the opportunity to ask questions and clarify details of the field techniques.

Practical training was conducted at Ruvula and Msimbati sites. At the start of the practical training, the participants and the Sea Sense team conducted a beach patrol to assess the features of the beach which made it suitable for nesting sea turtles.

The participants then gathered for a recap on the practical skills that had been introduced and discussed during the theory sessions. Each participant was required to practise identifying a nest, translocating it to a safer area and excavating it to determine hatching success.

After each of the skills had been perfected, the participants were taken to an area near to Msimbati where sea turtles are regularly slaughtered for consumption. More than 60 fresh carapaces were counted. The existence of this site was a shock to some of the participants and helped to reinforce the need for a sea turtle conservation strategy in MBREMP.

Sea Sense assisted MBREMP staff with the development of an appropriate work plan for the sea turtle conservation programme and associated activities for 2012. Four MBREMP staff participated in the development of the plan. The work plan included a timetable for beach patrols, monitoring meetings with CTO's, village meetings and awareness activities. The work plan will facilitate the timely management of programme activities and enable effective monitoring of the progress of sea turtle conservation in MBREMP.

3.6.7 UDSM Students

Between August and October, two students from the University of Dar es Salaam completed an eight week placement at Sea Sense. The students participated in dugong bycatch surveys in Mkinga

District, CFMA training workshops in Rufiji and Kilwa Districts and met with Conservation Officers in Temeke District to learn more about practical sea turtle conservation techniques.

The students also undertook several administrative tasks in the Sea Sense office including a desk study of regional dugong conservation strategies and entry of bycatch data.

3.7 Education and Awareness

3.7.1 World Environment Day

In keeping with Sea Sense efforts to raise awareness of the importance of a clean and healthy marine environment, a community clean up day was organised in Mafia District to coincide with World Environment Day on June 5th. Clean up activities were conducted in Kilindoni, Kigamboni and Kulungeni, in collaboration with local environmental conservation groups. A truck was organised to transport the collected waste to a landfill site designated by Mafia District Environmental Management Officer. More than seven truckloads were collected. There was a lot of interest in the activity and high participation amongst the local community.



Plates 17 & 18: Community clean-ups in Mafia District on World Environment Day

3.7.2 World Sea Turtle Day

Thursday 16th June was 'World Sea Turtle Day'. To celebrate, Sea Sense organised a community sports day in Juani Island, Mafia District, to raise awareness of the importance of conserving and protecting sea turtles and encourage commitment to conserving Tanzania's most important sea turtle nesting site. The celebration was formally opened by the Ward Representative for Jibondo. Football and netball matches were played out in front of crowds of spectators from the local community. The winning teams were presented with t-shirts and new sports equipment and hundreds of sea turtle posters were distributed amongst the community. Many villagers also took part in beach clean-ups on two of Mafia's most important sea turtle nesting beaches. The event was a huge success and celebrations carried on long after dark.




Plates 19 & 20: Juani football team celebrate their win over Utende (left) and the ladies netball teams receive their prizes (right)

3.7.3 Waste Management Education

Awareness of the impacts of poor waste management on the marine environment is seriously lacking in many of the villages along the Tanzanian coast. There is also a lack of knowledge in communities about ways to reduce or dispose of waste. Waste management is not included in the school curriculum and many people remain ignorant of simple ways to manage different types of waste.

Mafia Island in particular suffers from poor waste management. Mafia Island has limited facilities to cope with waste disposal and because of ocean currents, litter from other areas around the world washes up on the shores of Mafia, adding to the waste generated by Mafia Island residents. In view of this, Sea Sense conducted a waste management education programme for three secondary schools in Mafia District: Kilindoni, Chemichem and Kitomondo schools. The objectives of the waste management education programme were:

- To raise awareness of waste issues in Mafia Island
- To provide education on ways to manage different types of waste
- To improve understanding of the impacts of waste on the marine environment

Four waste management sessions were delivered in each school, lasting one and a half hours each. 40 students attended the sessions in each school. The sessions focused on the following:

- The ecosystem concept and basic marine environmental biology
- Threats to the marine environment
- Pollution

The sessions consisted of lectures, group discussions and interactive games to help understanding of the concepts and encourage interaction.



Plate 21: Students play the 'Web of Life' game

There was a particular focus on plastic pollution which is one of the biggest pollution threats to the marine environment. The "4 R's" (Refuse. Reduce. Reuse. Recycle.) were introduced and students were asked to brainstorm ideas of how they could achieve each. The students were then given detailed drawings and descriptions of useful items that could be made out of discarded plastic bottles including hand washers, flytraps and rain gauges. Sea Sense asked the students to attempt to make one of the items at home to bring to class the following day.



During the third session Sea Sense asked each student to draw a picture of their perception of the marine environment and provided paper and art materials including water-colour paints, crayons and marker pens. A number of students also came to class with hand washers and flytraps that they had made at home. The entire class was dedicated to art and creativity focused on waste management. At the end of the day, Sea Sense held a competition for the best hand washer of the class and awarded a prize to the winner.

Plate 22: A recycled hand washer is put to the test!

Sea Sense also organised a number of beach clean-up days to raise awareness of the threat to nesting sea turtles and the health of the local community. Sea Sense recruited assistance from a variety of sources including Juani handicrafts group, school pupils from Mafia secondary schools, a local netball team and an environmental group. Beach clean-ups took place on several sea turtle nesting beaches in Juani, on public beaches in Utende village and at the harbour in Kilindoni.



Plate 23: Students from Kitomondo Secondary School take part in a beach clean-up in Juani Island

3.7.4 Theatre for Development

Theatre for Development (TFD) is a participatory tool for creating learning opportunities and educational entertainment in rural communities. Members of the community are trained as TFD 'artists' and design a storyline based on an existing issue of concern within their community. The performance is specifically designed to pose questions and issues for discussion in order to have an exchange of ideas and experience. By involving local people in interactive play performances on a range of social issues (eg health, climate change, resource management), TFD builds a forum for creative, collective learning and empowers communities to develop solutions to a range of social, cultural and environmental issues.

With the help and guidance of staff from Bagamoyo College of Arts, Sea Sense organised two TFD events in Pangani District. Villagers in Choba and Sange villages were trained in TFD techniques including role playing and story-telling, to create a number of short plays to convey messages about the impact of human activities on the marine environment.

Following a week of training and rehearsals the performances took place in each of the villages and hundreds of villagers came to watch. The 'artists' acted out a series of short sketches including a piece involving two fishers who had accidentally captured a sea turtle in their net and were debating whether it should be released or slaughtered.



Plate 24: TFD performers in Choba village, Pangani District

The sketch provoked intense discussion about the right to eat sea turtles. Some felt strongly that sea turtles were an important source of protein while others argued that slaughtering sea turtles damaged the very ecosystem on which they depended for their livelihoods. After intense debate, the communities agreed that the turtle should be 'released'. Theatre proved to be an effective tool to raise awareness and change attitudes towards conservation initiatives.

3.7.5 Fishers Marine Conservation Workshop

Millions of people in Tanzania's coastal zone rely on marine resources for their livelihoods yet have virtually no understanding of the impacts of human activities on the marine ecosystem and lack the necessary skills to manage marine resources sustainably.



Plate 25: Fishers workshop, Pangani District

To address this lack of capacity and understanding, Sea Sense organised an education and awareness workshop targeting local fishers in Pangani District together with a number of village leaders. The objective of the workshop was to equip fishers with essential knowledge and understanding of the link between conservation and livelihoods and the important role of endangered marine species in the wider marine ecosystem. The workshop consisted of presentations, group discussions, interactive games and a field trip to conduct a beach clean-up.

During the workshop it was clear that there was a widely held belief amongst the fishers that there were no economic benefits from conservation and none of the participants understood the link between conservation and livelihoods. Most believed that conservation activities could only be conducted by the Government of Tanzania and local communities had no role to play. Others believed that the community needed lots of money to be able to participate in conservation activities.

By the end of the workshop, many of these beliefs and perceptions had been dispelled and participants understood the importance of local community involvement in marine resource conservation.

3.7.6 DVD Shows

Marine conservation films were shown in Kilwa Kivinje (Kilwa District), Kipumbwi and Stahabu (Pangani District) and Mbutu, Amani Gomvu, Kimbiji, Buyuni and Pemba Mnazi in Temeke District. Hundreds of people attended the film shows and there were lively discussions about marine conservation after the films had finished.

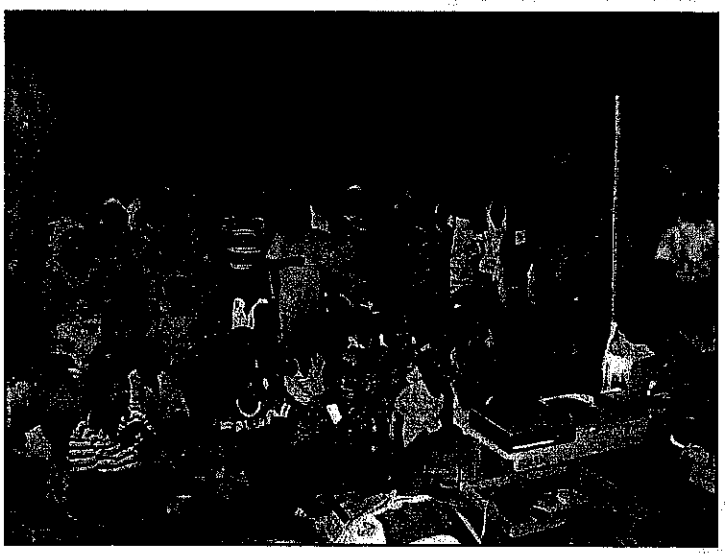


Plate 26: Film shows in Temeke District

In Kilwa Kivinje there were several groups of people at the shows who believed that Sea Sense represented the government and had been sent to insist on the establishment of BMU's in Kilwa. The groups were very aggressive and caused significant disruption to the film shows.

3.7.7 Mangrove Planting

In March, Sea Sense organised a mangrove planting event in collaboration with Roots and Shoots group from IST Secondary School and Visikini Environmental Group. Eleven women from Visikini participated together with 16 students and three staff from IST. Sea Sense Conservation Officers from Visikini and Mbutu also participated.

The Sea Sense Education Officer gave a brief lecture about the biology and ecological role of mangroves. Mangrove saplings were then harvested from within the mangroves and replanted in an area which had been completely cleared of mangroves by the local community for building materials.

An area covering approximately 800m^2 was replanted with more than 7,000 samplings. The local group were extremely grateful for the participation of the students and requested another planting day later in the year.

3.7.8 Global Friends Programme

Sea Sense partners with Born Free Foundation to deliver the Global Friends Programme, which aims to provide African schools with vital resources such as school desks and books and develop educational programmes that encourage children to learn about and take action for wildlife. Several primary schools in Mafia Island have benefited from the programme which has helped to build a link between conservation, education and communities.

In 2011, Bweni and Juani Primary Schools were the beneficiaries of the Global Friends Programme. Bweni Primary School requested text books covering History, Civics and Geography for Standard Six and Seven pupils. The Mafia District Education Officer and Ward Primary School Coordinator accompanied Sea Sense staff to Bweni to make the presentation to the teachers and pupils.

Juani Primary School requested resources that would enable them to develop music and sporting activities at their school. Sea Sense responded by delivering some musical instruments to establish a school band together with a football kit for the school football team. Staff from Mafia District Council and Mafia Island Marine Park joined in the presentation event.

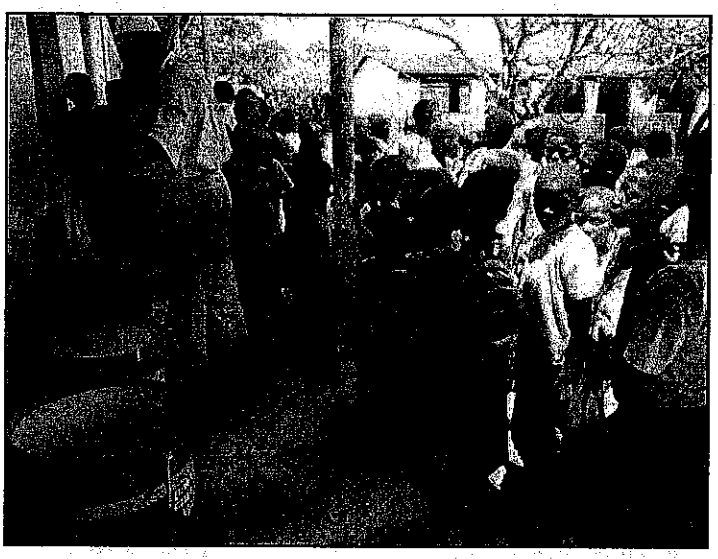


Plate 27: Juani Primary School pupils wait their turn to try out the new instruments

3.7.9 Media and Magazine Releases

In February 2011, a two page spread detailing the work of Sea Sense appeared in The Citizen newspaper.

In 2011 Sea Sense wrote a monthly article for the Dar es Salaam Yacht Club magazine. Articles covered topics including sea turtle biology, dugong conservation, ecotourism, environmental education and dynamite fishing.

3.7.10 Education and Awareness Presentations

The Sea Sense team gave presentations on endangered marine species conservation to classes at the Elementary and Secondary International School of Tanganyika (IST) and Dar International Academy (DIA) in Dar es Salaam.

Sea Sense education sessions at IST had a significant impact. Many of the students chose marine conservation as their topic for their Primary Years Programme (PYP) final exhibition in May. The students created some inspiring exhibitions and raised TSh 386,000 for Sea Sense by selling cloth bags and collecting donations.

In September, Sea Sense visited the Help2Kids orphanage in Dar es Salaam as part of their 'Environment Week'. Sea Sense staff spent the day with the children playing environmental games, telling sea turtle stories and explaining how they could help to protect the marine environment.

3.7.11 DIA Community and Service Programme

Dar International Academy runs a school volunteer programme whereby students volunteer on different projects in the wider community once every two weeks. A group of students at the school signed up to a 'Marine Conservation Programme' and conducted a beach clean-up, raised awareness of sea turtle ecotourism at local hotels and promoted the Sea Sense 'Adopt a Turtle Nest' programme. The students took part in a 'Junior Conservation Officer' day in March and learnt how to identify a turtle nest, translocate it safely and monitor it during the incubation period.

3.7.12 Dar es Salaam Charity Goat Races

Sea Sense was present again at the 2011 Charity Goat Races in Dar es Salaam. The Sea Sense stand was full of information about endangered marine species and attracted hundreds of interested visitors. Sea Sense staff distributed a selection of awareness and education materials and encouraged visitors adopt a sea turtle nest. Sea Sense t-shirts were also for sale.

TSh 483,000 was raised at the 2011 Goat Races through sales of t-shirts, nest adoptions and posters.

3.7.13 Sea Sense Website

In 2011, Sea Sense launched a new website which includes details of all Sea Sense projects together with interesting facts and figures about endangered marine species and their status in Tanzania.

www.seasense.org

A Sea Sense Facebook page was also set up and provides weekly updates about the Sea Sense project and provides opportunities for other Facebook users to add their comments and photos

http://www.facebook.com/pages/Sea-Sense/198707600182212

3.8 Dynamite Fishing

Although illegal and highly dangerous, dynamite fishing continues unabated along much of the Tanzanian coast. Tanga, Temeke and Rufiji Districts are known dynamite fishing hotspots.

Data on date, time, location and number of blasts are collected by Sea Sense Conservation Officers. In 2011, Conservation Officers recorded 314 incidents of dynamite fishing with a total of 922 blasts. Figure 12 shows dynamite fishing data collected in Temeke District in 2011.

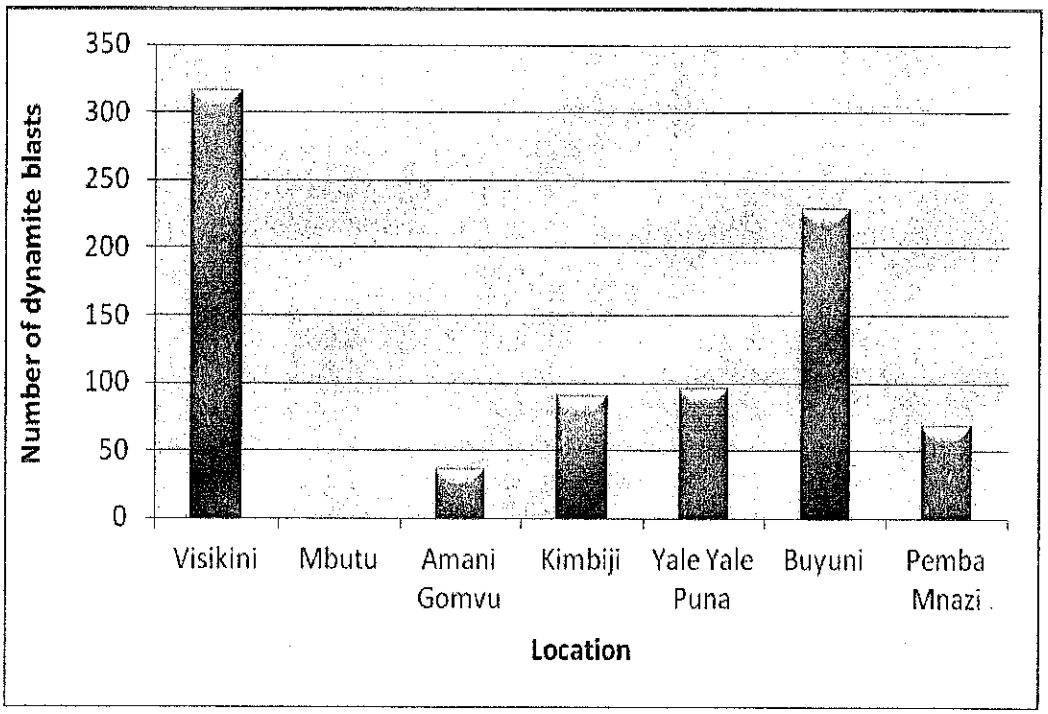


Figure 12: Frequency of dynamite fishing reports in Temeke District, 2011

The number of blasts recorded represented only a proportion of the true number of blasts. Some CO's have ceased to record blasts due to increasing frustration at the lack of government action to curb dynamite fishing. They also report an increasing lack of willingness amongst other community members to cooperate with reporting networks due to the lack of action.

In November, Sea Sense attended a meeting called by MACEMP to discuss strategies to address dynamite fishing. The meeting was attended by representatives from the World Bank, Attorney General's Office, Fisheries Division, Zanzibar Fisheries Department, WWF and TIPFA. Proposed actions included:

- Production of status report including economic analysis and potentially exposing individuals and entities involved in marketing and supply of dynamite
- Improving transparency and accountability in judicial process
- Translation of Fisheries Regulations to Kiswahili
- Enforcement operation at key hotspots
- Close loopholes in terminology of Fisheries Act, 2003 and Regulations, 2008 regarding penalties for dynamite fishing

Sea Sense will be involved in the production of the status report.

3.9 Scientific Symposia, Workshops and Meetings

3.9.1 31st International Sea Turtle Symposium

In April, the Sea Sense Coordinator gave an oral and poster presentation at the 31st International Sea Turtle Symposium in San Diego, USA. An oral presentation was given on sea turtle monitoring in Mafia Island and a poster presentation given on sea turtle conservation efforts in Maziwe Island, Pangani District.

The symposium is held each year and is an international gathering of 800-1000 of the world's foremost sea turtle scientists, conservationists, policy-makers and enthusiasts from more than 70 countries, and the only major conference of its type. The symposium was a valuable opportunity to publicise the progress being made in sea turtle conservation in Tanzania and network with colleagues from the region to discuss progress relating to the implementation of the Indian Ocean South East Asia (IOSEA) Marine Turtle Memorandum of Understanding of which Tanzania is a signatory state.

3.9.2 Western Indian Ocean Marine Science Association (WIOMSA) Symposium

Sea Sense attended the 7th WIOMSA Symposium in Mombasa in October and gave an oral presentation on the impacts of dynamite fishing and a poster presentation on 10 years of sea turtle monitoring in Mafia Island.

3.9.3 Tanzania Turtle & Dugong Conservation Committee (TTDCC)

To facilitate the implementation of the sea turtle and dugong MoU's in Tanzania, a national committee has been established comprising a number of institutions that have an interest in endangered marine species conservation. Representative institutions include:

- Fisheries Development Division (Chair & Secretary)
- Marine Parks & Reserves Unit (Treasurer)
- University of Dar es Salaam
- Tanzania Fisheries Research Institute
- Vice Presidents Office – Division of Environment

- Sea Sense (Co-chair)
- WWF

The overall objective of the Committee is to coordinate all national initiatives related to conservation and management of dugongs and sea turtles. A full committee meeting was held in February 2011 and several smaller meetings were held to discuss implementation of the dugong bycatch survey.

4. Funding

4.1 RECOMAP

In May 11, Sea Sense completed all project activities funded by Recomap Call for Proposals 2. Funds were used to develop sea turtle ecotourism in Mafia and Temeke Districts over an 18 month period.

4.2 WWF

In July 2011, Sea Sense entered into the second year of a three year funding period. Funding from WWF supports endangered marine species work in Mafia, Rufiji and Kilwa Districts. Sea turtle work is focusing specifically on the development of sea turtle ecotourism in Mafia District. In Rufiji and Kilwa Districts dugong conservation activities are being implemented through the Collaborative Fisheries Management Area process.

4.3 USAID

2011 saw the completion of the second year of funding from USAID to support sea turtle work in Pangani District which will continue until 2013. During year two of the project, Sea Sense monitored and protected sea turtle nests at six nesting beaches and conducted several training and education events including a teacher training workshop and a Theatre for Development project.

4.4 Born Free Foundation (BFF)

During 2011, BFF provided essential funds to cover project overheads including staff salaries, office rent, insurance and annual audit costs.

4.5 Dar es Salaam Charity Goat Races

In 2011 Sea Sense was awarded a grant of TSh 9,464,000 from the Dar es Salaam Charity Goat Races. The funds are being used to support a marine conservation education programme in five secondary schools in Temeke District.

4.6 Flora and Fauna International

In September, Sea Sense was awarded a grant of GBP 6,366 by the FFI Flagship Species Fund. The funds will be used to support endangered marine species awareness workshops for five Beach Management Units in Temeke District.

4.7 Corporate Donations

A total of USD 13,000 was raised through corporate donations from Dominion Oil and Gas and Resolute Tanzania. The funds are being used to support endangered marine species work in Temeke District.

5. Problems Encountered

5.1 Continuation of Illegal Activities

Despite clear evidence and information provided by Sea Sense to national, district and village personnel, illegal activities including sea turtle slaughter, nest poaching, dynamite fishing, live coral mining and mangrove cutting continue.

Following frequent reports of illegal activities taking place in and around Kilwa, Sea Sense conducted a patrol at Kilwa Mtoni and Kilwa Masoko to assess the true extent of illegal activities including coral mining, dynamite fishing and mangrove harvesting.

During the patrol at Kilwa Masoko several fishers who knew Sea Sense volunteered information about the extent of sea turtle slaughter. A large number of discarded carapaces were observed on the beach and hidden in nearby vegetation. Several lime processing sites were also identified at Kilwa Mtoni.

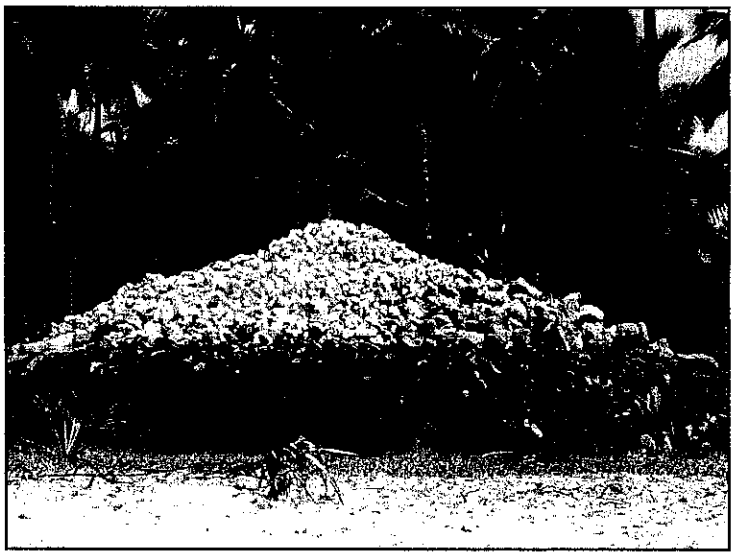


Plate 28: Lime processing site at Kilwa Mtoni

At Kilwa Masoko, large areas of mangrove forest had been cleared. The Conservation Officer from Kilwa reported that the mangroves had been cleared by fishers looking for bait. Photographs were taken and the issue reported to the RUMAKI office in Kilwa.

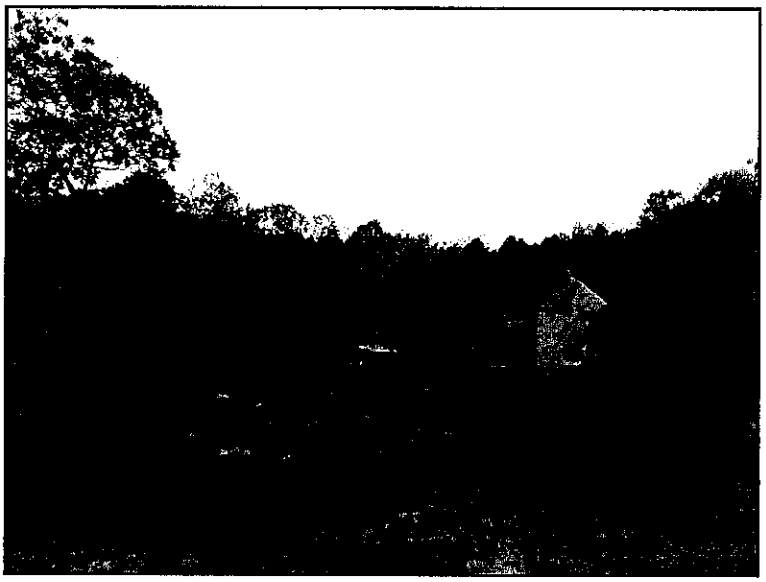


Plate 29: Extensive mangrove clearance at Kilwa Masoko

Sea turtle slaughter was also reported to be commonplace at Kilwa Kivinje and Kilwa Kisiwani. The Sea Sense Conservation Officer in Kilwa Kivinje recently apprehended a fisher selling turtle meat and reported him to the village office where the case is currently being dealt with.

5.2 Limited Enforcement & Awareness

Despite clear conservation measures in Tanzanian legislation to protect endangered marine species, there is very limited enforcement by relevant government authorities. Offenders who deliberately hunt or poach turtle eggs, or who use destructive and illegal fishing practices such as dynamiting, are rarely issued with appropriate penalties in accordance with the law.

Limited awareness of the laws is also a major challenge. In 2010 Sea Sense made considerable effort to raise awareness of the revised 2009 Fisheries Regulations that have improved the level of protection for endangered marine species. Most coastal communities had no knowledge of the regulations. The new regulations are currently being translated into Kiswahili and upon completion, Sea Sense intends to produce awareness materials for distribution in coastal communities.

5.3 Poor Waste Management

In addition to the challenges related to the disposal of plastic waste, Sea Sense identified other waste management issues in Mafia that have serious implications for the health of the local community. Firstly, the area used by fishers at the harbour in Kilindoni to dry their fish was extremely dirty and was a breeding ground for flies and other crawling insects which are known to carry infectious diseases.



Plate 30: Proliferation of maggots near to Kilindoni harbour, Mafia District

Sea Sense took several photos of the area and took them to the DMEO and DED office as evidence. Sea Sense stressed that urgent action was needed to prevent a serious health issue developing. The District Fisheries Officer was asked to speak with the fishers to insist on improved waste management practices.



Secondly, as part of the waste management education programme, Sea Sense visited several seasonal fisher camps on the islands of Shungimbili, Nyororoa and Mbarakumi on the west coast of Mafia Island, all of which are designated as Marine Reserves. Despite their Reserve status, there were large, well established fisher camps, particularly on Nyororo which supported an estimated fisher population of 250. The area around the camps was full of discarded plastic bags, water bottles and juice boxes which will ultimately end up in the ocean and pose a significant risk to sea turtles and other marine species.

Plate 31: Plastic waste at migrant fisher camp in Nyororo Island

There were also several sea turtle carapaces amongst the rubbish, indicating that the fishers were slaughtering sea turtles for consumption.

Sea Sense spoke with several groups of fishers and it was clear that most of them were not local to Mafia but were migrant fishers from Mtwara, Rufiji, Tanga and Dar es Salaam. Many confessed to using unregistered boats and illegal fishing gears. However, they had little fear of apprehension due to lack of Fisheries Division or Marine Park patrols in the area and alleged corruption amongst officials who accepted bribes to allow illegal fishing. Sea Sense provided information to the fishers on endangered marine species, the 2009 Fisheries Regulations and the impacts of poor waste management.

Sea Sense reported the presence of the migrant fisher camps and the destruction of the island environment to the District Commissioner, Mafia Island Marine Park staff and the District Fisheries Office. The District Commissioner called a meeting with representatives from each department. Sea Sense was able to give detailed feedback about the fisher camps, their use of unregistered boats and illegal fishing gears, poor enforcement by the Fisheries Office, the unsanitary conditions on the island and suspected slaughter of sea turtles. Sea Sense provided photographic evidence to show the state of the islands. Upon seeing the evidence, the District Commissioner asked the Fisheries Department to write a report on what had been discussed and explain why they had failed to address waste management and illegal fishing issues within the reserves.

Sea Sense has since made a follow up but it was unclear if the report had been written or not. Sea Sense will continue to raise awareness amongst District staff of the need to take action against illegal exploitation of marine resources.

6. Aims for 2012

- Continue endangered marine species conservation activities in six coastal districts in Tanzania
- Conduct sea turtle flipper tagging programme in Juani Island, Mafia District
- Satellite tag four nesting sea turtles in Mafia District
- Satellite tag three nesting sea turtles in Temeke District
- Submit dugong tissue samples to James Cook University, Australia, for analysis
- Recruit a Turtle Tour Guide in Ushongo village, Pangani District
- Produce a sea turtle ecotourism brochure for Mafia Island
- Conduct Theatre for Development project in two villages in Pangani District
- Conduct dugong awareness workshops for CFMA members in Mafia District
- Conduct education and awareness programme at nine secondary schools in Mafia and Temeke Districts
- Provide endangered marine species education to five Beach Management Units in Temeke District

- Hold a 'World Environment Day' celebration in Mafia District
- Hold a 'World Sea Turtle Day' celebration in Mafia District
- Conduct endangered marine species bycatch awareness sessions in Mafia and Pangani Districts
- Conduct a sea turtle conservation workshop for 15 SANAPA wardens
- Provide training to sea turtle monitors in Mnemba Island Lodge, Zanzibar
- Promote Sea Sense turtle adoption programme
- Attend inaugural Western Indian Ocean Environmental Educators Network workshop (REEFS) in Mauritius
- Attend 32nd International Sea Turtle Symposium in Mexico
- Conduct a fundraising campaign
- Conduct a media campaign to promote the work of Sea Sense

7. Immediate & Long Term Benefits

The immediate benefits from Sea Sense activities are:

- Protection of nesting sea turtles and their eggs from both human and non-human predators
- Protection of dugongs through the CFMA process and the implementation of the Dugong MoU
- Improved understanding of sea turtle biology through research programmes (tagging, DNA sampling)
- Enhanced capacity amongst local communities, government personnel and UDSM students through training and field work in marine conservation and sustainable resource use
- Improved local livelihoods through employment of community members (Conservation Officers & Tour Guides)
- Improved knowledge and awareness of the status, distribution and threats to marine species and habitats in Tanzania

Long-term benefits include:

- Development of ecotourism and generation of revenue through sea turtle adoptions and handicrafts production
- Improved understanding of marine conservation and sustainable resource use at community level leading to wise use of resources in the future
- Improved population status of endangered sea turtles and other marine species in Tanzania
- Implementation of international sea turtle and dugong MoU's
- Improved knowledge amongst the scientific community of sea turtle conservation in Tanzania

- Improved reputation of Tanzania in relation to endangered marine species conservation

8. Acknowledgements

Sea Sense would like to thank their donors, particularly Born Free Foundation, WWF, USAID and the EU RECOMAP programme for their continued funding and support. Thanks also to Dar es Salaam Charity Goat Races, Resolute (Tanzania) Ltd, Dominion Tanzania Ltd and Authentic Tanzania for supporting Sea Sense work. Finally, our thanks to all Conservation Officers, Village Chairpersons, Council members and Environment Committees for helping to protect endangered marine life in Tanzania.

Appendix I: Results of Activities Implemented by Sea Sense in 2011

Activities	Results / Achievements	Remarks
1. Flagship species data collection	• Number of turtle nests recorded: 379 • Eight turtles tagged in Mafia Island • Number of live dugong sightings: 11 • Many humpback whales sighted off the Tanzanian coast between July and December	• 375 nests were laid by green turtles (*Chelonia mydas*), peaking in April • Four were laid by hawksbill turtles • Dugong sightings in Mafia and Rufiji Districts
2. Sea turtle nest monitoring and protection	• Number of nests hatched successfully: 360 • Number of hatchlings: 33,453 (success rate: 74% for greens and 80% for hawksbills) • Number of nests predated / partially predated: 16 • Number of nests poached: 3 • Number of nests inundated: 8 • Number of nests rotted: 8	Nests were predated by red ants and monitor lizards. Efforts were made to protect nests from predation through translocation and netting.
3. Mortality analysis for flagship species	• Number of sea turtle mortalities recorded: 166 • Average CCL was 62.3 cm (SD±23) • Cases of fibropapilloma in stranded specimens: 1 • Number of dead dugongs reported: 0 • Number of dead cetaceans recorded: 7	• 156 were green turtles, eight were hawksbill, one was an olive ridley and one was unidentified
4. Sea Turtle Ecotourism	• Sea turtle ecotourism opportunities in	

	Mafia, Temeke & Pangani Districts • Four Turtle Tour Guides leading guests in Mafia and Temeke Districts • Four access routes to nesting beaches cleared in Juani Island • Beach shelter constructed at Kishiko Kikubwa beach • $2,830 raised in Mafia District • $2,698 raised in Temeke District (including $1,350 raised through partnership with safari operator in DSM) • Revenue from sea turtle ecotourism donated to Village Environment Funds in four villages • 51 sea turtle nests adopted, raising $2,550 • $1,615 raised through Sea Sense t-shirt sales • 'Guidelines for Development of Sea Turtle Ecotourism in Tanzania' produced • Sea turtle ecotourism promoted on www.mydestination.com/Tanzania • Sea turtle ecotourism workshop held with tourism operators	
5. Surveys	• Endangered marine species bycatch survey conducted in Mkinga and Mtwara Districts • Dugong boat survey conducted in Mafia Island	Surveys revealed - Dugongs rarely seen at either location - Sea turtle consumption commonplace

		- Dolphins frequently observed at both locations
6. Training	• Statistics and Monitoring & Surveillance committees of two CFMA's trained in dugong conservation in Rufiji and Kilwa Districts • 10 villages leaders in Buyuni village , Temeke District trained in participatory video techniques • 32 primary school teachers trained in environmental education programmes • 10 staff in Fanjove Island, Kilwa District trained in sea turtle biology and conservation • 29 staff from three tourist lodges trained in sea turtle biology and conservation • 10 fishers in Sange village, Pangani District trained in safe release of sea turtles from fishing nets • 17 staff and community members in MBREMP trained in sea turtle biology and conservation • Two students from the University of Dar es Salaam trained in office administration and practical field conservation methods • 40 women trained in handicrafts production in Mafia District	• CFMA training included: dugong biology & life history, global status, threats to survival

7. Education and Awareness	• World Environment Day celebrated in Mafia District • World Sea Turtle Day event held in Mafia District • Waste management education campaign at three secondary schools in Mafia District • Theatre for Development performances held in two villages in Pangani District • Marine conservation workshop for fishers held in Pangani District • Marine conservation films shown in Kilwa, Temeke and Pangani Districts • Mangrove planting day held in Temeke District • School equipment delivered to two primary schools in Mafia District as part of the Global Friends Programme • Presentations held at two international schools in DSM • Village meetings held in six coastal Districts • Beach clean-up events held in Mafia District • 13 magazine articles and press releases published • Sea Sense stand at Dar es Salaam Charity Goat Races	• Several hundred people attended WED and WSTD events • TFD valuable tool to stimulate discussions on marine resource use

	• Community & Service programme implemented with DIA students • New website and Facebook page launched	
8. Dynamite Fishing	• Blasts recorded by CO's in Temeke, Rufiji and Kilwa District • Sea Sense attended MACEMP meeting to discuss national level anti-dynamite fishing strategies	• Despite many anti-dynamiting initiatives, the practice persists along much of the Tanzanian coast • Village leaders agree that dynamite fishing is the most threatening fishing practice in Temeke District. Main reason given for the persistence of dynamite fishing is limited or lack of law enforcement. Many villagers complain that fishers caught with dynamite or dynamited fish are released after a few days, contrary to Fisheries laws. • Many CO's refused to collect dynamite fishing data due to lack of action from authorities
9. National, Regional and International Workshops and Meetings	• Oral and poster presentations given at 31st International Sea Turtle Symposium • Two papers presented at 7th WIOMSA Symposium • One meeting of the Tanzania Turtle and Dugong Conservation Committee held	

肯亞野生動物署計畫報告摘要

肯亞野生動物署(Kenya Wildlife Service, KWS)為肯亞野生動物主管機關，於 1989 年設立，職掌範圍包括動植物之保育、經營管理和利用政策、各類保護區之設立及經營管理、保育教育宣導、推動野生動物研究計畫、野生動物相關國際公約、野生動物危害等。肯亞政府僅提供 KWS 20%預算，KWS 以國家公園等收入補足其他預算需求。

依據肯亞野生動物署 2008 年至 2011 年計畫及報告資料，摘要如下：

2008 年所提「奈洛比國家公園黑犀牛監測儀器和圍籬計畫」，計畫目標是監測奈洛比國家公園(Nairobi National Park)黑犀牛族群。

為確保肯亞黑犀牛族群之穩定成長，保育策略有必要因環境的變化及不時出現的新挑戰予以調整。1990 年代，因盜獵問題嚴重，犀牛族群由 20,000 頭減少到只剩 400 頭。肯亞野生動物署黑犀牛保育和經營管理策略之目標為每年增加族群數量 6%，也就是由現在的 500 頭，成長到 2011 年時 700 頭。

奈洛比國家公園位於肯亞首都奈洛比南方 8 公里處，佔地 117 平方公里。奈洛比國家公園黑犀牛族群，自 1990 年起，每年成長率略高於 5%，已移出 100 餘頭至其他保護區。奈洛比國家公園的 68 頭黑犀牛，約佔全肯亞族群之 11%。監測和看守犀牛須要儀器(GPS、相機和望眼鏡)，建立圍籬可防止人類之入侵。

截至 2009 年 2 月主要採購計畫執行所需器材及架設圍籬。(單位 US$)

編號	項目	價格	編號	項目	價格
1	露營相關器材	121.50	9	廁坑	125.00
2	汽車輪胎	763.78	10	帳棚	6,828.05
3	露營相關器材	311.44	11	手電筒 5 支	250.94
4	電池	92.80	12	補給食物/文具	130.00
5	補給食物	61.25	13	補給食物	46.71
6	廁坑	100.00	14	臨時工資	37.50
7	備用零件	254.50	15	臨時工資	15.63
8	水泥	129.55	16	建材	25.63
總計 9,294.28			尚餘經費 9,705.72		

其餘預計購買物品如下：

編號	項目	價格
1	太陽能充電板 3 組(提供電腦電力用)	1,500
2	太陽能電池 4 組(提供電腦電力用)	1,256
3	反用換流器(100 瓦)	2,188
4	電腦 2 部	1,875
5	雜支	2,888
	總計	9,707

監測計畫所蒐集資料，將是犀牛行為和遷移路線研究之重要資料，監測項目包括：

- 數位相機用來建立每隻黑犀牛的身份檔案。
- 望遠鏡可供巡護人員瞭解和監測黑犀牛身體狀況。
- 全球衛星定位系統(Global Positioning System, GPS)可提供黑犀牛所在位置和巡邏路線等資料，有助於規劃有效巡邏路線和瞭解黑犀牛活動範圍。
- 電圍欄(energizers)、太陽能電池、充電控制器、圍籬可提昇經營管理黑犀牛族群的成效。
- 有夜視功能之望遠鏡可協助夜間巡護人員找到犀牛，也可補充白天巡護人員所蒐集的資料。
- 監測所蒐集資料，有助於評估黑犀牛族群現狀，並可建立犀牛族群現狀月報或年報，包括年齡/性別組成、族群大小和密度、死亡率和原因、犀牛身體狀況、分娩週期、carry capacity 和限制因子。

依據 2009 年和 2010 年 KWS 提供之計畫報告，成功執行下列工作：

- 將巡護人員基地由 Mbagathi 移到新地點 Capture Base。
  現在巡護人員駐紮在離 Mbagathi 營地 20-30 公里處，犀牛監測工作之協調聯絡因而大幅改善。
- 增進黑犀牛之安全及改善圍籬監測工作
  新設 2 處圍籬巡邏基地和 3 處衛星基地，修復巡邏車輛等工作，使棲地和圍籬被破壞情形有所改善，巡邏隊機動性增強。
- 改善犀牛族群資料之蒐集
  2008 年估計奈洛比國家公園有 70 頭犀牛，2010 年增至黑犀牛 77 頭和白犀牛 11 頭，再度被觀察到之比例分別為 87%和 100%。因新購之電腦及太陽能發電設施啟用後建立資料庫，監測資料之分析和取得更容易。

工作項目細節說明如下：

一、 集中犀牛工作小組基地

- 10 名巡護人員已移到新基地 Capture Base。
- 已購買及架設 10 組營帳設施。
- 已採購各種野外營地需要之裝備。

二、 犀牛和圍籬監測工作

- 已於 Kappa 和 Marimbet 設立 2 處圍籬基地。
- 於野生動物廊道(corridor)和熱點(hot spot)設立 3 處衛星基地。
- 採購零件、器材、備用輪胎、5 個手電筒，並修復巡邏車。
- 沒有發現犀牛被盜獵。

三、 黑犀牛族群資料

- 2008 年 10 月奈洛比國家公園黑犀牛估計數量為 70 頭，2009 年將其中 5 頭移到犀牛較少的 Ol jogi ranch 地區。
- 2008 年 9 月至 2011 年 5 月間，發現 7 頭幼年黑犀牛，2008 年 9 月至 2009 年 3 月間觀測到 83%黑犀牛。2010 年再度觀察到 87%黑犀牛。
- 2009 年 10 頭白犀牛被送至奈洛比國家公園，2010 年生下 1 頭小犀牛。
- 已採購電腦 2 台、印表機 2 台，UPS 不斷電系統 2 組、變頻器 1 組、深度循環電瓶 1 組、太陽能板和相關設施 2 組。

贊助肯亞犀牛保育計畫的其他機關包括：

- 非洲野生動物基金會(African Wildlife Foundation)
- 英國北部動物協會(Chester Zoo, North of England Zoological Society)
- 英國政府之達爾文計畫UK Government (Darwin Initiative)
- 歐洲動物園和水族館協會(European Association of Zoo and Aquarium)
- 伊甸野生動物信託(Eden Wildlife Trust)
- 法蘭克福動物協會(Frankfurt Zoological Society)
- Frefrei Geboren
- 國際自然保育聯盟(International Union for Conservation of Nature, IUCN)物種存續委員會(Species Survival Commission)非洲犀牛專家小組(African Rhino Specialist Group)
- 犀牛方舟協會(Rhino Ark)
- 犀牛救援協會(Rhino Rescue)
- 國際拯救犀牛協會(Save the Rhino International)
- 美國國際開發署(United States Agency for International

Development)
- 美國魚類暨野生動物署(US Fish and Wildlife Service)
- 世界自然基金會(WWF)
- Zoo D'Amnevile
- 倫敦動物協會(Zoological Society of London)

2009年所提「蠕蟲對人類環境和梅魯國家公園黑犀牛影響之保育研究計畫」，計畫內容及報告摘要如下：

肯亞野生動物署於2001年起，開始執行犀牛復育計畫，將犀牛重新引入(restock)梅魯國家公園(Meru National Park)，2003年運進8頭犀牛，2006年4月前，梅魯國家公園犀牛族群有55頭(21頭黑犀牛，34頭白犀牛)。2009年有51頭(19頭黑犀牛，32頭白犀牛)。梅魯國家公園特別在園區內設立48平方公里之保護區，作為犀牛棲息地。2006年4月和2007年9月間，有6頭犀牛死亡。犀牛死亡原因目前仍調查中，可能的原因包括經由采采蠅傳播的昏睡病，壁蝨引起的邊蟲症，蠕蟲(helminths)和被附近農地污染的水。

梅魯國家公園由14條河流供應水源，這些河流附近居民有些家庭並無廁坑，有些廁坑建在河邊，而國家公園上游的梅魯村並無下水道系統，洪水氾濫時，所有污水包括排泄物都會沖倒國家公園的河流中，水和土壤有可能被蠕蟲污染。

本計畫希望瞭解人體內的蠕蟲、環境和犀牛有否關連，計畫目標包括：
- 調查梅魯國家公園犀牛族群腸內寄生蟲的來源是否來自人類。
- 調查梅魯國家公園附近居民蠕蟲感染途徑。
- 調查梅魯國家公園園區內外之動物飲水地區糞便感染程度。
- 調查國家公園附近人民飼養之有蹄類哺乳動物之蠕蟲感染途徑。

調查地點為梅魯國家公園附近的Meru North District, Igembe Division，調查地點年雨量變化大，範圍由724mm至1,200mm。本計畫調查對象包括研究地區所有學校、選定學校中所有9-11歲學童和研究地區所有填表表明願意被調查的人士。

本計畫工作項目包括人體糞便檢查、大規模化學治療、監測和評估接受治療的人、蒐集和檢測動物排遺、水質檢測瞭解糞便污染情形和資料分析和管理。希望計畫之執行，可改善犀牛之健康狀況，以期犀牛族群能以每年增加5%的程度成長，建立梅魯國家公園穩定犀牛族群。

本計畫合作單位包括肯亞野生動物署、肯亞醫學研究所(Kenya Medical Research Institute)和微生物學研究中心(Centre for Microbiology Research)。

本計畫預期效益包括：

- 社區驅蟲計畫將達成降低蠕蟲數量目的，改進社區和居民健康。
- 瞭解人體內的蠕蟲、環境和犀牛間之關連，可作為研擬當地環境衛生教育計畫之基礎。

本計畫預期成果包括：

一、建立各野生動物棲地蠕蟲密度和數量資料。

二、管理保護區犀牛蠕蟲情形，改善犀牛健康。

計畫執行進度說明如下：

- 已於6個地區主管單位說明計畫執行事宜，召集行政、衛生和教育單位人員共同參與。
- 已至15個學校說明計畫執行細節。
- 已召開2次社區會議，宣導計畫執行項目。
- 已辦理器材和儀器採購。
- 已擬定2010年工作時間表如下：

工作目標	工作項目	開始執行日期
檢測學童糞便蠕蟲密度	蒐集700份學童糞便	3/15
檢測環境中蠕蟲密度	蒐集及分析200份土壤樣本 撰寫1份報告	3/22
檢測犀牛蠕蟲密度	蒐集及分析200份犀牛糞便樣本 撰寫1份報告	3/25
監測治療後學童糞便蠕蟲密度	蒐集700份學童糞便	4/5
分送計畫報告	辦理研討會一次 召開會議4次	6月
監測及評估計畫進度	撰寫1份報告	7月

2009年至2011年5月期間計蒐集669份學童糞便，分屬5個學校，包括Kanjoo、Thambiro、Kathithini、Kalimiku、Vision academy。蒐集Kanjoo、Thambiro、Kathithini地區土壤樣本30份，蒐集Kanjoo、Kathithini和Mutundu等河流之水體樣本15份，蒐集12份犀牛糞便樣本。檢驗結果所有犀牛糞便和水體樣本都有鉤蟲，大部分土壤和糞便樣本有鉤蟲。

人類造成被鉤蟲卵污染之土壤，雨季時土壤被沖至附近河流，犀牛飲用到受污染的水而被感染。教育宣導和設立生態廁所(eco-toilets)將有助於改善此情形。上開期間計畫報告也列有各校驗出不同種類蠕蟲之結果表格。

本計畫之執行有下列非預期的效應：

- 提升社區對改善環境衛生需求之瞭解。
- 政府單位同意在受感染社區建築生態廁所。
- 計畫執行期間發現有必要繼續進行第二階段計畫。此階段重點是人體、環境和犀牛體內寄生蟲之基因研究。

肯亞野生動物署 2010 年所提「梅魯保育區大象行動模式研究計畫」，計畫內容及報告摘要如下：

梅魯保育區(Meru Conservation Area, MCA)涵蓋保護區域範圍如下：

保護區域	面積(km^2)
Meru National Park (MNP)	870
Bisanadi National Reserve (BNR)	606
Kora National Park (KNP)	1,789
Mwingi National Reserve (MNR)	745
總計	4,010

之前於MCA、Eastern Conservation Area (ECA)和北部放牧區(Northern Grazing Area, NGA)約計11,000 km^2地區進行航空調查(aerial survey)，有大象紀錄的地區包括KNP, BNR和NGA。唯空中調查僅提供大象位置和數量資料，需進一步瞭解大象每日行動，乾季和濕季使用棲地情形，才能劃定真正需要保護的地區。例如2006年12月的調查發現504頭(90%)大象出現在ECA保護區域外面。另因人口增加，保護區鄰近地區被變更為農地或人類聚落(human settlement)的案例增多，野生動物保育及經營管理，也有必要兼顧動物及人類，與當地居民合作，以達永續經營之目標。

KWS迫切需要蒐集大象行動資料之原因如下：

- 確認大象乾季和濕季實際使用之棲地。
- 提供大象分佈最新資料，安全監測將更有成效。
- 資料可供ECA設計更好的大象保育或經營管理措施。
- 保護區外之某些特定地區對大象很重要，所蒐集資料可作為遊說的後盾。
- 調查Meru大象是否於濕季時遷徙至Shaba National Reserve。

- 調查大象遷徙廊道之寬度和長度，確保這些地區不被分割或規劃為人類居住地或農耕地。

本計畫總體目標如下：

- 畫出ECA和環繞地區之大象遷徙路線圖。
- 找出大象乾季和濕季偏好使用之棲地。
- 測出大象遷徙路線和農田或聚落的距離。
- 分析MCA和環繞地區之土地利用變更對大象行動模式之影響。

計畫執行方法：

一、繫項圈之前(Pre-collaring activities)

- 蒐集整理現有ECA和環繞地區土地利用資料。
- 設計軟體以供下載大象衛星資料。不同象群位置資料，可供選擇合適繫項圈之象群。
- 採購及運送所有器材至繫項圈地點。

二、繫項圈(Actural collaring operation)

- 備妥麻醉槍。
- 由husky aircraft選定目標象群，之後通知直昇機搭載獸醫、科學家及一名攜帶項圈的助理至現場。
- 選定目標，予以麻醉後繫上項圈。同時蒐集資料或採樣，例如血液、前後肢長度和寬度、耳朵直徑等。
- 注射恢復劑，大象站立開始移動時，工作人員搭直昇機離開。
- 重複上述步驟，預計為4頭大象繫上項圈。

三、繫項圈之後(Post collaring)

- 蒐集分析資料。
- 監測上開4頭大象，準備月報表。資料每2天下載一次。

本計畫需動員之人力包括計畫主持人1人、飛行員2人、挑選大象人員2人、安全巡護人員2人、支援人員5人、軟體設計1人，共計15人。所需設備及器材包括麻醉槍、手提電腦、藥品(Immobilizer & revival drugs)、抗生素、GPS、照相機、飛機(Husky & Helicopter)、車輛、項圈、繩子、水、取樣袋/瓶等。

本計畫蒐集到大象遷徙路線資料以及乾季和濕季偏好使用之棲地。發現以前使用之遷徙廊道目前為人類居住區。因而瞭解梅魯國家公園和Shaba National Reserve之間地區，人象衝突增加之原因。

計畫執行往後延3個月，因需要蒐集更多基本資料，而經費限制需調

整計畫執行項目優先順序。另採購項圈需經過特殊程序，法國發展署(French Development Agency)應允贊助之經費有所耽擱，於2011年6月才能納入計畫預算。

已進行之工作項目包括蒐集MCA土地利用資料、於MCA使用新項圈進行初步調查，以及進行各項器材採購程序。KWS所提供報告包括2張非洲象追蹤圖。

重新調整之計畫執行時間表如下：

工作項目	工作目標	預計或執行完成時間
文獻回顧	蒐集整理現有MCA和環繞地區基本資料，例如土地利用、人口/村落、野生動物族群大小和分佈、野生動物遷徙路線	2010年12月
取得衛星影像資料	已取得MCA衛星影像資料	2011年1月
訓練野外觀察人員	以GPS找出大象位置	2011年6月
大象監測	每日大象活動資料和空中監測	2011年7-9月(濕季) 2012年1-3月(乾季)
採購項圈	採購2個項圈	因超出預算暫緩，先進行GIS程序
研發軟體由衛星下載資料	完成軟體研發	暫緩
飛機燃料和藥品	每月飛行15小時，持續6個月追蹤GIS資料	每月兩次
繫項圈	完成繫6個項圈工作	暫緩
彙整資料於網站	6個項圈所蒐集資料匯集至電腦，並正確顯示於衛星影像上	暫緩
月報	每月撰寫一篇報告	乾濕季各3篇
報告大象行動模式	辦理一次研討會	2012年4月
將研討會建議納入報告	撰寫一篇報告	2012年5月
結案報告初稿	撰寫一篇報告	2012年6月

本計畫總預算US$85,400，我國贊助US$15,000，已支用US$3,000，其

餘US$12,000將運用於衛星影像和軟體研發，俟工作完成後動支經費。

肯亞野生動物署美國聯絡辦公室所提「肯亞野生動物署設立 DNA 鑑定分析實驗室計畫」，綜合 2011 年計畫提案和 2012 計畫報告資料，摘要如次：

非法販賣野味(bush meat)為非洲極為普遍與嚴重的保育問題。專家估計每年在非法交易中有將近數百萬的野生動物被製成數千萬噸甚至更多的違禁肉品以牟取利益。非洲、亞洲及新熱帶地區均有為取得野味而非法獵捕野生動物之行為。非洲的許多地區，野味具有一定的商業規模，在市場上為價格合理的蛋白質來源。非法獵捕的幅度常造成野生族群的大幅降低，有時甚至造成當地族群滅絕。肯亞也面臨非法野味造成野生動物族群下降的問題。2009 年一個研究計畫彙整 270 件野生動物調查數據資料，顯示野生動物族群比 30 年前下降 33%，國家公園內外皆有此現象，所以應該不是棲地因素造成的。

野味已不是僅供自家使用，非法獵捕野生動物已發展為經濟上有利可圖的行業，不法集團每年獵捕大量野生動物供給鄉鎮和都市中的非法肉販，野味的非法交易通常都與犯罪集團掛勾。在許多棲息地造成生態浩劫，讓許多物種面臨滅絕的危機，加劇人類與野生動物間的衝突。

非法獵捕野味產業的規模可由幾方面來估算。其一是每年從肯亞國家公園發現數以萬計的陷阱(wire snare)。通常，肯亞野生動物署會固定巡邏清除野生物棲息地內的陷阱、追捕盜獵者和處理被捉或受傷的動物。當地及國際的非營利組織也會協助。

- The David Sheldrick Wildlife Trust (負責運作小象孤兒院)有五個小組，負責全職清除捕獸陷阱。此信託估計自 1990 年起肯亞野生動物族群下降 60%。
- The Bill Woodley Mount Kenya Trust 的創新計畫，雇用過去的盜獵者為野生動物守護員，每年四次在熱點(hot-spots)清除陷阱。
- Born Free-Kenya, Care for the Wild 和其他組織每年也都會作定期搜尋及清除數以萬計的陷阱。
- Care for the Wild 估計每年約有 500,000 隻野生動物在察沃(Tsavos)國家公園因野味交易被非法獵殺。

證據顯示肯亞有大量陷阱及其他非法捕獸器，且為有組織的犯罪行為。狩獵野生動物造成非常嚴重的生態破壞。有時野生物大量滅絕會

強化人類與野生動物衝突。舉例來說，大量獵捕有蹄目動物造成食肉目動物失去重要獵物，有時就會轉而獵食家畜。

野生動物肉類也造成人類健康很大的問題，通常野生肉類都未經衛生檢驗。炭疽(anthrax)是一種致命的細菌感染，可能經由食用或處理未檢驗的動物肉傳染。其他人畜共通傳染病也都能經由野生肉類傳染，例如牛海綿狀腦病(bovine spongiform encephalopathy，即狂牛症 mad-cow disease)、布氏桿菌病(brucellosis)、伊波拉病毒(ebola virus)、亨尼帕病毒(henipa virus)、馬爾堡病毒(Marburg virus)、鸚鵡熱(psittacosis)、狂犬病(rabies)、沙門氏菌(salmonella)、急性嚴重呼吸道症候群(Severe Acute Respiratory Syndrome, SARS)、旋毛蟲病(trichinosis)等。事實上，有70%的人畜共通傳染病肇因人類接觸受感染的野生動物。2010年4月中旬，紐約衛生官員在截查從非洲進口至美國的野生動物肉類發現兩株猴泡沫病毒(simian foamy virus)，係由檢查猴和黑猩猩肉類過程中發現感染病毒。

肯亞對於供人食用之肉品屠宰、運送及貿易均有法規限制。野味非法販賣者嚴重觸犯法律，傳染風險也越趨嚴重。消費者也常不自知買到違法野生動物肉品，通常肉販會將非洲野牛、長頸鹿和各種羚羊肉以"牛肉"售出，這是一種詐欺消費者的形式。但目前許多非洲政府仍未通過立法，以保障消費者不被欺騙。消費者只能自行承擔風險。

非法買賣野味涉及許多法令，為多重犯罪，諸如串謀、偽造商業記錄、洗錢、稅務詐欺等。對多數國家來說，野生動物是國家資產。野生肉品交易是一種竊盜和蓄意破壞國家資產的行為。野生動物觀光資源對許多國家來說是重要的經濟基石。在肯亞，觀光業佔外匯收入的 21%及國內生產總值的 12%。非法交易販賣野生肉品違反數條野生動物相關法令，如獵捕保育物種及以使用禁用武器獵捕。

使用 wire snare 捕捉野生動物是最常用的方法，但也相當殘忍，動物有可能被套到腳、頸或身體。套到頸部的動物被勒殺，套到頸或身體的動物越掙扎套得越緊，有時會陷入皮膚中。野味盜獵者也會使用其他殘酷陷阱，例如捕獸夾(steel jaw trap)、pitfall、deadfall 和毒藥。

獵人通常在棲息地狩獵並當場屠宰獵物。屠宰既是作業上的權宜之計也為自己帶來法律上的保障。在作業上，清除內臟及不能賣的部位減輕了運送上的負擔。法律方面，如果只運送肉品，執法者很難辨識其為野生動物肉類。

獵捕者通常販賣野生動物肉品給中盤商，中盤商將肉品處理，並經過包裝運送至鄉鎮或城市。通常業者會謊稱野生動物肉品為牛肉、羊肉或其他家畜肉品，販售給消費者以賺取利潤，通常家畜肉品價格較高。

野生動物法執法單位逮捕並起訴許多野味交易者。惟近年來，非法交易者更會鑽法律漏洞。非法交易者只要迅速及清潔處理野味，去除骨頭只買賣動物肉，執法者很難提出證據證明是否為野生動物肉品以起訴非法交易者。唯一能分辨肉品的種類的方法是以 DNA 分析鑑定。有此鑑定，檢察機關就能夠以合法的證據定罪。有效的定罪是唯一能阻卻非法交易者在這有利可圖的貿易中遊走。實質罰鍰的判決也能有效阻卻許多人從事此類非法貿易。

2009 年，KWS 在肯亞查獲 220 件野味案件。大多為盜獵者或中盤商。商業屠宰業者提供犯罪集團主要的利益，卻常逃過法律制裁，原因是他們只販售處理良好的肉品。執法者通常很難提出證據證明肉品的來源。KWS 有必要設立符合 ISO17025 標準的 DNA 分析實驗室，取得肯亞評鑑署(Kenya Accreditation Service, KENAS)認可，並為肯亞法院接受，方能協助處理此類案件。

選定肯亞野生動物署設立 DNA 鑑定分析實驗室的原因為其擁有專業能力能有效使用實驗室，其擁有良好的情報與調查能力，並有逮捕權及起訴權，執法人員能確保此計畫執行，包括從識別、攔截和逮捕相關涉案人員。KWS 也擁有完整可靠的體制。KWS 掌管全肯亞的野生動物。雖然實驗室座落於肯亞，KWS 將讓其他非洲野生物執法單位也能夠付費使用此實驗室。

KWS 有良好行政能力，以卓越的企業管理、領導方法和執行長之表現獲得數項獎座。KWS 有 123.96m^2 的設施可作為實驗室，此設施位於 KWS 奈洛比總部的獸醫服務處，只需要重新整修翻新，並裝置必要儀器和配備。此實驗室將符合 ISO 17025。實驗室將遵循國際重要規範，例如美國法務部的「法醫實驗室：設施規劃、設計、施工手冊」及國際實驗室評鑑合作組織(International Laboratory Accreditation Cooperation, ILAC)法醫科學實驗室導引手冊(Guidance for Forensic Science Laboratories) http://www.ilac.org/documents/g19_2002.pdf.

實驗室將同時遵守 DNA 分析實驗室標準，以及法醫學應用建立標準。實驗室將在 KWS 獸醫服務處的主管 Dr. Francis Gakuya 監督下運作。所有技術由耶路撒冷希伯來大學的 Dr. Gila Kahila Bargal 指導。

Dr. Bargal 進行所有以色列自然暨保護區署的 DNA 取證分析。她的能力已受到幾位辯護律師的測試，包括一件上訴到以色列最高法院的案件。最高法院根據 Dr. Bargal 的分析維持原判決。從而奠定她的實驗室與其方法在國家法院的權威。

Dr. Bargal 同意無償訓練 KWS 的生物學家。然而交通費與食宿費需自付，他們將在以色列進行約一個月的訓練。此訓練將在 DNA 分析實驗室完工之後才進行。訓練完成後，Dr. Bargal 首席助理 Ms. Lia Hadas 將陪同 KWS 的生物學家回到奈洛比。Ms. Hadas 將會留在奈洛比確認新實驗室是否順利營運及 KWS 的三位生物學家是否能完全勝任營運實驗室的重責。

KWS 實驗室運作初期將針對特定野味物種及一些特別瀕危具有風險之物種，提供正確可靠的鑑定。這些物種包括野水牛、大羚羊、牛羚、黑斑羚、葛氏瞪羚、湯氏瞪羚、班馬、格利威斑馬、疣豬、大種彎角羚、象、亨氏狷羚、塔那河紅疣猴、塔那河白眉猴、小旋角羚、柯氏狷羚、犬羚、長頸鹿。

一旦鑑定能力完善建立，KWS 即能鎖定特定非法交易野生肉品的店家。肉品檢驗樣本可由臥底官員至特定店家購買送至實驗室。當肉品鑑定為特定的野生物種，KWS 人員即可持搜索票搜索並逮捕相關涉案人員。檢獲之肉品送至實驗室鑑定作為起訴證據，其他相關證據如商業記錄、通訊錄等，有利於指證相關涉案人員。

將邀請 Dr. Bargal 赴肯亞協助 KWS 人員作審理案件前的準備。她也將為肯亞法官講授 DNA 分析的原則及此項技術如何有效鑑定物種提供可信的證據。

肯亞野生動物罪刑較輕微，通常為罰款。目前正努力修訂野生動物法，授權較嚴厲的懲罰。修法之前，可以其他方式加以懲罰更為有意義。其中一項變通方式是對販賣野生動物肉品的被告提出多項控告。

第一項控告當然為違反野生動物法。另外可提出的控告例如：

- 因不符肯亞對屠宰，運輸，儲存和銷售動物之法令而造成危害公眾健康。
- 收入等罪行，如偽造商業記錄、逃漏稅、洗錢等。
- 共同犯罪等罪行，如共謀、欺騙消費者/顧客等。

與衛生部、獸醫服務處、肯亞稅務局及肯亞警方合作，多項指控皆有

可能成立，其中幾項罪行可能被判入獄。這種合作能導致判刑，提供了有效嚇阻犯罪的目的。實驗室建立完整機制後，將提供其他非洲國家運用，只收取成本費用。DNA 分析實驗室將於預算確定後 12 個月內完成建置。

DNA 分析實驗室的建立與運作為處理肯亞野味貿易問題的一個重要機制。目前這個技術已被證明是唯一能鑑定該肉類為何物種以作為有效證據的技術。此類證據是可信的且在許多其他司法管轄區已被證明為有效的罪證-尤其是在有資源來應用此技術的工業化國家。

肯亞野生動物署 DNA 鑑定分析實驗室預定於 2012 年 10 月揭牌，2012 年工作時間表如下：

工作項目	期程
完成建築設計及審核(設計圖請參考計畫報告)	1 月
興建工程完成簽約	2 月
進行實驗室興建	3-8 月
KWS 工作人員至以色列希伯來大學接受訓練	8 月
以色列專家協助 KWS 人員完成實驗室設備和器材建置	9 月
實驗室開始運作	10 月

本計畫經費來源如下：

- KWS 動支 US$30,000 更新實驗室建築。
- 亞培實驗室(Abbot Laboratories)贊助 US$154,000。
- 農委會林務局贊助 US$10,000。
- Bio-Rad Laboratories, Munchen; Eppendorf, Hamburg; Fritsch, Idar-Obstein; C Gerhardt – Konigswinter; Heltich-Tuttlingen; Mettler-Toledo-Gießen 和 Julabo-Seelbach 等實驗室和儀器公司贊助器材和儀器，清單詳列於計畫報告中，約計 US$36,000。

2011 年肯亞野生動物署所提「保育教育和環境服務給付計畫」，計畫內容及執行情形，摘要如下：

肯亞生物多樣性豐富，以野生動物為主之觀光業每年約有美金八億營收。肯亞野生動物種類繁多，包括眾所周知的非洲象(佔非洲族群 1/3)、獅、豹、黑猩猩、犀牛、長頸鹿、各種羚羊、野牛，以及 100 餘種鳥類、水生生物、爬蟲類、昆蟲、植物等等。大部分野生動物分佈於各類保護區中，包括國家公園、保留區、私立保留地等。因盜獵、棲地破壞、野味貿易(bushmeat trade)、與人類或家畜競爭土地等因

素，造成很多物種受威脅或瀕臨絕種。

近年來，觀光收入不足夠及不穩定性之問題已浮現，有些因素並非肯亞政府可掌握。缺乏持續及充足之經費來源仍然是威脅肯亞生物多樣性保育的主要原因。每年經費不足約一千萬歐元，需靠政府預算、民間或公家單位捐款和刪減預算來因應。國際和國內事件也對 KWS 造成財政危機，例如九一一事件和國內選舉後之暴動。肯亞野生動物保育工作預算 75%來自觀光收入，2008 年肯亞選舉後之暴亂造成觀光客見少 85%，而 2010 年國際金融危機也使觀光收入減少 40%。

依據野生動物保育和管理法(Wildlife Conservation and Management Act) Cap 376，規劃設立肯亞野生動物署基金(Kenya Wildlife Service Fund, KWSF)，預期提供持續可靠經費來源，不受觀光收入、國內政治環境或國際經濟之影響。每年約需五千六百萬美金進行保育工作包括野生動物安全維護、監測和研究、野生動物和人類衝突之處理、動物轉運、基本建設(包括肯亞國家公園、保留區、野生動物保護區、海洋公園和保護區外之工作站等)。KWSF 預計於 10 年間募集一億美金，每年一千萬美金之利息提供保育工作經費。

2009 年 KWS 董事會核可設立基金，並開始募款，成效不錯，2010 年募得 Ksh 二千萬，2012 年一月累積到 Ksh 六千萬。

本計畫為推動 KWSF 設立之預備計畫，工作項目包括教育宣導和研究，提升民眾對保育野生動物及棲息地之瞭解，以及保育生物多樣性之重要。本計畫目標為：
一、編纂重要地區之保育教育資料。
二、建立環境服務給付方案。

教育宣導為推動保育工作之有效方法。民眾若瞭解保育野生動物之益處，野味貿易、野生動物和人類衝突、與保育無法相容的土地利用方式、破壞野生動物棲地、侵佔野生動物棲地或廊道等行為將會減緩。民眾對野生動物保育有正面看法，造訪國家公園等地區次數增加，也會支持或主動參與保育工作。

預定製作教育宣導品，並分送至各團體和學校提升保育認知，宣導內容包括野生動物和人類衝突、野味貿易之危害、社區和野生動物之互動、社區企業活動之開發等。經由保育工作人員和民眾之溝通，希望達成保育花費下降、野生動物保育有成、觀光業成長、肯亞國民生計

改善等長程目標。

將針對下列項目，建立環境服務給付方案(Establish Payment for Environmental Service Scheme)：

- 集水區保育幾付。
- 碳補償(carbon offset)計畫，如碳封存(carbon sequestration)。
- 生物多樣性保育。
- 美麗景色之維持。

KWS 研究和資源調動工作人員將推動下列工作：

- 研究環境服務幾付(Payment for Environmental Service, PES)之方式、研發、設計、目標和執行，以達最高成效。
- 調查生物多樣性和生態系服務重疊程度，瞭解其機會與限制。
- 找出可能符合生物多樣性保育目標之自然區域，經由 PES 方案保護更多生物多樣性服務。
- 針對森林已受保護之現有保育計畫，研擬對應現有目標之方法，重建重要生物多樣性廊道，並設立 PES 方案。
- 研究 PES 方案成本和風險之測量方法。
- 進行科學基本資料調查，決定監測和評估程序。
- 針對有潛力列入 PES 之地點，進行評估分析、風險評估、經營管理調查。
- 進行使用或接受環境服務者幾付意願調查。

PES 將考量環境、社經、政治等因素，以及納入環境和成本效益之政策，並確保長期保育經費來源，使用野生動物和環境資源者參與保育和經營管理計畫。PES 方案主要經濟來源包括：水、海洋和漁業、能源和礦業、林業、運輸(陸、海、空)。PES 方案並將依循現有「贊助者提供經費，換取森林不開發」之保護模式，希望引伸至碳債(carbon debt)的自然債交換(Debt-for nature swap)能募得足夠基金，保育肯亞生物多樣性。

依據KWS報告，經編纂、同儕審查、編輯修訂後，已完成保育教育宣導資料10種，並將印10,000份，於8個保育區發放。設計、印製和分送工作將於2012年9月完成。KWS提供數份宣導資料樣本，內容包括拯救山地紫羚、非洲象保育、保護大型食肉動物、與社區合作改善人民生計及保育野生動物等。



STATUS REPORT

KENYA WILDLIFE SERVICE

CENTRE FOR WILDLIFE FORENSICS AND GENETICS

MOSES OTIENDE

and

FRANCIS GAKUYA

January 2012

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Acronyms

DNA	Deoxy- ribonucleic acid
ISO	International Standards Organization
KENAS	Kenya Accreditation Service
KWS	Kenya Wildlife Service
US	United States
USD	United States Dollar

Executive Summary

Illegal trafficking in "bush meat" – the meat taken from poached wild animals, is a pervasive and extremely serious conservation problem facing wildlife in Africa today. Experts invariably estimate that this illegal trade consumes millions of wildlife annually to produce thousands of tons, or more, of contraband meat that is sold for profit.

Illegal trade in bush meat is a criminal enterprise that creates ecological havoc in many habitats and drives many once-abundant species to near-extinction. It also intensifies human wildlife conflict and is an unacceptably serious health hazard. This enterprise is a form of consumer fraud that involves the commission of multiple crimes including conspiracy,. It is a type of larceny-the theft of public property and vandalism (willful destruction of national species and hunting with forbidden weapons). This crime is intolerably cruel.

Wildlife law enforcement agencies have indentified; arrested and prosecuted many bush meat dealers. But in recent years, these dealers have become sophisticated. The dealers have learnt that if they slaughter the animal quickly and "cleanly", de-bone them and deal only in wildlife red meat, it becomes nearly impossible for a prosecutor to produce court-admissible evidence that can be linked to a particular species "beyond reasonable doubt".

The only reliable way to distinguish between a kilogram of de-boned giraffe meat and a kilogram of beef in a court room is by use of DNA forensic analysis. Using forensic analysis, the prosecution can enter admissible and incriminating evidence required to secure convictions. Meaningful conviction is one way of stopping such dealers from plying this very lucrative trade. Convictions with substantive penalties will also have the effect of deterring many others from engaging in this vice.

This project seeks to create a DNA forensics analysis laboratory at the Kenya Wildlife Service (KWS) Headquarters. The Service has the overall mandate to conserve and manage wildlife in Kenya; has professional competence to use the DNA forensic laboratory effectively (good intelligence and investigatory capacities); has powers to institute arrests; and has prosecutorial authority required to bring cases to court. KWS also has excellent standards of accountability, long-term reliability and institutional integrity. In addition KWS is prepared to make the services

of the laboratory available to other African wildlife law enforcement agencies on an "at cost" basis.

This project has to date received generous contributions from Abbott Laboratories of USD 154,000 and Taiwan Forestry Bureau, CoA - USD 10,000, and equipments from Bio-Rad Laboratories, Munchen; Eppendorf, Hamburg; Fritsch, Idar-Obstein; C Gerhardt – Konigswinter; Heltich-Tuttlingen; Mettler-Toledo-Gießen and Julabo-Seelbach whose approximated value is USD 36,000.

Background Information

Illegal hunting of wild animals for "bush meat" is a common and widespread problem across Africa, Asia and the Neo-tropics. In many parts of Africa, bush meat is hunted on a commercial scale and sold to markets as an in-expensive source of protein. The magnitude of this illegal hunting often causes significant decline in wild population and sometimes local extinctions.

Kenya is confronted with the same problem experienced by all other African countries. Wildlife populations are declining and illegal hunting for bush meat is implicated. Some apologists claim that bush meat poaching is a peripheral issue that is more than a poor farmer hunting a small antelope or porcupine to feed his family. This perspective is inaccurate and misleading. Bush meat and poaching are no longer a subsistence hunting problem. Rather, it has expanded to become a financially lucrative industry, run by gangs and syndicates that kill very large numbers of wildlife annually to illegally supply butcher shops in towns and cities.

The magnitude of the bush meat poaching industry can be witnessed from several perspectives. One perspective is the magnitude of wire snares recovered annually by de-snaring teams inside and outside Kenya's protected areas. KWS conducts regular patrols to clear wildlife habitats of snares, catch poachers, and treat snared/ wounded animals. These patrols reveal concrete evidence of illegally bush-meat trade.

Bush meat trade also imposes serious human health hazard as this meat is not inspected by authorized health inspectors. In Kenya, meat control and public health laws control the slaughter, transport and sale of meat destined for human consumption. The laws specify which animals may be slaughtered, where they may be slaughtered and how the meat is to be transported to markets. Often, local consumers are not aware that they are purchasing the bush meat from butcheries. This swindle is a form of consumer fraud.

Wire snares are the most common technique used to capture wild animals. The snares either grasp an animal by the foot, trunk, around the neck or body. Neck captures usually result in strangulation while foot, trunk and body captures usually hold an animal on a pivot to a single location. The more the animal struggles to escape, the tighter the snare becomes, often cutting through the skin. Snares also expose captured animals to intense pain, loss of blood, thirst, as

well as predation. Other techniques witnessed include steel jaw traps, pitfalls, deadfalls and poisons.

Justification for the establishment

The bush meat trade is a series of linked businesses. The trappers hunt the wild animals in their natural habitats and often slaughter them on site. Slaughtering is done both at a logistical expediency and a legal protection. Logistically, by removing the viscera and other unusable parts, the poachers lighten the load they must carry out of the habitat. Legally, if they are caught carrying only red meat, they know it will be difficult for wildlife authorities (prosecutors) to present that meat as species-specific evidence in a courtroom.

The unscrupulous dealers trim the bush meat to assure it cannot be identified morphologically, and then wraps the bush meat in old newspapers and/or plastic sacks for transport to towns and cities. The meat is then delivered either to local distributers or directly to retail butcher shops, who sell it to consumers as regular meat. This enhances profits, as farm-raised meat is much more expensive than bush meat. Thus, the bush meat trade is usually a syndicate of criminals who conspire to commercialize on wildlife thus violating instituted laws.

In 2009, KWS made over 220 bush meat arrests, mostly poachers or middlemen. Unfortunately, commercial butchers, who provide the key financial incentive for these syndicates, have protected themselves from prosecution as they deal only with well-trimmed meat. They are aware that prosecutors presently cannot provide court-admissible species- specific identification evidence based solely upon red meat being sold on their premises. Prosecution cannot be successful without incriminating evidence.

KWS urgently needs DNA forensics laboratory to correct this a normally. The laboratory will conform to the ISO 17025 standards, and will be accredited by the Kenya Accreditation Service (KENAS) and accepted by the Kenya Court system. Reliable and persuasive evidence will result in a significant improvement in the conviction rate in bush meat cases, resulting to closure of errant butcheries, protection of general public and promoting safety of wildlife, as it will be a deterrent to others who might be tempted to engage in this illegal trade.

The forensic DNA laboratory

This project will create a DNA forensic analysis laboratory at KWS headquarters in Nairobi Kenya. KWS has the skilled human resource required to operate the laboratory and it has the skilled law enforcement and legal staff needed to assure a comprehensive capacity for a bush meat campaign-from identity, intercepting and arresting person implicated in the bush meat trade to prosecuting such persons in court.

KWS has an exceptionally good record of administrative competence, which has been acknowledged by the receipt of several awards testifying to excellence in corporate governance, leadership practices and clean externall audit reports. KWS aspires to be a world leader in wildlife conservation. These are attributes which create an environment that supports the likelihood of the DNA forensic laboratory being successful.

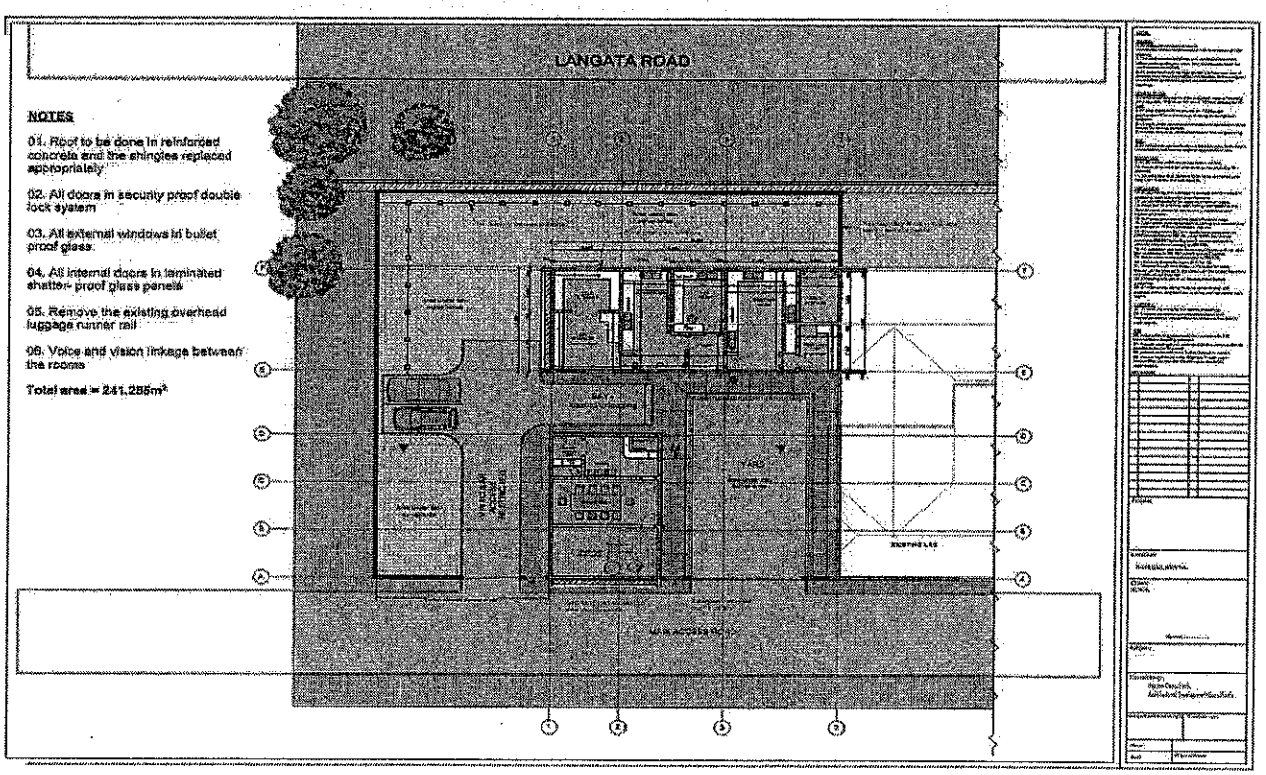
KWS has a 123.96 square meter facility available to serve as the premises of the laboratory. The facility, located at KWS Headquarters in Veterinary Services compound, will be renovated as well as the infrastructure upgraded. Nevertheless, the laboratory does have a home, and it is only a matter of basic refurbishing effort to make it a suitable structure for the intended work.

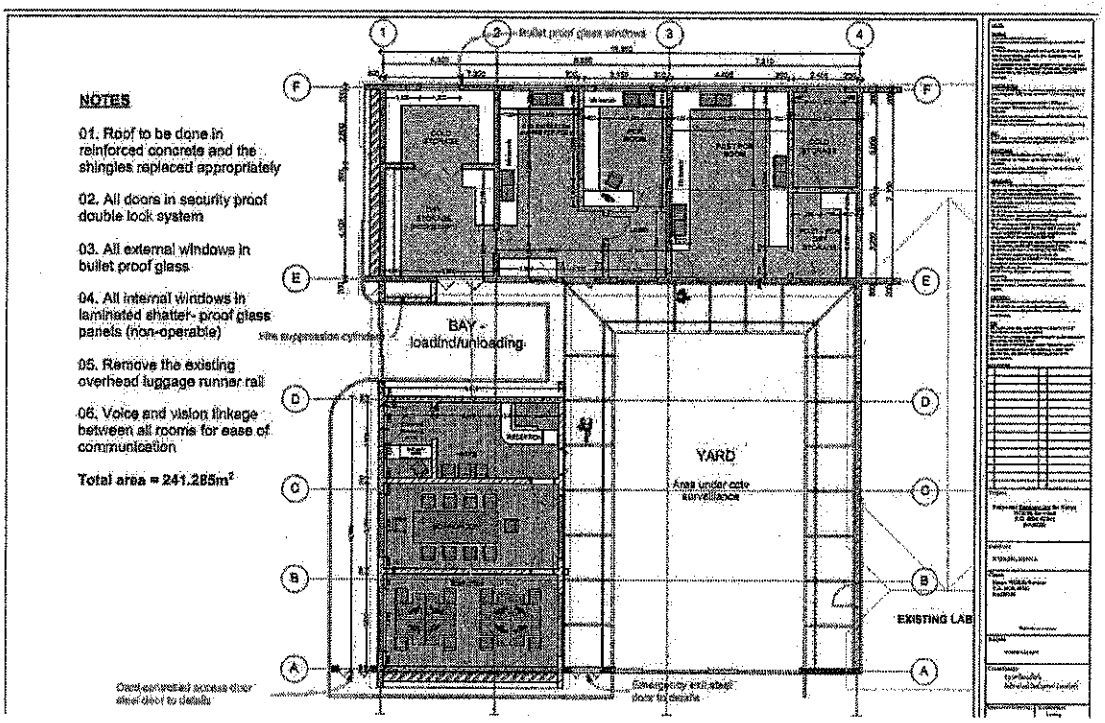
Renovations will create a laboratory that compiles with ISO17025. The U.S. Department of Justice's *Forensic Laboratories: handbook for Facility planning, Design, Construction and Moving* is being used as a guide to create a facility that will comply with standards established by the Kenya Accreditation Service (KENAS) as well as any special requirement established by the Kenya Judiciary and by the Kenya Ministry of Justice and Constitutional Affairs. The International Laboratory Accredit Cooperation (ILAC) Guidance for Forensic Science Laboratories. HttP://www.ilac.org/documents /g19-2002pdf are also being used.

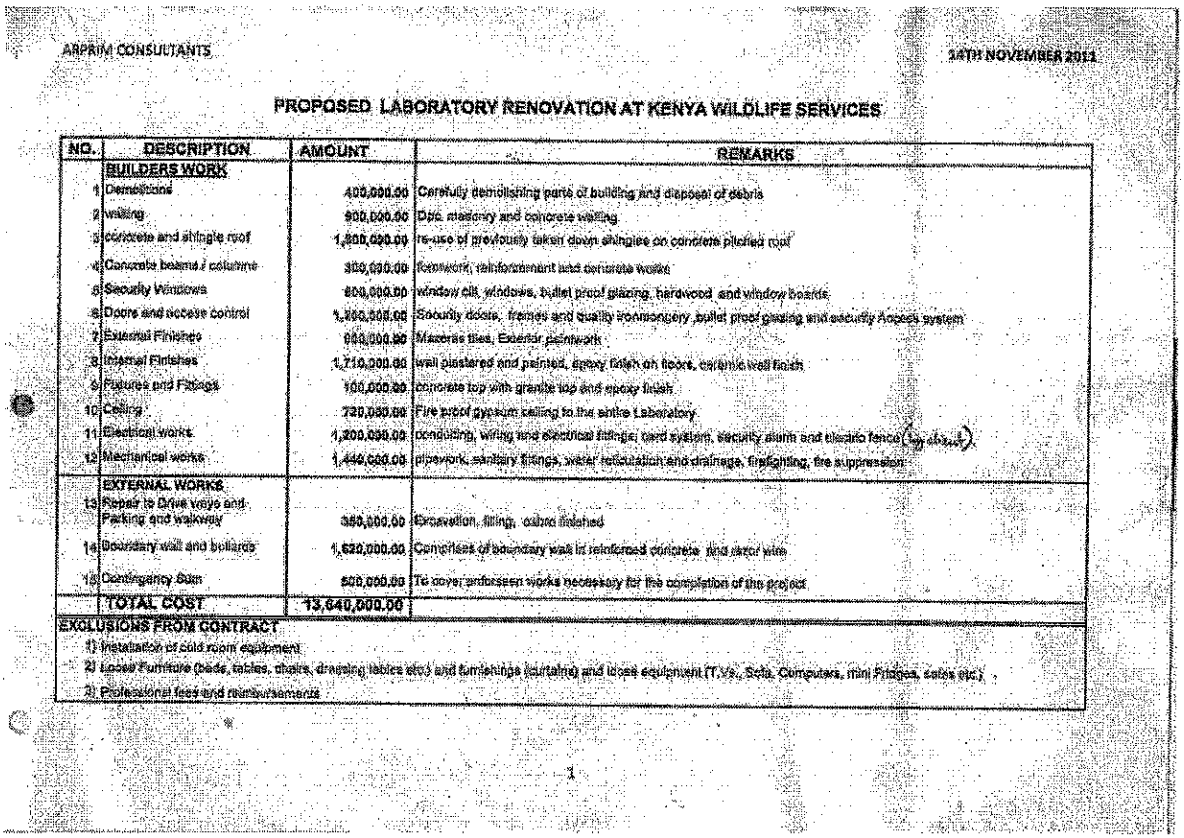
This laboratory will comply with both established standards for DNA analytical laboratories, as well as establish standards for forensic application (e.g. rigorous security procedures, compliance with chain-of-custody procedure, etc.) The DNA laboratory will use well-known, standardized analytical technique, with conventional extraction and real time PCR amplification methodology. Identified sequences will be matched against internationally-accepted controls for species identification.

Architectural Design

KWS being a government corporation has selected an architect in compliance with the Kenya Public Procurement and Disposal Act, 2005 and is currently tendering for a contractor to complete the project. The architectural design is now complete with approximate construction costs. The design is as illustrated below.




NOTES
01. Roof to be done in reinforced concrete and the shingles replaced appropriately
02. All doors in security proof double lock system
03. All external windows in bullet proof glass
04. All internal windows in laminated shatter- proof glass panels (non-operable)
05. Remove the existing overhead luggage runner rail
06. Voice and vision linkage between all rooms for ease of communication
Total area = 241.285m²
BAY - loadind/unloading
YARD
Area under cctv surveillance
EXISTING LAB



ARPRIM CONSULTANTS 14TH NOVEMBER 2011

PROPOSED LABORATORY RENOVATION AT KENYA WILDLIFE SERVICES

NO.	DESCRIPTION	AMOUNT	REMARKS
	BUILDERS WORK		
1	Demolitions	400,000.00	Carefully demolishing parts of building and disposal of debris
2	walling	900,000.00	Dpc, masonry and concrete walling
3	concrete and shingle roof	1,800,000.00	re-use of previously taken down shingles on concrete pitched roof
4	Concrete beams / columns	300,000.00	formwork, reinforcement and concrete works
5	Security Windows	600,000.00	window cill, windows, bullet proof glazing, hardwood and window boards
6	Doors and access control	1,200,000.00	Security doors, frames and quality ironmongery ,bullet proof glazing and security Access system
7	External Finishes	900,000.00	Mazeras tiles, Exterior paintwork
8	Internal Finishes	1,710,000.00	wall plastered and painted, epoxy finish on floors, ceramic wall finish
9	Fixtures and Fittings	100,000.00	concrete top with granite top and epoxy finish
10	Ceiling	720,000.00	Fire proof gypsum ceiling to the entire Laboratory
11	Electrical works	1,200,000.00	conduiting, wiring and electrical fittings, card system, security alarm and electric fence
12	Mechanical works	1,440,000.00	pipework, sanitary fittings, water reticulation and drainage, firefighting, fire suppression
	EXTERNAL WORKS		
13	Repair to Drive ways and Parking and walkway	360,000.00	Excavation, filling, colors finished
14	Boundary wall and bollards	1,620,000.00	Comprises of boundary wall in reinforced concrete and razor wire
15	Contingency Sum	500,000.00	To cover unforseen works necessary for the completion of this project
	TOTAL COST	13,640,000.00	

EXCLUSIONS FROM CONTRACT

1) Installation of cold room equipment

2) Loose Furniture (beds, tables, chairs, dressing tables etc) and furnishings (curtains) and loose equipment (T.V's, Sofa, Computers, mini Fridges, safes etc)

3) Professional fees and reimbursements

1

Equipment

The specific equipment to be used in the laboratory is itemized in this report. KWS is very grateful to Bio-Rad Laboratories, Munchen; Eppendorf, Hamburg; Fritsch, Idar-Obstein; C Gerhardt – Konigswinter; Heltich-Tuttlingen; Mettler-Toledo-Gießen and Julabo-Seelbach for generously donating the following equipment:

Available Equipment

Packing Pieces Article Design	QTY
Thermoshake VTO500, orbital with cooling, 230VAC 50hz	1 pc
Finished plate TB51, for 30 Erlenmeyer flasks 50-100ml	1 pc
Micro-centrifuge Hettich	2 pc
Rotor for 4*8 PCR stripes	2 pc
Laboratory precision scale EL202/00	1 pc
Laboratory precision scale PL202-S/00	1 pc
Standard pipette PIpetLite (Starset)	1 pc
Mikroliter standard – tips (bag of 250pcs)	1 pc

Mikroliter standard – tips (bag of 1000pcs)	1 pc
Julabo cooling unit F250	1 pc
Vacuum blotter	1 pc
Vacuum station	1 pc
Eppendorf Single channel pipettes	14 pc
Ep T.I.P.S. (pipette tips)	16 pc

Required Equipment

	QTY
Real Time PCR 7500ABI	1 pc
Pyro sequencer	1 pc
Photonanodrop for DNA quantification	1 pc
Freezer negative 80	2 pc
Freezer negative 40	2 pc
Freezer negative 20	2 pc
Refrigerator	2 pc
Shaking incubator with temperature, shaking speed and digital timer controller	1 pc
96 head thermal cycler	2 pc
assorted pipetters	Assorted
UV cross linker unit	1 pc
UV radiation system	2 pc
DNA extraction Acrylic Nucleic acid work station with UV controlled light	1 pc
Pre-PCR extraction Acrylic Nucleic acid work station with UV controlled light	1 pc
Pipette aid	4 pc
Spectrophotometer	1 pc
Dry Shippers 500 lt, 250 lt, 100 lt, 50 lt	2 pc each
Ice maker	2 pc
Lab top coolers	6 pc
Generator	1 pc
Autoclave	1 pc
Incinerator	1 pc
Post PCR Gel box – Large, medium, small	2 pc each
Power station Voltage and current supplier for electrophoresis	4 pc
Microwave	2 pc
UV Transilluminator (UV White light surface)	2 pc
Camera system (Kodak)	2 pc
Computer PC, screen and printer	4 pc each
Sequencer key (Gene code corp) DNA sequence, assembly and analysis software	4 single use

Forensic Expert Training

The laboratory will be operated under the supervision of Dr. Francis Gakuya, Head of Veterinary Services and the day-day running be managed by Mr. Moses Otiende, Molecular Biologist for KWS. Presently, 2 KWS staff has been identified as the laboratory's technicians. These technicians have academic credentials in biology as well as practical experience working in molecular laboratories and other applied biology disciplines. The technicians do not have the requisite skills needed to run a DNA analysis laboratory. The identified personnel (molecular biologist and technicians) are expected to train in molecular techniques that will be useful in day to day running of the laboratory. They are expected to be trained by Dr. Gila Kahila Bargal of the Hebrew University of Jerusalem. Dr. Bargal heads the DNA forensic analysis laboratory at the university's Koret School of Veterinary Medicine. She routinely conducts all DNA forensic analysis required by the Israel Nature and Parks Authority. Her competence has been tested by several defense attorneys, including one case that that was appealed all the way to the Supreme Court of Israel. The Supreme Court upheld the conviction based on Dr. Bargal's analysis, thereby endorsing her laboratory and it's methodologists at the highest level of the national judiciary.

Dr. Bargal agrees to train the KWS staff *pro bono,* thus there will be no need for tuition. However, there will be need to pay for their round trip economy air tickets from Kenya to Israel as well as to pay their living expenses and accommodation while in Israel. The training should take about 1 month.

Dr. Bargal is prepared to travel to Kenya shortly before any cases are tried in court to assist the KWS officers in case preparation and presentation. She is also prepared to conduct a brief seminar for Kenyan judges to explain the principals of DNA analysis, and how these techniques provide a reliable and admissible proof regarding identification of animal species.

Once the KWS biologists have been trained, they can return to Nairobi in the company of Ms. Lia Hadas, Dr. Bargal's principal assistant, who has a very high level of competency in the operation of a DNA forensics laboratory. Ms. Hadas will remain in Nairobi to assure that the

new laboratory is functioning properly, and that the two KWS biologist are fully competent to operate the laboratory on their own

This training is anticipated be conducted in August 2012 after the DNA laboratory at the KWS headquarters is competed and ready to function.

Expected Outputs

Initially, the KWS laboratory will focus on providing positive reliable identification of a particular species that are common in the bush meat trade, as well as selected species that are at risk, particularly because of their endangered status. These species include: Buffalo, Eland, Wildebeest, Impala, Grant's gazelle, Thompson's gazelle, Elephant, Hirola (Hunter's hartebeest), Tana River red colobus monkey, Tana River mangabey, Lesser kudu, Kongoni (Coke's hartebeest), Common Zebra, Dik dik, Grevy's zebra, Warthog, Greater kudu and Giraffe.

Once full competency in operations is achieved, KWS can target a number of butcher shops that surveillance indicates are implicated in trafficking in bush meat. Samples of meat from the butcher shops can be purchased by undercover KWS officer and delivered to the new laboratory for species identification. When bush meat species are positively identified, KWS security units can secure such warrants and then serve them on implicated persons who will then be arrested and evidence seized. Some of the seized evidence will be the meat itself. This will be delivered to the DNA laboratory for the DNA analysis required for prosecution. Other evidence can be items such as business records, address books, and similar items that can serve as evidence in multiple charge indictments and which also might help to identify other persons involved in criminality.

Penalties upon conviction of wildlife-related crimes in Kenya are usually minimal, normally a modest fine. Efforts are now being made to amend Kenya Wildlife Act to authorize more serious penalties. Until that is done, however, prosecutions can seek alternative ways of imposing penalties that are more meaningful.

An interesting alternative is to lay multiple charges against persons accused of illegal dealing in bush meat. Certainly the first charge must be violation of the Wildlife Act. Bit additional charges can also be lodged, such as:

- Endangering public health by failing to comply with Kenya legislation on the slaughter, transport, storage and sale of animals,
- Revenue offences, such as failure to maintain appropriate business records and falsification of business records, tax fraud, money laundering, and similar charges,
- Common crime offences, such as conspiracy, defrauding the public (consumers/client), etc.

With the cooperation from the ministry of health, director of veterinary services, Kenya Revenue service and the Kenya Police, there is prospect of charges being lodged, many of which can result in custodial sentences. Such cooperation can result in sentencing that provides a meaningful deterrent to others.

Once the laboratory is established and has experience in conducting DNA analysis and presenting those analysis as evidence for prosecutions, and once the laboratory has settled into daily operations that can be characterized as "routine", it's services will then be made available to other African wildlife law enforces agencies on "at cost" basis meaning the laboratory will charge other agencies no more than the actual cost of conducting analysis.

The DNA forensic laboratory at KWS headquarters will be fully operations within the next 9 months as stipulated by the work plan.

Conclusions

The creation and operation of a basic DNA forensic analysis will provide a key mechanism for addressing the bush meat trade in Kenya, This present technology has proven to be the soul available means for producing court-admissible incriminating evidence for positive identification of a species using its meat alone. This type of evidence is reliable and has been proven effective incriminating many other jurisdictions - particularly in industrialized countries which have the resources to apply this technology.

When used as the basis for multiple charges that seek culpability regarding violation of human health, revenue and common crime offences, the DNA forensic analysis laboratory can be the essential factor in achieving penalties, including custodial sentences, fines and forfeitures that will be the basis for meaningful deterrence. Such deterrence can be the fundamental cornerstone in any effective campaign to suppress illegal trade in bush meat.

Acknowledgment

KWS takes this opportunity to extend its sincere gratitude to Dr Bill who has remained devoted in fundraising to ensure that the project is completed. KWS gratefully acknowledge the support all the donors who have donated funds and equipment. KWS specifically recognizes Abbott Laboratories for its generous contribution of USD 154,000 and Taiwan Forestry Bureau, CoA - USD 10,000, the organization is also extends its thanks to Bio-Rad Laboratories, Munchen; Eppendorf, Hamburg; Fritsch, Idar-Obstein; C Gerhardt – Konigswinter; Heltich-Tuttlingen; Mettler-Toledo-Gießen and Julabo-Seelbach for generously equipment who approximated value is USD 36,000. We also acknowledge KWS Director Julius Kipng'etich for commitment and guidance in the project; will also not forget the contribution of Ibrahim Ogle, Dr Francis Gakuya, Eng Wamaya, Moses Otiende and Vincent Obanda for their administrative and technical assistance during the course of execution of the project.

Project Work-plan 2012

Task	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct
Completion of architectural design and submission for approval										
Tendering &award of construction contract										
Commencement of construction										
Training of KWS technical staff at Hebrew University (Israel)										
Lab equipment assembly and optimization of primer panels (with help of the Hebrew expert)										
Official opening of laboratory										

PROGRESS REPORT ON
CONSERVATION EDUCATION & PAYMENT FOR ENVIRONMENTAL SERVICES
MAY 2012

1. Project Outline

Project Name / Title	Conservation Education and Payment for Environmental Services
Organization	Kenya Wildlife Service
Date	30th May 2012

2. Project Achievements

The project has been able to design materials for conservation education to communities and also support fundraising for conservation efforts in Kenya. A total of 10 conservation fact sheets have been prepared. The design and printing is expected to be completed by September 2012. Attached are the fact sheets and designs.

3. Activities undertaken

The main activity being undertaken is to disseminate conservation education materials to communities, stakeholders and partners.

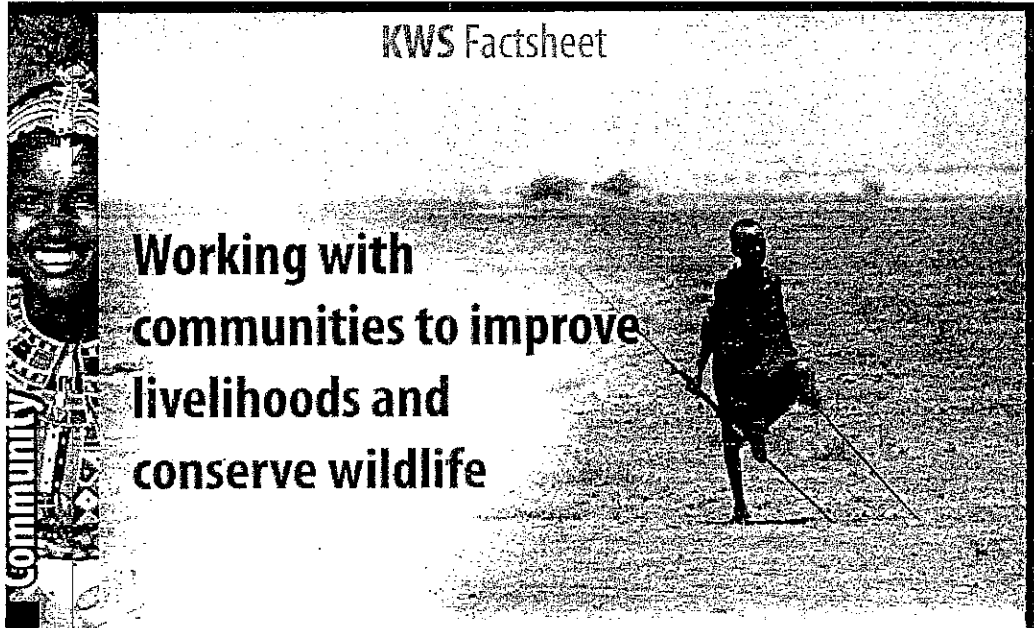
i) Developed briefs for the designs
ii) Prepared the materials to be included in the design
iii) Procured the designer and printer
iv) Distribution of the materials

4. Revised Timeline for implementation

Objective	Activities	Indicator	Output	Cost US $
Disseminate conservation education materials to communities, stakeholders and partners	• Design habitat specific fact sheets • Print 10,000 conservation fact sheets • Dissemination meetings in conservation areas	10 fact sheets designed 10,000 fact sheets procured for printing 8 Conservation area dissemination	Conservation education material done and disseminated	10,000
Total				10,000

5. Expenditure Report

The total US $ 10,000 has been committed in the design and printing of 10,000 sheets. All delivery is expected to be done in August and dissemination in September 2012.



Working with communities to improve livelihoods and conserve wildlife

The challenge:

As you read this, only about 30 percent of Kenya's wildlife is inside a protected area. That means that buffalo, elephant, zebra, lion....are roaming outside the protected areas; a ranch, a farm, a community grazing area. For wildlife to roam in safety, local communities should benefit from their presence. Yet today, of the millions of dollars that come into Kenya for wildlife tourism, nearly all goes to airlines, tour operators, camps and lodges, and the government. In most cases, little or nothing goes directly to the community. No wonder that snaring for bush meat and even poisonings are common.

What KWS is doing?

Helping communities earn livelihoods

With a new Community Enterprise Development Department, Kenya Wildlife Service (KWS) is taking a leadership role in both developing new community conservation nature-based enterprises and taking a new look at older ones. The Department's purpose is to build the capacity of communities to engage in nature-based businesses — businesses that depend on keeping the land and its wildlife in good shape. Nature-based business can range from a lodge or campsite to a kayaking or rock-climbing centre, to novel uses of land like mushroom farming, bio-prospecting, for example, aloe vera.

The idea is simple: if communities agree set aside some of their land for wildlife and commit to safeguarding wildlife there, they get help with developing a viable eco-tourism or other facility that will bring jobs and funds. Often this involves negotiating a fair contract with a professional tourism company to build a lodge or camp that the community can help staff and/or manage. In addition, some community members — including in many cases former poachers — get training and jobs as community wildlife scouts to help with security.

A first step of the newly-created Community Enterprise Development Department was to develop an inventory of community and other conservation enterprises throughout the country to get a comprehensive baseline on nature-based businesses: who benefits and how much?

With hard data, policies and regulations can be put in place to ensure that communities benefit.

For instance:

Oleral Kipeto Community Wildlife Sanctuary in Kajiado County covers 5,000 acres near Kitengela, amid the wildlife corridor that animals use to move from Nairobi National Park to the plains further south. KWS has helped the local land owners do an impact and feasibility study for wildlife, environment, and possible market.

They have started sensitising the community about the options, and members are joining.

They are training 20 community wildlife scouts to patrol and monitor the ecosystem.

They have taken community members for exchange visits to other community conservancies and have helped them being the planning process, and engaged a consultant to do a professional management plan and business prospectus, and advertise for a private-sector company to develop a tourism facility. They will help the community negotiate rewarding terms.

Compensating for loss

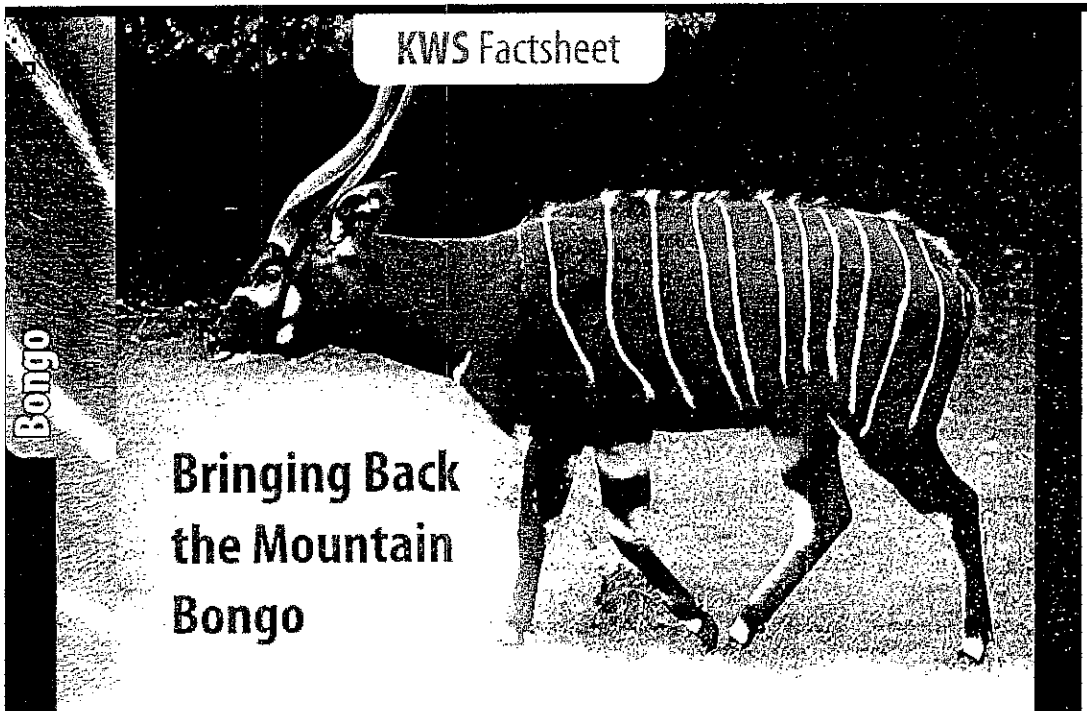
When a tourist sees an elephant, she sees an awe-inspiring creature straight from a storybook. But a local farmer sees a beast that could trample her farm in a night. While a visitor can't get enough of a pride of lions, a local family sees killers who ate their livestock, and with it, perhaps their only source of livelihood. A lion kills a cow; the family kills a lion.... And now, in part because of retaliatory killings, less than 2,000 lions are left in Kenya's wilderness.

In addition to helping communities benefit, KWS aims to ease the burden of living with wildlife. Today, individuals are compensated by the government, if injured or killed by wildlife. Only two pilot "consolation" schemes—in Kitengela and Amboseli-currently exist to help pay for lost livestock, farms and other property.

Both community members and wildlife rangers say it makes a huge difference in community attitudes to compensate or "console" families for both human and property loss. A goal is to extend realistic compensation schemes throughout the country.

For more information, please contact

KWS Factsheet



Bongo

Bringing Back the Mountain Bongo

Background:

A century ago, the Mountain Bongo (Tragelaphus eurycerus isaaca) was sought by hunters for its striking striped coat and long, twisted horns. In the 1960s and 1970s, visitors often saw the animals at lodges in the Aberdare National Park. A decade ago, however, the Mountain Bongo was believed to be extinct in the wild, due mainly to poaching and deforestation on the high mountain slopes.

In 2003, KWS, conservation organisation Rhino Ark, and community members launched the Bongo Surveillance Programme (BSP) in forest areas that had once hosted large numbers of Mountain Bongo, and had recently been protected by the electric fence around the Aberdare Ranges. Using foot patrols and hidden cameras, the BSP found small groups of Bongo in various areas of the Aberdares, then still smaller groups in the Mau forest.

By now, over 100 animals have been counted in the wild, all of them in Kenya. They are concentrated in highland forests on the slopes above the Great Rift Valley, primarily in Aberdare National Park and Forest Reserve, the Mau Forests Complex and Mount Kenya Forest. Another 68 are in a semi-captive facility on the slopes of Mount Kenya.

The Mountain Bongo is considered critically endangered by international conservation organisations, as endangered today as elephant and black rhino were in the late 1980s.

The challenge:

A National Bongo Task Force, convened by KWS and representing all stakeholders from the public and private sectors, is forging a national strategy for bongo conservation. It will be multifaceted, since these, the largest forest antelope, need ample roaming space in secure forest areas. And while reforestation efforts are underway in some areas, forests have been dwindling overall — to less than two per cent of land cover.

As one early step, the American Museum of Natural History has pledged to help with DNA identification to verify the numbers living in the wild, confirm whether small, isolated populations are viable, and to help track the animals.

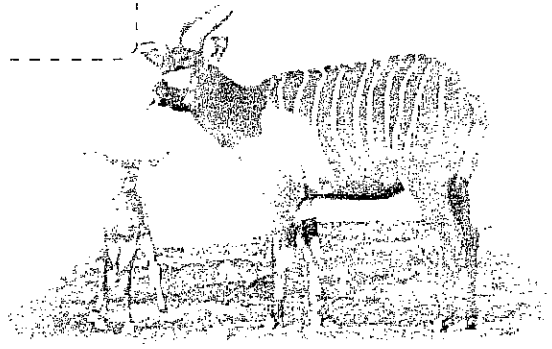
The process is due to start after fencing a protected area on the northern side of Mt Kenya.

What will it take?

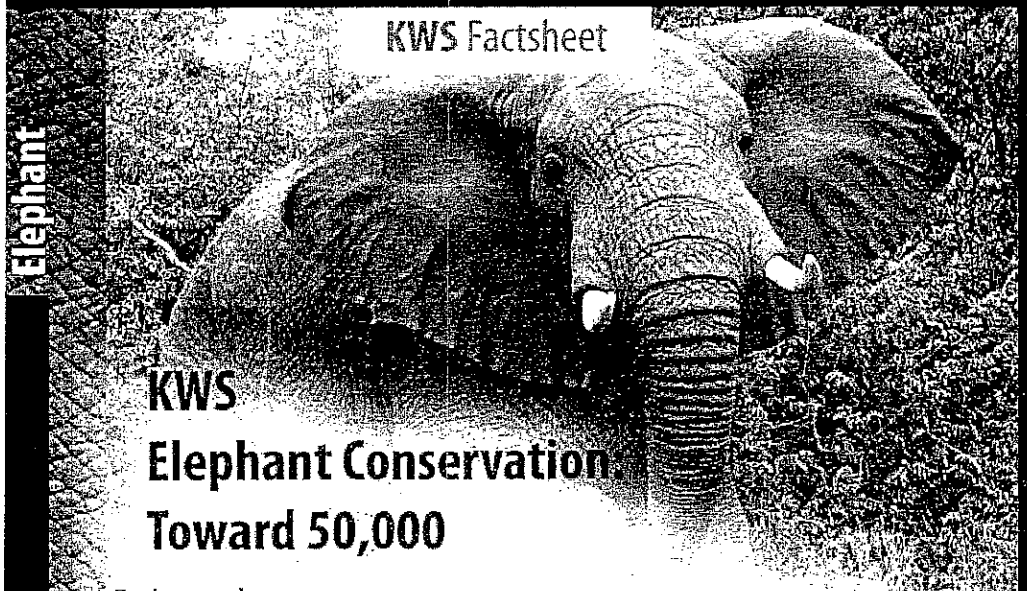
Ironically, there are five times as many Mountain Bongos in zoos around the world than in the wild. And the entire captive population of over 500 originally came from the Aberdares. In 2004, American zoos donated 18 captive-born bongos to repopulate Mt Kenya. The population has bred to 68, now guarded by the Mt Kenya Wildlife Conservancy, which also has an active public education programme to prepare local Kenyans to welcome the bongo back. The plan is to release 10 individuals to the wild on Mt Kenya each year.

To ensure that these extraordinarily beautiful antelope survive to the 22nd century and beyond, KWS will be working with partners and the Kenyan public to conserve and reforest the mountain slopes that the Mountain Bongo need. Such conservation work does double duty: These are, after all, Kenya's great "water towers," which feed Kenya's major rivers and ultimately provide water and livelihoods for the majority of Kenyans.

For more information, please contact:



KWS Factsheet



KWS Elephant Conservation: Toward 50,000

Background:

The elephant, which is the world's largest mammal, is a highly charismatic animal that serves as a rallying point for conservation, capturing the attention of people from all over the world and generating significant returns from wildlife-based tourism.

It's an umbrella species since its conservation depends on large areas of the ecosystems being conserved and protected and it requires 200kg of fodder pasture material per day and 100-litres of water per day. Outside of protected areas, the conflict between elephants and people is intense, especially crop raiding and related risks to life and livelihoods has major implications for public support for conservation.

Elephants are keystone species with significant roles in ecological dynamics and, therefore, their persistence is important to the conservation of other elements of biodiversity.

The dramatic comeback of the African elephant in Kenya over the last two decades shows that with adequate focus and funding, extremely challenging conservation goals can be achieved. Massive slaughter of elephants as well as rhinos sparked major conservation efforts two decades ago, including the launch of the Kenya Wildlife Service in 1989. The elephant population had plunged more than 90 percent--from about 167,000 in 1973, down to 16,000 in 1989. The fledgling KWS turned the trend around. The elephant population has doubled since then—to 37,000 in 2012—thanks to international conventions prohibiting most of the ivory trade, vigilant anti-poaching, research, translocations, and collaboration with communities living with wildlife.

The African elephant is the keystone species for the country. Since elephants need so much room to roam, securing enough land for them also means saving numerous less visible species of animals and plants.

How has KWS responded?

In KWS' early days, the threat from poaching was so huge, urgent, and direct that the organisation used trained paramilitary personnel to stop the killers. Today's challenges to conservation are more complex, though, and require more varied and sophisticated approaches. At any given time, some 70 percent of elephants are roaming outside protected areas, particularly on land used by herding communities who live in wildlife-rich areas.

The communities often suffer conflict with elephants: elephants blocking schoolchildren on their way to school; killing livestock and trampling crops, and sometimes killing people. But to track and monitor elephants — let alone extend elephant-friendly territory--requires enlisting the support of local communities, including training and equipping community game scouts.

Elephant-management methods

Using a variety of elephant tracking mechanisms, KWS works with communities to establish schools, farms and settlements out of the way of age-old elephant routes. In serious cases of human-elephant conflict, KWS erects electric fences or translocates animals to less populated areas. In some cases, KWS must resort to "Problem Animal Control" — shooting individual elephants that have inflicted a lot of damage or become a hazard to human life. The Service is also exploring the possibility of elephant contraception. But elephants are a vital part of the ecosystem, as well as a big lure for tourism. KWS works with communities to help them develop nature-based businesses, so they can benefit from the jumbos whom they might otherwise view as hazards and rivals.

Through these efforts, KWS is progressively winning space for elephants. Scientists believe the country can support 50,000 and are working toward that goal.

What are the major challenges now?

Success has a downside. Major challenges now include human/elephant conflicts, high increase in human population expanding rapidly at 4 percent a year. Human encroachment on wildlife habitat and changes in land use has resulted in high human wildlife conflict. Poaching is again on the rise. Kenya lost some 278 elephants to poaching in 2011. Most specialists attribute the rise to the partial lifting of the ivory ban, which allowed a one-off sale to Japan and China by southern African countries in 2007.

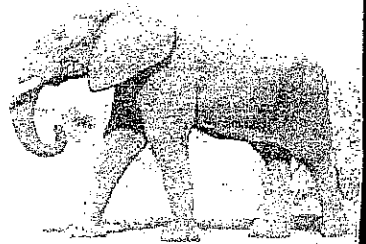
Combating poaching has become tougher as organised crime has taken over the illegal ivory trade in recent years. Poachers have also become stealthier, using dogs and poison arrows instead of noisy automatic weapons, so they are harder to locate.

KWS vision for the African elephant :

Despite current conflicts, KWS scientists believe that Kenya could comfortably host 50,000 elephants (up from the current 37,000). Reaching those numbers will call for increasingly intensive management, plus:

(a) investment in good land-use planning and using the resulting plans;
(b) working with communities and planners to connect fragments of habitat so that elephants can roam far enough for food, water, and mates
(c) a broad understanding that wildlife is a worthwhile use of land and a worthy economic alternative to industrialisation and agriculture; and
(d) active community buy-in and participation, which depends on local people reaping direct benefits from elephants.

Given the means, KWS is up to the challenge.



For more information, please contact:

KWS Factsheet



Keeping Large Carnivores Safe in Kenya

Background:

The lion may be king of the wild, but there's no doubt which species rules Kenya.

Fifty years ago some 20,000 lions roamed the country; today only 2,000 are left. Lions are not the only large carnivore to see their numbers dwindle to the endangered category: From 10,000 cheetahs a half-century ago, between 800 and 1,160 remain; wild dog numbers have crashed from 20,000 to fewer than 1,000.

By 1963, Kenya's human population was estimated at 9 million; today by the last census in 2009 the population is at 38 million Some 50 years from now, that number is likely to have doubled. And, unless action is taken to change a number of trends, it is also likely that all the other animals now at the top of the food chain will be extinct.

Disappearing habitat plays a huge role in this story. So, too, do intentional killings, especially when predators take livestock, or people fear they will. In colonial times, farmers were encouraged to kill wild dogs, for instance. Later, poisoning of lions became common using agro-chemicals.

How is Kenya Wildlife Service (KWS) working to keep carnivores safe

In 2010, KWS released the National Large Carnivore Conservation Strategies 2009 - 2014, developed over a number of years with stakeholders from around the country.
The strategies set a direction for conserving lion, leopard, cheetah, wild dogs and striped hyenas.
Together, the strategies are designed to ensure:

(a) Viable and ecologically functional populations of both large carnivores and their prey, and
(b) Reduction of livestock killings by carnivores.

Because of different prey and habits, the strategies vary in the details. For instance, cheetahs roam larger areas, with a lower population density, than any of the other large African cats. The statistics are daunting: cheetahs can range over 1,000 square kilometres a year. Typically, they live with only one or two cats per 100 square kilometres.

Therefore, conservation approaches must be international in scope. Wild dogs are also wide-ranging, so their strategies are similar and specialists are cooperating across species and across national boundaries.

What will it take?

Putting these strategies in place will be a tremendous challenge. All of them involve:

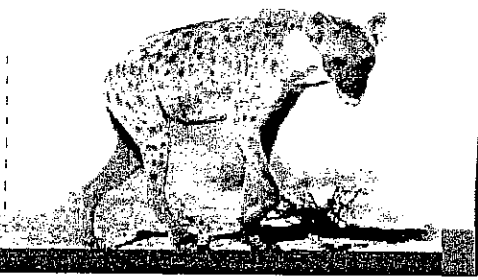
(a) Working with local communities to create carnivore conservation zones outside of protected areas, since carnivores range widely outside the parks and preserves
(b) High technology for tracking and better understanding predators and prey
(c) New twists on ancient protection methods, such as predator-proof bomas, (enclosures) that cats and hyenas can't sneak into
(d) A massive push to help communities benefit from the wildlife that lives on their land and often endangers them or their livestock, and, based on the above and intensive awareness campaigns,
(e) A change in attitudes and action among Kenyans in general, so that lions, for instance, are no longer seen as a threat, but as the "pride" of Kenya
(f) Cooperation with neighbouring countries, since some of the endangered animals range so widely.

The strategy is a huge commitment, and enacting it will not come cheap.
We can already see some of the progress though. In the wake of the great drought of 2009, killing of livestock by carnivores near Amboseli National Park surged, likely because their prey had been decimated. To restore predator-prey balance, KWS translocated 7,000 wildebeest and zebra from other areas to Amboseli. The grass-eaters are expected to provide enough food for the carnivores to keep them from being tempted by livestock and also to help the carnivores rebound. The move cost KSh 103 million (over US $1.2 million).

As the translocation demonstrates, KWS is aiming to help people, livestock, and large carnivores co-exist, as they did for thousands of years. But in this time of intense competition over land, intensive management will often be required to get it right.

So far, coordinated action plans have been developed for seven countries: Kenya, Botswana, Zimbabwe, Zambia, Sudan (southern), Mozambique and South Africa. More are in development.

For more information, contact:



PLEDGE FORM

KENYA WILDLIFE SERVICE

World Class Parks!



The Kenya Wildlife Service (KWS) is a state corporation established by an Act of Parliament Cap 376 with a mandate to conserve and manage wildlife in Kenya and to enforce related laws and regulations.

The challenges facing wildlife and biodiversity conservation in Kenya are many and varied. They include climate change, habitat degradation and loss, forest depletion, tourism market volatility, human wildlife conflict brought on by population growth and changing land use habits of communities that co-exist with wildlife as well as wildlife crime.

Given its central mandate and pivotal role in creating a level of certainty for Kenya's wildlife conservation and management efforts, Kenya Wildlife Service needs your help!

WHY WE NEED YOU

For Kenya Wildlife Service **EVERY PENNY COUNTS.**

In our work at KWS, we never forget that in spirit, our natural legacy belongs not just to Kenyans but to humanity as a whole. In conserving and protecting, we take pride in knowing we undertake a most sensitive task but one with greater ramifications for our nation.

HELP KWS to conserve wildlife and its habitats by supporting its Security Operations, Research and Biodiversity Monitoring, reduction of Human - Wildlife Conflict; conservation education programs, Habitat management, translocation and research and monitoring, Endowment Fund; Animal Adoption Program; Conservation Fundraising Events and by giving Donations in cash or in-kind to both restricted – you pick a specific program or area and designate your support - and unrestricted which allows Kenya Wildlife Service to allocate funds/support where the need is the greatest.

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☐ **Kenya Wildlife Service Fund** ☐ **Animal Adoption Program** ☐ **Endangered Species Conservation** ☐ **Habitat Management**

☐ **Unrestricted** ☐ **Restricted (tick area)** Security of Visitors & Wildlife Infrastructure Development :

Conservation Fundraising Institutional strengthening :

Marketing and Improving tourism facilities: Habitat management, research & monitoring:

National Parks and Reserves

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Address: _____ Tel: _____

Email: _____ Post Code: _____ Country: _____

☐ I enclose my cheque for Ksh/USD/Euros _____ made payable to the **Kenya Wildlife Service** ☐ I donate in cash Ksh/USD/Euros _____ to the **Kenya Wildlife Service**

Date: _____ Signature: _____

You will receive our receipt and letter of thanks in due course. Once completed, please send this form to:

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Tel: +254 020 600800, 6002345 +254 020 2379407/8/9 - Fax: +2546003792
Email: kws@kws.go.ke; rmm@kws.go.ke; **Website:** www.kws.go.ke
CHEQUES WRITTEN TO: **Kenya Wildlife Service – Donations Account: Account No.:** 229975312:
Bank: Kenya Commercial Bank: **Branch:** Moi Avenue: **SwiftCode:** KCBLKENYA

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巴西南帕他納魯大犰狳保育和生態計畫成果報告摘要

本計畫執行期間，計畫統籌人 Dr. Arnaud Desbiez 提供執行進度說明和照片給林務局兩次，成果報告摘要如附：

執行計畫後，捕捉到 5 隻大犰狳，製作研究區大犰狳巢穴分佈圖，架設 10 部自動照相機，拍攝到數千張各種動物使用、進出或經過大犰狳巢穴，蒐集到 11 份大犰狳排遺，完成將計畫擴充至貧齒總目之評估工作，利用媒體將大犰狳介紹給巴西和其他國家民眾，訓練五位專業人士(包括 3 位獸醫和 2 位生物學家)。

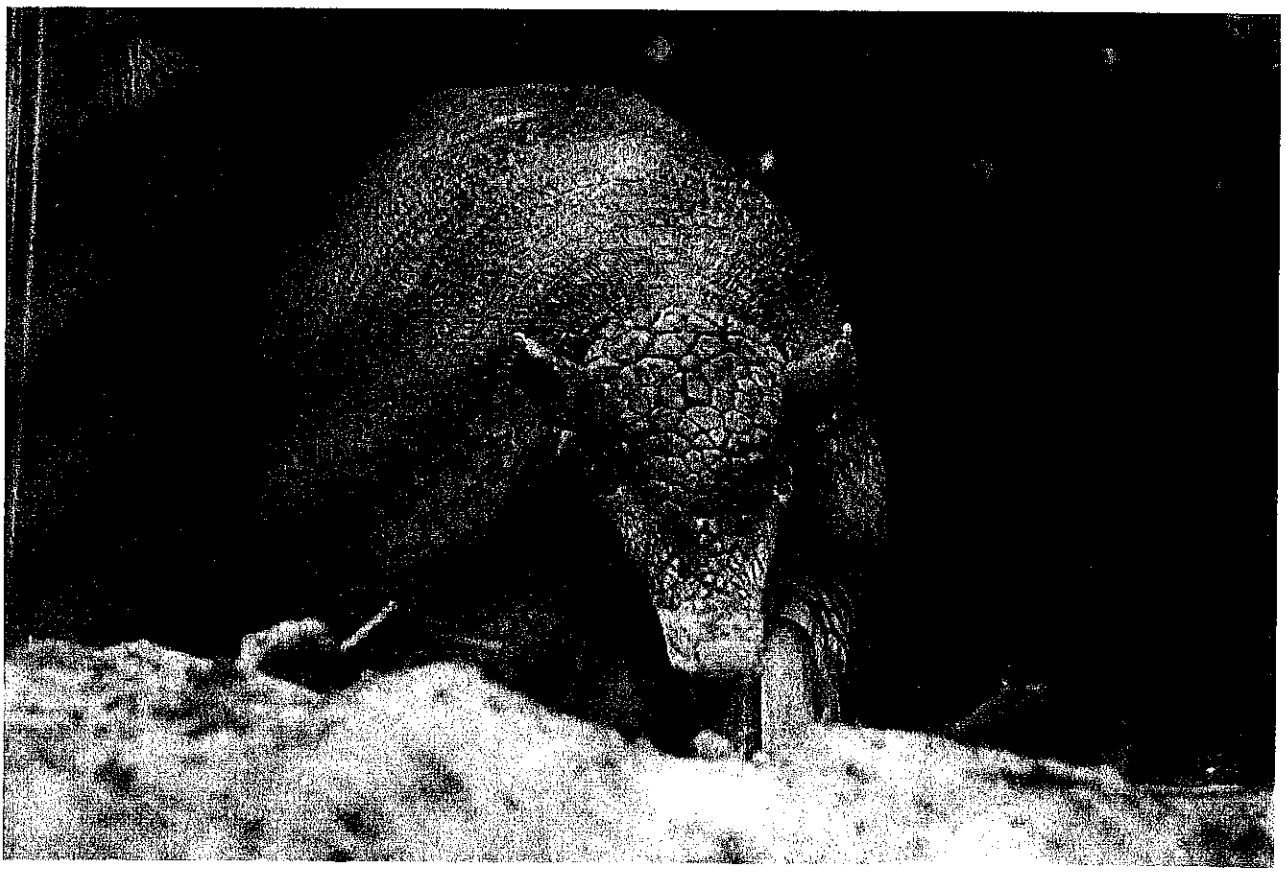
捕捉到的大犰狳分別為成年雄性 3 隻，亞成年雄性 1 隻，成年雌性 1 隻。因為大犰狳極為少見，捉到 5 隻似乎很多，但連續 6 個月每天巡視，平均 1 個月才捉到 1 隻而已。捕捉到的大犰狳均進行健康評估，並蒐集生物樣本，包括血液、糞便、寄生蟲、尿液、細菌培養(鼻、口、直腸、陰道等抹片)、一小片供 DNA 分析之組織。大犰狳裝追蹤器效果不定，有的幾天後脫落，維持最久的為 45 天。以後將嘗試不同器材或方式，也利用六帶犰狳試出較適合追蹤大犰狳的器材。

自動照相機拍攝到大犰狳性別比例和捕捉到的相同。大犰狳不同個體辨識度高，蒐集到的資料有助於研究大犰狳壽命、個體間溝通、生殖等。對研擬族群生存力模式也很重要。自動照相機拍攝資料證實大犰狳通常單獨行動，以及生態系工程師之角色，許多物種利用大犰狳穴。另外，六帶犰狳之監測有助於瞭解大犰狳之行為及生態學。因大食蟻獸食性與大犰狳類似，也蒐集大食蟻獸排遺協助研究。進行調查時也發現有農民對白蟻丘下毒的現象，如果能證明大食蟻獸與大犰狳有食用這些種類之白蟻，將會發起反對毒白蟻丘的行動。

環境教育方面，為提升大眾對大犰狳之瞭解，已針對 Pantanal 和 Sao Paulo 觀光客、地主、農場工作人員、幼童和大學生講授或說明保育大犰狳之重要性。贊助本計畫的英國 Chester Zoo 發新聞稿宣布在 Pantanal 發現大犰狳，BBC 也報導本計畫，並發佈自動照相機拍攝到的大犰狳照片。其他國際媒體和巴西大多數報紙和一家電視台也陸續跟進報導，顯示大眾對大犰狳之好奇及興趣。國際知名攝影家 Kevin Schaffer 造訪計畫研究地點 10 天，將拍攝到的大犰狳照片置於其網站，並與國家地理雜誌聯繫，將於 2012 年 5 月刊登本計畫及大犰狳相關文章。

與本計畫合作的巴西 NGO IPE 出版摺頁，宣導大犰狳保育議題。2013年預計產製印有保護大犰狳圖片或字樣的夾腳拖，藉由人腳一雙方式傳遞保育訊息。許多記者對自動照相機所攝照片有興趣，本計畫執行人員將善用此資源，增加報紙和其他媒體之報導次數。

Pantanal Giant Armadillo Project



Progress Report for

The Conservation Division, Forestry Bureau, Taiwan

Project Coordinator: Dr Arnaud Desbiez

Funds awarded in 2011: US$ 5,000.00

January 2012

Executive Summary

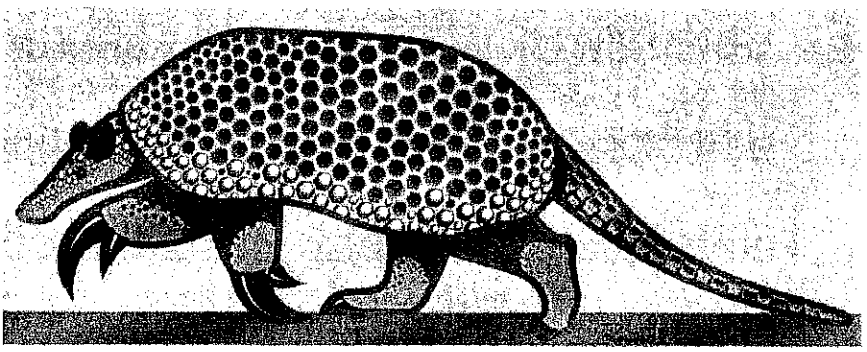
The giant armadillo (*Priodontes maximus*) is the largest of the armadillo species and can reach up to 150 cm and weigh up to 60 kilograms. Although giant armadillos range over much of South America almost nothing is known about them and most information is anecdotal. Due to its cryptic behavior and low population densities, this animal is very rarely seen. The giant armadillo is threatened with extinction and is currently classified as Vulnerable (A2cd) by the IUCN/SSC Red List of Threatened Species. This project aims to establish the first long-term ecological study of giant armadillos in the Brazilian Pantanal wetland. The main goal of the project is to investigate the ecology and biology of the species and understand its function in the ecosystem using radio transmitters, camera traps, burrow surveys, resource monitoring, resource mapping and interviews.

The project was initiated in July 2011 and received a donation of US$ 5000 from The Conservation Division, Forestry Bureau, Taiwan. The objective for the first six months of the project were to test and establish methodologies, begin the scientific research and launch several environmental education and capacity initiatives.

A total of 5 individuals have been successfully captured. Burrows throughout the ranch mapped, 10 camera traps strategically placed and thousands of pictures of animals using, visiting or passing in front of the burrows have been taken, 11 fecal samples collected, potential to expand the project to other Xenarthrans assessed and media campaign to introduce the species to both National and International public started, 5 Brazilian professionals have been offered training (3 veterinarian and 2 biologists). The impact of the project on the local community has been extremely positive.

In 2012, we will pursue and consolidate the research on giant armadillos using methodologies we established in 2011, the project will be expanded to other Xenarthrans, the epidemiological study of Xenarthrans started, we will continue liaising with national and international media, prepare a scientific publication, offer training to Brazilian Nationals, continue integrating the project to local and National initiatives, continue liaising with local and national authorities on project results and implications. At the end of 2012 the first steps to evaluate and use data to evaluate the status of giant armadillos according to the IUCN/SCC redlist criteria will be taken. Data will also be compiled for population viability analysis. An action plan for the species in the Pantanal biome will be created in 2013.

Giant armadillos have a fascinating evolutionary history, exhibit distinctive adaptations (20 cm fore claws, armor), play an interesting role in the ecosystem (control termites and act as ecosystem engineers), have an intriguing appearance and have great potential for education and outreach initiatives as ambassadors for biodiversity.



Main Achievements: Research

Since June we have caught five giant armadillos. Three adult males, one sub adult male and one adult female. Because the species is so rare, it is very difficult to find. Although this number seems high, this actually represents a capture rate of less than one animal a month, working almost every day. One animal escaped capture after breaking our trap. We have now designed and tested an efficient trap and holding box for the capture of giant armadillos. The method is the safest and least stressful for the animal as we wait near the trap and remove it immediately and place it in a large holding box.

The anesthesia protocol we have been using always worked perfectly and the animals respond well to the reverser drugs. This means we can wake them up immediately after finishing the procedure. For each individual a complete heath assessment of captured animals was performed and biological samples collected. This included blood, feces, ectoparasites, urine, and nasal, oral, rectal, vaginal or preputial swabs for bacterial cultures. A small tissue sample is also collected for posterior DNA extraction and genetic and lepra analyses. As for the telemetry device, as anticipated we have had mixed results.



Danilo Kluyber project vet attaching a transmitter to a giant armadillo

The transmitters bolted to the armor fell off in some cases after a few days and at best after 45. We will try using new screws and bolts, but this method can only provide short term data. The GPS devices we purchased were very expensive and too heavy and we were disappointed. We are seeking to design with the manufacturer something more appropriate for the species.

In August our team also successfully implanted two six banded armadillos and the recently used this experience to successfully implant a giant armadillo. This should allow us to collect data for over two and a half years. The major drawback is that the signal is much weaker. During the day when the animal is underground in its burrow detection is weak and can be as low as 200m in some cases. The externally attached device could be detected at a range of over 1 km. We will continue testing some new external devices, but since the objective of the project is collecting long term data it seems that implants will be the method of choice. In January we will start a preliminary analysis of the telemetry data.

The camera traps have provided us with invaluable data. The sex ratio between males and females photographed is almost the same contrarily to our capture data. The female that the lowland tapir project had captured in 2008 was caught in the same area again by our cameras in 2010 and 2011. Giant armadillos can easily be distinguished from each other by the pale scales on the edge of the carapace. This important data will help us learn about life span, intra-specific communication, reproduction and much more. This data will be crucial to developing our Population Viability Models.



We have never caught on camera more than one adult male in the same area. However we have pictures of a male and a female passing in front of the camera days or weeks apart. We have no pictures of giant armadillos sharing a burrow or traveling together confirming the solitary nature of the species. Using data collected by the camera traps, we have also confirmed the important role of giant armadillos as ecosystem engineers. We have documented many species using abandoned or recently dug burrows. We will be publishing these results in the next few months. This important publication will help promote the important ecological function of giant armadillos and add new arguments to why they must be conserved.

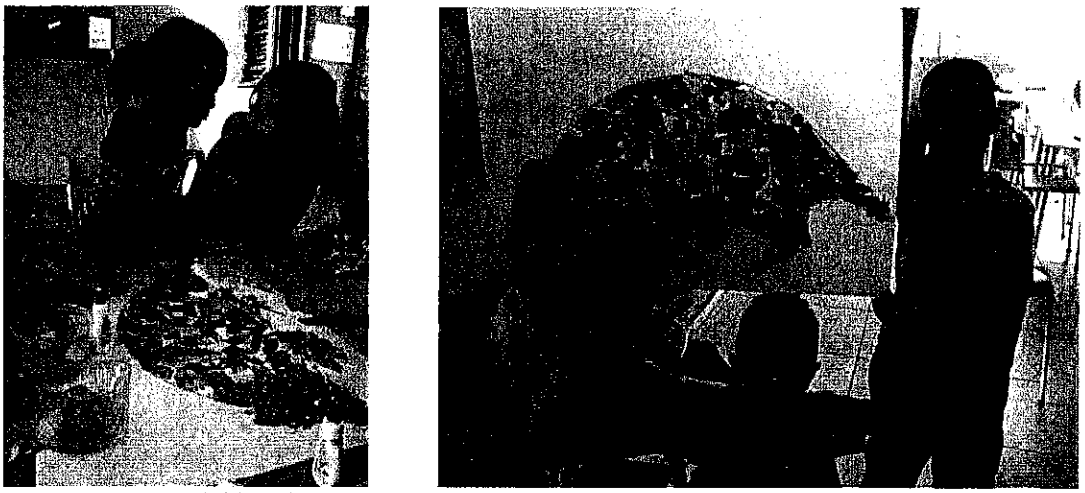
We also use indirect observations to better document giant armadillo ecology. We have collected samples of ants and termites from foraging holes and scratches and managed to collect 11 fecal samples. However finding fecal samples still remains difficult.

As we learned more about giant armadillos we realize we need to learn more about some of their closer relatives. Monitoring two six-banded armadillos has provided us with invaluable knowledge. This species is easier to monitor, is diurnal and provides us with many insights on armadillo behavior and ecology. This work will be expanded in 2012. We have also started to collect fecal samples of giant anteaters. It appears that giant anteaters use the same resources as giant armadillos. Since the two species co-exist throughout a large part of their range, how do their niches differentiate? Do they really use the same resources? Do they use the same resources but in different habitats? It has also come to our attention that famers in the nearby cerrado are poisoning termite mounds. We believe both species feed on these species of termites and require data to prove it. We will then have the data and tools launch a strong campaign against this practice.

Overall we have surpassed our expectations for the first six months of the project thanks to the dedication of our team which has spent almost the entire period in the field. Our team actually consists of Arnaud Desbiez and Danilo Kluyber and trainees. We hired a second veterinary, Caio Motta from the Sao Paulo Zoo for the first expeditions. We will return to the field in January, however due to the floods work will have to be post-poned until mid-May. We hope to purchase a quad bike next year to allow us to continue to work during the floods.

Main Achievements:
Environmental Education, Awareness campaigns, Outreach

Our first step in raising awareness is to make the public aware of the existence of this incredible animal. This is our main goal during the first two years of the project. We have given many talks about the species and the importance of preserving the Pantanal to tourists visiting the ranch, landowners, workers and children in the Pantanal and Sao Paulo as well as to university students. We have been invited to present the project next year by several groups and organizations.



Children learning and creating fun activities around Giant armadillos

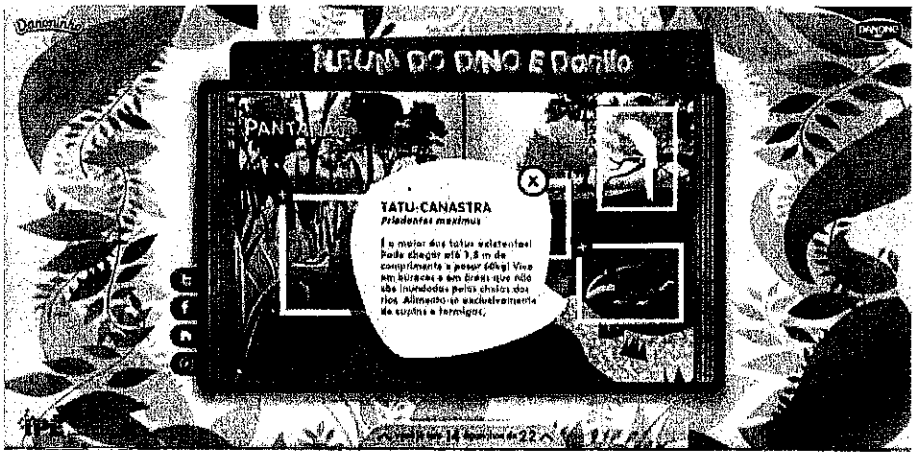


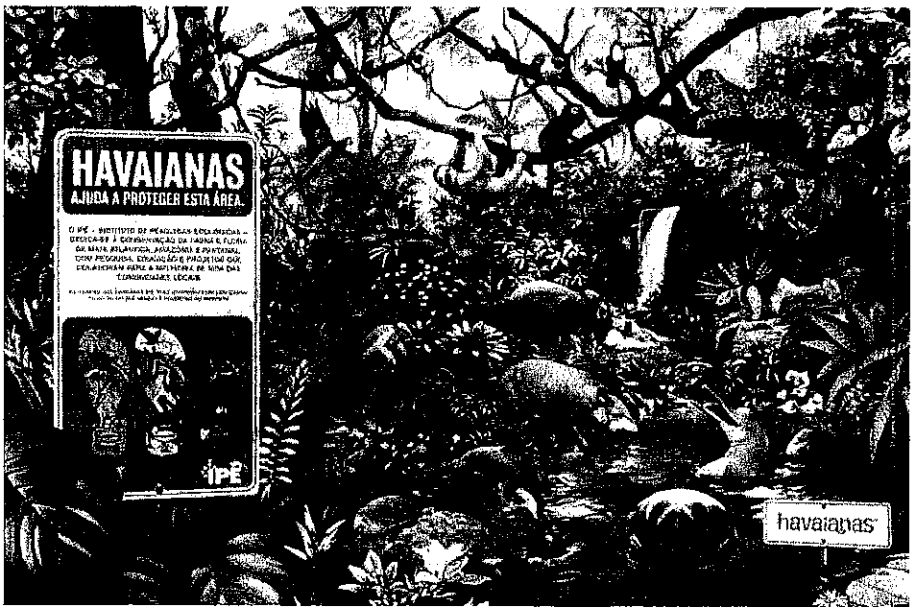
Arnaud Desbiez making a presentation about giant armadillos to tourists visiting the Pantanal

Thanks to a press release sent by Chester Zoo in October the project has been featured on the BBC web site http://www.bbc.co.uk/nature/14993426 . This actually led to worldwide coverage and in Brazil almost every news paper showed our pictures of giant armadillos on their website, there was even a mention on the television news presenting our pictures (example http://www1.folha.uol.com.br/bbc/979176-cientistas-capturam-imagens-de-tatu-gigante-no-pantanal.shtml). Our main conclusion from this exposure was that no one knows about this species, but everyone is fascinated once they learn about them. As predicted giant armadillos can really become important ambassadors for biodiversity.

World re-known photographer Kevin Schaffer spent 10 days with us in the field in 2011. Using a camera trap he took excellent giant armadillo pictures some of which can be viewed on Arkive (http://www.arkive.org/giant-armadillo/priodontes-maximus/image-G128256.html) If you want to use any of his pictures please contact him. Have a look at his web site http://imageandissues.blogspot.com/2011/10/back-from-heat.html . Kevin has also helped us establish contacts with National geographic an a small article about the project and giant armadillos will be appearing in the magazine in May or June 2012.

Thanks to our partnership with a Brazilian NGO called IPE we have made significant progress on our National environmental awareness initiatives and giant armadillos are featured in a pamphlet developed by DANONE. IPE is also trying to develop a flip-flop in partnership with Havaianas to promote the species. We hope that in 2013 giant armadillos will be featured on flip-flops used by adults and children throughout the country. These partnerships with private companies are an invaluable tool for us to reach the general public.

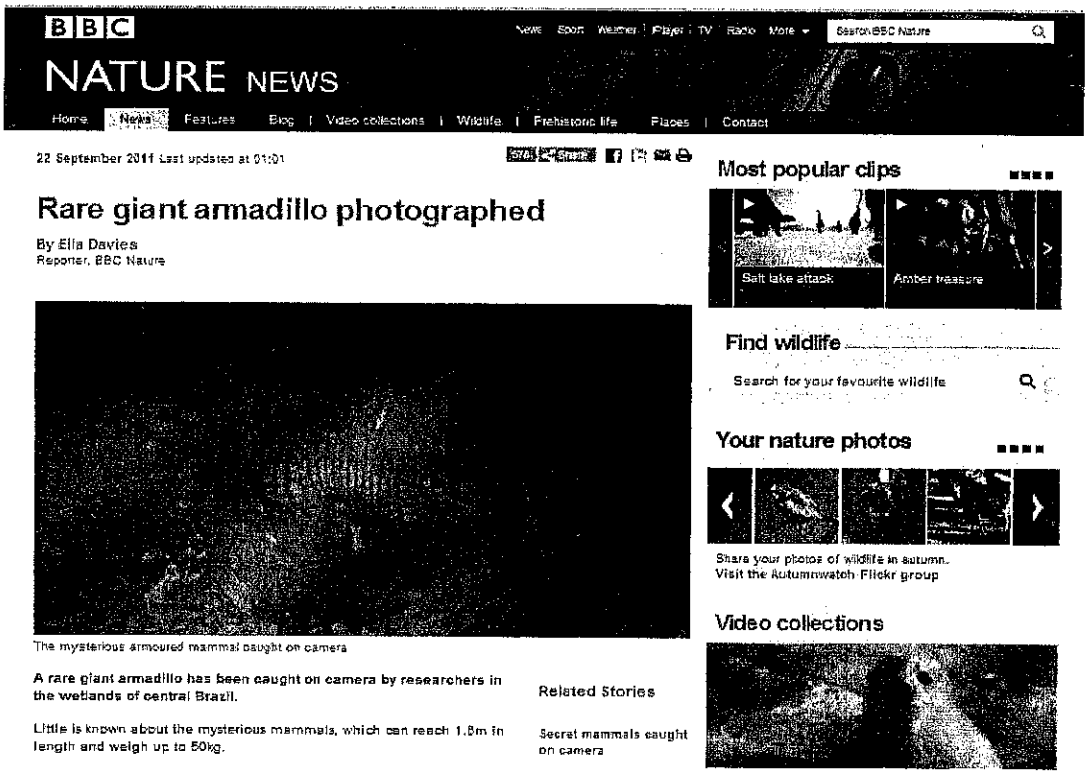




The Danone campaign (above) introduced children to giant armadillos, while Havaianas may include giant armadillos as one of the animals they use in their designs for sandals

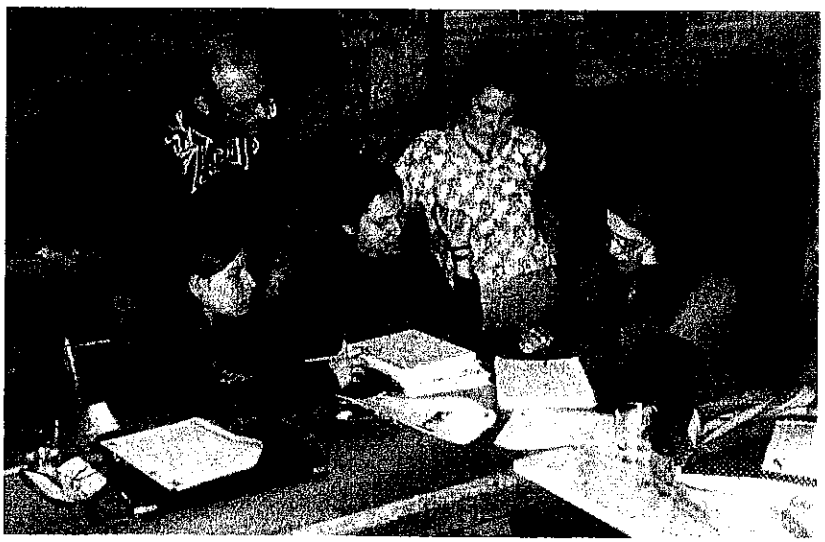
In 2012, we will certainly continue working with the national and international media to promote giant armadillos and the importance of preserving their habitat. In the next few months we will be publishing an article about the use of giant armadillo burrows by other species. Our work with Camera traps has also

attracted the attention of Journalists http://www.guardian.co.uk/environment/2011/dec/06/wildlife-camera-traps-conservation?fb=native&CMP=FBCNETTXT9038 . We will use results for this paper and the exciting pictures it includes to launch another media campaign.



Main Achievements: Training and Capacity building

A total of five Brazilian professionals have received training and experienced the different aspects of a field Conservation project in the past six months. It is important that our experience and knowledge be shared with the next generation of conservationists. The giant armadillo project is a great opportunity to provide firsthand experience and training. Three veterinarians and two biologists have worked in the field with us over various periods of time in the past six months. Arnaud Desbiez also gave a class at the ESCAS University in Sao Paulo about species research, action planning and population modeling.



Impact on Local Community

The project is fully supported by the local community in the study area. The project is being supported by Baía das Pedras ranch. Baía das Pedras is a 17,000 hectare privately owned traditional cattle ranch. They provide lodging and meals to the field team and are passionate about the project. In return, the team gives presentations and provide materials about the project to eco-tourists visiting the ranch. The entire community and neighboring ranches are involved in the project. Ranch workers participated actively in the search for giant armadillo tracks, burrows and other evidences. The project participates in the environmental education component of a local rural school.

Reporting and Fundraising

Two reports detailing the progress of the project were sent to the Conservation Division of the Forestry Bureau from Taiwan. In addition many pictures illustrating our work was sent. During 2011, we actively fundraised for the project. In addition to the to the Conservation Division of the Forestry Bureau, in 2011 we received funds from:

Bergen County Zoo, USA; Cerza Zoological Park, France; CEPA foundation, France; Chester Zoo, UK; Columbus Zoo, USA; Idea Wild; Prins Bernhard Fund for Nature; The Royal Zoological Society of Scotland

We also received in kind support for IPE, Baia das Pedras ranch and the Sao Paulo Zoo

Plans for 2012

In 2012, we will pursue and consolidate the research on giant armadillos using methodologies we established in 2011. The plan is to capture and monitor 6 adult individuals (3 males and 3 females) for at least 2 years. In addition the project will be expanded to other Xenarthrans, in particular a study on the six banded armadillo will be initiated. This work will evaluate the impact of cattle ranching on the species by monitoring individuals in a highly impacted area and a pristine area. It is hoped that this study will help shed some light on armadillos and help formulate hypothesis on the rare giant armadillo for which we will cannot obtain a significant sample size easily. We will also intensify the collection of giant anteater fecal sample and plan to monitor giant antearter in the dry season of 2013. The epidemiological study of Xenarthrans will be started and serve as a basis for Danilo Kluyber's Ph.D.

In 2012 we will need to raise funds for the purchase of a Quad bike to enable us to work in the flooded season and through the thick scrub forest.

We will continue liaising with national and international media. A scientific publication on use of burrows will be prepared and used to attract media attention for the species. We will offer training to at least 5 more Brazilian Nationals. As in 2011 we will continue integrating the project to local and National initiatives and continue liaising with local and national authorities on project results and implications.

At the end of 2012 the first steps to evaluate and use data to evaluate the status of giant armadillos according to the IUCN/SCC red list criteria will be taken. Data will also be compiled for population viability analysis. An action plan for the species in the Pantanal biome will be created in 2013.

Financial Report

All the funds allocated to the Giant armadillo project in 2011 have been spent as agreed upon in the proposal. These funds have been key to the success of the project.

BUDGET ITEM	Funds spent from from Conservation division Forestry Bureau
Transportation	
Fuel for Field Truck	$835
National Plane tickets (São Paulo- Campo Grande)	$500
Field Equipment & Supplies	
Field Equipment (selebeam, walkie-talkies, portable GPS unit, compass, flashlights, raincoats, boots etc.)	$400
Field Supplies (notebooks, batteries, flagging tape, markers etc.)	$200
Camera-Trap - Reconyx HC 500 USA @ 5 units in 2011	$2,200
Camera-Trap - Memory Disk 4GB @ 5 units in 2011	$95
Camera-Trap - Rechargeable Battery Sets @ 5 in 2011	$110
Camera-Trap - International Battery Charger @ 2 units in 2011	$60
Tidbit Temp Logger - Onset Tidbit v2 Temperature @ 3 units in 2011	$400
Education and Outreach	
Purchase and creation of image for the giant armadillo project	$200
TOTAL	**$5,000**

南非荒野基金會教育宣導計畫成果摘要

南非荒野基金會(Wilderness Foundation South Africa)所提教育宣導計畫(Imbewu Programme) 成果摘要如下：

南非荒野基金會為非營利民間組織，其緣起說明如後。Dr. Ian Player 於 1963 年設立荒野領袖學校(Wilderness Leadership School, WLS)，著重以教育機構進行自然步道相關活動，並希望藉由野外經驗，提升南非人的環境意識。Dr. Player 深信荒野地為社會存續的基礎，為因應自然保留區及荒野地區受威脅情況日益嚴重，1972 年 Dr. Player 設立荒野基金會(Wilderness Foundation, WF)，希望藉由宣導活動、遊說、出版和環境教育等相關活動，增進民眾對荒野地區的瞭解。

本計畫提案人 Mr. Andrew Muir 於 1986 年加入 WLS，在擔任 National Director 八年期間，創設四個計畫(Usiko, Khula Nam, Imbewu and Pride of Table Mountain)。2001 年末，該機構組織重整，WLS 只負責荒野步道相關活動，而其他由 Dr. Player 設立的機構或相關計畫整合為南非荒野基金會，並由 Mr. Muir 擔任 Executive Director。目前美國和英國也都設立 Wilderness Foundation。美國的為 Wild USA，英國的是 Wilderness Trust UK。

Mr. Andrew Muir 於 2008 年獲頒 2008 Rolex Award for Enterprise 及 The Herald GM Citizen of the Year (GM 先鋒年度人物獎) environment category (環境類別)。前者係因推動 Umzi Wethu Academy for Displaced Youth Programme 得獎，此項計畫訓練及協助愛滋孤兒從事生態旅遊相關工作。Rolex Award for Enterprise 2008 年約有 1,500 人申請(來自 127 國)。2008 年獲獎者有 5 人，獎金十萬美元。後者係獎勵對環境保育之貢獻。

南非荒野基金會的目標為：

- 加強南非荒野地之保育，並依法保護。
- 經由民眾支持，積極保護荒野地。
- 協助其他保護南非荒野地相關機構。
- 經由教育宣導等計畫，提倡荒野為南非資源的觀念。
- 監測荒野地經營管理計畫，設法增加公有或私有荒野地的面積。
- 尊重野生動物及荒野地在南非存在的權利。

Imbewu 在 Zulu 土著語言中是種子(seed)的意思。Imbewu 計畫是南非荒野基金會和南非國家公園管理局(South African National Parks, SANP)人與保育處(People & Conservation Departmnet)共同合作設立，希望南非青年對自然及文化歷史有新的認知。南非由不同政黨執政後，仍然僅有 4%的南非黑人去過國家公園或 game reserve。1996 年，第一個 Imbewu Camp 在克魯格國家公園(Kruger National Park, KNP)設立。2002 年，SANP 和南非荒野基金會合作將 Imbewu 計畫納入 SANP 的全國教育策略(National Educational Strategy)。南非荒野基金會並與 SANP 簽訂備忘錄，SANP 可於任何一個國家公園設立 Imbewu 計畫。

Imbewu Camps 通常緊鄰荒野地區，營區為半原始狀態，以對環境衝擊最小的方式建造。Imbewu 計畫甄選學生和老師，提供為期 4 天的國家公園經驗。許多青年住在國家公園附近，但卻從來沒進去過，有的青年住在貧民區，只看過被破壞過的環境。Imbewu 計畫由智慧長者(wise elders)領隊，他們是經驗及傳統知識豐富的退休巡護人員(game rangers)。每人都有 30 年以上的野外經驗，平均年齡 66 歲。有些長者雖然不識字，但經由部落傳統之口耳相傳，對生態系和傳統知識瞭解甚多。Imbewu 計畫協助訓練這些長者，擔任解說員，將傳統生態智慧傳承給年輕學生。

Imbewu 計畫的課程包括：

- 由 Imbewu 計畫教師帶領解說的步道之旅。
- 非洲文化價值，傳統植物使用。
- 每個 Imbewu 課程參加人數最多 16 人，並分兩個小組，每組由一位 wise elders 帶領，解說或活動內容包括：不留痕跡原則(leave no trace principles)、水及其重要性、生火及蒐集薪材規範、團隊合作、尊重生命、尊重 wise elders、尊重彼此等。
- 以傳統土著語言在營火旁說故事的方式，分享大自然的知識。

被遴選參加 Imbewu 計畫者都是具有領袖特質及對大自然有興趣的人，年紀介於 15～24 歲間，男女各半。Imbewu 計畫希望參加的人能將學到的經驗傳達出去，鼓勵參加者籌設保育社團，或於學校或社區推動環境計畫。鄰近國家公園鄉鎮高中每校遴選 8 人，遴選標準如下：

- 對環境議題有興趣者。
- 有領導能力者，例如學校或社區模範。
- 一般而言，沒機會參加類似自然體驗課程的學生。

- 願意學習並多瞭解環境保護領域者。
- 願意克服對黑夜、動物、蛇和昆蟲等之恐懼，而體驗大自然者。

Imbewu 計畫主要成果包括：

- 1996 年起，陸續於南非 6 個國家公園設立 Imbewu camps (包括 Imfolozi, Kruger, Addo, Tsitsikamma, Namaqua, Kgalagadi)。Imbewu 計畫是目前南非全國性類似計畫中，規模最大的。2010/11 年有 200 餘人參加，設立迄今已有 12,000 多人參加過 Imbewu 計畫的課程。
- 已訓練多位智慧長者擔任環境教育教師。為因應長者年紀漸長身體虛弱之情況，由 SANP 安排巡護人員協助，並同時向長者學習，以達成傳承之目的。每年參與之巡護人員均需事先參加訓練班。
- 製作 Imbewu 計畫簡報資料，至學校說明計畫重點。例如 2007 年到 19 個學校宣導。
- 2007 年 SANP 協助安排 Imbewu camp 學員參加 game drive 實地觀賞野生動物，因此項活動非常成功，2008 年起持續辦理。
- 2005 年 Imbewu 環境教育計畫擴充至衣索匹亞和肯亞。衣索匹亞計畫由生態學習和社區行動協會(Movement for Ecological Learning and Community Action, MELCA)推動，進展順利且執行成效良好。MELCA 於 2004 年在衣國註冊，Imbewu 計畫在衣索匹亞取名 SEGNI 計畫。衣國土著語言 SEGNI 是種子(seed)的意思。

設於下列國家公園的 6 個 Imbewu camps 說明如下：

一、 Kruger National Park

- Imbewu Kruger 1996 年設立，已有 3 位 wise elders (解說員)，2004 年有 389 人參訓。
- 2005 年止，共辦 32 梯次，有 512 人參加。
- 2006 年擴充 Imbewu camp，將在 Letaba 的營地移到 Satara。新營地未完成前，於舊營地附近步道辦理自然體驗課程。

二、 Addo Elephant National Park

- Imbewu Addo 2000 年 7 月設立，已有 3 位 wise elders。
- 2004 年有 160 人參訓。
- 2005 年辦 23 梯次，有 182 人參加。
- 2006 年辦 27 梯次，有 232 人參加。
- 2007 年辦 22 梯次，有 174 人參加。
- 2008 年辦 20 梯次，有 160 人參加。
- 2009 年於 Kabouga 和 Woody Cape 共辦理 22 梯次，分別來自

17 個學校。

- 2010 年於 Kabouga 和 Woody Cape 共辦理 23 梯次，分別來自 21 個學校，有 184 人參加。
- 2011 年於 Kabouga 和 Woody Cape 共辦理 25 梯次，分別來自 22 個學校，有 192 人參加。

三、 Tsitsikamma National Park

- Imbewu Tsitsikamma 於 2000 年設立，已有 4 位 wise elders 和 6 位青年解說員。
- 2004 年有 168 人參訓，分別來自 24 個高中。
- 2005 年辦 19 梯次，有 152 人參加。
- 2006 年辦 9 梯次，有 48 人參加。
- 2007 年辦 23 梯次，有 176 人參加。
- 2008 年間，通往營地的路被洪水沖毀，且營地附近盜獵活動增加，為確保學員之安全，決定另覓地點，2009 年將新址環境影響評估送交相關單位審查。

四、 Namaqua National Park

- Imbewu Namaqua 2002 年設立，已有 4 位 wise elders，2004 年有 137 人參訓，分別來自 5 個高中。

五、 Imfolozi National Park

- Imbewu Imfolozi 2001 年設立，已有 23 位 wise elders，2004 年有 350 人參訓。Imfolozi 國家公園的 Imbewu 計畫一直面臨募款困難問題，仍尋求合作單位中。

六、 Kgalagadi Trans-frontier Park

- Imbewu Kgalagadi 2009 年 10 月設立，目前有 4 位 wise elders。教育宣導重點議題為土地和愛護地球、青年教育、傳統知識和技巧、說故事。
- Kgalagadi Trans-frontier Park 前身為 Kalahari National Park，當初國家公園設立時，土著 Bushmen 被迫遷移，後來國家公園將土地還給當地之 Khomani Sa community，Bushmen 逐漸遷回。1999 年 3 月歸還 27,769ha，後來又歸還 43,000ha。Bushmen 為依賴荒野和地球維生之代表，本 Imbewu 計畫的重點即為傳承此種傳統文化和生活方式。
- 2009 年 9 月開始訓練土著耆老，並推動土地和照顧地球教育(Land and Earth Care Education)計畫、青年教育(Youth Education)計畫以及傳統知識和技巧回收(Recycling of Traditional Knowledge and Skill)計畫。
- 2009 年 7 月為 8 位 elders 辦理 Imbewu 先驅計畫，由南非荒野基金會和國家公園主管單位 SANP 共同參與，評量教育計

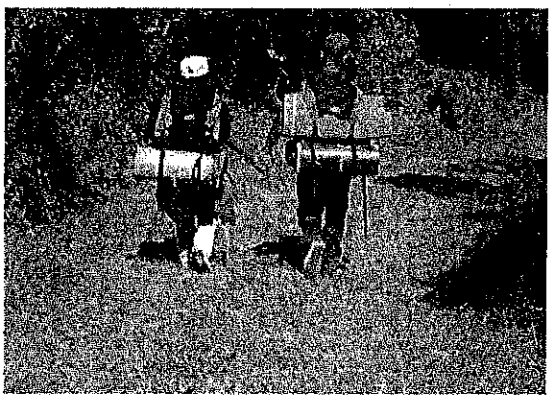
畫應該包含之內容。共有 5 位 elders、2 位青年、2 位 Bushmen Trackers (擅長追蹤野生動物)參與。elders 建議日後教育計畫納入 4 大重點，包括自然學習(Nature Learning)、族群和諧(Harmony between all people)、加強溝通(Promote Communication)和生命目標(Creating Purpose in Life)。

- 2009 年 11 月、2010 年 4-5 月及 2010 年 6 月辦理 3 梯次 Imbewu 野外環境教育活動。

南非荒野基金會其他工作或活動成果，包括：

- 2009 年止，有 100,000 多人參加過 Wilderness Foundation 舉辦的活動。
- 推動 The Baviaanskloof Mega-reserve Project，協助促成面積 500,000ha 保護區之設立和初期經營管理，2008 年起逐步將管理權移交 Eastern Cape Parks Board (ECPB)。
- 推動設立面積 9000ha 之 Plains of Camdeboo 私立保護區，並進行植生和土壤復育計畫。除現有野生動物外，也將再引入大羚羊(Eland)、南非長角羚(Gemsbok)、紅狷羚羊(Red Hartebeest)。
- 與 Msinsi Holdings 和 Ethembeni Community 合辦 Pride of Durban 活動，針對學校辦理保育宣導。宣導重點為自然環境作為維生系統的重要性、永續利用自然資源、人類對環境的威脅、如何降低人類對環境的衝擊等。2006 年辦 24 梯次，有 43 位老師及 695 位學生參加。
- 2003 年開始於 Port Elizabeth 辦理 Pride of Groendal 活動，針對學校辦理認識動植物、自然觀察及其他活動，2006 年辦 10 梯次，277 位學生參加。
- 1996 年起辦理 Pride of Table Mountain 活動，本自然步道解說活動籌辦人於 1998 年、2002 年和 2003 年獲頒環境獎(Cape Times Environmental Award 等)。1996-2008 年共辦 220 多梯次，13,000 位學生參加。1996-2010 年共有 14,000 人參加。
- 2008 年創辦 Pride of Bosberg Mountain 活動，2009 年有 392 人參加。
- 2010/11 年 Groendal、Table Mountain 和 Bosberg Mountain 三項活動共有 1,300 人參加，自 1996 起，共有 18,200 人參加。
- 於 MTO Forestry Plantation area 辦理戶外教學，2010/11 年共有 960 人參加，1996 迄今有 10,000 人參加。
- 1996 年起陸續辦理 Pride of Table Mountain、Pride of Groendal、Pride of Bosberg Mountain 等活動以來，至 2011 年底，約計訓練解說志工 40 人，共有 20,000 人參加活動。

PROGRESS REPORT: 2011
IMBEWU ADDO



1 INTRODUCTION:

This report focuses on the activities of the Imbewu project operating in the Addo Elephant National Park for 2011 as per the financial support designated by the Forestry Bureau, C.O.A, of Taiwan.

IMBEWU ADDO 2011: Is operational in the Addo Elephant National Park in the Eastern Cape and started in 2000. Addo National Park is now the third largest national park in South Africa. It has expanded to conserve a wide diversity of biodiversity, landscapes, fauna and flora. Stretching from the semi-arid karoo area in the north around Darlington Dam, over the rugged Zuurberg Mountains, through the Sundays River valley and south to the coast between Sundays River mouth and Bushman's river mouth, Addo covers about 180 000 hectares (444 700 acres) and includes the Bird and St Croix Island groups. The Imbewu project continues to be active at two sites in this National Park: Kabouga (near Kirkwood) and Woody Cape (near Alexandria). **A total of 25 Trails were delivered reaching a total of 192 learners through 22 schools in 2011.**

Selection of Learners: The Senior High School learners all came from schools located in compromised, rural, urban and township communities in the vicinity of Port Elizabeth in the Eastern Cape. **Communities are**: *Motherwell; Kenton on Sea; Alexandria; Uitenhage; Zwide; kwaNobuhle; Kirkwood; Addo; Paterson; Port Elizabeth;*
The Senior Schools are: *Betrams High School - (mixture of colored and Black community; Soqhayisa High School; Ikamvalesizwe High School; Ukhanyo High School; Alexandria High School; Douglas Mbophal; Mfesane High School; Masiphathisane High School; Mlungisi Senior Secondary School; Thembalabantu High School; St Colmcille; Kirkwood High School; James Jolobe; Samkelwe High School; Sandisulwazi High School; St colmcille; Ethembeni High School; Moses Mabida High School; Uitenhage High School; Vulumzi High School; Colleen Glen; Kuyga Intermediate.*

DATE	VENUE	GUIDES	SANPARKS RANGER	SCHOOL	NAMES	GENDER	GRADE	AGE
28-31 Jan	Kabouga	Elder Willem	Ranger Jackson	St Colmcille	Lincoln Charles	Male	11	16
					Simphiwe Lucas	Male	11	16
					Andisiwe	Male	10	17
					Bronwyn Adams	Female	11	16
					Karen Bans	Female	11	16
					Elthea Keezia	Female	11	16
					Andrea Adams	Female	11	16
TOTAL						**3 M 4 F**		**7**
5-7 Feb	Woody Cape	Elder Moses	Ranger Mboneli	Ikamvalesizwe				
					Thambo Nkosinathi	Male	11	18
					Thandulethu Mapapu	Male	11	18
					Bulelani Singqoto	Male	11	18
					V. Nkayi	Male	11	16
					Anele Nela	Male	11	17
					Sakhekile Tuni	Male	11	17
					M.Akhona	Male	11	16
TOTAL						**8 M**		**8**
11-14 Feb	Woody Cape	Elder Tekisi	Ranger Steve	Ukhanyo	Kate Ntombensha	Female	10	17
		Steve			Thembela Honara	Female	10	17
					S, Mkule	Female	10	16
					Siphokazi Sokata	Female	10	15
					A. Badela	Male	10	17
					Anele Sokutu	Male	10	21
					Vusu Khaya	Male	10	17
					Bontia Blom	Male	10	22
TOTAL						**4M 4F**		**8**
18-21 Feb	Woody Cape	Elder Moses	Ranger Samson	Alexandria High	Luvuyo Qandana	Male	10	16
					Siwive Jonas	Female	10	15
					Sandiswa	Female	10	16
					Asisipho	Female	10	15
					Nosisipho	Female	10	16
					Thabiso Yawa	Male	10	18
					Sihle	Male	10	16

					Tshabalala			
					Mihlali Mtwa	Female	10	16
TOTAL						**2M 5F**		**7**
25-28Feb	Woody Cape	Elder Tekisi	Ranger Xolani	Kuyga	Xolani	Male	9	17
					Siphokazi Pamle	Female	9	15
					Sanele	Male	9	15
					Melumzi Maneli	Male	9	17
					Thembisa Myandaza	Female	9	17
					Babalwa Grootboom	Female	9	15
					Thando Masele	Male	9	16
					Phumza Nzuzo	Female	9	16
TOTAL						**4M 4F**		**8**
4-7 March	Kabouga	Oom William	Ranger Michael	Moses Mabida	Sinethemba Lose	Male	9	
					Siphosam Joni	Male	9	
					Abongile Ngayempi	Male	10	
					Abongile Lumke	Male	10	
					Sinethemba Dayi	Male	9	
					Sandile Zamxaka	Male	9	
					Siyabulela Dyasi	Male	9	
					Siyabulela Mabudla	Male	9	
TOTAL						**8M**		**8**
11-14 March	Kabouga	Oom William	Ranger Thembisile	Sandisulwazi	Siyabulela Mini	Male	8	
					Algen van Louw	Male	8	
					Ukhanye Nogaya	Male	8	
					Ntombizanele Vena	Female	8	
					Juandre Plaatjies	Male	8	
					Charmilla Jacobs	Female	8	

					Zenande Nongqayi	Female	8	
					Renesha Jaggers	Female	8	
TOTAL						**4M 4F**		**8**
25-28 March	Woody Cape	Elder Moses	Ranger Mbonele	Uitenhage	Nadeem Colgate	Male	11	17
					Raeez Deljion	Male	11	16
					Killian Goesan	Male	11	17
					Orcilla howard	Female	11	16
					Jameelah Dolley	Female	11	16
					Nasreem	Female	11	16
					Gratitude Tois	Female	10	15
					Lee-roy	Male	10	16
TOTAL						**4M 4F**		**8**
15-17 April	Woody Cape	Elder Tekisi	Ranger Steve	Nompucuko Combined School	Buzani Phelokazi	Female	9	17
					Gqobha Vuyolwethu	Male	10	17
					Mesilani Lithemba	Male	9	18
					Mjuza Anelisa	Female	10	16
					Mkhobeni Abongile	Male	10	18
					Nkantini Noluvo	Female	10	16
					Ntozini Vuyisani	Male	9	17
					Siyona Wandisa	Female	9	17
TOTAL						**4M 4F**		**8**
6-8 May	Kabouga	Elder William	Ranger Jackson	Samkelwe	Mamani Vuyisa	Male	10	17
					Mphumzi maziko	Male	10	16
					Nogampula siyabonga	Male	10	16
					Zolani Pullen	Male	10	18
					Blani Luxolo	Male	10	16
					Maze	Male	10	17
					Alwyn	Male	10	18
					Nono	Male	10	18

					Siyanda			
TOTAL						**8M**		**8**
20-23 May	Woody Cape	Elder Moses	Ranger Mboneli	Enthembeni	Ludwe Petrus	Male	11	19
					BususwaTite	Female	11	17
					Sisipho	Male	11	17
					Vuyoluweth u Sipho	Male	11	16
					Sithembiso	Male	11	17
					Sandiswa	Female	11	16
					Annelisiwe Ngere	Female	11	18
TOTAL						**4M 3F**		**7**
3-5 June	Woody Cape	Elder Tekisi	Ranger Dumisele	Nkukulekho	Nandipha Blou	Female	9	15
					Nimvula Twalingca	Female	10	16
					Thabisa Payi	Female	15	9
					Nosisipho Likas	Female	15	9
					Sesethu	Female	16	10
					Lilitha Gweyiyo	Female	15	
					Mfundo Dondolo	Male	16	10
					Nsiva	Female	15	10
TOTAL						**1M 7F**		**8**
10-13 June	Woody Cape	Elder Moses	Ranger Steve	Soqhayisa	Andile Manyi	Male	16	10
					Thandixolo Malie	Male	17	17
					Simnikiwe Madlebe	Female	16	10
					Xolelwa Beyi	Female	16	10
					Nosiphiwe Pikoli	Female	17	10
					Ayanda Tobi	Male	17	10
					Phumlani Barnes	Male	18	10
TOTAL						**4M3F**		**7**
29July-1Aug	Woody Cape	Elder Tekisi	Ranger Dibansile	James Jolobe	Pamela Tukulu	Female	13	8
					Anathi Mathulinga	Male	15	8
					Zona Mpyani	Female	18	11
					Nondumiso	Female	18	11
					Abongile Mbuthi	Male	15	8
					Komanisi	Female	21	11

					Nomtundo			
					Sophokazi Loli	Female	13	8
TOTAL						**2M5F**		**7**
12-15 Aug	Woody Cape	Elder Moses	Ranger Dibansile	Masiphatisane	Afika Nkwinta	Male	18	12
					Zomoxolo	Male	18	12
					Zizo Matinise	Female	19	12
					Pamela Tali	Female	20	12
					Yolanda Kleinbooi	Female	16	12
					Wendy Lose	Female	17	12
					Thembani Basela	Male	18	12
					Lunje Mxuma	Male	17	12
TOTAL						**4M4F**		**8**
19-22 Aug	Woody Cape	Elder Tekisi	Ranger Mboneli	Ndebo	Thembeka Nanana	Female	16	10
					Zintle	Female	15	10
					Yolanda Sali	Female	15	10
					Siyanda Mdyado	Female	14	8
					Yandisa Njengela	Female	16	10
					Olwethu Poswayo	Female	14	9
					Namgamso Dikweni	Female	15	8
					Thembeka Gayezi	Female	16	10
TOTAL						**8F**		**8**
26-29Aug	Woody Cape	Elder Moses	Ranger Dibanisile	Colleen Glen	Nombulelo Steen	Female	16	9
					Solomzi	Male	14	9
					Khanyiso	Male	17	9
					Thandokazi	Female	15	9
					Bulelwa	Female	15	9
					Mandisa Magquntulu	Female	16	9
					Ntombizodwa Nyema	Female	16	9
					Monwabisi	Male	16	9
TOTAL						**3M5F**		**8**
2-5 Sept	Kabouga	Elder Toto replaced Elder Willem who had passed away	Ranger:Michael	Mfesane	Sibongile Dondashe	Female	16	9
					Lineo Kana	Female	15	9
					Dabo N	Female	16	9

					Anesisho Nobani	Female	15	9
					Noxolo Mvila	Female	15	9
					A Feni	Female	15	9
					S Falaza	Female	15	9
					Ntombisatatu Tsetswa	Female	16	9
TOTAL						**8F**		**8**
9-12 Sept	Kabouga	Elder Toto	Ranger: Jackson	Moses Mabida	Siphokazi	Female	17	9
					Sinaco Mpaliso	Female	14	9
					Vuyokazi Bokuva	Female	15	9
					Mandiphumle	Female	16	9
					Bongiwe	Female	15	9
					Z. Grootboom	Female	17	9
					Thandekha	Female	16	9
					Sisanda	Female	15	9
TOTAL						**8F**		**8**
16-19 Sept	Kabouga	Elder Toto	Ranger: Thembisile	Samkelwe	Andisiwe Nono	Female	19	10
					Nonkosi	Female	16	10
					Mandilakhe	Female	17	10
					N. Jamda	Female	18	10
					Vuyokazi Pandle	Female	19	10
					Bongiwe Dlosi	Female	17	10
					Nomakwesi Willem	Female	18	10
					Asanda Somya	Female	18	10
TOTAL						**8F**		**8**
23-26 Sept	Kabouga	Elder Toto	Ranger: Jackson	Mlungisi Perfector	Siyanda Bawa	Male	20	11
					Nobesuthu	Female	19	9
					Buyiswa Adams	Female	16	9
					Lunga Yamiso	Male	19	11
					Masisubela	Male	16	9
					Ayabulela Hina	Female	16	10
					Bangalethu	Male	16	9
					Sibongile	Female	16	9
TOTAL						**4M4F**		**8**
14-17 Oct	Woody Cape	Elder Tekisi	Ranger Dibansile	Alexandria High	Noleen Ndiki	Female	16	10
					Siphosihle Mefuya	Female	18	10

					Vuyisika Njini	Female	18	10
					Xolisa	Male	18	10
					Samantha	Female	17	10
					Pamela	Female	17	11
					Silindokuhle	Female	17	10
					Mselwa Lamani	Female	17	10
TOTAL						**1M7F**		**8**
21-24 Oct	Woody Cape	Elder Moses	Ranger Dibansile	Kuyga Intermediate	Brendon Smith	Male	16	9
					Sanele	Male	16	9
					Alridge Porgieter	Male	19	9
					Adriane Charlie	Female	16	9
					Beronice Meyers	Female	17	9
					Voyokazi Magabelo	Female	16	9
					Molumzi Maneli	Male	17	9
					Panyezwa Nzuzuo	Female	16	9
TOTAL						**4M4F**		**8**
28-31 Oct	Kabouga	Elder Toto	Ranger: Michael	DDT Jabavu	Sithembiso	Male	16	9
					Ntombe Tonga	Female	16	9
					Abongile Ncathu	Male	16	9
					Stembise Ntsebo	Male	15	9
					Noluvo	Female	17	9
TOTAL						**3M2F**		**5**
1-4 Nov	Kabouga	Elder Toto	Ranger: Thembisile	St Colmcille	Trevino Davids	Male	15	9
					Connel Mei	Male	15	9
					Merlyn Lemienie	Male	14	9
					Tracy Sampson	Female	15	9
					Carol-Ann Daniels	Female	14	9
					Leigh-Ann Fischer	Female	14	9
					Siwan Plaaitjies	Male	16	9
					Geraldo September	Male	15	9
TOTAL						**5M3F**		**8**
GRAND TOTAL						**84M108F**		**192**

2 CAMPS:



Kabouga: Is about 1 hour outside of Port Elizabeth. In 2011 a third camp site was established and the wise elder decides where they sleep each night. Each day on trail the learners will do a lot of walking, sometimes with their packs other times not. The elder and the ranger will point out various plants, animal spoor, dung and other interesting fauna and flora. In Kabouga they see a lot of animals, Warthog, Red Hartebeest, Baboons Kudu, Ostrich, Bushbucks and other small animals. There has historically only been one elder available for this site which is problematic as rotation of trails is necessary to give sufficient rest periods. We are currently attempting to recruit additional elders from this area.



Woody Cape: Is about 2-3 hours drive outside of Port Elizabeth. At Woody Cape there are still only two camp sites but they tend to use only the one as water is scarce at the other. We are working towards establishing at least three campsites in both venues and hope that this will be in operation near the end of 2011. In Woody Cape it is very rare to see a lot of game as the vegetation is dense forest thicket. They sometimes see Bushbuck and smaller wildlife. As this site is along the coast, the learners spend time on the beach learning about marine ecology y. It is a long walk to the beach but well worth it. There are two available elders for this site which makes for easy rotation of duties.

Comments from the Imbewu Co-ordinator: 2011: Are consistent with 2010

On challenges that were overcome e.g. cultural believes/personal fears/attitudes etc:

"The biggest fear most of them have in the first day/ night is sleeping outside in the bush and encountering snakes or other dangerous animals. As the time goes they get used to sleeping outside and overcome their fears."

On adequate clothing of the Learners on Trail: *"Mostly they come with adequate clothing and shoes but occasionally there will be those who don't have the correct shoes."*

The primary challenge:

'The biggest challenge that we are facing is that of recruiting new elders. They are few and far between. We have recruited a new guide for Kabouga, Toto Witbooi who is doing well so far. Ideally we need 2 guides bit are still battling to find someone suitable. Hopefully next year we will be able to recruit another elder.'

Comments from Students on trail: 2011:

"The trail means a life without the trees. The experiencing of the environment outside and wildlife is good for reflecting your thought without noise. On this trail I learnt a lot- I now have new eyes. When I was a young girl I did not value nature, I was destroying it but with the help of the WF and Imbewu I am moving away from my negative attitude toward Nature- I am falling in love."- **Thabisile Nomatshile**

"I'M SCARED!!! I'M VERY SCARED!!! I want to get this feeling out, hope the journey will help me. The feeling of being scared has gone away, we walked the long walk, I was so very tired but at last we found a place to sleep. We cooked and talked about our experience and we slept. I was scared because middle of the night I had to look after the others. It felt I was in control of the world when I was on night watch. The birds sang and I was connected to the nature, the music made me calm and my mind was clear. I wondered how nature survives. The feeling made me appreciate nature and never to kill a animal or even a insect!I don't believe this I do not know if maybe I'm cruel but I don't miss my family that much. My mind is all nature – plants, grass etc the beauty of it, the attraction the smell – smelling of fresh air WOW! That stood up for me- it's been ages since I smelt fresh air- where I come from there's air pollution."- **Vuyiseka Villem**



3. IMBEWU LEADERS: ('Wise Elders'-Retired Park Rangers and SANPARKS Field Rangers) Addo Imbewu currently has 3 'Wise Elders' (Black men ages: 61-72 who are all retired SANPARKS Rangers) and 8 SANPARKS Field Rangers (Black men ages: 30-50) who assist the Elders on Trail. One Elder and one Field Ranger lead the Trails. The Kabouga section had one Elder: Mr khuwleli William Dodo: who was Xhosa and had been an Imbewu elder for many years. He was 71 years old. We are sad to report that he died in June 2011 after completing one of his trails. We are greatly saddened by the loss of a loyal friend and colleague. He has taught and entertained thousands of young people about the ways of nature and the links to their cultural believes and heritage. In August 2011 we managed to recruit a new elder for the Kabouga section: Mr Toto Witbooi.



Above: Right: Oom Willem resting under a tree on his last selection trail. WF Imbewu Co-ordinator: "*We have lost a Warrior in Conservation, he died doing what he love most- Going to the Wilderness teaching the Youth about the importance of the Environment*".

The breakdown at the end of 2011 for the Imbewu Elders is as follows:

The Woody Cape section has two Elders: 1. Mr Thameni Moses Ntseta: who is Xhosa and has been an Imbewu guide for 4 years. He lives in the town of Alexandria and is 66 years old. 2. Mr Tekisi John Manyathela is a Xhosa man who is 70 years old and also lives in the town of Alexandria. The Kabouga Section: has Mr Toto Witbooi who replaced Mr William Dodo who died in June 2011. Mr Witbooi worked as a ranger for SANPARKS before he retired and he lives in Motherwell – an informal settlement outside of Port Elizabeth.

Elders are recruited according to their age and knowledge of the field. We look for retired rangers who have an extensive knowledge of plants and animals as well as a deep cultural background. They must be walking fit and be able to pass on their knowledge and experiences to the young generations. We constantly endeavour to recruit new Elders. The 8 SANPARKS Field Rangers rotate their Imbewu duties amongst each other. The Refresher First Aid training was conducted at the end of 2010 and will be repeated at the end of 2012 (between 1-2 years depending on

need). **Quote from the Imbewu Co-ordinator:** *"They enjoy showing off their knowledge of plants and animals as well as their walking fitness. If a child feels ill on the camp the elder boils a cure in the form of a plant / root or some leaves and is held high esteem. We would like them to continue having passion for Nature, and never stop planting the seed of Nature to the young generation."*

4 CHALLENGES /FUTURE PLANS: (consistent with 2010 challenges)

- **Recruitment of new Elders:** It is not easy to find new retired Rangers, elderly people who need to: be physically fit and healthy; have a wealth of knowledge about ecology, conservation issues, and socio-cultural history of the area; are willing to spend 3 nights in the bush and want to pass their knowledge on to the youth.

Monitoring & Evaluation systems: We would like to improve on our evaluation techniques for short & long term evaluations and monitoring. Currently we only have the evaluation questionnaires and essays that the learners complete to verify project experience and content. We would like to monitor and track learners' implementation of what they have learnt with fellow pupils and in their communities i.e. have they joined or initiated environmental interest groups, recycling endeavours etc. Long Term, we would like to know if the trails have impacted or influenced the learner's career, job, extramural choices and activities. We are exploring opportunities with SANPARKS and other service providers like WESSA who could incorporate this evaluation as part of their existing EE Schools and Eco-Schools outreach programmes. **In 2012 we are planning to commission an external evaluation on our Imbewu Trails as well as develop an internal Monitoring and Evaluation Framework for the Trails.**

- **Adequate Clothing & Foot ware for Learners:** As most learners come from economically vulnerable and disadvantaged backgrounds, we do find that they are not always adequately clothed for the Trail experience. For example warm and weatherproof items and proper walking shoes are especially lacking. We would like to purchase some of these items that would be worn by learners whilst on trail and then returned to the WF. However will need to source additional funding from our donor partners to cover this expense.

- **Other items to benefit Trails:** WF would like to provide appropriate clothing for our Trail Leaders and provide uniforms that identify with the Imbewu project and the Wilderness Foundation. This too would need to be sourced through additional funding requests.

5 UMZI WETHU ACADEMY IMBEWU'S 2011:



General Umzi Wethu Academy Overview: 2006-2011

A total of 142 youth have graduated from the Umzi Wethu programme in 9 student intakes, with 81 Hospitality students and 61 Field Ranging students. About 50 more are now enrolled at the WF-run Academies: in Port Elizabeth (PE),Somerset East (SE) and the new Academy recently established (in 2011) in partnership with the Sustainability Institute based in Stellenbosch in the Western Cape. The program has since inception and continues to place 94% of its graduates in jobs with 85% of those graduates retaining their positions. In addition 10% of Umzi graduates continue to advance to junior and middle management positions in both hospitality and eco-tourism sectors.The employment rate for Umzi Wethu students remains between 80 % and 90%. Please see details below:

As of August 2011

	Umzi 1	Umzi 2	Umzi 3	Umzi 4	Umzi 5	Umzi 6	Umzi 7	Umzi 8	Total	
Graduates	13	11	13	13	20	19	18	18	125	Graduates
Deceased	2	0	0	0	1	0	0	0	3	Deceased
Employable	11	11	13	13	19	19	18	18	122	Employable
Employed	9	9	12	8	14	15	11	10	88	Employed
Student	2	0	0	1	3	0	2	5	13	Student
Total	11	9	12	9	17	15	13	15	101	Total
Percentage	**100%**	**82%**	**92%**	**69%**	**89%**	**79%**	**72%**	**83%**	**83%**	**Percentage**
Job Seekers	0	2	1	4	2	4	5	3	18	Job Seekers

Most recent (2010/2011) Umzi Student Quotes on Imbewu Selection Trails: Student Feedback: Overall, students rated the selection process 8/10. Almost all the students felt that the selection process was fair, with one student commenting that *"I think it was fair because I can see that those that are selected are people who have given their best and who know what they want in life, we were given different chances/tasks to prove ourselves"* and another saying *"it was fair, because every candidate had an equal chance to prove themselves"* and another saying *"yes, because it opens up your heart and makes you realize that you can change the past and make everything right, it gives you the opportunity to realize and change."* All students said the program was *"fully explained"* to them. The interviews were seen as *"scary"* to many students but they also *"learnt a lot"* in them. Overall students felt the interviews were fair and that the selection panel members made them feel accepted and comfortable, with one student commenting that *"the interview was nice, in a way the interviewers made me feel comfortable and confident to reply to every question they asked."* The selection trail was also viewed positively with one student saying that the trail was *"challenging, but I must say I've learnt so much and it honestly evoked a new person in me, that I can face my fears if I only look at the bright side"* and another said *"it was a good experience for me because I got to meet new people and we had to get along to be selected and we did, we cooked, slept and walked together."*There were no additional negative comments about the selection process, but one student suggested *"the trails were nice and I think Umzi must create activities on trail in order to keep candidates active and in order to see some of the weaknesses and strong points of them."* Another student said that *"I'm looking forward to being part of this programme because it's an amazing program and this is my future."*



Most recent (2010/2011) Umzi Student Quotes on Imbewu Nature Trails (which forms part of the Umzi Training model):

Most students love these trails: **Student quotes**: *"being Xhosa and always been deprived from this I realize how much we miss as a nation just because of cultural believes." "I see the lands my grandparents talked about and I can understand where they come from being out here, I also want to live of the soil and teach my children the same."* **Oct-Dec 2010**: *"They opened my mind in a way that there is another world out there and we should appreciate it and love it. I learned how to conserve. This is one practice that instilled the mentality of saying that there is nothing impossible. This is where I can say life is at its best." "To me trails are a very good example of life.....There are ups and downs, so to me on trail I have learnt that in life you must not give up."For one student sleeping out doors is not a new experience. He has been rejected by his siblings because they were unable and /or unwilling to care for him. The difference for him now as an Umzi student is that even in the midst of 'nowhere' in the bush, he is not lonely anymore- together with nature and his Umzi family he now feels a sense of belonging and is surrounded by people who care enough to listen to him.* **Jan-March 2011**: *"I am a responsible and reliable person that likes new challenges in life and does not give up that easy." "I learned that I am stronger than I thought I was. I can make it if I want to do well and in life I need to trust myself only.""I've discovered I'm a nature freak and love being out there, I feel at home out there, I'm free." "Wilderness trails were very exciting because I've experienced new things in the trails and realize some things about myself that I didn't know.""This one of the best things about this program, it must never be taken away. It's an amazing experience that I will cherish for my entire life."*

6 CONCLUSION:

We would like to take this opportunity to thank the Forestry Bureau Taiwan for its decade of support of our Imbewu Trails giving poor children in South Africa, the opportunity to experience their natural heritage for the first time. Over the 10 years of your support you have enabled over 2000 learners from disadvantaged communities to experience a wilderness area for the first time and to learn about the role they can play in conserving their natural environment. We thank you most sincerely!

THE WILDERNESS FOUNDATION: REPORT

TAIPEI LIAISON/FORESTRY BUREAU COA: IMBEWU REPORT: 2011/2012

Income :	$ 10 000.00	R	80 046.00	**R**	**80 046.00**
Expenditure for 2011/2012 - December 2011 incl. For 9 trails				**R**	**82 366.67**
Equipment (gas cannisters, torches, etc.)	$ 23.43	R	187.54		
Trail costs (food, fuel, etc.)	$ 2 152.11	R	17 226.79		
Maintenance: camp equip.	$ 216.21	R	1 730.70		
Motor vehicle expenses	$ 51.18	R	409.65		
Admin overheads (telephone, stationery)	$ -				
	$ 64.89	R	519.39		
Salary: rangers/staff	$ 2 963.08	R	23 718.27		
Management fees	$ 4 372.49	R	35 000.00		
Training: trail guides	$ -	R	-		
Audit fee	$ -	R	-		
Insurances (for vehicle, equip)	$ 446.53	R	3 574.33		
	$ 10 289.92	R	82 366.67		

(rate of receipt of funds)

馬拉威里朗威野生動物中心(Lilongwe Wildlife Centre, LWC)
計畫執行情形摘要

環境教育為馬拉威教育系統中重要之一環，但老師和教育者缺乏環境教育背景，有必要編纂環境教育教材以供運用。本計畫之目的為召開2個環境教育教材編纂研討會，研擬環境教育教材資料。主題包括森林消失、反盜獵、動物福利、貧窮和環境破壞之關係、廢棄物管理、棲息地和生物多樣性。第一次研討會所擬初稿將提供LWC合作夥伴審核，各界意見彙集後，將召開第二次研討會，目標為設計契合馬拉威教育系統之環境教育課程資料。當教材定稿並經過測試後，將大量印製，並提供環境教育人員及學校教師使用。

參與此計畫之成員包括：

單位	參加人數
馬拉威里朗威野生動物中心(LWC)	2
馬拉威野生動物和環境協會 (Wildlife and Environmental Society of Malawi)	1
國家公園和野生動物部 (Department of National Parks and Wildlife)	2
環境事務部(Environmental Affairs Department)	1
教育部(Education Department)	1
環境復育協調小組(Coordination Unit for the Rehabilitation of the Environment)	1

已於2011年10月召開第一次研討會，討論環境教育資料內容包括：

- 環境中之動物：野生動物和家畜均依賴其環境方能生存。
- 自然和生物多樣性：動植物在自然界之角色和重要性、生物多樣性之威脅因子(例如沙漠化)、保護自然可採取之行動等。
- 廢棄物及其管理：廢棄物所造成的問題、各種管理方法等。
- 水：水資源有限需予保護、水的來源、水循環(water cycle)等。
- 氣候變遷：氣候變遷是全球共同面對之挑戰、馬拉威氣候變遷情形、氣候變遷之影響、如何減緩衝擊、如何調適、森林之重要性。
- 另一環境教育模組將使用當地語言，主要內涵為當地自然環境。

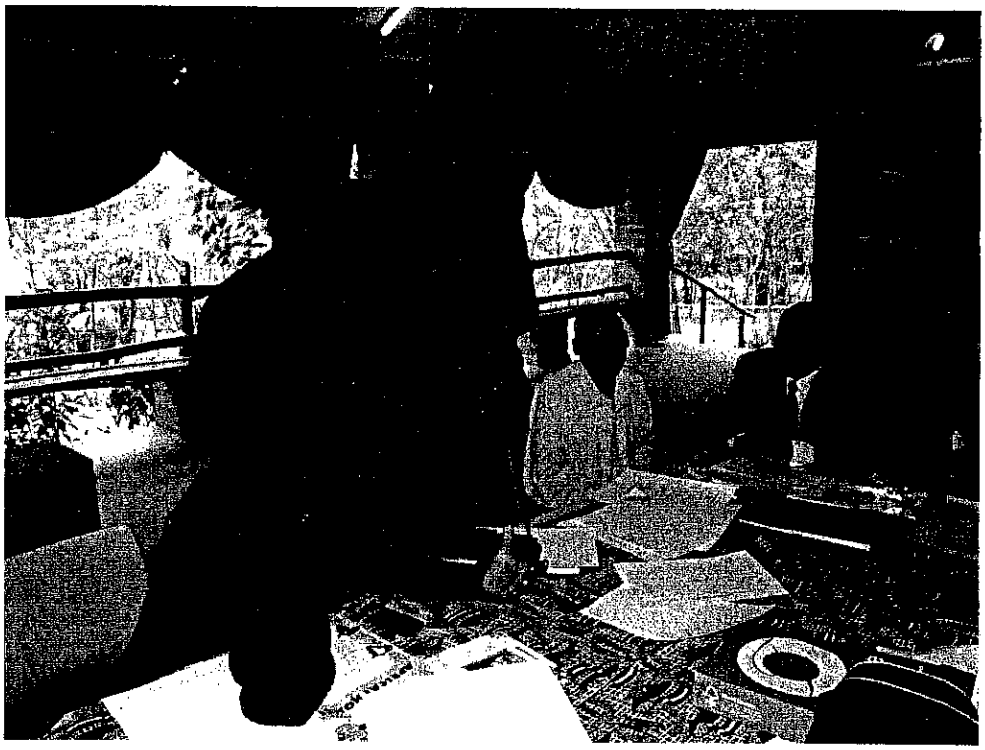
第一個主題之教材資料已完成初稿，其餘進行中。預計於2012年4或5月召開第二次研討會，並於6月印製出所有教材資料。

Lilongwe Wildlife Centre

For the People & Wildlife of Malawi

ENVIRONMENTAL EDUCATION MATERIALS DEVELOPMENT PROJECT: Progress Report

February 2012



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Introduction
This report covers the first half of one year funding for developing environmental education modules. A final end of year report will be provided at a later date.

Funding was granted from the Taiwanese Forestry Bureau to develop and print environmental education resources to be used by educators in Malawi in order to support environmental education. Two materials development workshops were planned to take place in the development of these resources and so far, the first workshop has been implemented where Lilongwe Wildlife Centre and partners spent three days coming up with the content for the resources. Topics for the resources include;

a) Animals in their environment – that shows how animals, both wild and domestic are dependent on their environment for survival

b) Nature and biodiversity – teachers learners about the importance of the different forms of life, including flora and fauna, the threats to biodiversity, including deforestation, and what actions they can take to protect nature.

c) Waste and waste management – students learn about the problems with waste, why it needs to be managed and the different ways of managing it.

d) Water – students learn that water is a limited resource that needs to be conserved. They also learn about the sources of water and about the water cycle.

e) Climate change – This module creates awareness among students about climate change as a global challenge, how the climate in Malawi is changing, its effects and about climate change mitigation and adaptation, including the importance of forests.

f) And another module in Chichewa for learners in the foundation phase of learning and are taught in the local language. This one is entitled "Chilengedwe cha m'dera mwathu" and they learn about natural things in their environment.

All of the topics above are covered in the school curricula and once developed, visiting schools will have a choice of a particular module they want to be delivered to their learners. The next workshop will be scheduled once all materials have been reviewed and this workshop will be for reviewing of the materials developed.

Project aims
This project is aimed at equipping Lilongwe Wildlife Centre's education centre and her partners with resources that will be used to improve delivery of environmental education to school children. Over 10,000 learners visit Lilongwe Wildlife Centre per year and in the last year alone, Lilongwe Wildlife Centre visited over 60 schools within the city during our school outreach programme.

It is envisaged that this project will help raise awareness of and support environmental action and sustainable development issues through lesson plans and activities linked to curriculum learning areas. School teachers who lead environmental clubs will also find the modules useful as they will have already made lesson plans and extra activities to do with learners.

It has been widely agreed that environmental education helps improve educational quality and quality of life and it encourages learners to take action towards environmental sustainability so as to life in clean and healthy environments.

Outcomes of the project
During this quarter, Lilongwe Wildlife Centre has implemented one 3-day workshop with her partners. The partners represented the following organizations; Department of National Parks and Wildlife (Lilongwe Nature

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Sanctuary), Department of Environmental Affairs and Lilongwe Society for the Protection and Care of Animals (LSPCA).

During the workshop, partners noted that often, environmental education practitioners lack resources for delivering environmental education and they applauded Lilongwe Wildlife Centre for implementing such a project to develop resources that can be used by all partners.

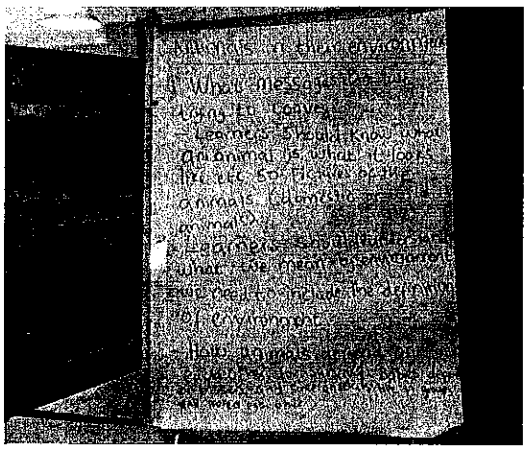
Achievements
Following the 3-day workshop, a draft document has been produced containing the 5 topics listed above and so far, lesson plans have been developed for the first module "animals in their environment" and more are being developed on the remaining topics.

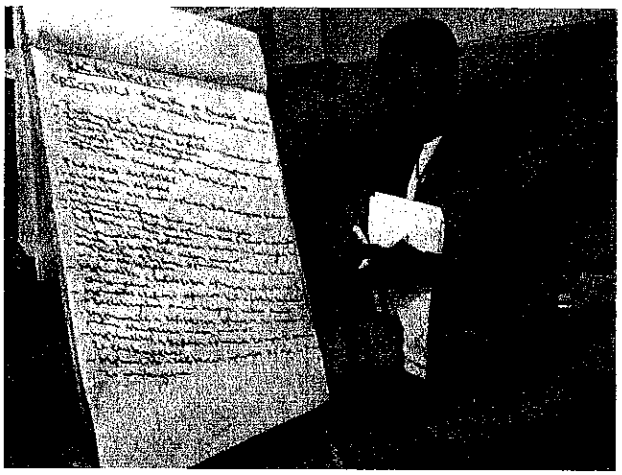
Challenges
The main challenge in this quarter was getting all partners together for a 3-day workshop. The first workshop was planned to take place in September 2011 but because most partners had other commitments, it had to be rescheduled to October and even though we had it in October, other partners like the Department of Education, Coordination Unit for the Rehabilitation of the Environment and the Wildlife and Environment Society of Malawi were not able to attend as they had other workshops to attend but promised to attend the second workshop. In their place, Lilongwe Society for the Protection and Care of Animals was invited. We emailed the documents to all partners who could not attend to get their feedback and comments.

Planned activities
We are planning to hold the second workshop in April/May to finalise all the modules and print them in June 2012.

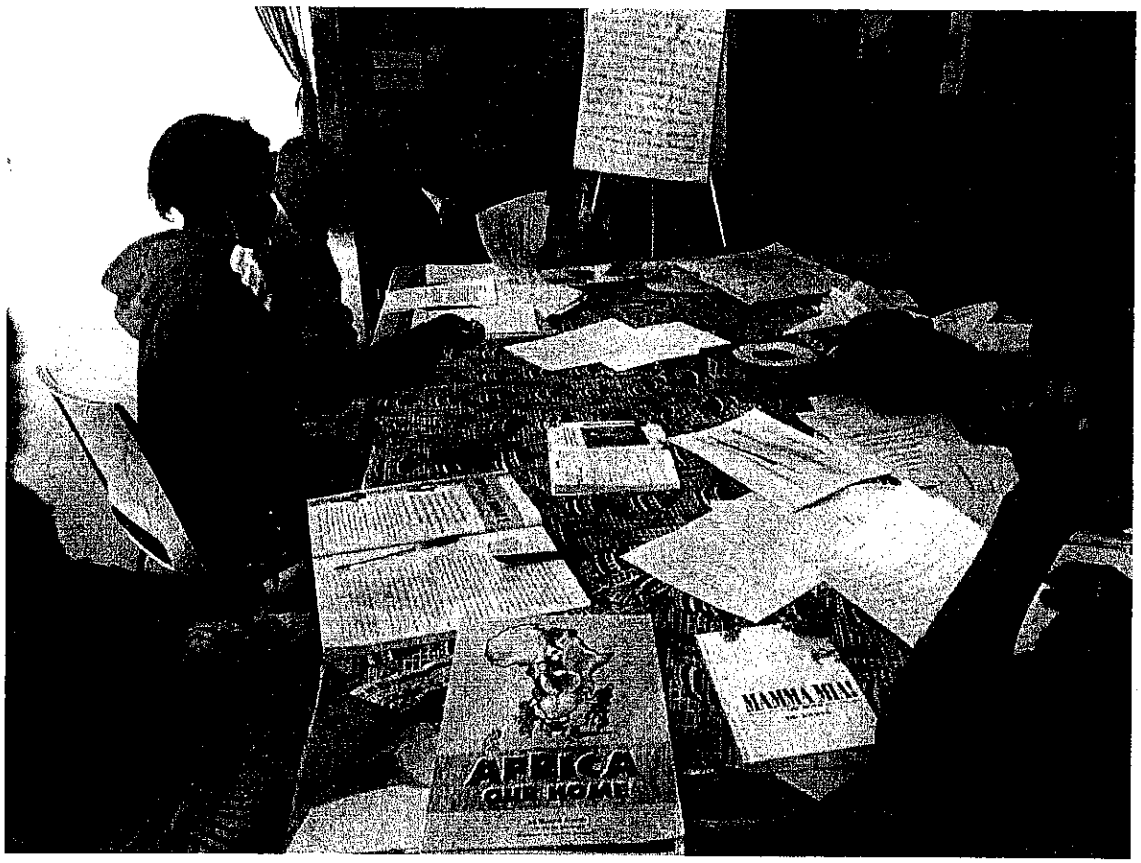
Financial report
So far, about $588.00 has been spent, mostly on workshops and administration overheads. The remaining funds will be used to host the second workshop and to print materials.

Photos taken during the first workshop

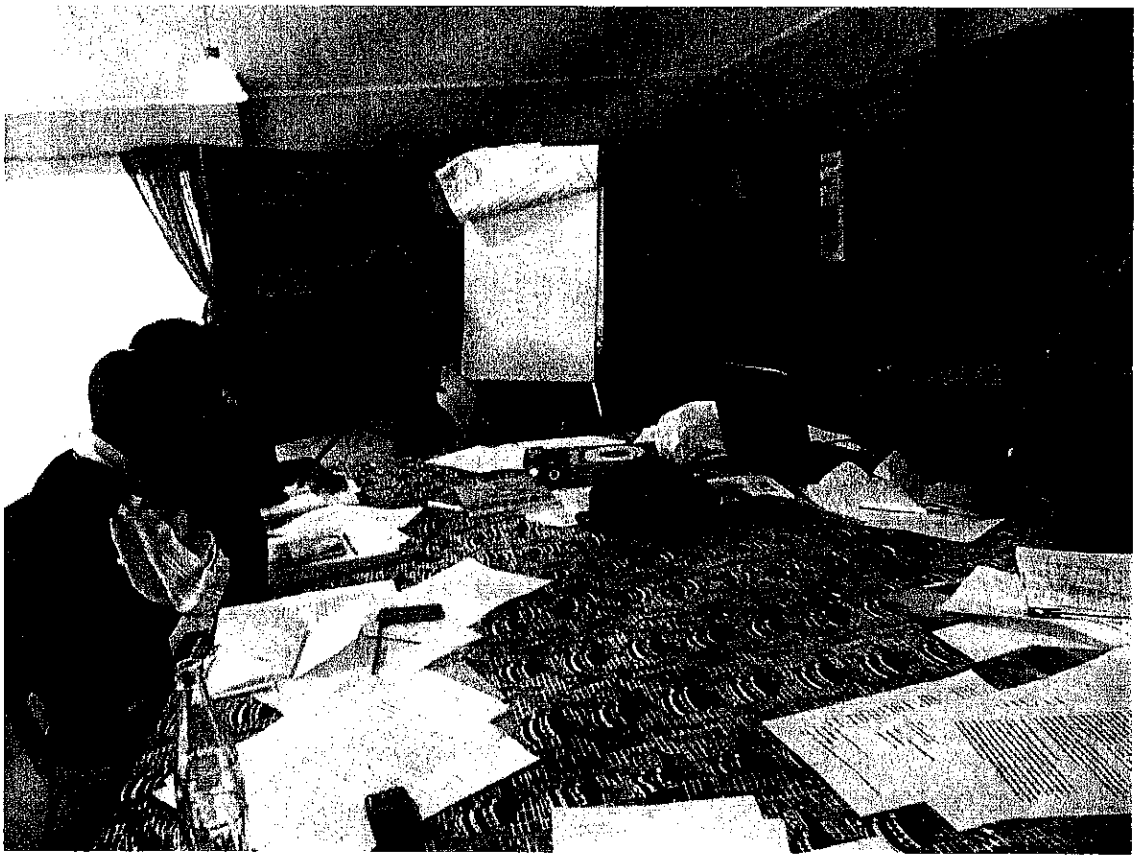




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印度保育團體 Aaranyak 計畫報告摘要

Aaranyak 設立於 1989 年，為印度東北部主要的生物多樣性保育協會。Aaranyak 主要目標包括：

- 推動保育宣導活動。
- 於鄰近保護區之社區，規劃以社區為基礎之保育行動，降低民眾對生物資源之依賴，提倡永續發展。
- 執行研究計畫和辦理保育活動，提升民眾生物多樣性保育認知。
- 以教育宣導和司法途徑，勸阻野生動物貿易行為。
- 探詢以法令和司法方式保護生物多樣性之方法。

Aaranyak 所執行計畫包括：

- 教育宣導和人才培訓計畫
- 印度東北地區受威脅物種保育計畫(包括犀牛、象、虎、豹、鳥類、爬蟲類、靈長類動物、等之研究和保育計畫)
- 保育和生計計畫
- 法律和提倡計畫
- 水、氣候和災害計畫
- 野生動物遺傳學計畫

自 1997 至 2009 年，Aaranyak 受委託的計畫，包括已完成的和持續進行中的有 19 項。包括「經由社區參與保育金毛葉猴計畫」、「大禿鸛救援和復育計畫」、「大象保育宣導計畫」、「爬蟲類資源調查計畫」、「印度生物多樣性策略及行動計畫」等。贊助單位包括 David Shepherd Wildlife Foundation, IUCN, US Fish and Wildlife Service, Conservation International, Rufford Foundation, Smithsonian Institution, BirdLife International 及印度政府單位等。

2008 年所提「東喜馬拉雅野生動物犯罪監測計畫」，因 Aaranyak 於 11 月才收到經費，執行期間改為 2008 年 12 月至 2009 年 11 月。計畫內容及執行情形如下：

非法野生動物交易已成為世界第二大犯罪行為(第一大為麻醉藥品非法交易)，野生動物非法交易案件的增加，於地區、國家和國際層級，都已成為極度受關注的議題。國際刑警組織(Interpol)表示跨國非法野生動物交易有逐漸增加的趨勢，並通常伴隨其他跨國非法犯罪行為，如麻醉品交易及武器走私。目前有八百種以上的植物和動物是禁止國際間交易的。在印度，象牙、虎皮及骨、豹皮、雲豹皮、犀牛角、麝

香、熊膽及製品、藏羚毛等的非法交易，已震驚保育團體及其政府。印度政府當局已制訂許多政策及法律，以保護野生動物並制止這方面的犯罪行為。近來數個民間組織亦開始協助政府執法單位，調查野生動物的非法走私案件。

本犯罪監測計畫主要範圍包括印度東北地區、不丹和尼泊爾。計畫目標包括：

- 透過可信賴線民所提供之資訊，調查野生物盜獵或走私涉案人。
- 建立並維繫計畫人員與各政府機構執法人員聯絡網，以有效對抗盜獵及走私者之不法行為。
- 與印度以外東喜馬拉雅地區或國家之執法機構建立聯絡網，以資訊共享的互惠方式分享情報，遏止野生動物的非法交易。
- 針對野生物盜獵或走私涉案人採取法律行動，並聘法律顧問以確保將野生動物犯罪者處以印度法律中之最高刑罰。
- 撰寫一份「印度東北地區非法野生動物貿易現況報告」，於 15 屆 CITES 大會前送阿薩姆省政府、印度政府和 CITES 秘書處參考。
- 針對印度東北地區 125 位反盜獵執法人員，辦理 5 梯次法規訓練班，每梯次 25 人、為期兩天。

野生動物犯罪監測計畫 1998 年由 David Shepherd Wildlife Foundation (DSWF)和 Global Survival Network 贊助成立，原來名稱為 Cross Town，迄今建立的資料庫有 100 個野生物盜獵或走私涉案人資料。

監測及探查盜獵或走私者行動，以及蒐集犯罪活動新資料為本計畫優先執行項目。獲知盜獵及走私者的未來動向至為關鍵，此類資訊可協助逮捕參與活動之罪犯。偶爾可從印度或其他東南亞國家當地居民口中獲悉此類訊息，但此類犯罪行為主要都選在人煙稀少的偏遠地區以避人耳目，並且大多數背後均有地下幫派組織操控，故知情者多因害怕遭到報復而選擇沉默，致使執法單位難以知悉，也難預防犯罪行為的發生。因此有關情治單位系統之建立及維持良好運作至為重要。

本計畫以極度審慎方式執行，負責蒐集盜獵或走私活動資料人員之身分予以保密。如需因應非法野生動物貿易研究，人員姓名將使用代號。使用錄音機和相機協助蒐集資料。一旦情報完整，移請相關執法單位緝捕，但情況緊急時，與警察和林務部門人員諮商後採取行動。

暫訂之一年工作計畫，主要工作包括：

- 蒐集情資工作人員訓練。

- 蒐集與分析盜獵或走私野生動物資料。
- 採取行動遏止盜獵後走私活動。
- 辦理 5 次法規訓練班。
- 辦理 2 次「打擊犯罪年會」邀集警、政、軍等單位，分析一年來所蒐集情報，商討來年行動計畫。

將以下列方式衡量計畫成效：
- 被逮捕或擊斃之盜獵者走私犯人數。
- 被沒收的武器、彈藥、野生動物相關違禁品數量。
- 盜獵行為被終止的次數。
- 運用執法機構聯絡網，打擊犯罪之成果。

本計畫執行情形如下：
- 2008 年 12 月起，集結線民情資以獲取野生動物相關犯罪資訊，尤以盜獵及走私為主。截至 2009 年 7 月為止，阿薩姆省已有 20 多名盜獵者遭到逮捕。
- 與官方林務人員定期交流、分享資訊，並協助執法人員在處理及逮捕野生動物犯罪者方面達成更多績效。
- 對一扣押野生動物製品案件，提供 Manas 國家公園管理單位法律相關意見及協助，此案有 11 名走私者涉案而遭到逮捕，目前仍在 Barpeta 法庭審理中。
- 已完成三場法規訓練，分別在 Orang 國家公園、Nameri 國家公園暨老虎保護區、及 Manas 國家公園暨老虎保護區暨世界襲產。
- 已撰寫本計畫之進度報告，俟計畫結束即發布，可提供更多東北印度之野生動物犯罪之詳細資訊。

2009 年，印度保育團體 Aaranyak 所提「印度瑪那茲(Manas)國家公園亞洲象族群動態調查計畫」內容，2010 年 3 月及 12 月計畫報告綜合摘要如附：

亞洲地區亞洲象棲地約有 59 處，雖然族群量數量評估各家說法不一，但大家都同意，亞洲象面臨生存危機。約有 873,000 平方公里(即半數以上)之亞洲象棲息地面臨棲地破碎化和人類活動之威脅。印度大象棲地面積雖僅佔所有亞洲象棲地之 17%，但族群量卻佔 60%。1999 年全印度大象族群估計約有 21,000-25,000 頭，東北地區約有 11,000 頭。印度境內，2/3 的大象分佈範圍受到人類活動之嚴重威脅。2002 年印度政府調查資料顯示印度東北地區有 9,243 頭大象，Manas 老虎保護區內有 658 頭大象。印度東北地區雌象偏多之現象由來已

久，因此有必要監測雄象數量之變化。

本計畫之重要性如下：

- 本計畫將是此地區第 1 個全面性的大象族群結構調查計畫。
- 研究提供各項族群量之基本資料，以及其他公象族群結構資料。

本計畫之預計成效包括：

- 研究成果將有助於大象族群之經營管理。
- Manas 雄象族群資料將運用於大象族群之經營管理。
- 對大象之生態有更多之瞭解。
- 成年公象的數量和性別比例調查，將協助瞭解盜獵活動對族群之影響。
- 所建立之大象相片檔案，可提供分辨問題象之用，以協助經營管理工作。
- 計畫成果可供保育主管機關參考，對決定大象保育策略有益。

Manas 國家公園佔地 500 平方公里，位於 Manas 老虎保護區之核心區。屬亞熱帶至熱帶氣候，相對濕度 76%，平均年雨量 3,300mm，夏季平均最高溫度 37℃，冬季平均最低溫度 5℃。旱季時，大群亞洲象聚集於 Manas 和 Beki 兩條河流，對調查工作有利。當國家公園內的草原長出新芽時，大象族群也會到此吃草。國家公園內的道路系統也使研究地點各地區都能被調查到。

Manas 國家公園亞洲象族群動態調查計畫報告，摘要如下：

首先進行問卷調查，對象包括森林工作人員、村民和象夫(mahout)，初步瞭解大象在 Manas 國家公園分佈情形。將國家公園劃分為一平方公里為單位之樣區，進行調查工作。Manas 國家公園雨季通常為 6-9 月，雨季前(pre-monsoon)為 3-5 月。但 2010 年 pre-monsoon 也有豐沛雨量，從 2 月開始下雨，因持續降雨，造成植被繁茂，雙重因素，造成觀察到大象情形比預期低。

2010 年 1-4 月進行調查，5-7 月雨季無法調查，8-10 月繼續調查，共調查 86 次，徒步調查和車輛調查都有執行，所有吉普車可達之處都有調查。因動物行動造成的小徑，則以徒步調查方式進行。共有 12 次遇到單隻或成群的象，沒有重複觀察到相同的象，摘要如下：

- 第一群 7 頭：1 頭有牙雄象(tusker)、3 頭雌象、2 頭幼象(calves)、1 頭性別不明亞成年(sub-adult)象。下雨半小時，雨後天晴，中午

12 點發現象群橫跨 Manas 國家公園道路。

- 第二群 16 頭：1 頭有牙雄象、8 頭雌象、3 頭幼象、4 頭亞成年象(雌及雄)。2010 年 2 月下午 3:30 於 Manas 國家公園中央地區發現象群正在草原進食。
- 第三群 9 頭：2 頭雌象、3 頭幼象、3 頭亞成年象、1 頭性別不明象。晴天時由車上觀察此群 11 分鐘，象群於樹林間進食。
- 第四群 11 頭：本群被發現時在草原和森林交界處，象群偵測到調查人員立即退入森林中，來不及判別性別組成。2010 年 4 月 23 日發現此群，當日陰天，後來下小雨。
- 在 Kuribeel 草原發現 1 頭沒有牙雄象(makhna)，當日天氣晴朗，下午時發現此象。這頭象經常走出國家公園外破壞農作物。
- 五月發現另 1 頭沒有牙雄象。當日下雨，此象正穿越道路。
- 六月在國家公園路上觀察到 1 頭有牙雄象。下午 4:42 發現，但此象立刻躲入草原中，調查人員視線被長草遮蔽，無法繼續觀察。
- 乾季時發現 1 頭沒有牙雄象。此象正處雄象生殖季節之狂暴狀態(musth)。
- 第 9 群 18 頭：1 頭有牙雄象、5 頭雌象、6 頭幼象、2 頭亞成年雄象、另外 6 頭藏在草原中無法判別雌雄。乾季焚燒草原時，於下午發現此群正在進食。
- 另發現三群大象，但來不及照相。其中一群中有 1 頭沒有牙雄象，另二群之組成無法評估。

2011 年 Aaranyak 所提「Jaldapara 野生動物保護區和 Gorumara 國家公園印度犀牛監測計畫」，摘要如附：

印度的犀牛(Greater one-horned Rhino, *Rhinoceros unicornis*)原來分佈地區廣泛，但目前已縮減至印度和尼泊爾幾處保護區。Jaldapara 野生動物保護區面積 216.51 平方公里，約有 130 頭犀牛。Gorumara 國家公園面積 79.99 平方公里，約有 50 頭犀牛。

本計畫之目標包括：

- 分析保護區犀牛遺傳多樣性(以非入侵性之排遺基因分析評估)。
- 分析犀牛族群近親交配(inbreeding)之程度。
- 分析保護區中犀牛之遺傳基因結構。
- 進行保護區中犀牛之長期基因監測計畫。

本計畫之預期成果包括：

- 此二保護區犀牛遺傳多樣性可與其他棲地之犀牛進行比較研究。

- 近親交配(inbreeding)程度分析，可協助評估印度犀牛族群經營管理之方向。因保護區犀牛為隔離族群，決定是否需要引進新族群，以維持族群基因健康，確保其族群之延續。
- 遺傳多樣性空間分佈資料可協助確認演化重要單位(Evolutionary Significant Units, ESU)，可為決定長期保育優先順序之參考。
- 研究成果發表於科學期刊供保育權益相關人士參考。

本計畫將以蒐集犀牛排遺進行基因分析方式進行。本計畫之工作計畫包括蒐集樣本、萃取 DNA、Microsatellite genotyping、確認基因性別、基因資料分析和解釋、報告撰寫。

本計畫執行情形摘要如附：

2012 年 4 月於 Gorumara 國家公園採樣 74 份，於 Jaldapara 野生動物保護區採樣 36 份，進度報告圖一為採樣地點圖。110 份樣本之遺傳分析工作進行中，將持續執行下列工作：

- 持續基因資料分析工作。
- 於 Gorumara 國家公園和鄰近地區，進行第二年採樣工作，以監測犀牛逸出國家公園之類型。
- 經由基因分析，確認每頭犀牛個體。
- 評估犀牛遺傳多樣性。
- 比較西部孟加拉犀牛族群和阿薩姆族群之基因和族群結構。

Monitoring of Greater One Horned Rhino in Jaldapara Wildlife Sanctuary and Gorumara National Park of West Bengal using non-invasive genetics tool

Progress Report
March 2012

Principal Investigators

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Implementing Agency:

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Cover Photo: Greater One-horned Rhino in Jaldapara Wildlife Sanctuary. Picture taken by Udayan Borthakur

Summary

In the present project, we are evaluating the contemporary extent of genetic diversity and its spatial distribution in Greater One-horned Rhino in the protected areas of West Bengal, viz., Gorumara National Park and Jaldapara Wildlife Sanctuary. We are using genetic techniques of dung DNA analysis to extract information for the rhinos in the area. We are also sampling nearby areas, protected as well as unprotected, where stray rhinos have started living permanently. Presently, field sampling and laboratory analysis of dung samples is in progress, as per methodology proposed.

Background

Greater One-horned Rhino (*Rhinoceros unicornis*) were once distributed throughout the range of Northern floodplains and nearby foothills of the Indian subcontinent between the Indo-Myanmar border in the east and the Sindhu river basin, Pakistan in the west. Habitat destruction and rampant poaching for mythical medicinal values of its horn has led this species to confine themselves into few isolated pockets of protected areas of India and Nepal.

Wildlife Genetics Programme of Aaranyak has been investigating the contemporary extent of genetic diversity and population structuring in the Greater One-horned Rhino populations of Assam. We have already found that the population of rhinos in the protected areas of Assam carries a moderate to high level of heterozygosity, in spite of severe bottlenecking in early twentieth century. Aaranyak's genetic research has also given concrete evidence of demographic exchange among the rhino bearing protected areas of Assam.

In view of our genetic research findings on the Greater One-horned Rhino of Assam, it was necessary to obtain comparable data from West Bengal, where a significant population of the species occurs in two protected areas, viz., Gorumara National park and Jaldapara Wildlife Sanctuary. The genetic data obtained from the West Bengal population can be compared with that from Assam population, and possibly in future with Nepal, which in turn would help understanding the metapopulation genetic structure of the species. This will be important in identifying Evolutionary Significant Units (ESUs) of Greater One-horned Rhinos in the entire area of its range distribution.

Keeping this in mind, Aaranyak proposed undertaking a genetic study of Greater One-horned Rhino in Jaldapara Wildlife Sanctuary and Gorumara National Park of West Bengal, using dung as a source of DNA from the target species.

Project objectives

The proposed objectives were as follows:

1. Noninvasive dung DNA analysis based evaluation of the contemporary levels of genetic diversity of rhinos in the protected areas of West Bengal
2. Assessment of the level of inbreeding and other associated founder effects in the rhino population of West Bengal
3. Evaluation of genetic population structuring of rhinos in the protected areas of West Bengal
4. Initiation of a long term population genetic monitoring of rhinos in West Bengal through genetic identification of individual rhinos from dung samples

Work done so far

Sampling

Rhino dung sampling was carried out in Gorumara National Park and Jaldapara Wildlife Sanctuary in April 2011. In Gorumara, some of the stray-out rhinos have started living permanently in the unprotected habitats to the north of the park, while some individuals have reached other protected areas such as Mahananda and Chapramari Wildlife Sanctuary. The corridors used by these stray-out rhinos are mostly human settlements and tea-gardens, which increases the risk of loss to both rhinos and human. Therefore, sampling for dung was carried out in these corridors and protected areas to indentify and monitor individual rhinos through genetic profiling. This whole exercise was carried out with the support and active cooperation from the Gorumara National Park and Jaldapara Wildlife Sanctuary authority. In the first sampling session, 74 fresh dung samples were collected from Gorumara and adjoining areas and 36 samples from Jaldapara (shown as blue points on the map in fig. 1). About 10 grams of fresh dung samples were collected from the field, each sample mixed thoroughly and stored in DMSO-EDTA-TRIS-salt saturated (DETs) buffer. In the laboratory, all the samples were kept at – 20°C freezer until DNA extraction.

Genetic analysis of rhino dung samples

DNA extractions for all the dung samples (n = 110) were performed using the guanidine isothiocyanate - silica based protocol, albeit with few modifications from Boom et al. (1990). Multilocus microsatellite genotyping was performed using 13 highly polymorphic loci as described in table 1. These thirteen loci were selected and standardized for work on Greater One-horned Rhino during our genetic work on populations of Assam (unpublished data).

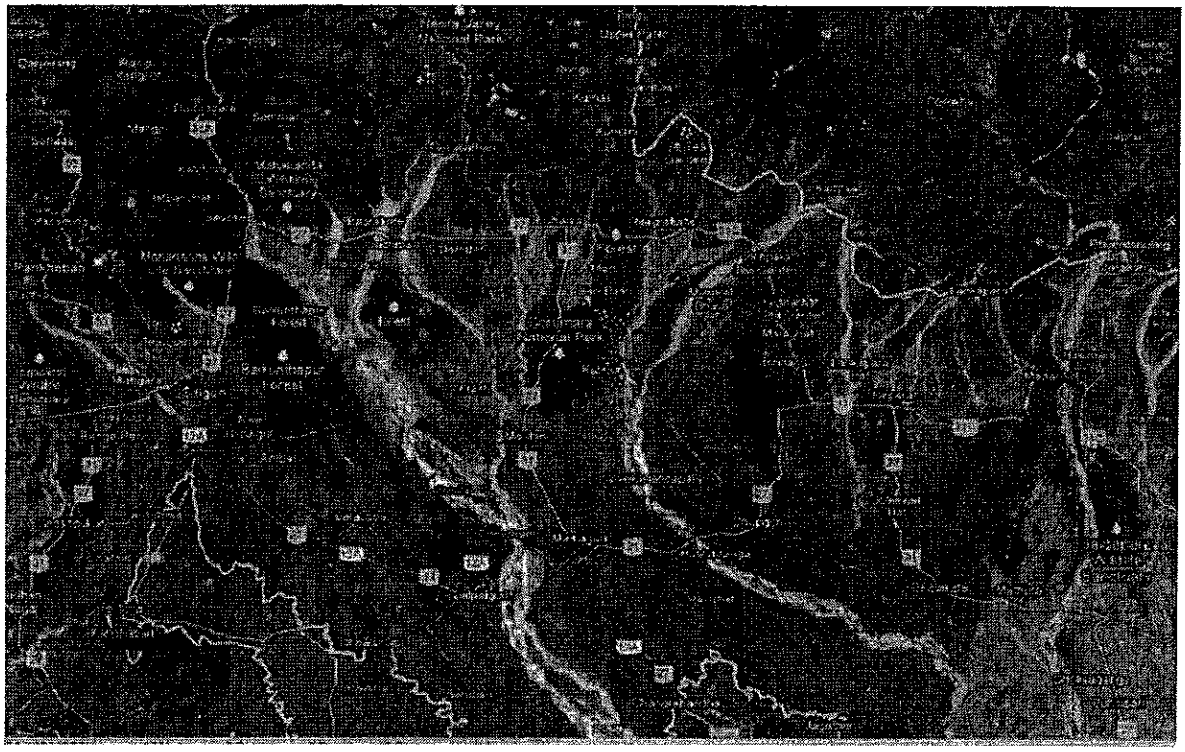


Figure 1. Map showing sampling locations of Gorumara, Jaldapara and nearby protected areas where rhino straying instances are of common occurrence

Table 1. Polymorphic microsatellite loci used for genotyping of rhino dung DNA samples from Gorumara and Jaldapara

S. No.	Name of the locus	Original species developed from	Reference
1	Rh1	*Rhinoceros unicornis*	Zschokke et al. 2003
2	Rh3	*Rhinoceros unicornis*	Zschokke et al. 2003
3	Rh4	*Rhinoceros unicornis*	Zschokke et al. 2003
4	Rh5	*Rhinoceros unicornis*	Zschokke et al. 2003
5	Rh6	*Rhinoceros unicornis*	Zschokke et al. 2003
6	Rh7	*Rhinoceros unicornis*	Zschokke et al. 2003
7	Rh9	*Rhinoceros unicornis*	Zschokke et al. 2003
8	Rh10	*Rhinoceros unicornis*	Zschokke et al. 2003
9	Rh11	*Rhinoceros unicornis*	Zschokke et al. 2003
10	SR III A	Dicerorhinus sumatrensis	Scott et al. 2004
11	SR III B	Dicerorhinus sumatrensis	Scott et al. 2004
12	SR 63	Dicerorhinus sumatrensis	Scott et al. 2004
13	SR281	Dicerorhinus sumatrensis	Scott et al. 2004

At present, analysis of the genotyping data is in progress, in order to determine allele sizes of all the 13 loci from 110 rhino samples from West Bengal.

Work ahead

1. To complete generation of allele size data from rhino dung samples collected during April 2011
2. To undertake second year field sampling in Gorumara and adjoining areas for monitoring straying patterns of rhino.
3. To complete identification of individual rhinos from allele sizing data.
4. To access genetic diversity and recent population bottleneck from allele sizing data.
5. To compare West Bengal population data with that from Assam populations for analysis of genetic populations structuring of rhinos in the landscape.

References

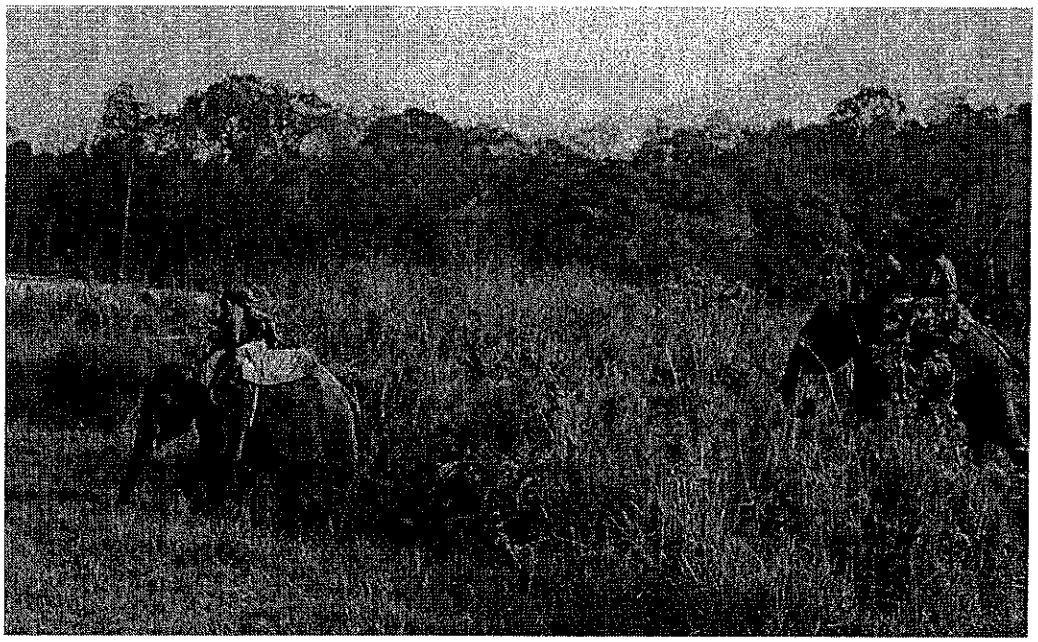
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Zschokke S, Gautschi B, Baur B. 2003. Polymorphic microsatellite loci in the endangered Indian rhinoceros, Rhinoceros unicornis. Molecular Ecology Notes 3: 233–235.

Appendix I

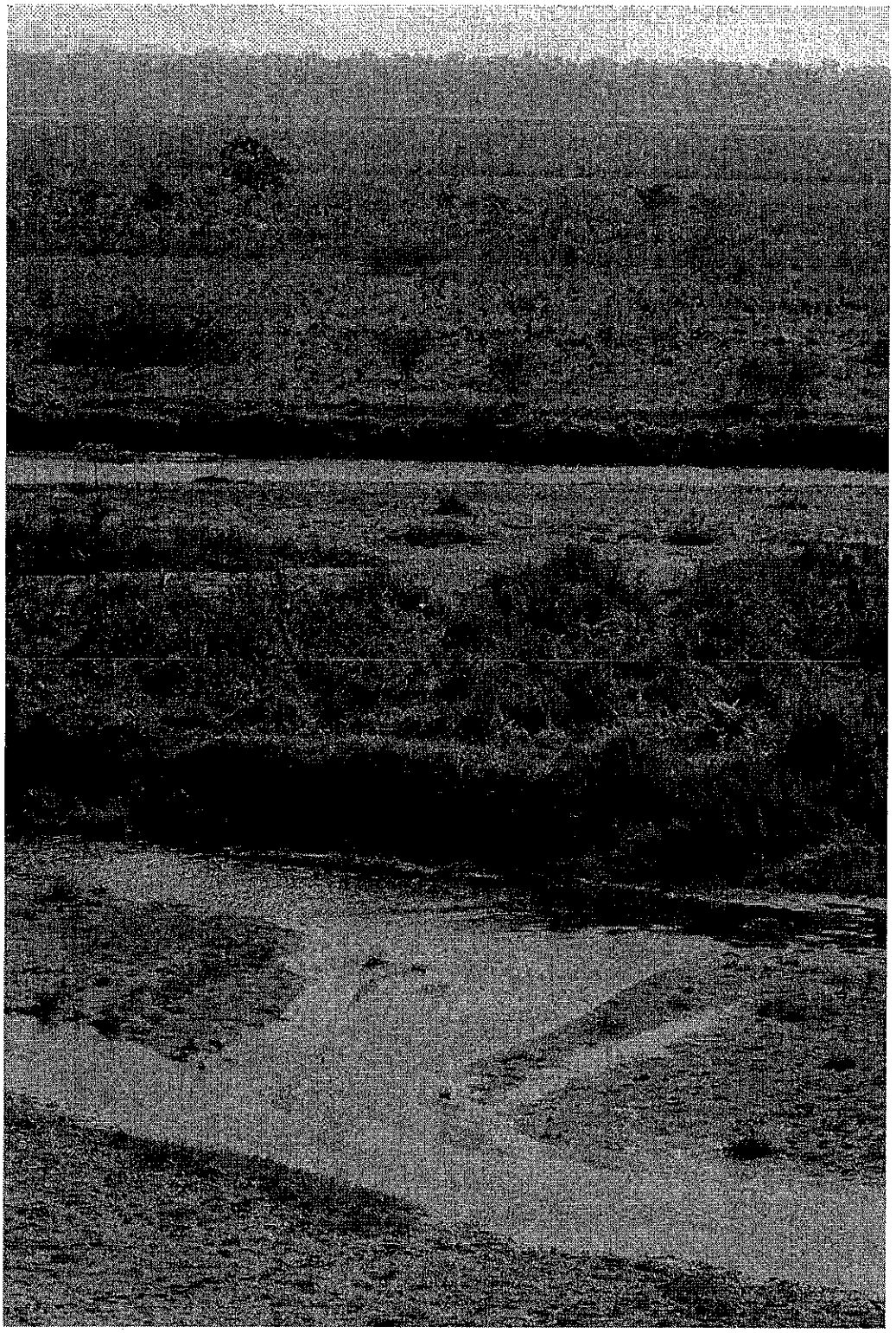
Snapshot of project activities



Sampling of rhino dung samples in Gorumara National Park using elephants



Aaranyak Researcher collecting rhino dung sample for genetic analysis



A view of the rhino habitat in Gorumara National Park



Researcher working on genetic analysis of rhino dung samples in the Wildlife Genetics Laboratory of Aaranyak

印度東北犀牛基金會計畫報告摘要

印度東北犀牛基金會(The Rhino Foundation for Nature in NE India)所提計畫執行情形，摘要如附：

印度東北犀牛基金會設立於 1994 年，已執行 16 個保育計畫。美國魚類暨野生物署(US Fish & Wildlife Service)贊助 5 個計畫，另贊助 1 個計畫的包括英國保育團體動植物保育協會(Fauna & Flora Preservation Society)和拯救犀牛協會(Rhino Rescue)，以及阿薩姆(Assam)環境和森林部(Environment & Forest Department)等。基金會榮譽行政主管為 Dr. A. U. Choudhury，研究野生動物超過 25 年，1998 年至 2004 年間，曾經兩度擔任阿薩姆環境和森林部 Deputy and Joint Secretary，為阿薩姆野生動物最高政府組織 State Board for Wildlife 委員，是 IUCN 數個專家小組的成員(例如亞洲象、亞洲犀牛、亞洲野牛、熊、貓科動物、小型食肉動物、雉類和受威脅水鳥等)，已發表 580 餘篇野生動物相關文章或研究報告，並出版 19 本有關印度東北部野生動物書籍，執行 30 項印度東北部保育或調查計畫。

我國於 2007 年贊助印度東北犀牛基金會所提「印度阿薩姆地區野水牛族群現況評估計畫」，成果報告摘要如附：

野水牛(Wild water buffalo, *Bubalus arnee (=bubalis)*)是全球受威脅物種，2004 年被 IUCN 列入瀕臨絕種(Endangered)類別。野水牛曾經廣泛分佈於印度東部和北部，分佈範圍連續延伸到越南。現在印度只有東北部有野水牛，另有少量族群出現於尼泊爾、泰國、柬埔寨和不丹。野水牛為馴化水牛的祖先，為重要遺傳資源。棲息地消失、盜獵以及與馴化水牛雜交都是造成族群減少的原因。目前印度野水牛族群大多是被分隔的小族群，1994 年時約有 3,000 頭。IUCN 2004 年紅皮書列出泰國族群已降至 40-50 頭，分佈於 Huai Kha Khaeng Wildlife Sanctuary。自 1948 年起，有許多野水牛研究，但阿薩姆最近的調查研究是 1994 年，Manas 國家公園約有全球 1/3 的野水牛，Dr. Choudhury 2006 年的調查發現族群大量減少。

本計畫主要目的為評估野水牛族群現況，並出版約 150 頁含照片的報告。所有原列於 Dr. Choudhury 報告的地點均再度進行族群調查，Kaziranga 國家公園部分由阿薩姆環境和森林部負責調查。因野水牛棲息地的草長得很高，調查工作將騎象走穿越線，並儘量拍照。為維護野水牛棲息的草原，阿薩姆環境和森林部，每年引火焚燒，避免棲

息地演替為樹林。焚燒作業完成後的一段時間是重點調查時間，因為那時視野較佳。除實地調查外，也將訪談當地居民、老獵人等。

調查結果紀錄到 215 頭野水牛，70 頭雄牛，109 頭雌牛，24 頭小牛，12 頭性別不明。這些野水牛有 21 群，每群約 5-18 頭。本計畫為第 1 次全面性野水牛族群調查，以前的調查都是局部性。本次調查未成年野牛比例為 54%，顯示族群為健康成長狀態。性別比例雄：雌為 1：1.56。Kaziranga 國家公園部分，未成年野牛比例為 35-37%，性別比例雄：雌為 1：2.97。

Dr. Choudhury 於 2010 年 8 月將該年出版之「消失之族群：野水牛 The Vanishing Herds: The Wild Water Buffalo」一書寄贈林務局，該書封面、封底和扉頁均有林務局中英文名稱及 logo。本書為第一本印度東北野水牛專書。

2009 年所提「照相追蹤調查印度梅加拉亞(Meghalaya, India)地區瀕危哺乳動物計畫」，依據計畫和報告資料，摘要如附：

本計畫調查對象為老虎、亞洲野水牛和小貓熊(red panda, *Ailurus fulgens*)。老虎和亞洲野水牛 2008 年皆被列入 IUCN 瀕臨絕種(Endangered)類別，小貓熊 2008 年列為 IUCN 脆弱物種(Vulnerable)類別。印度東北地區梅加拉亞(Meghalaya)州主要棲地是否仍有老虎、亞洲野水牛和小貓熊，以及其數量均有待確認。老虎數量不明，之前僅發現幾處獸跡和排遺。Meghalaya 亞洲野水牛棲地有限，數量稀少。小貓熊通常在喜馬拉雅山高處和中國高山中，Meghalaya 有小貓熊的報告廣受質疑，但在 Meghalaya 的 Garo Hills 發現保存良好的小貓熊皮，小貓熊能否存在於比較溫暖的 Meghalaya，又引起人們之興趣。因為森林被砍伐以供人類居住、耕作或從事其他活動，這 3 種動物的數量減少許多。以前雖有為數不少印度東北地區動物族群調查報告，但都沒有全面性的梅加拉亞州上述動物主要棲地之調查資料。本計畫調查所得資料，可提供未來保育行動計畫之重要參考資料。

本計畫調查地點包括 Meghalaya 州 Garo Hills 的 Nokrek National Park 和 Balpakram-Siju-Baghmara complex。在 Khasi Hill 的研究地點為 Trongpleng 附近。一處地點將架設至少 6 部照相機，之後再依序移至其他兩處，此過程將重複數次。也將訪談環境和森林部人員、當地居民、老獵人和其他瞭解狀況的人。計畫執行預計 2009 年 7 月開始，但野外調查將於 10 月以後進行，因印度夏季為雨季，調查工作困難。

2009 年因研究地區爆發種族衝突(詳如計畫報告附件)，計畫執行被迫延後，預計 2011 年 3 或 4 月完成。本計畫執行進度說明如下：

- 與森林部人員和田野調查相關人員聯繫洽談計畫事宜。
- 完成調查地點現堪。
- 蒐集調查地點相關研究報告和資料。
- 取得環境和森林部研究委員會(Research Committee)申請研究許可證。
- 於 Khasi Hills 架設自動照相機，發現大靈貓(Large Indian Civet, *Viverra zibetha*)蹤影，大靈貓曾經是常見之動物，因盜獵和棲地消失族群數量減少，2010 年被 IUCN 列為 near-threatened。
- 選址架設相機時，很難得拍攝到 Himalayan Pal Civet (*Paguma larvata*)。
- 發現數種哺乳動物之毛皮或排遺，包括豬獾(Hog Badger, *Arctonyx collaris*)、 花豹(Leopard, *Panthera pardus*)、豹貓(Leopard Cat, *Prionailurus bengalensis*)、 紅鬣羚(Red Serow, *Capricornis rubidus*)、赤鹿(Indian Muntjac, *Muntiacus muntjac*)、大鼯鼠(Red Giant Flying Squirrel, *Petaurista petaurista*)。

2010 年所提「印度阿薩姆地區野水牛保育計畫」，為 2007-2008 年計畫(詳如上述報告資料)之延續計畫，計畫內容及執行情形摘要如附：

1960 年代，野水牛族群數量減少及分佈範圍縮小，目前全世界 4/5 族群集中在印度阿薩姆，估計有 3,000 頭。Dr. A. U. Choudhury 2006 年調查之前的研究包括 Prater (1948), Gee (1964), Oryx (1967, 1989), Sheshadri (1968), Choudhury (1994)。因林務局和重要生態系合作基金(Critical Ecosystem Partnership Fund, CEPF)之贊助，2008 年得以評估阿薩姆省不同地區野水牛族群現況，為使調查資料發揮功用，故有此延續計畫。

本計畫預計辦理野水牛保育宣導活動，除辦理視聽講座外，也將發放宣導摺頁給野水牛棲地附近村民、學校和村代表會等。宣導營邀請參加對象包括當地居民、村代表會、學校教師、森林部第一線工作人員和民間團體。摺頁內容包括野水牛瀕危情形及阿薩姆族群佔全球族群大多數，提升大眾瞭解野水牛保育之重要性。

將提供一部二手摩托車給當地保育團體 Nature Card & Friend (NCF)，NCF 過去 4 年積極參與保護區外(Kollolua-Jokai)野水牛保育

工作。摩托車可於監測、反破壞及宣導活動。因稻田4個月的生長期間，保護區外野水牛夜晚大部分時間逗留於農田，預計設立5處便宜的季節性反破壞營地(運用當地竹子和茅草建造)。也將提供手電筒供營地工作人員和當地村民夜晚巡護時使用。

本計畫執行情形如下：

- 擬定計畫執行行動計畫。
- 已規劃2011年2月起辦理至少10梯次之野水牛保育宣導活動，地點包括Dibrugarh district (Lengeri and Bolai near Kollolua-Jokai), Lakhimpur district (Borchapori), fringes of Manas National Park & Tiger Reserve (Batabari, Koklabari, Bhuyapara, Bansbari, Panbari, Ultapani) and Kaziranga National Park & Tiger Reserve (Laokhowa)。
- 已設計和印製保育野水牛摺頁和海報，有英語版和阿薩姆語版。
- 已聯繫當地保育團體共同參與保育活動。
- 2011年2月採購二手摩托車供保護區外監測或宣導之用。

2011年所提「印度東北哺乳類動物專題論文集編審及出版計畫」，摘要如附：

印度東北為印度哺乳類動物多樣性最高之地區，約有250種，之前僅有零星之研究，包括數種早期研究報告文集或博物館清冊Pocock (1939,1941)及Prater (1948)。1970年代有Gee (1964)一般性調查、hoolock gibbon研究(Tilson 1979)、短期調查(Saha 1981)。1980年代(Choudhury 2001)進行印度東北哺乳動物長期調查，發表百餘篇科學報告及200餘篇一般報導。1990年代也有政府機構或個人進行數次調查工作。此期間提案人出版了兩省哺乳動物書籍分別為阿薩姆省(Choudhury1997)和阿魯納查省Arunachal Pradesh (Choudhury 2003)。

本計畫蒐集和更新科學資料，至博物館蒐集資料，製作物種分佈圖，繪製物種圖或蒐集物種照片。此為東北地區首次進行此項計畫，對未來將有顯著影響。結果可供決策者、規劃人員、保育人士、學生或一般人士參考。

提案人Dr. Choudhury於2012年2月10日來函表示，印度東北哺乳類動物專題論文集將於近日出版。

Project Title:

Mammals of North-east India – review, compilation and production of a monograph.

Interim Report
2011 Small Grant

Principal Investigator

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The northeastern region of India has the highest mammalian diversity in the country with around 250 species. The results of a long-term research by this Principal Investigator since early 1980s have been put together as a post-doctoral thesis and the Gauhati University in India has awarded a D.Sc (Doctor of Science) degree on that. This project intends to update the thesis which is somewhat out dated (of 2001) and bring it out in a book form. This will be first such work on the region and will be a significant work or future generation.

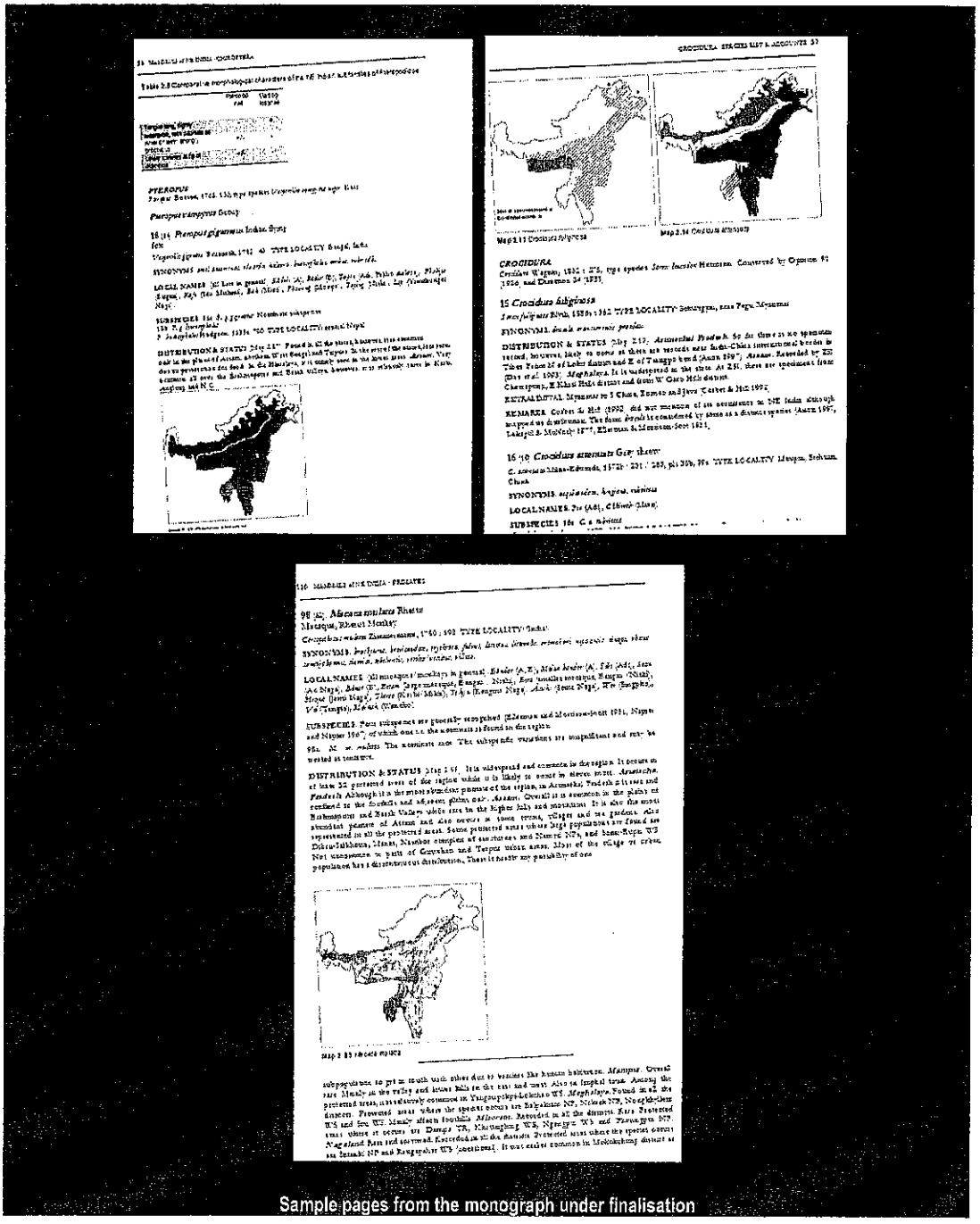
A support from COA, Taiwan under **Small Grant 2011** has been received recently for production of the first comprehensive document on the mammals of North-east India – a region of very high biodiversity. The works on the manuscript is nearing completion and it is expected that the materials will reach the press within the next six months. Samples of pages with maps already prepared are in Appendix for reference.

It may be mentioned here that the present work will make a substantial and long lasting contribution to nature conservation as it is the first complete documentation of the mammals of this biodiversity-rich region of India as well as South Asia. The policy-makers, planners, conservationists, students as well as general readers can use it during their works. This will also be the key reference material for a global readership and will be the beginning of a similar work for other regions of India as well.

REFERENCES

Choudhury, A. U. (2001). A systematic review of the mammals of North-East India with special reference to the non-human primates. D.Sc.Thesis. Gauhati University, India. 209pp including 3 maps.

APPENDIX



Sample pages from the monograph under finalisation

尼泊爾鳥類保育協會計畫成果摘要

尼泊爾鳥類保育協會(Bird Conservation Nepal, BCN)所提環境教育相關計畫及執行情形依據過去數年資料摘要如附：

BCN 設立於 1982 年，目前有 500 個會員，為尼泊爾最大及設立最早的賞鳥、鳥類研究和鳥類保育民間團體。BCN 是國際鳥盟(BirdLife International)在尼泊爾的合作組織。2005 年 BCN 完成將「Bird of Nepal」英文本翻譯成尼泊爾文的工作。該計畫由世界銀行(The World Bank)、國際鳥盟亞洲基金(BirdLife Asia Fund)和荷蘭的 Van der Hucht Funds 共同贊助。2005 年 BCN 完成尼泊爾的重要野鳥棲地(Important Bird Areas, IBAs)計畫，也辦理相關教育宣導活動。英國皇家鳥類保護協會(Royal Society for the Protection of Birds, RSPB)目前贊助 BCN 之運作。

BCN 的工作目標包括：

- 教育大眾自然和自然資源之重要性。
- 執行以知識為基礎之計畫，並引導至環境保育議題。
- 鼓勵學生參與保育相關活動。
- 與政府單位和國內或國際民間團體合作，以達成可測量的成果。
- 出版和分送活動相關資料。

巴格馬提河自然公園(Bagmati River Nature Park)位於尼泊爾首都加德滿都，加德滿都大都會區是尼泊爾人口最密集的地方，Bagmati 河自然公園是大都會區少數綠地中的一個，也是唯一為了保護自然而設立的公園，是進行環境教育的絕佳地點。Bagmati 河自然公園佔地 30ha，主要是草原和灌叢。BCN 已取得尼泊爾政府同意重整園區，以後將有草原、灌叢、森林和湖泊。

BCN 於加德滿都山谷 Bagmati 河自然公園入口附近，設立高品質的環境教育中心，設計及辦理環境教育活動。除提供 220 萬加德滿都大都市圈(包括 Kathmandu、Lalitpur、Bhaktapur 和幾處小村落)附近民眾參訪機會，為全尼泊爾唯一的環教中心，本中心的目標群眾為 5-16 歲學生。尼泊爾鳥類保育協會認為教育兒童有關野生動物、保育和環境管理是改變態度和行為的有效方法。加德滿都大都市圈目前有小學 1,228 所，國中 813 所、高中 606 所，共計約有 150,000 名學生，另外，該區大學生約有 145,000 人。BCN 經營管理此環教中心已 7 年。

本計畫目標為：

- 提升加德滿都山谷都會民眾對環境保護和經營管理之認知。
- 鼓勵大眾參與環境復育計畫。
- 加強相關機構之環境教育。
- 推廣賞鳥和保護區觀光活動。
- 辦理有創意的環境教育宣導活動或宣導品，推廣 4Rs (Reduce, Reuse, Recycle, Replacement)。

本計畫活動包括：

- 擴大自然公園遊客中心規模，改善其設施，使更多民眾有充實知識的機會。該中心位於自然公園入口附近，提供自然公園資料，也是辦理活動的重點地區，中心原可容納 150 人。
- 購買儀器或器材維持中心正常運作及辦理活動。
- 架設移動性帳棚，辦理鳥類保育宣導展示活動。
- 在自然公園重要地區設立資訊看板。之前已設計展示區，介紹自然公園和野生動物，以及尼泊爾環境相關議題。
- 規劃和辦理環境教育活動，招募和訓練志工協助執行教育計畫，目前有兩位全職人員(Education Officer 和 Education Assistant)負責此項工作。
- 定期與目標團體(例如學校)及權益相關人士開會，建立夥伴關係，確保環境教育計畫成效。日前已擬定教育中心長程計畫。
- 製作各類出版品，例如傳單、海報、環境紀念品、都會區鳥類圖鑑等。之前製作的環境教育系列宣導資料，內容包括自然、環境、野生動物棲息地、個人可採取的保育行動、環境教育活動設計等。
- 辦理大型宣導活動，提倡森林和鳥類保育、賞鳥活動、永續發展等觀念。並支援下列活動，例如 2010 生物多樣性年、2011 國際森林年、2011 尼泊爾觀光年、聯合國 10 年永續發展計畫(2005-2015)中森林和自然保護區部分、、3 月 20 日世界麻雀日、6 月 5 日世界環境日、9 月 24 日國家保育日等。
- 辦理各類活動，例如賞鳥、環境營、環境教育師資培訓(Training of Trainers, TOT)等。
- 針對社區辦理和 BCN 人員辦理能力訓練班，主題為環境教育和永續發展。

本計畫預計成果包括：

- 經由 3As (Awareness, Attitude change, Action)模式，提升社會大眾環境認知。
- 預估 30,000 名學生、50,000 位成人將受惠於環境中心準備的資料。

- 吸引為數眾多之兒童、學生、成人造訪環境中心及自然公園。
- 印製分送 2,000 份傳單和 5,000 份鳥類鑑定摺頁。

BCN 所提 Bagmati River Nature Park (BNP) 計畫，2007 年半年之工作成果包括：

- 2007 年夏季栽種一些樹苗後，樹苗旁長雜草，持續進行除草工作。
- 未經處理的污水流經公園至河流中，預計種植蘆葦(10x6.5 m)過濾污水，降低水污染。
- 設置金屬垃圾桶，減少固體垃圾污染。
- 2007 年 8 月至 2008 年 1 月間，BNP 派員到 45 個學校宣導保育教育、鳥類和生物多樣性等議題，其中 30 個學校(1,195 位學生，78 位老師)之後到自然公園，進行戶外教學。BNP 也與其他保育團體合辦保育宣導活動兩次。
- 每月進行鳥類調查，共記錄到 41 種鳥類。
- 自然公園中有 21 種植物，已立牌列出學名和尼泊爾語俗名，協助一般遊客和學生認識植物。
- 遊客中心(visitor center)運作正常，供一般遊客索取自然公園和尼泊爾鳥類資料，BNP 沒有正式統計造訪遊客中心的人數，通常每天有 96 人到遊客中心。
- 進行 2 次問卷調查，瞭解民眾對 BNP 經營管理之意見。
- 加入 Nepal Government Bagmati Area Sewerage and Rehabilitation Committee 會員，有利 BNP 以政府優先計畫執行相關計畫。

2008/09 半年報告，摘要如下：

- 2008 年，BNP 派員到 25 個學校宣導保育教育、鳥類和生物多樣性等議題，其中 23 個學校之後到自然公園，進行戶外教學。
- 為響應及宣導世界濕地日，於 2009 年 2 月 2 日辦理藝術創作比賽，主題為「拯救鳥類：拯救巴格馬提(Save Birds: Save Bagmati)」。
- 經營管理遊客中心，每天約有 200 人參訪。中心提供 Bagmati 河自然公園和尼泊爾鳥類相關資料。
- 增設 6 個金屬垃圾桶(原有 4 個)，6 面宣導告示牌，2 張座椅。
- 自 2007 年起，每月進行鳥類調查，迄今記錄到 69 種鳥類。
- 種植樹苗，改善環境，並進行除草照顧幼樹成長等工作。也進行步道除草工作和清理園區垃圾等工作。另因 2008 年冬季比往常乾燥，雨量減少，裝設一部抽水機，以供新植樹苗澆水之用。

- 贊助 4 名大學生於自然公園進行環境研究。

2009/2010 年計畫報告摘要如下：

- 2009 年 3 月至 8 月，BNP 派員到 20 個學校宣導保育教育、鳥類和生物多樣性等議題，其中 17 個學校之後到自然公園，進行戶外教學。
- 2009 年 5 月 22 日辦理國際生物多樣性日校際測驗比賽 (International Day for Biological Diversity 2009 Inter School Quiz Contest)，測驗題目主要為鳥類和生物多樣性相關，共有 15 個學校參加比賽。
- 2009 年 6 月 5 日世界環境日(the world environmental day 2009)，辦理植樹活動，環境、科學暨科技部(Ministry of Environment, Science and Technology)部長為活動貴賓，許多機構代表和學生參加活動，共種植 500 棵樹。
- 2009 年 9 月至 2010 年 2 月，BNP 派員到 20 個學校宣導保育教育、鳥類和生物多樣性等議題，其中 5 個學校之後到自然公園，進行戶外教學。
- 持續經營管理遊客中心，約有 50 名參訪人士加入 BCN，並引發附近大學生對 BNP 之興趣，目前有 5 位大學生在 BNP 和遊客中心實習。
- 每月進行鳥類調查，2009 年 3 月至 8 月以及 2009 年 9 月至 2010 年 2 月記錄清單列於報告 Annex II，此段期間有紀錄到新出現種。
- 換新的 Bagmati River Nature Park 招牌，加列重要資料。
- 設立 2 面看板(6x4 ft)，列出不同季節可在 BNP 看到的 36 種鳥，除列出俗名和當地名稱外，也包括保育訊息。這些看板吸引許多遊客駐足閱覽，其中 500 人向遊客中心索取看板鳥類更詳細資料。
- 預計於 2010 年 4 月 24 日(BNP 設立日)，辦理鳥展，將透過 BCN 會員和網站大力推廣，預估可吸引 2 萬人至 BNP 參訪。

2010/2011 年計畫報告摘要如下：

- 2010 年 9 月至 2011 年 2 月，BNP 派員到 27 個學校，向 1,115 位學生宣導保育教育、鳥類和生物多樣性等議題，其中 12 個學校之後到自然公園，進行戶外教學。
- 經營管理遊客中心，園區狀況持續改善，訪客因而增加。約有 80 名訪客加入 BCN 並參與相關活動及保育計畫。附近大學生對 BNP 也有興趣，目前有 5 位大學生在 BNP 和遊客中心實習。

- 每月進行鳥類調查，2010 年 3 月至 2011 年 2 月，75 種鳥類記錄清單列於報告 Annex II，此段期間有紀錄到新出現種。有些鳥種 2009 年有觀察到，但 2010 年未發現。9 月和 10 月各記錄到 50 和 52 種，為種類最多之月份。六月記錄到最少種類。
- 步道除草工作持續進行。因雜草種子為有些鳥類之食物，保留樹下的草，以吸引鳥類。
- 參加尼泊爾河流保育信託(Nepal River Conservation Trust)舉辦之 Bagmati River 季活動。

2011 年計畫報告摘要如下：

- 2011 年，BNP 派員到 22 個學校，向 52 位教師和 712 位學生宣導保育教育、鳥類和生物多樣性等議題，大多數學校之後到自然公園進行戶外教學。大學部份，有 6 位教師和 116 位學生參與。
- 辦理 8 次社區環境教育活動。因當地社區以務農為主上班族為次，活動大多晚上辦理，Bhaktapur 場次有 183 人參加。
- 2011 年 12 月 31 日辦理賞鳥活動，吸引 45 位鳥友參加，記錄到 29 種鳥類。
- 持續每月鳥相監測，記錄到 74 種鳥類(報告 Annex II)，此段期間紀錄到新出現種 Thick-billed warbler *Acrocephalus aedo*。
- 2011 年 9 月 3 日，參與第 3 屆國際禿鷹日，說明禿鷹族群減少原因，並分享環境教育對生物多樣性保育之重要性。
- 於重要野鳥棲地(Important Bird Area, IBA) Phulchowki 山林推動環境教育計畫和以賞鳥為主之生態旅遊。
- 出版 1,000 份加德滿都山谷鳥鳴 CD，內含 30 種該地常見鳥之叫聲或歌聲。
- 2012 年 1 月 23 日，辦理都會 20 區鳥類調查活動，紀錄 37 種鳥類。

Participatory Environmental Education to the Urban Community of Kathmandu Valley, Nepal



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Background

Bird Conservation Nepal (BCN) has been developing and managing Bagmati River Nature Park (BNP) along the Bagmati River corridor jointly with ministry of Environment / UN Park Development Committee. The aim of the project is to create suitable habitats for both the urban as well as migratory bird species and provide environmental education and experience based learning to school students. There is no any nature park or reserve within the accessible surroundings where students can learn about nature, natural habitat and environment issues. About 33 planted tree species, Narkat *Phragmites maxima* and Bagmati River are the major habitat in the Park. More than 70 species of birds are recorded from this Park. Wildcat and Indian Grey Mangoose are mammals can be seen here.

The development of the Bagmati River Nature Park offers a huge opportunity to promote conservation and environmental issues to the large urban population and school students of Kathmandu. The key focus of BCNs work is to an educational programme for the numerous local schools, offering excellent field educational opportunities. This programme, has been funded by Taiwan forestry Bureau since 2007. Since then we are continuously visiting different schools of Kathmandu Valley to disseminate environmental education and encouraging them to visit the Park to get field based knowledge. The development of one of the few green urban spaces within the city will offer a unique visitor experience where visitors will be able to walk and enjoy urban wildlife and habitats.

In summary, the Bagmati River Nature Park is providing people information about birds and other wildlife and gives them the opportunity to enjoy, cherish and learn about the natural environment.

Project Activities

Environmental Education at School

As a part of major activities we visited many schools of Kathmandu valley to run the environment conservation education and encourage them to visit the park to get field based education. We took classes from primary to college level students. About 1.30 hour course was designed to cover all age groups and standard of students, slide shows and oral presentations were made.

Course content of school/college visit programme was as follows:

- Birds and Biodiversity of Nepal and its importance
- Importance of birds for biodiversity and environment conservation
- Urban and sub-urban birds Kathmandu valley and their status
- Bird identification recording techniques
- Bagmati River Nature Park
    - Background
    - Flora and fauna of BNP
    - It's role in birds and environment conservation in urban landscape.

Total 712 students and 52 teachers of 22 schools were directly benefited from our school visit activities. Similarly 116 students of college and 6 teachers benefitted from this activity (Annex I). Brochures of Bagmati Nature Park, Birds of Kathmandu valley, Newsletters of BCN *Danphe* and *Munal*, BCN brochures, Posters of Globally Threatened birds and poster of indicator bird species were distributed to the participants.

Environmental Education at Local communities

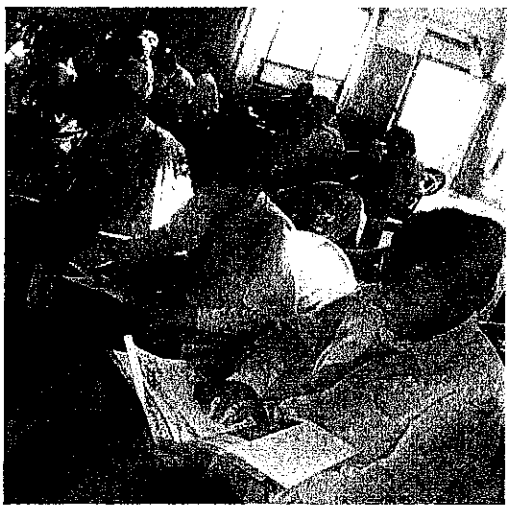
Total 8 events were organized among local communities and youth clubs to run environment conservation awareness education in urban areas. Such activities were organized during evening to ensure the wider participants because most of the local peoples were farmers and busy in office work during day time. 183 local peoples of Bhaktapur area were benefited from this activity. Bhaktapur is another district which is facing rapid urbanization and development as a result many birds are facing serious threats.

Elderly participants were encouraged to share their knowledge on changes in habitat and bird diversity around them and their activities which may be having negative impact on birds. After that they were made aware about overall biodiversity status of Nepal and Kathmandu valley and also conservation measures to be adopted. They were also informed about the role and importance of BNP.



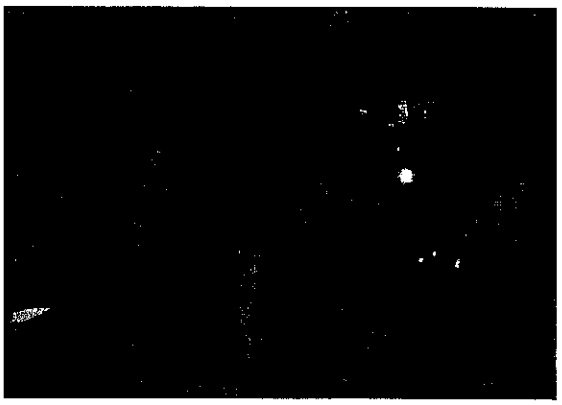

Glimpses of School visit



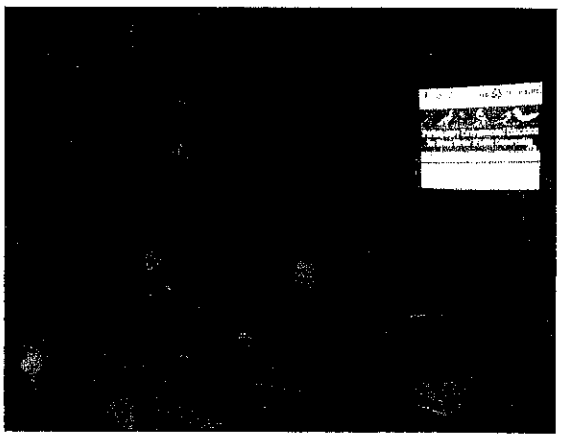



Glimpses of college visit









Glimpses of local communities and youth club awareness activities



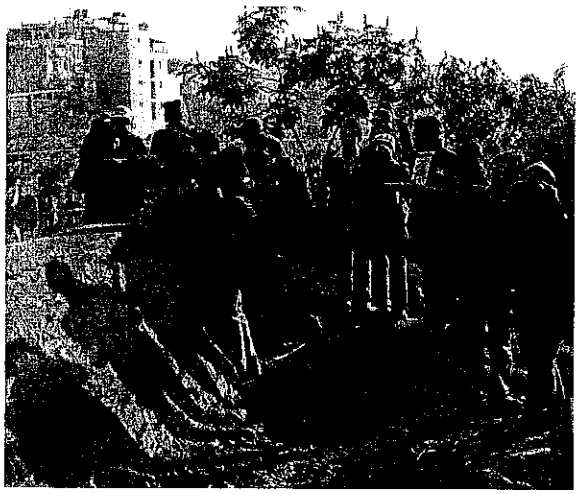


Glimpses of park visit

Bird watching and monthly bird monitoring

BCN's fortnightly bird watching programme was organized at BNP on 31 December 2011 for its member and interested students. Total 45 birdwatchers were gathered at BNP. Our volunteer described about the park and progress activities about the Park. Total 29 bird species were recorded during the day including winter visitor birds like Dark-throated Thrush *Turdus ruficollis*, Tickell's Leaf Warbler *Phylloscopus affinis* and Grey-backed Shrike*Lanius tephronotus.*

Monthly bird recording of BNP has been done continuously, total 74 bird species are recorded so far (Annex II). New bird species recorded at BNP is Thick-billed Warbler *Acrocephalus aedo.*







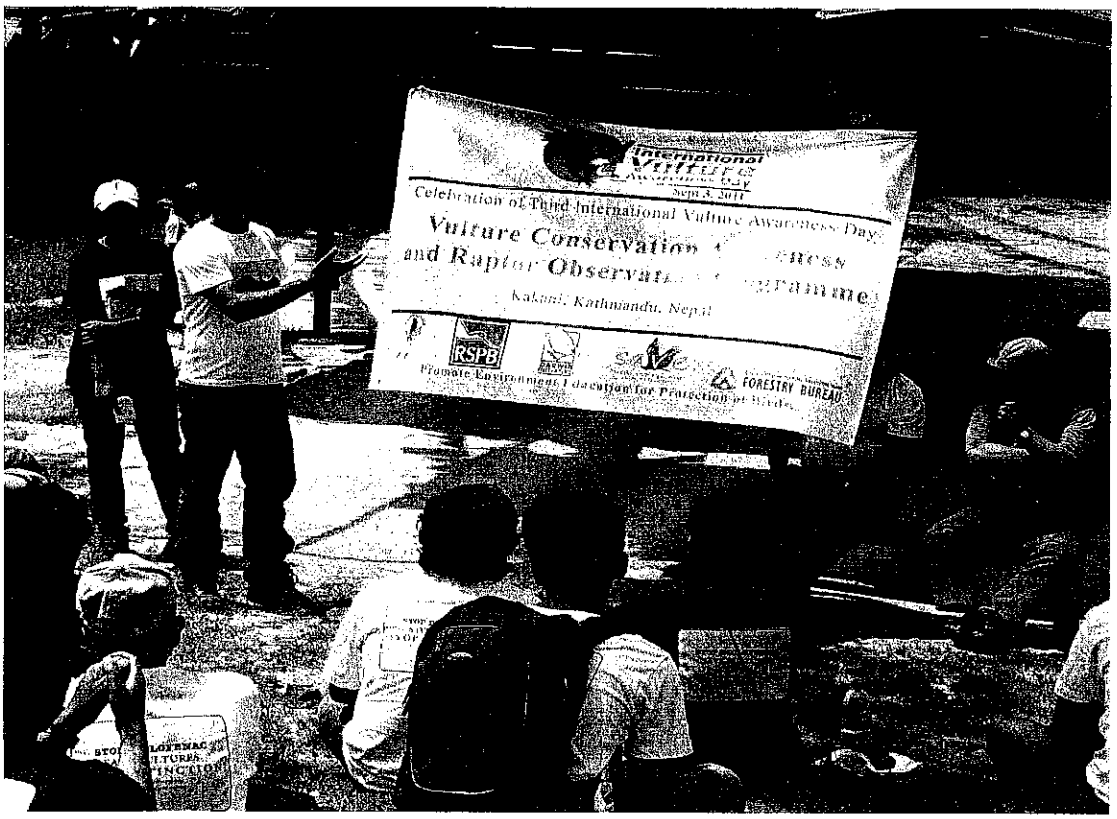
Olive-backed Pipit *Anthus hodgsoni*



Thick-billed Warbler *Acrocephalus aedon*

3rd International Vulture Awareness Day

3rd International Vulture Awareness Day was celebrated on 3 September 2011 in Nepal. Vulture Conservation Awareness and Raptor Observation Program was organised at Kakani, Nuwakot on 3 September 2011. Raptor observation was done in landfill site, Okharpauwain order to observe the decline of vultures and overall raptors in comparision with the past population. During this event, Mr. Hari Saran Nepali "Kazi". Founder president of BCN shared his experiences and briefed about the causes of decline of vultures. Similarly, Dr. Hum Gurung, Chief Executive Officer, BCN highlighted on need of Environmental Education to public for biodiversity conservation. Juddha Bahadur Gurung, Member secretary, NTNC focused on role of youth in conservation. Mr. Shree Ram Subedi, President, BCN encouraged everyone to join their hand together for conservation of vultures.



Environment Education and birdwatching tourism at Phulchowki Mountain Forest

Phulchowki Mountain Forest is an Important Bird Area (IBA) of Nepal located 16km southeast of Kathmandu Valley. It provides refuge for over 300 bird species.This IBA is renowned bird watching site for foreigner and Nepalese birdwatcher, a research area for university students and recreational site for the propels of the densely populated Kathmandu valley.
It was felt an orientation meeting is urgent to make aware about its importance among the stakeholders, necessary step to take ahead and address the recently happened security accident in the area. It was held on 12 November at Godabari, the lower slope of Mountain. Total 65 individuals representing different related organization and local peoples participated in this meeting.Dr. Hum Gurung presented about the importance of Phulchowki Mountain Forest for birdwatching tourism, issues on environment education and security problems in that area. Representatives from Police, Army, Community Forest User groups, District Forest Office and media put their view how the birdwatching tourism can sustain, protecting the forest and benefitting the local peoples.

At the end president of BCN summarized the meeting saying this area is very important for birdwatching tourism and can play key role in livelihood of local people he said all relevant stakeholders should take their responsibilities for the better protection and promotion of it.
News coverage of that event published in one of the renowned national daily news paper, the Kathmandu Post http://m.ekantipur.com/2011/11/13/capital/a-journey-to-paradise-of-chirping-creatures/343722.html .

Bird Song CD

We produced 1000 copies of CD of Bird Songs of Kathmandu Valley. CD Room contain contains call/songs of 30 most common birds seen at valley in around valley. Small booklet along with CD contains color picture and short information about the same birds. It was produced to raise the interest on birds and bird watching among the people.



Front view of CD

Urban Bird Count 2012

BCN organized an urban bird count event on 23 January 2012. About 30 minute was spent in the morning. Counting was done in different 20 locations of Kathmandu valley. This programme was run to know the status of birds in urban landscape of valley at one time and raise awareness on the urban birds among the resident of valley. Members of BCN contributed voluntarily in this activity. Total 37 different birds were seen during this event and summery of bird count is given as below.

SN.	Top 10 Common birds	Recorded in % of Count Areas	Top 10 highest counted birds	Number Counted
1	House Crow	100%	Rock Pigeon	**225**
2	House Sparrow	91%	House Crow	**174**
3	Rock Pigeon	82%	House Sparrow	**127**
4	Common Mynah	82%	Eurasian Tree Sparrow	**51**
5	Black Kite	73%	Black Kite	**47**
6	Eurasian Tree Sparrow	64%	Common Mynah	**42**
7	Red-vented Bulbul	68%	Rose-ringed Parakeet	**36**
8	Tailorbird	68%	Red-vented Bulbul	**28**
9	Rose-ringed Parakeet	50%	Cattle Egret	**23**
10	Jungle Mynah	4	Jungle Mynah	**15**

Annex I: List of School and community awareness

S.N.	Name of school/Institute/University	Address	Class Date	Park Visit Date	Grade	Girls	Boys	Total
1	Vidyarthi Niketan Higher Secondary School	Balakhu, Bhaktapur	22-Jul-11	23-Jul-11	8 and 9	32	15	47
2	Shree Padma Higher Secondary School	Darbar square, Bhaktapur	24-Jul-11	30-Jul-11	9 and 10	40	12	52
3	Basu Higher Secondary School	Byasi, Bhaktapur	29-Jul-11	30-Jul-11	11 and 12	11	8	19
4	Central Department of Zoology	Kirtipur, Kathmandu	29-Jul-11	30-Jul-11	M.Sc., Zoology	2	6	8
5	Nyatapola Secondary School	Kamal Vinayak, Bhaktapur	31-Jul-11	6-Aug-11	10	22	16	38
6	Oxford Practical English Secondary School	Sallaghari, Bhaktapur	5-Aug-11	6-Aug-11	10	6	13	19
7	Jyoti Gyan Academy	Surya Vinayak, Bhaktapur	7-Aug-11	13-Aug-11	8,9 and 10	16	15	31
8	Adarsha Kanya Niketan Higher S.S.	Mangal Bazar, Latitpur	12-Aug-11	13-Aug-11	9 and 10	32	0	32
9	Suryodaya Secondary School	Hanuman Ghat, Bhaktapur	19-Aug-11	27-Aug-11	9	12	12	24
10	Model Janta English Secondary School	Nagpokhari, Bhaktapur	26-Aug-11	27-Aug-11	8 and 9	26	14	40
11	Shree Madan Smarak Higher Secondary School	Pulchowk, Lalitpur	28-Aug-11	10-Sep-11	6 and 7	24	17	41
12	Peace Nepal (Club)	Thalachhen-4, Bhaktapur	9-Sep-11	10-Sep-11	Local people	3	13	16
13	Mahalaxmi Tole Sudhar Sammittee	Mahalaxmi Sthan-4, Bhaktapur	16-Sep-11	Pending	Local people	27	41	68

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14	Danphe English School	Naitole, Pulchowk, Lalitpur	23-Sep-11	24-Sep-11	8 and 9	9	11	20
15	Prabhat Higher Secondary School	Mahakali Sthan, Bhaktapur	14-Oct-11	15-Sep-11	11 and 12	21	26	47
16	Bekhal Brother's Team	Bekhal, Bhaktapur	14-Oct-11	Pending	Local people	0	18	18
17	Basu College	Kalighat, Bhaktapur	21-Oct-11	5-Oct-11	10,11,12,B.B.S	38	25	63
18	Khwopa College	Dekocha, Bhaktapur	4-Nov-11	5-Oct-11	B.Sc, Env	31	22	53
19	Jana Sewa Team	Bholachhen, Bhaktapur	4-Nov-11	Pending	Local people	14	22	36
20	Dreamland English Mediam School	Nagapokhari, Bhaktapur	11-Nov-11	12-Nov-11	8 and 9	12	6	18
21	Golmadi Samaj Sudhar Sammittee	Golmadi, Bhaktapur	11-Nov-11	Pending	Local people	19	25	44
22	Universal English Secondary School	Bholdhoka, Lalitpur	18-Nov-11	26-Nov-11	9	9	13	22
23	Horizon English Secondary School	Dhapaghal, Lalitpur	25-Nov-11	26-Nov-11	8	11	9	20
24	Vidhya Bikash English Secondary School	Balkumari, Lalitpur	2-Dec-11	10-Dec-11	8 and 9	24	13	37
25	Golden Sungava English School	Duwakot, Bhaktapur	9-Dec-11	10-Dec-11	8 and 9	17	15	32
26	Ambition Academy	Sallaghari, Bhaktapur	16-Dec-11	Pending	9	32	16	48
27	East Point Secondary School	Muldhoka, Bhaktapur	23-Dec-11	31-Dec-11	9	9	14	23
28	St.Merry English School	Maheshori Sthan, Bhaktapur	30-Dec-11	31-Dec-11	7 and 8	21	13	34

29	Manakamana English Secondary School	Nagancha, Bhaktapur	6-Jan-12	Pending	8 and 9	11	8	19
30	Sagarmatha Hlgher English Secondary School	Jawalakhel, Lalitpur	4-Jan-12	Pending	8 and 9	17	13	30
31	Chandani Aawasiya Secondary School	Shankhamul, Lalitpur	20-Jan-12	Pending	9	13	8	21
32	Shree Hansa Bahini School	Mahalaxmi Sthan, Bhaktapur	27-Jan-12	Pending	5 and 6	8	9	17

Annex II- Birds of Bagmati River Nature Park

S.N.	Family/Order/ Common Name	Scientific Name
	ANSERIFORMES	
	Anatidae	
1	Garganey	*Anas querquedula*
	PICIFORMES	
	Picidae	
2	Eurasian Wryneck	*Jynx torquilla*
3	Fulvous-breasted Woodpecker	*Dendrocopos macei*
	UPUPIFORMES	
	Upupidae	
4	Common Hoopoe	*Upupa epops*
	CORACIIFORMES	
5	White-throated Kingfisher	*Halcyon smyrnensis*
	CUCULIFORMES	
6	Pied Cuckoo	*Clamator jacobinus*
7	Eursian Cuckoo	*Cuculus canorus*
8	Grey-bellied Cuckoo	*Cacomantis passerinus*
	PSITTACIFORMES	
	Psittacidae	
9	Rose-ringed Parakeet	*Psittacula krameri*
	APODIFORMES	
	Apodidae	
10	Alpine Swift	*Tachymarptis melba*
	STRIGIFORMES	
	Strigidae	
11	Spotted Owlet	*Athene brama*
	COLUMBIFORMES	
	Columbidae	
12	Spotted Dove	*Streptopelia chinensis*
13	Eurasian Collared Dove	*Streptopelia decaocto*
14	Oriental Turtle Dove	*Streptopelia orientalis*
	GRUIFORMES	
	Rallidae	
15	White-breasted Waterhen	*Amaurornis phoenicurus*
	CICONIIFORMES	
	Scolopacidae	
16	Common Snipe	*Gallinago gallinago*
17	Common Sandpiper	*Actitis hypoleucos*
18	Green Sandpiper	*Tringa ochropus*
	Accipitridae	

19	Black Kite	*Milvus migrans*
20	Common Buzzard	*Buteo buteo*
21	Shikra	*Accipiter badius*
	Falconidae	
22	Common Kestrel	*Falco tinnunculus*
	Ardeidae	
23	Little Egret	*Egretta garzetta*
24	Cattle Egret	*Bubulcus ibis*
25	Indian Pond Heron	*Ardeola grayii*
	PASSERIFORMES	
26	Brown Shrike	*Lanius cristatus*
27	Long-tailed Shrike	*Lanius schach*
28	Grey-backed Shrike	*Lanius tephronotus*
	Corvidae	
29	Rufous Treepie	*Dendrocitta vagabunda*
30	House Crow	*Corvus splendens*
31	Black-winged Cuckooshrike	*Coracina melaschistos*
32	Eurasian Golden Oriole	*Oriolus oriolus*
33	Black Drongo	*Dicrurus macrocercus*
34	Ashy Drongo	*Dicrurus leucophaeus*
35	Asian Paradise-flycatcher	*Terpsiphone paradisi*
	Muscicapidae	
36	Dark-throated Thrush	*Turdus ruficollis*
37	Red-throated Flycatcher	*Ficedula parva*
38	Grey-headed Canary Flycatcher	*Culicicapa ceylonensis*
39	Siberian Rubythroat	*Luscinia calliope*
40	Bluethroat	*Luscinia svecica*
41	Oriental Magpie Robin	*Copsychus saularis*
42	Hodgson's Redstart	*Phoenicurus hodgsoni*
43	Black Redstart	*Phoenicurus ochruros*
44	Common Stonechat	*Saxicola torquata*
45	Pied Bushchat	*Saxicola caprata*
	Sturnidae	
46	Asian Pied Starling	*Sturnus contra*
47	Common Myna	*Acridotheres tristis*
48	Jungle Myna	*Acridotheres fuscus*
	Paridae	
49	Great Tit	*Parus major*
	Hirundinidae	
50	Barn Swallow	*Hirundo rustica*
51	Red-rumped Swallow	*Hirundo daurica*

52	Nepal House Martin	*Delichon nipalensis*
	Pycnonotidae	
53	Red-vented Bulbul	*Pycnonotus cafer*
54	Black Bulbul	*Hypsipetes leucocephalus*
	Cisticolidae	
55	Zitting Cisticola	*Cisticola juncidis*
	Zosteropidae	
56	Oriental White-eye	*Zosterops palpebrosus*
	Sylviidae	
57	Blyth's Reed Warbler	*Acrocephalus dumetorum*
58	Thick-billed Warbler	*Acrocephalus aedon*
59	Common Tailorbird	*Orthotomus sutorius*
60	Common Chiffchaff	*Phylloscopus collybita*
61	Tickell's Leaf Warbler	*Phylloscopus affinis*
62	Hume's Warbler	*Phylloscopus humei*
	Nectariniidae	
63	Purple Sunbird	*Aethopyga gouldiae*
	Passeridae	
64	House Sparrow	*Passer domesticus*
65	Eurasian Tree Sparrow	*Passer montanus*
66	White Wagtail	*Motacilla alba*
67	White-browed Wagtail	*Motacilla maderaspatensis*
68	Grey Wagtail	*Motacilla cinerea*
69	Rosy Pipit	*Anthus roseatus*
70	Olive-backed Pipit	*Anthus hodgsoni*
71	Baya Weaver	*Ploceus philippinus*
72	Scaly-breasted Munia	*Lonchura punctulata*
73	Black-headed Munia	*Lonchura malacca*
	Fringillidae	
74	Yellow-breasted Greenfinch	*Carduelis spinoides*

喜馬拉雅自然學會計畫報告摘要

依據數年計畫資料，Himalayan Nature 於 2000 年設立，為非營利民間研究和保育團體，定期發表研究成果，提供環境相關經營管理建議給政府機構或民間團體參考。Himalayan Nature 由熟悉喜馬拉雅地區自然環境的國際知名學者專家組成。Himalayan Nature 總部在尼泊爾首都加德滿都，在 Chitwan、Koshi 和 Lumbini 設有研究中心。

Himalayan Nature 的專長包括生物多樣性研究、監測和評估、野生動物政策分析、保育生物學、觀光和生物多樣性保育、復育生態學。主要工作包括農業生物多樣性、草原、濕地和森林生態、以自然為主之生態旅遊和鄉村旅遊、社區生態系經營管理、永續發展、環境污染、環境影響評估和初步環境檢測。

Himalayan Nature 執行計畫之成果包括：

- 出版南亞第一本 Wild Mammals of Nepal 和 checklist of Lepidoptera of Nepal
- 出版 Conservation Tales
- 舉辦第一個入侵性外來種小花蔓澤蘭(*Mikania micrantha*)全國性研討會
- 協助尼泊爾修訂保育類動物名錄(經費由 Critical Ecosystem Partnership Fund 和 WWF Nepal 贊助)
- 進行鳥類遷徙調查研究(經費由濕地信託 Wetland Trust UK 和 Charles Sturt University 贊助)
- 進行穿山甲保育研究，並出版海報和小冊宣導(經費由 Rufford Small Grants Foundation, UK 贊助)

依據 2007 和 2008 年提出之報告，「Lumbini 地區農地鳥類保育計畫」執行期間為 2007 年 10 月至 2008 年 5 月，成果報告內容摘要如下：
本計畫目標包括：

一、 激發農民對農地鳥類之關愛
二、 邀請當地年輕人參與保育宣導工作
三、 進行農地鳥類監測工作
四、 保育農地鳥類

計畫成果摘要如下：

- 蒐集全球性受威脅物種和 Lumbini 地區農地鳥類資料，共記錄 318 種鳥類，並出版有史以來第 1 份英文版 Lumbini Important Bird Area 鳥類清單。

- 辦理研討會和說明會，與社區人士會談，進行保育教育和訓練。
- 辦理賞鳥活動和保育宣導活動。
- 建立受威脅鳥類守護隊，鼓勵當地居民擔任赤頸鶴(Sarus Crane)、禿鸛(Lesser Adjutant)和印度烏鵰(Indian Spotted Eagle)等的守護者。共守護 5 隻赤頸鶴、10 隻禿鸛和 1 隻印度烏鵰成功長出翅膀。
- 製作海報分發民眾及張貼在會議場所或學校，海報上有林務局名稱及 logo。海報名稱為「Save the farmland birds to support our livelihoods」，內容包括農地鳥類的生態和文化貢獻等訊息。
- 進行問卷調查，評估教育宣導活動、座談會和保育宣導品之成效。

「Lumbini 地區生態旅遊計畫」2009 年和 2010 年所提計畫及報告摘要如下：

本計畫主要是提倡以自然為基礎的生態觀光，Lumbini 地區是尼泊爾第 4 大觀光景點，每年約有 70,000 名觀光客到訪，但大部分只是短暫停留，附近農村沒有受益，這些觀光客若有留宿，通常也只留一晚，去參觀佛陀誕生地。沒有旅客到生物多樣性熱點(biodiversity hotspots)，體驗大自然之美。

Lumbini 為佛陀誕生地、世界襲產地(World Heritage Site)，也是生物多樣性豐富之地區，國際鳥盟(BirdLife International)也劃定 Lumbini Important Bird Area (IBA)之範圍。本地有 8 種鳥類面臨威脅，但 IBA 的保育策略和行動計畫都尚未擬定。本區有尼泊爾境內最知名的受威脅物種赤頸鶴(Sarus Crane, *Grus antigone*)族群，也是唯一正常繁殖之族群。位於 Lumbini 15 公里內，有潛力成為以自然為基礎的生態觀光地點包括：

- Gainda Tal：距離 Lumbini 13 公里，為尼泊爾最重要的濕地，湖泊有多種鳥類、哺乳類和爬蟲類。Sal 森林之野生動物豐富，也受到當地社區保護。
- Khadara Phanta：距離 Lumbini 7 公里，為尼泊爾私人管理的最大草原，許多鳥類、哺乳類和爬蟲類棲息其間。
- 農地和農村：前兩年計畫之執行，Himalayan Nature 對附近野生動物和文化景點已有所瞭解，有利推展本計畫。
- Suryapura 的鉗嘴鸛(Asian Openbill)築巢區：距離 Lumbini 15 公里，此地有 500 餘對鉗嘴鸛。將與當地居民共同執行計畫，培養村民對鉗嘴鸛的興趣，並進而推展物種保育工作。
- Lumbini：主要考古地點，將與上述地點建立連結。

本計畫之工作內容包括：

- 與重要生態景點地區居民及地主洽談推動生態觀光，得到正面回應。
- 實地調查並製作地圖，進行生物資源調查，包括爬蟲類、昆蟲、鳥類和哺乳類，找出可吸引遊客之重點。
- 推動復育工作，例如替涉禽建構人造濕地、提供鳥類和蝙蝠用巢箱等。並伺機進行野生動物救傷計畫，已拯救的動物包括陸龜和鉗嘴鸛(Asian openbill)。
- 邀請當地居民參與計畫之執行，辦理生態旅遊訓練班。
- 至各級學校推廣生態旅遊觀念。
- 設立指標牌和生物多樣性解說牌，並將出版各景點之生物多樣性資料小冊。
- 出版 Lumbini 生物多樣性熱點小冊(將於會場傳閱)，並分送給當地學校、青年社團、以及 Lumbini 地區和鄉鎮發展委員會。

2009 年贊助之「增進傳統知識和技巧以改善 Lumbini 居民生計及保育生物多樣性」計畫，目標、工作項目及執行進度報告摘要如下：

本計畫目標為：

一、 調查及記錄生物多樣性熱點附近居民傳統知識和生活形態。
二、 提倡傳統技巧，辦理傳統技藝訓練班，例如編織和手工藝等。
三、 提供市場通路，支持鄉鎮事業。
四、 教導村民永續採集自然資源之方法。

本計畫執行工作包括：

- 辦理數次互動活動，與居民面談，加強與村民之溝通聯繫，並與當地社團討論保留傳統文化之方法。
- 設立 5 個當地團體推動訓練計畫。並已設立 20 個婦女、學生、保育團體等。
- 調查居民日常運用之傳統知識和技巧。已於 Lumbini、Suryapura V.D.C.和 Bishnupura V.D.C.三地區進行問卷調查。
- 辦理訓練班，並教導使用當地非林木資源(Non-Timber Forest Products, NTFPs)永續採集之方法。已辦理婦女和青年編織班，訓練當地居民技能等。設計以當地素材製造產品，增加居民收入。
- 為當地工藝品找尋市場通路，改善人民生計，促進生態觀光業之發展。
- 訓練當地居民永續農業、水產養殖和捕魚之方法。

- 監測與評估計畫成效，發放宣導品。

2010 年所提「Lumbini 遊客對自然保育之認知計畫」未獲贊助。

2011 年所提「尼泊爾中部巴克塔布(Bhaktapur)社區森林(community forest)穿山甲保育計畫」，計畫內容及進度報告摘要如附：

亞洲有三種穿山甲，尼泊爾有兩種，分別為 Chinese pangolin (*Manis pentadactyla*)和 India pangolin (*Manis crassicaudata*)，兩種都是受威脅物種，受到尼泊爾國家公園和野生動物保育法(National Parks and Wildlife Conservation Act)之保護。也都列入華盛頓公約(CITES)附錄二。穿山甲在中國內部被大量獵捕，其他原產國之穿山甲也因醫藥用途輸出至中國大陸而面臨嚴重獵捕壓力。穿山甲族群過去 15 年來數量大減，穿山甲一代約 5 年，未來 15 年有可能以 50%比例降低。2010 年 IUCN 紅皮書(IUCN Red List of Threatened Species, 2010)將其列為 Endangered，CITES 2000 年要求禁止穿山甲國際貿易。

過去 3 年調查發現未受干擾之穿山甲棲息地，但未來仍有可能因興建道路、供水系統或鄉鎮發展計畫而受到影響。當地社區過去獵捕穿山甲，但態度已有所改變而有意願為穿山甲設立保護區。Sipadol Village Development Committee 的社區森林約有 50 隻穿山甲。

本計畫之目標如下：
一、穿山甲族群調查、分佈和確認合適棲息地。
二、維持當地穿山甲健康族群。
三、提升民眾認知，減少穿山甲面臨之威脅。
四、協助當地社區設立穿山甲保育區(Pangolin Conservation Area)。

本計畫工作項目包括：
一、族群數量調查、選定並劃定穿山甲保育區。
　將劃出穿山甲熱點(hotspots)地區。
二、設立穿山甲經營管理委員會。
　將提供野外調查技術訓練，預計召開 3 次季會。
三、進行訓練計畫。
　訓練內容包括穿山甲生態、棲地、足跡、紀錄 GPS 資料。
四、出版海報和小冊。
　預計出版 1,000 份海報和 500 份小冊，宣導保育穿山甲及其棲地之重要性。
五、教育宣導計畫。

教育宣導計畫將以當地語言推動，如講座、海報、宣導活動、廣播、網頁等。

六、廣播節目。

每兩週於 Bhaktapur FM 播出一次 10-15 分鐘保護穿山甲節目。

七、網站更新。

Himalayan Nature 網站設穿山甲專頁，並定期更新。

目前工作進度說明如附：

- 進行文獻回顧及野外調查。
- 已取得尼泊爾政府單位執行穿山甲計畫之許可，並將調查成果通報國家公園暨野生動物保留區部(Department of National Parks and Wildlife Reserve)相關生態學研究人員。
- 向掌管尼泊爾社區森林的林區管理處說明計畫執行細節，林區管理處同意提供協助。
- 代表林區管理處和巡山員召開計畫執行討論會，參加人員包括穿山甲棲地附近居民、學校校長和教師、社區森林主要使用者、婦女團體、青年團體、其他權益相關人士等。
- 贊助當地團體 Tauolchhap Community Forest User Group 進行培力計畫和加強保育穿山甲計畫。
- 設立穿山甲經營管理委員會(Pangolin Management Committee)，Himalayan Nature 的 Prativa Kaspal 被推選為委員。
- 出版 1,000 份保育穿山甲海報(有林務局 logo)。
- 2012 年 2 月 2 日，Himalayan Nature 與國家公園暨野生動物保留區部共同慶祝第 41 屆世界濕地日(World Wetland Day)和第 12 屆 Koshi Tapu 動物保留區賞鳥季(Bird Festival)，並發表保育穿山甲海報及其他保育教育出版品。
- 每週六於 Nepali ko Radio 播出一次 Samrakshan Chautari 節目 30 分鐘保護穿山甲節目，內容包括非法貿易、穿山甲研究人員專訪等。此為尼泊爾第一個以穿山甲為主題之廣播節目。為擴大宣導效果 Himalayan Nature 將此節目納入網站聯結中。
- 聯絡媒體報導非法貿易穿山甲議題。
- 2012 年 3 月進行穿山甲棲地調查。
- 2012 年 3-5 月進行穿山甲族群調查。
- 2012 年 5 月 15 日，小型哺乳類保育和研究基金會辦理年度 National Seminar 時，發表穿山甲計畫報告，並說明計畫由農委會林務局贊助。
- 設立網站提供尼泊爾穿山甲及其他相關資料。

A preliminary report to Community-based Conservation Initiative of Chinese Pangolin *Manis pentadactyla* in the community forests of Bhaktapur, Central Nepal



Chinese Pangolin with its baby

Submitted to

Forestry Bureau
Council of Agriculture
Taiwan

Submitted by

Prativa Kaspal, Dr Hem Sagar Baral, Sharad Kumar Singh
Himalayan Nature
12th Feb 2012

Executive Summary

Among the three species of pangolin found in Asia, two species are in Nepal and both are protected by national and international laws. Pangolins are considered to be unique and interesting mammals because of their appearance and habits. These animals also have significant cultural value in Hindu religion. Local perceive pangolin to hold magical powers and also is taken with great delicacy in Nepal. In spite of these, they have received very little scientific attention. Illegal forest exploitation and its trade due to lack of awareness in poverty-stricken rural communities and non-functional government are causing its survival in peril. The present study aims to help in restoring the natural habitats of the threatened Chinese Pangolin *Manis pentadactyla*. It aims to support and encourage the community aspiration to declare the community managed forests as pangolin conservation area (PCA) at local level. The proposed study area, Taudolchhap community forest and its adjoining forests of Sipadol of Bhaktapur forest is one of the prime habitats of this threatened species. It will record the present population of Chinese Pangolin along with measures to safeguard its habitat through the meaningful participation of local people via transferring scientific knowledge on pangolin to them, publication of visual educative materials on it and also help empowering them to ensure long-term survival of these threatened animals in their natural habitats.

Background

It is difficult to appreciate current rates of species loss unless we have some estimate of both the number of species alive today and their rates of decline. Environmental factors are viewed as a key to population persistence because they effect large and small population alike and nowadays many are human in origin. Such anthropogenic factors include habitat fragmentation, competition or predation by exotic species. Anthropogenic ally caused habitat loss and fragmentation are key problems affecting current populations and Meta Population Theory has been used to model population persistence in small, remnant pieces of habitat. As human population growth and resources are driving forces behind the biodiversity crisis, understanding the strategies by which people produce and limit offspring and the circumstances under which they overexploit resources is critical to the conservation agenda.

Trade in wildlife and wildlife products is one of the greatest drains on biological diversity. However, international laws such as the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) are in place to be regulated to control its trade. The conservation of endangered fauna and flora species is an important and controversial issue at national and international level. Despite the concerted efforts of the independent organizations, government agencies and private individuals, many species still face the prospect of extinction due to environmental degradation and the threat of illegal trade of wildlife and its related products.

Introduction

Pangolin belongs to genus Manis Linnaeus, 1758. It is derived from Malayan phrase 'Pen Gulling' meaning 'rolling ball', while the term Pholidota came from a Greek word meaning 'scaled animals'. It is known as Scaly Anteaters because of its structure and food habits. Having no teeth and an inability to chew, pangolin feeds mostly on ants and termites using its long tongue to catch them. It is nocturnal, usually seen solitary inhabiting inside the burrow or inside the tree hole where there is abundant ant and termites. There are three species of pangolin found in Asia. Among them two species are found in Nepal. They are Chinese pangolin, Manis pentadactyla, Indian pangolin Manis crassicaudata. Both species are threatened animals protected by National Parks and Wildlife Conservation Act, 1973. Internationally, it is enlisted in Appendix II of CITES. The species is heavily hunted inside of China, and is heavily hunted for export to China in other range states, primarily for medicinal purposes. The populations have been greatly reduced in the last 15 years (generation length estimated at 5 years), and decline suspected to continue over the next 15 years, at a rate of over 50%. The species is thus listed as Endangered in IUCN Red Data Book (IUCN Red List of Threatened Species, 2010). To protect the vulnerable species, parties to the Convention on International Trade in Endangered Species (CITES) called for a complete ban on international trade of pangolins in 2000. The present forest is the dominant home to Chinese Pangolin, Manis pentadactyla as revealed by regular three years of study on it in the particular area. Chinese Pangolin is a long-tailed, sticky-tongued tropical mammal. It is usually nocturnal, sleeping during the daytime in underground burrows. Its body is covered with large, flat, imbricated horny scales. It has long, narrow snouts, long tails, and sticky, ropelike tongue that it can thrust far out to catch the ants and termites on which it feeds. This placental mammal can roll themselves into tight balls and so heavily armored that few enemies can harm them. Generally, it is inoffensive, but when captured it may lash out with its scaled tails. It is much hunted for its meat, entertainment, medicinal purposes and also to sale it in high prices. As it is shy and looks for food only at night, it has been saved from extinction.

Objectives

To survey pangolin population, distribution and identify suitable habitats
To maintain a safe haven for pangolins and a viable population in the area
To raise public awareness to minimize threats on pangolins
To strengthen and support communities in setting up Pangolin Conservation Area (PCA) at local level

Rationale

Our previous study in the past years has shown the area is to be an undisturbed natural habitat of this threatened species till to days. However this may not be in the coming days because of growing land modification process for road construction, water supply system, town planning etc. To note, in 2009, four rescued live pangolins have been released in the area after ensuring its

habitat security, suitability and food availability. Local communities of the area who used to hunt pangolin are showing their changed attitude towards pangolin conservation of the native and reintroduced pangolins in the area. Communities including those hunter-turned conservationists are willing to declare the area as Pangolin Conservation Area (PCA) at local level. This crucial approach is an opportunity to work together in conserving pangolin habitats. Besides habitat loss pangolin populations have been threatened nowadays by illegal trade. For instance, seizure of two Chinese nationals with 46 kilograms of pangolin skin, confiscation of 1.5 kg pangolin scales in Sino/Nepal border, two Nepalese traders with a live pangolin etc within two months advocates the existing threats to the species. Lack of information on the whereabouts of rescued pangolins that were handed over to the government authorities has also prompted the local people to initiate conservation programmes to safeguard remaining pangolin populations. This proposed work will help in initiating this public stewardship towards setting up a safe site for pangolin. This conservation footprint on its success can be replicated to other pangolin range area of a country.

Methodology

Study area

Bhaktapur extends from latitudes N 26°36 to N 27°44 and longitudes E 85°21 to E 85°32. It covers an area of 138.46 square kilometre. In terms of area, it is the smallest district of Nepal. The study area lies within the community forests of Suryabinayak Range Post located at N 27° 38 to N 27°39 and E 85°25 to E 85°26 of Bhaktapur District within the Kathmandu Valley. It lies at the southern part of the Bhaktapur and is surrounded by three districts. To its eastern side, there is Kabhrepalanchok, to the west, there lies Kathmandu, Lalitpur, to the northern side there is Kathmandu and Kabhrepalanchok, and to the southern side, there is Lalitpur district. It is about 15km far from the main road, Araniko Highway. The community forest of Sipadol Village Development Committee is one of the most important pangolin habitats representing mid hill ecosystem with an altitude ranging from approximately1000 to over 2000m asl. This area is a home to more than 50 pangolins (Kaspal.2008).

Activities on the ground

As per the methodology, following works have been undertaken till to date:

i. Literature review

Literature survey on the research and advancement on this field are being collected and reference was made to work done by the team from Himalayan Nature in the area in 2008(Kaspal, P.2008) and 2010(Kaspal, P.2010). We are still compiling published and unpublished research reports, newsletters or any journals on pangolins.

ii. Permission from Social Welfare Council

Social Welfare Council (SWC) is the government organization formed to monitor I/NGO's in Nepal. It gives approval letter to run projects in Nepal after the commitment of funding from international organizations. As per our request for its permission to carry forward the study on pangolins, it has given its approval and we have then shared our work activities with the concerned ecologist, assistant ecologists of Department of National Parks and Wildlife Reserve.

iii. Coordination with District Forest Office:

All the community forests are under the supervision of different District Forest Offices of Nepal. Likewise, District Forest Office, Bhaktapur monitors and evaluates all the activities that are being run in the community forests. With due acknowledgement to Forestry Bureau, Taiwan, we highlighted our research objectives and methodologies with the district officer and staff. District Forest Office assured to help us in this work.

iv. Inception meeting:



Fig: Glimpses of the interaction program

On behalf of DFO representatives and rangers, we have conducted inception meetings with thepeople residing near the pangolin habitats, school headmasters an teachers, key personnel of community forestry users groups, women groups and the youths along with other stakeholders of the area.

v. Disbursal of cash to Taudolchaap Community Forest Users Group:

With due acknowledgement to Forestry Bureau, COA, Himalayan Nature has agreed to disburse a sum of 84,000(eighty four thousand only) to Tauolchhap Community Forest Users Group for enhancing local capacity and strengthening pangolin conservation activities in the area. Under the Program Green Employment organized by TCFUG, Professor Karan Bahadur Shah, Chair of

Himalayan Nature handed over a cheque of 42000 as the first installment. A team consisted of Chief technical Adviser, Dr Hem Sagar Baral, Mr Sharad Singh, Director and conservation officer of Himalayan Nature participated the program. Altogether there were 50 participants including the Local District Officer, Central representatives from Federation of Community Forestry Users Groups, Nepal (FECOFUN), District Forest Officer, Bhaktapur, Rangers and tourism entrepreneurs, local women group, principals and teachers and local people.



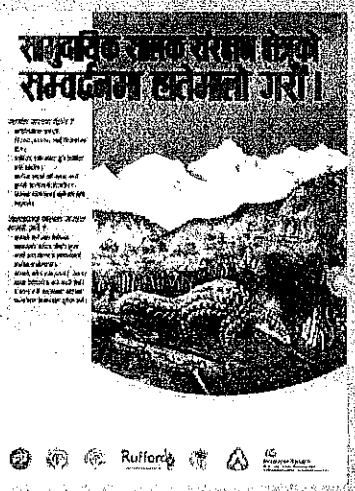
Fig: Cheque being handed over by Chairman Prof. Karan Shah to the president of TCFUG, Sipadol



Fig: Glimpse of the program

vi. Pangolin Management Committee formation

Local management committee was formed including marginalized tribes and women. Prativa Kaspal as a representative from Himalayan Nature has been nominated in this committee for a year. Statement of works, duties and responsibilities of committee members were agreed upon.



vii. Publication of Pangolin poster

Let's join hands to strengthen the first Community Conserved Pangolin Conservation Area.

One thousand copies of poster have been re-published with new title in simple Nepali language. The title pledges to join hands to strengthen the first Community Conserved Pangolin Conservation Area. Due to the wide appreciation and also due to limited budget we have re-published the poster. It gives some fundamental answer to the query why to conserve pangolin and some information has been stated for its conservation. All of the information is in Nepali Language to comply with the local readers. With acknowledgement to

Forestry Bureau, Taiwan, posters have been published with logo of Forestry Bureau, COA with some supporting conservation partners.

vii. Inauguration of Pangolin Poster

Department of National Parks and Wildlife Conservation and Himalayan Nature as one of its conservation partners celebrated 41st World Wetland Day and 12th Bird Festival in Koshi Tapu Wildlife Reserve (KTWR) on 2nd February 2012. KTWR is the first Ramsar site of international significance. Altogether there are nine Ramsar sites in Nepal.This year, the slogan of the wetland day was 'Wetlands Tourism: a Great Experience'.

Honorable Minister Mr. Nadan Kumar Datta, Ministry of Agriculture and Cooperatives and other chief guests of the wetland day celebration programme, released our pangolin poster along with other publications on conservation education. We will soon be distributing these posters during our education outreach activities in the study areas and other pangolin range areas of Nepal.



Fig: Pangolin poster being launched



Fig: Wetland poster of this year being launched

viii. Radio programme

Radio programme entitled "Samrakshan Chautari" has already been broadcasted from Nepali ko Radio for 30 minutes on every Saturday of a week at 9:30am to 10:00am. It highlighted the various life histories, ecological services and its importance to human beings and so on. Notably, an episode on its silent illegal trade has been screened. Interview with pangolin researchers has been taken and many key personals working on conservation area have nominated for this interview session. This radio program is the first such radio program being exclusively dedicated to pangolin conservation and gaining appreciation for this new initiative in Nepal. It will be in operation till 9 months. Needless to say, this has provided an additional exposure. We have provided a link to listen this program from our website www.himalayannature.org.

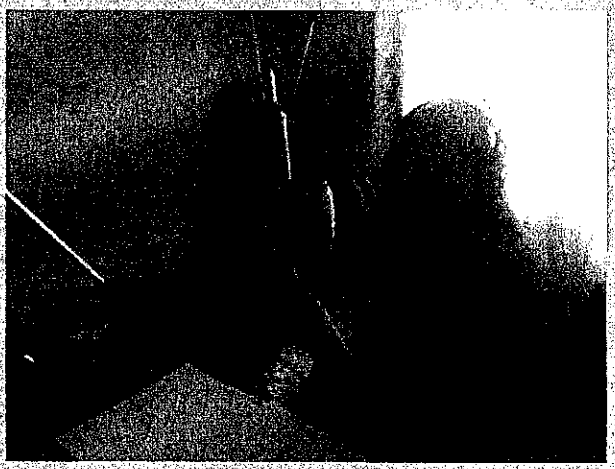


Fig: Programme being broadcasted

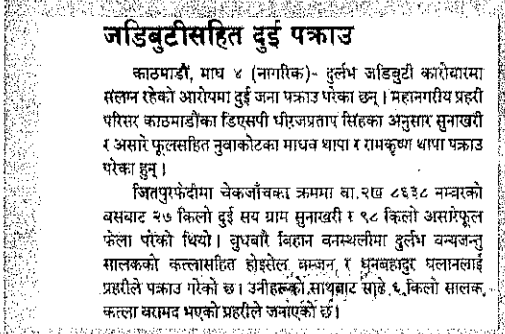
Some media coverages on pangolin's illegal trade in Nepal



22nd January 2012, Kantipur

सालकको अवैध तस्करी

धेरै थाँचिले सालक मारेर खाडा बिक्री गर्ने अभ्यासप्रति चासो बढ्दो छ



जडिबुटीसहित दुई पक्राउ

काठमाडौं, माघ ४ (नागरिक)- दुर्लभ जडिबुटी कारोबारमा संलग्न रहेको आरोपमा दुई जना पक्राउ परेका छन्। महानगरीय प्रहरी परिसर काठमाडौंका डिएसपी धीरजप्रताप सिंहका अनुसार सुनाखरी र असारे फूलसहित नुवाकोटका माधव थापा र रामकृष्ण थापा पक्राउ परेका हुन्।

जितपुरफेदीमा चेकजाँचका क्रममा वा.२ख ८६३८ नम्बरको बसबाट २७ किलो दुई सय ग्राम सुनाखरी र ९८ किलो असारेफूल फेला परेको थियो। बुधबार बिहान वनस्थलीमा दुर्लभ वन्यजन्तु सालकको कत्लासहित होइसेल, लम्जन, र धनबहादुर घलानलाई प्रहरीले पक्राउ गरेको छ। उनीहरूको साथबाट साढे ९ किलो सालक, कत्ला बरामद भएको प्रहरीले जनाएको छ।

For more details please visit **www.himalayannature.org.**

Thank you so much.

2nd preliminary report to Community-based Conservation Initiative of Chinese Pangolin *Manis pentadactyla* in the community forests of Bhaktapur, Central Nepal



An art of Chinese Pangolin with its habitat

Submitted to
Forestry Bureau
Council of Agriculture
Taiwan

Submitted by
Prativa Kaspal, Hem Sagar Baral, Sharad Kumar Singh
Himalayan Nature
June 2012

Activities undertaken

Anatomical study of the dead Chinese Pangolin in Natural History Museum

On 1st March 2012, a dead Pangolin was handed over to Kathmandu District Forest Office by local people of Sitapila, Kathmandu. For further investigation and to preserve it through taxidermy, it was then given to Natural History Museum. Upon invitation, we got a chance to study the morphological and anatomical characteristics of the dead pangolin. First of all, species identification was done by its body features and counting its. By the presence of15 overlapping scales around the body and its dark colour, it was a fully grown male Chinese Pangolin weighing 7.8 kg. It possessed distinct root hairs and which varied from 3 to 8 in number.

Morphological features

Body length except tail= 98cm
Tail length=38.5 cm
Girth= 52cm
Length of the longest nail (middle) =7 cm
Height=27cm
Length of the tongue = 50 cm

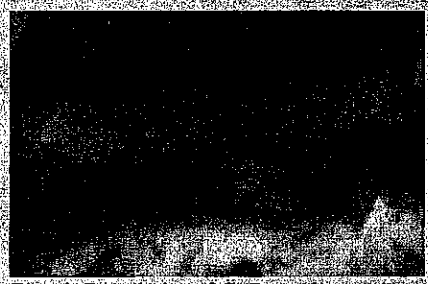


Fig: i. Root hairs of C. Pangolin



Fig: ii. A long sticky tongue

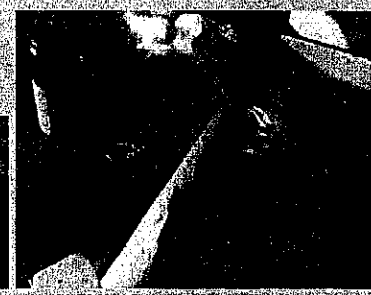


Fig: iii. Internal visceral parts

Reconnaissance survey

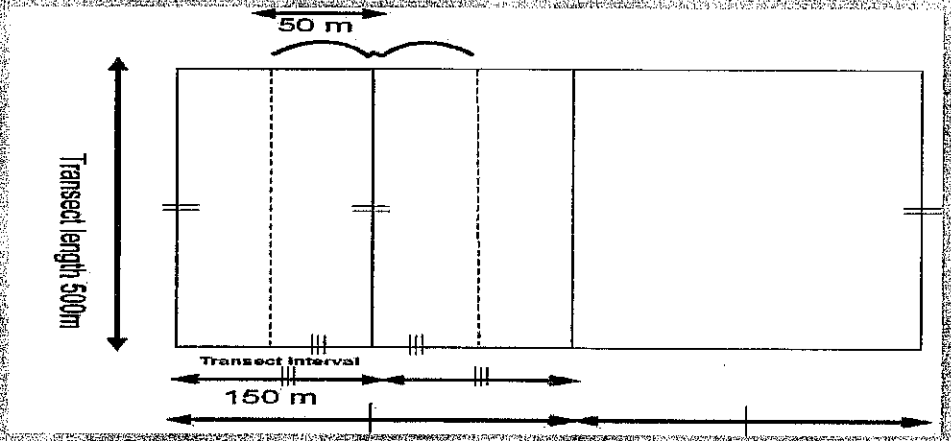
A reconnaissance survey was made from 5 th to 10 th March to identify the overall habitat of pangolin in the area. During the survey, we found variations in the soil type and in the vegetation type corresponding to variation in altitude.

Preparation and printing of survey form

Before heading to the field for survey, simple user friendly forms were prepared to list all the findings in a systematic way. They were distributed to the team members to record the information during the survey period. Please refer Annex I

Field Survey

Actual survey was carried out in and adjoining Taudolchaap community Forest from 25 th March to 8 th May 2012. Due to irregular topography of the area, only one block of 500 *500 m was possible. In a block, two transect each of 500m long were laid within an interval of 150m. The width was taken as 100m i.e each 50 m at both side of each transect. In those places where there blocks were not possible, we used line transect method to search for direct and indirect signs of the rare and shy pangolin i9n the area. Due to nocturnal behaviour, it was very difficult to sight live one in the day time.



Survey design

Survey team was led by Prativa Kaspal of Himalayan Nature. Prior to the survey, small meeting was set to discuss the survey plan with the team members. A team was formed including local interested youth, women, member of Pangolin Management Committee and the representative from District Forest Office, Bhaktapur. Although we did not find a live one, we found some fresh evidences of its presence such as droppings, 3 to 5 lined scratches, footprints and freshly dug burrows. We found a total of 184 burrows including new/ fresh and old.





Fig. 1, 2, 3 Recording GPS data during the field surveys




Fig: 4, 5. Burrows of pangolin observed in the field



Fig: 6. Scat / dropping of Pangolin

Pangolin project presentation on 3rd National Seminar on Small mammals Issues

Himalayan Nature presented a paper presentation on the ongoing pangolin project in the annual National Seminar on 15th May 2012 organized by Small Mammals Conservation and Research Foundation. We acknowledged the Forestry Bureau, Council of Agriculture, Taiwan for funding this project.

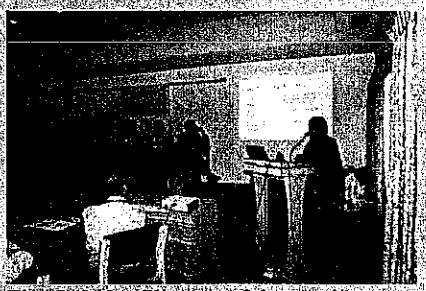




Fig: 7, 8, 9. Glimpse of the seminar

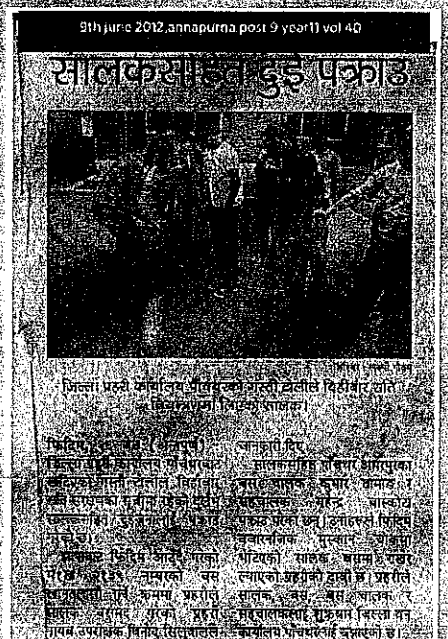
Website updates

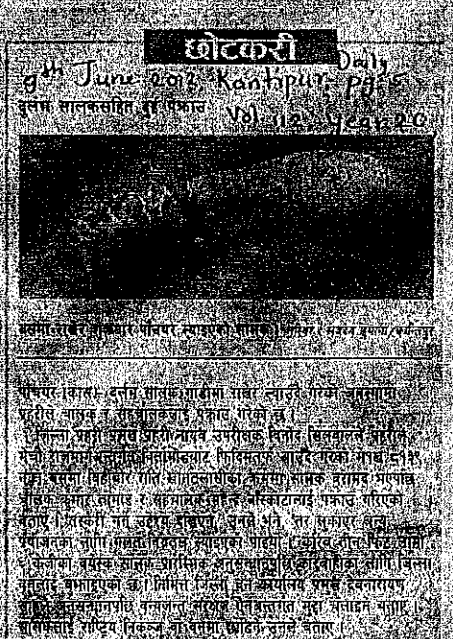
Separate website page has been designed to disseminate information on pangolin and its related issues in Nepal. Information has been updated regularly on the website address of Himalayan Nature. For detail please log on http://www.himalayannature.org/pangolin%20page.htm



Fig: 10 A sample of the webpage

Media coverage on illegal trade of Pangolins in Nepal





Annex I

Himalayan Nature

Details of burrows

Date:- **Time:-**

Burrows			Depth (cm)	Diameter (cm)	Elev. (m)	Slope	Latitude (N)	Longitude (E)	Habitat	Remarks
o.	new	old								

Thank you so much.

泰國保育團體大象保育聯絡網計畫報告摘要

泰國保育團體大象保育聯絡網(Elephant Conservation Network, ECN)所提計畫，執行情形如下：

ECN於1999至2002年間，進行2次大象族群調查，2005至2010年執行之計畫包括：

- 降低人象衝突計畫，由英國環境、食物和鄉村事物部達爾文計畫(Department for Environment, Food and Rural Affairs, DEFRA-Darwin Initiative)贊助。
- 廊道森林調查(Corridor forest survey)，由日本Keidanren Nature Conservation Fund贊助經費，此計畫主要調查大象使用地區，選出合適之廊道地區，泰國環境部依據計畫建議設立廊道，國會也同意於2008年9月生效。
- Salakpra森林調查，由美國魚類暨野生動物署(US Fish and Wildlife Service, USFWS)贊助。
- Salakpra大象生態系保育聯盟替代生計計畫。
- 保護森林巡邏計畫(由USFWS贊助)。

泰國西部 Salakpra 野生動物保護區森林復育計畫，計畫內容及成果摘要如下：

本計畫全名為 Community-based forest restoration for local people and Asian elephants in and around the Salakpra Wildlife Sanctuary, Kanchanaburi, West Thailand，計畫執行地點為泰國西部 Salakpra 野生動物保護區及附近地區。長程目標為促進以社區為基礎之森林復育計畫，提供知識、技術和方法予當地居民，以推動未來對人民、大象和其他野生動物以及國家均有利之森林復育計畫。計畫宗旨為建立知識基礎，發展當地技術，以利未來在 Salakpra 野生動物保護區內和附近土地惡化地區，推動大象森林棲地復育計畫。

本計畫目標如下：

一、強化當地社區執行森林復育計畫之能力。

二、設立以社區為基礎之本土森林物種苗圃。

三、蒐集 Salakpra 森林物種組成資料。

四、找出採集種子之最佳時機及處理方式，以加速種子萌芽和樹苗成長率。

五、邀集當地居民參與森林復育計畫及保護區監測計畫。

六、將計畫成果呈現給當地相關人士，鼓勵民眾參與森林復育計畫。

依據2008年至2010年計畫資料，Elephant Conservation Network與泰國自然資源和環境部(Ministry of Natural Resources and Environment)自然保育處(Department of Nature Conservation)合作執行本計畫，計畫核准號碼為Ref. No. NRCT 70/19。ECN並與倫敦動物協會(Zoological Society of London, ZSL)建立夥伴關係，以接受英國政府之經費支持。本計畫之執行由ECN與清邁大學(Chiang Mai University, CMU)森林研究暨復育小組(Forest Research & Restoration Unit, FRRU)共同執行，2008年至2010年，ECN均有提供泰國國家公園暨動植物保育部(Department of National Park, Wildlife and Plant Conservation Department)、Salakpra Wildlife Sanctuary或當地社區之支持計畫信函。

ECN Jittin Ritthirat (development scientist and manager)於2009年5月13日獲頒Whitley Award。Whitley Award由Whitley Fund for Nature (WFN)設立，主要獎勵現場保育工作者所推動之對野生動物保育和當地社區都有獲益之計畫，Jittin Ritthirat努力減緩大象和農村之衝突，並與當地社區共同復育泰國最早設立之野生動物保護區。

Salakpra Wildlife Sanctuary設立於1965年，是泰國第1個野生動物保護區。當初是為了保護鄰近曼谷的大批哺乳類動物。Salakpra Wildlife Sanctuary內大象族群約佔全泰國之20%。為確保大象之持續生存及減少人象衝突，有必要協助當地社區復育保護區及周邊地區被破壞之林地，以利大象和其他野生動物之生存，同時讓社區民眾可於森林中取得非林木的森林副產品。

計畫短期和長期受益者如下：

當地社區和居民

- 學習森林復育知識和技術。
- 社區相關人士參與Salakpra Wildlife Sanctuary保育工作。
- 提供當地居民，協助保育森林之意願及機會。

大象

- 在Salakpra Wildlife Sanctuary中之棲息地面積增加。
- 當地社區參與森林生態系復育工作有助大象之生存。
- 當地居民之參與，無形中提升環境認知，有利大象保育工作。

Salakpra Wildlife Sanctuary

- 復育被破壞之森林，而後進行生態系復育。
- 因環境觀念之提升，降低非永續利用森林之威脅。
- 建立合作關係，改善保護區和當地社區之關係。

泰國

- 有助於生物多樣性公約、氣候變遷和生物多樣性行動計畫。
- 減少人象衝突。
- 更多當地民眾參與森林或保護區之保育工作。

2008年之規畫活動包括：

- 與當地居民一起規劃苗圃之設立，及復育示範區。
- 與清邁大學合作，選出當地相關人士10人，提供森林復育技術訓練。
- 清邁大學針對ECN工作人員和社區民眾，辦理2次訓練班。
- 調查當地森林物種。
- 建立生物氣候學(Phenology)資料，針對當地50種樹種蒐集9個月資料。
- 設立苗圃並建立經營管理系統。
- 針對20種樹種，蒐集發芽和樹苗生長資料9個月。

2008 年成果包括：

- 2008 年 6 月，ENC 工作人員與荷蘭保育團體帶大象回家(Bring The Elephants Home, BTEH)洽談，爭取到 BTEH 之支持，並提供經費贊助本計畫。
- 2008 年 6 月於清邁附近 Doi Suthep National Park 內的 Hmong hill tribe village 辦理 3 次植樹活動。
- 2008 年 8 月 16 日在保護區內辦理植樹活動，於 6 塊土地種植 3,200 棵樹苗(13 種樹)。
- 於 2008 年 8 月 27 日和 10 月 3 日，於 Kaeng Plakod 召開計畫說明會。
- 於 2008 年 9 月開始監測保護區內樹苗生長率，共測量 3,000 餘株。
- 派學員赴清邁參與訓練課程前，ENC 於 2008 年 9 月 15 和 19 日，先辦理 2 次種子萌芽過程簡介課程，對象分別為當地社區和保護區工作人員。
- ENC 於 2008 年 9 月 29-30 日，在保護區內進行樹種調查，為設立生物氣候學步道蒐集資料。
- 2008 年 10 月 12-17 日，13 名計畫參與者至清邁大學(Chiang Mai University, CMU)森林復育研究單位(Forest Research & Restoration Unit, FRRU)參加密集訓練課程，之後社區和保護區工作人員開始推動苗圃設立工作。
- 設立 2 處苗圃，1 處在 Kaeng Plakod 社區森林中，1 處在保護區內的 Huai Sadong Guard Station。

- 於2008年10月22-30日和2009年3月進行2次本土森林樹種資源調查。
- 2008年10月22-30日，設立2條生物氣候學步道，一條位於保護區邊界的Kaeng Plakod社區森林中，另一條步道在保護區中。300棵樹(約50種)將予以標記，日後將持續蒐集資料並納入資料庫。以利後續種子生產和森林復育工作之參考。
- 苗圃設立後，於2008年12月15-21日和2009年2月17-20日辦理2次現場訓練課程。

2009年計畫目標如下：

- 進一步訓練當地居民執行森林復育工作。
- 繼續蒐集Salakpra Wildlife Sanctuary內樹種鑑定和生物氣候學資料。
- 找出採集種子的最佳時機及處理方式，以加速種子萌芽和幼苗生長率。
- 經營管理已設立之苗圃，推動第2個社區苗圃之設立。
- 將計畫初步成果呈現給各界相關人士，鼓勵更多人參與森林復育計畫。
- 與社區居民共同規劃，於當地設立森林復育區。

2009年計畫成果摘要如下，報告內有我駐泰國代表處赴計畫執行地區訪視照片。

- 2009年10月，苗圃的竹圍籬改為細鐵絲網圍欄(chicken wire)，可改善通風狀況，以及保護萌芽的種子被老鼠或松鼠啃食。塑膠屋頂改為磁磚，以承受豪雨及提供更多遮陰處。苗圃地面鋪上塑膠布，防除雜草和白蟻。後來證實塑膠布比以前使用化學藥劑和鹽有效。
- 2009年5月至10月，進行7次生物氣候學調查，另鑑定23種新樹種及採集種子，目前保護區樹種因而增加到58種。
- 進行48種樹種之種子處理、種子萌芽和生長率實驗，計15,653株樹苗。
- 2009年9月29日至10月2日，辦理訓練班，主要課程為資料分析、經營管理、森林復育及全球暖化等。
- 2009年6月5日於Kaeng Plakod社區森林，辦理植樹活動，共種植2,325棵樹苗(15種)，協助的270位志工包括當地政府機關人員、當地領袖人物、當地駐軍，以及保護區、防火隊和區辦公室人員。3週後監測存活率及除草，僅發現一株樹苗死亡。之後每6個月監測和除草一次，雨季時則除草3次。

- 2009 年 9 月開始進行資料分析，之後每週分析。分析結果將協助訂出採集種子時間和比較不同樹種之成長率。這兩項資料將決定 Kanchanaburi 森林復育計畫將選用哪些物種。
- 苗圃計畫主持人每月撰寫進度報告，每週檢視工作計畫和執行進度。苗圃員工每月填寫報表，每日填寫工作日誌。
- 2009 年 6 月 16 日於 Salakpra 保護區內，辦理植樹活動，約共種植 10,000 棵樹苗，參加人員 280 人，包括當地大學生、村民、觀光客志工、軍人、社區領袖和巡山員。4 週後進行第 1 次除草。(本活動 BTEH 有提供經費支援)。
- 2009 年 7 月 12 日，ENC 協助 Salakpra 野生動物保護區於村廟附近被破壞的公有地辦理植樹活動，種植 1,000 棵樹苗，參加人員有村民當地、巡山員和曼谷來的志工。
- 至苗圃訪視者包括：2009 年 7 月 17 日 Chong Sadao 地區議員；8 月 24 日泰國南部 Suratthani 省社區領袖；7 月 21 日法國電視台拍攝 ENC 降低人象衝突計畫工作情形。
- ECN 適時辦理宣導，展示森林復育海報。例如 ECN 森林復育團隊受邀參加 Pong Pad 村之最佳年度鄉鎮頒獎典禮，以及「植 9 百萬棵樹」活動時。
- ECN 苗圃和森林復育研究展現成果後，更多單位加入支持行列。例如附近的 Tha Thung 水庫和防火隊提供土壤和有機肥料；曼谷一家公司提供塑膠布改善苗圃設施；植樹時軍隊派員協助挖洞；有機農場教育中心教導 ECN 人員如何製造有機肥料。
- ECN 苗圃免費提供 1,214 株樹苗給當地社區和機關團體。

本計畫為3年計畫，2010年為第3年，計畫工作重點包括：

- 與社區居民共同規劃，增設2處森林復育示範區，預計一處設在保護區內，一處在社區森林。
- 辦理訓練班，提升計畫執行能力。訓練項目包括資料分析、實驗監測和植株存活率監測等。
- 繼續進行本土物種調查。
- 繼續蒐集生物氣候學資料，將監測物種由50種增至75種。
- 苗圃經營管理部分，將持續進行研究，提供示範區植株及推動教育宣導計畫。
- 萌芽和樹苗生長資料，將由每月蒐集50種樹種擴充至75種。
- 至少辦理3次教育宣導活動。
- 編纂「如何復育泰國西部森林技術手冊」，並於研討會發表。

2010 年計畫報告摘要如下：

- 持續種子處理、種子萌芽和生長率實驗，約 20,000 株樹苗。
- 進行本土樹種調查，共鑑定 195 棵樹(46 種)。
- 2010 年 5 月至 10 月，進行 10 次生物氣候學調查及採集種子。
- 監測並維護 2009 年栽植區，其中 8 個樹種之存活率為 65-80%，5 個樹種之存活率為 25-40%。
- 規劃和維護 2010 年栽植區，6 月種植 500 顆樹苗(25 種)，7 月種植 7,000 顆樹苗(40 種)。
- 2010 年 5 月 12-14 日和 2010 年 7 月 9-11 日，辦理密集訓練班。
- 2010 年 6 月進行鳥類調查。
- 2010 年 7 月捐贈 2,000 餘株樹苗給 2 所學校和 1 個鄉鎮。8 月捐贈 3,880 餘株樹苗給 3 個社區。
- 為建立和當地社區之良好關係，2010 年 6 月 24 日本計畫團隊參加社區所辦理之垃圾移除活動。
- 於 Salakpra 保護區內辦理植樹活動。本活動由荷蘭保育團體 BTEH 贊助。
- 2010 年 4 月製作數種海報宣導大象保育和減緩人象衝突議題。
- 2010 年 12 月 24-26 日，FORRU 和 ECN 於位於曼谷之自然保育部(Department of Nature Conservation)辦理野生動物保護展。

2011年計畫預計工作重點包括：

- 辦理4次分區會議，說明氣候變遷及森林之緩衝功能，當地或非當地社區森林收入來源，如出售非林木森林副產品或苗木，以及REDD方案(由富國協助窮國保護其森林，並取得碳減量信用額度)等。並選出社區代表至森林復育示範區觀摩。
- 針對有意願的鄉鎮(預計有5-6個)，運用衛星影像、空照圖、GIS等製作土地利用圖，召開2-3次研討會，加入土地所有權資料、選出公有地中之社區森林和可能成為社區森林地點、草擬訓練和執行行動計畫。
- 辦理社區森林行動計畫訓練班。廣邀其他團體、政府機構、私人企業參與。
- 安排社區代表參加泰國社區林業網絡(Community Forestry Network, CFN)全國會議和地區會議。邀請CFN代表參加社區會議及研討會，促成計畫合作或將計畫地區納入REDD方案。
- FORRU持續進行苗圃相關研究計畫，如種子和植株成長實驗、生物氣候學調查、樹苗存活率等，並訓練當地居民。
- FORRU和森林與人中心(Centre for People and Forests, CPF)團隊將建立系統，監測社區森林栽植進度和碳補償(carbon offset)效果。

2011 年計畫報告摘要如下：

- 2011 年 8 月 25 日和 10 月 15-16 日，辦理研討會，會後 22 位當地農民和 22 個社區領導人發展出森林聯合經營管理計畫。
- 2011 年 4 月 18 日辦理 GIS、讀圖和森林評估訓練班。
- 2011 年 4 月 22 日、4 月 24 日和 8 月 6 日針對不同地區進行森林利用評估調查。分別製作森林資源圖和森林利用區域圖。
- 2011 年 7 月 26 日召集 7 個社區討論森林聯合經營管理計畫。
- 2011年3月22日、5月1日、7月27日、8月11日、9月16日和9月23日分別於不同社區召開會議討論發展永續森林聯合經營管理、社區利用區和保護區疆界、社區林業、森林復育等議題。
- 2011年6月6-7日和7月26日辦理學習之旅，觀摩其他社區永續森林聯合經營管理情形和學習如何種植各種不同竹子。

Project Report to Taiwan Forestry Bureau
February 2012

Elephant Conservation Network

Communities & Climate Change: Facilitating the Restoration of Community Woodlands around the Salakpra Wildlife Sanctuary



part of the

Salakpra Elephant Conservation Project
Kanchanaburi Province
West Thailand

Taiwan Forestry Bureau

Report for Mar 2011-Feb 2012

1. Project Name

Communities & Climate Change: Facilitating the restoration of community woodlands around Salakpra Wildlife Sanctuary

2. Organisations

2.1 Applicant organisation:
Elephant Conservation Network (ECN)

2.2 Support organisations in Thailand
Centre for People and Forests (RECOFTC)
Salakpra Wildlife Sanctuary, Dept. National Parks, Plant & Wildlife Conservation

3. Project aim and objectives

Aim: Raise awareness of, and mitigate, the impacts of climate change on rural Kanchanaburi communities by developing an education and training programme in community forest restoration.

Objectives:

a) Raise awareness among villagers, community leaders and local officials of the likely impacts of climate change and the opportunities for mitigation through forest restoration.

b) Map degraded community and conservation forest in target areas in sand around southern WEFCOM in Kanchanaburi Province, and identify priority areas for collaborative restoration.

c) Facilitate the restoration of priority areas of degraded forest land by training and mobilizing schools, local communities, GOs, NGOs and private sector organisations.

d) Maintain the community-based model nursery and forest restoration plots in Kaeng Plakod village to demonstrate best practice and to serve as a training centre.

e) Monitor and evaluate the efficacy of the planting projects facilitated under this initiative in order to provide a measure of their economic and ecological impact.

4. Summary of project progress

***Obj.1: Raising awareness*:** Activities under this objective are done with the Regional Community Forestry Training Centre (known as the Centre for People & Forests).

- Activity: Valuing the forest ecosystem: learning how the forest ecosystem works and the services it provides
  - 1st workshop (25 Aug) with 37 people (18 community leaders, 19 farmers). Two presentations focused on impacts of forest degradation/ climate change.
  - 2nd workshop (15-16 Oct): involving the same participants, as well as three other farmers and four more local leaders who had become interested.

Outcome: As a result of these workshops, 22 local farmers and 22 community leaders and local leaders were keen to develop a forest joint management protection scheme to avoid losing ecosystem services and to qualify for carbon credit schemes if they become available. These villagers are now aware of the:

- The impact of forest users on the ecosystem
- The negative impacts of ecosystem damage
- risk to livelihoods from climate change
- value of Salakpra for ecosystem services

Obj. 2: Mapping degraded community & conservation forest:

- Activity: Assess forest status & map Tha Sanun village forest use zones
  - Training workshop (18 April 11): Technical training in use of GPS & maps for participatory forest assessments in Ban Tha Kradan. 25 participants from Song Pinong, Samsui and Thungna villages, plus community leaders from Thakradan and Thasanun. Learned map reading, GPS use, forest assessment techniques.
  - Forest use assessment survey (22 Apr 11): one survey in Thakradan (21 people), one in Salakpra near Mongkratae (15pp). Mapped forest resources.
  - Forest use assessment survey (24 Apr 11): in 4 villages in Nong Ped sub-district: Koh Buk, Song Pinong, Samsui & ThungNa. Survey in Salakpra by 48 villagers. Map of forest use zones produced
  - Meeting in Thasanun (26 Jul 11) with 7 community committee members to plan the joint forest management scheme and to discuss electric fence maintenance.
  - Forest use assessment survey in Thasanun village (6 Aug11) with 88 villagers and 4 ECN staff.
- Outcome: a database has been established, the results of the forest assessment surveys have been analysed, joint forest management agreements have been drafted and widely discussed.

Obj.3: Facilitate forest restoration: The conservation impact of this community scheme is also assessed from data collected by Salakpra's Smart Patrol teams.

- Activity: Use forest assessment survey data to design a community conservation & sustainable use monitoring system.

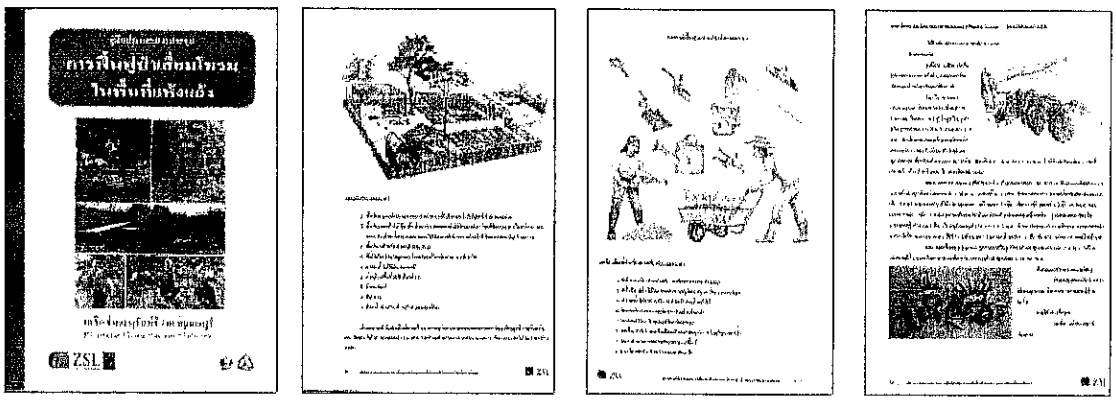
- 22 Mar 11: Organised a meeting in Thakradan village on "Developing sustainable joint forest management". Attended by 55 villagers.
- 1 May 11: Findings shared at meeting in Koh Buk with 45 community leaders, joint forest management agreement drafted.
- 27Jul 11: Meeting with community leaders and Salakpra officers to agree legal boundaries of community use zones in the conservation area.
- 11 Aug 11: Thakradan & Thasanun villages visited by a joint forest management team from the Philippines to discuss community forest projects.
- 16 Sep11: Meeting in Thasanun to discuss draft joint forest management agreement. Agree forest must be restored before sustainable harvesting can be managed.
- 23 Sep11: Meeting in Thakradan village: committee of 14 people established, work-plan agreed to mark the community woodland boundaries and draft a joing forest management agreement in October.

- Activity: study trips: to another, long-established community forest in a province north of Kanchanaburi, and to a nearby bamboo cultivation research centre.
  - 6-7 Jun 11: Study trip to Hui Hin Dum, Suphanburi province, to see how villagers there implement joint forest management. 12 participants from three villages: Thasanun, Thakradan, Songpinong.
  - 26 July 11: study trip to bamboo production research centre on the eastern side of Kanchanaburi province to learn about cultivating different kinds of bamboo.

- Outcome: participant communities are aware of potential strengths and weaknesses of community forestry schemes having visited, and been visited by, villagers with many years of experience. Participants also aware of the potential benefits of cultivating bamboo on community land rather than harvesting from the conservation area. These communities are now actively engaged in revising and implementing their joint forest management plans.

Obj. 4: Maintain model nursery & demonstration plots:

- Activity: the village and ECN staff at our community-based research nursery at Kaeng Plakod continue to produce indigenous tree species, especially the rare ones, while also monitoring the phenology of trees along the forest trail each month and the survival of saplings in the three demonstration plots. The team also trains other villagers how to establish nurseries, germinate seeds and plant out saplings so as to maximize their chances of survival. This forest restoration team has also helped villagers carry out their own forest surveys in the community use zones.



The cover and 4-pages of ECN's draft manual on 'How to Restore Indigenous Forest in west Thailand. Pages shown here are how to lay out and build an effective nursery, how to prepare soil, and how to identify a *takor naam* (*Sisyrolepsis muricata)* tree.

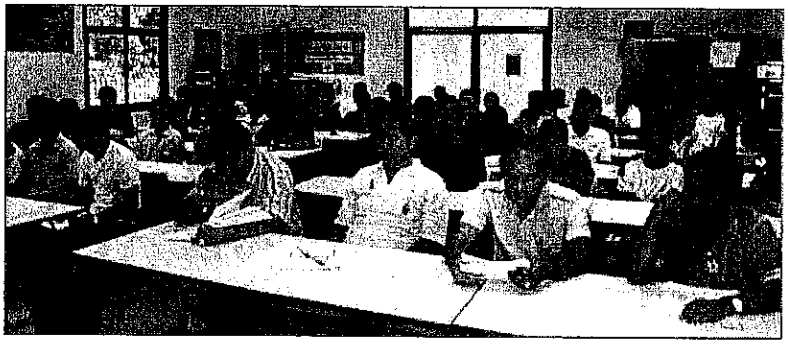
Obj.5: Monitor & evaluate efficacy of planting projects:

ECN's forest restoration research unit (FORRU) continues to monitor the demonstration plots in the community forest of Kaeng Plakod village planted with saplings in 2009-2010-2011.Key findings about survival rates after one, two and three years will be added to updated versions of this manual in due time.

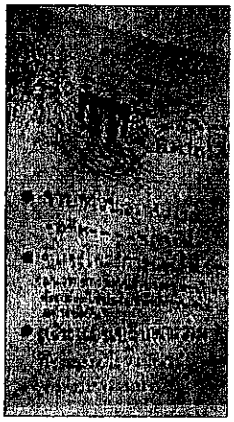
The efficacy of the community forest monitoring and restoration initiated by this Communities and Climate Change project is also being monitored, but we have no significant evaluation to date other than to say that the activities described here have been enthusiastically undertaken.

Some Project Photos

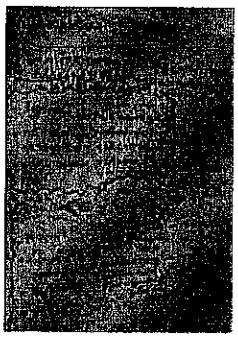
a) Forest & Climate Change awareness meetings



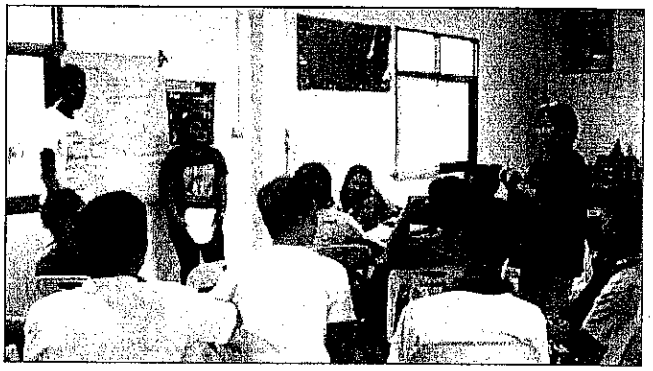




Two climate change awareness workshops, with talks and break-out groups to record known environmental changes in the community areas.



Below: a community leader adds a comment to the list of impacts



Khun Somying Soon tornwong (above right), director of the RECOFTC Thailand-programme joined our first climate change awareness workshop as well as the study trip to the Huai Hin Dam community.







The climate change awareness workshops were as interactive as they were informative, with villagers listening to one or more speakers and then applying what they learned to their own natural environment, collectively drawing up lists of observed changes that may be attributable to climate change as well as potential mitigation actions



b) Training in forest mapping and assessments



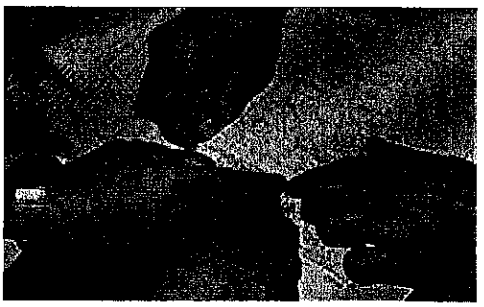




The 1-day community training in mapping and assessing forest quality and diversity began with a talk on the aim of the surveys, and was followed by practical training in using GPS units and recording data. After that, participants had to turn their data into maps and records. This training was done only days before the survey itself, so that villagers would recall what they had learned.









Participant villagers report finding this way of looking at, and thinking about, their local environment highly insightful, making them aware of changes they had noticed individually but had not thought to compile into a single body of information as a community, combining what they know.

c) Study trips





Study trip Huai Hin Dam sub-district where villagers manage their well-established community forests very effectively.



These informal meetings were highly participatory and practical, and lasted well into the night, with delicious, friendly meals.

During the day, the visiting team was taken by their hosts to see their community forests – every activity prompted a lot of questions.







A session on growing bamboo on a village's public land so that it can be harvested sustainably



d) Forest mapping and assessments

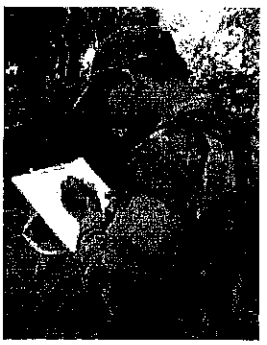



Two teams set off to survey the community use zones Inside Salakpra in the Nong Ped and Mong Mratae village areas.




Villagers use red tape to mark out the randomly identified 2m + 10m survey plots, here in ruak (left) and naam bamboo areas



Village record the data collected by other community members in each plot, using standard, pre-prepared forms.



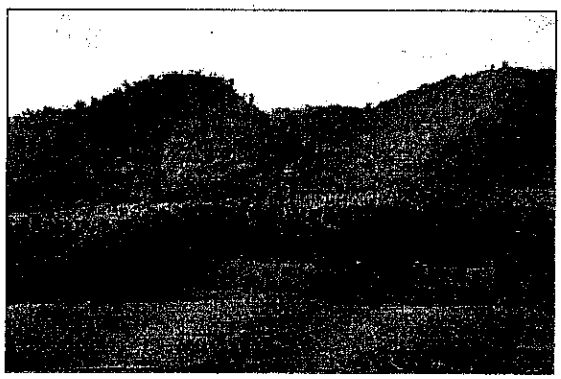


Measuring the circumference of tree saplings (left), and a larger tree (right). A trolley of illegally harvested bamboo.





Interior areas are steep (left), outer areas level (right), here with nuan bamboo. Centre: Karen forest equipment.




The Tha Sanun forest use zone, beyond the field (left). This village is keen to protect its diminishing waterways.




Over exploited forest, affected by annual fires (left). A over-exploited, over-grazed area of forest with ruak bamboo




A large spider's nest in the forest floor, with a sticky exterior web set out to catch prey.



Left: Pong and Nok talking over the community maps with two local leaders. Right: one of the hand-drawn village maps.

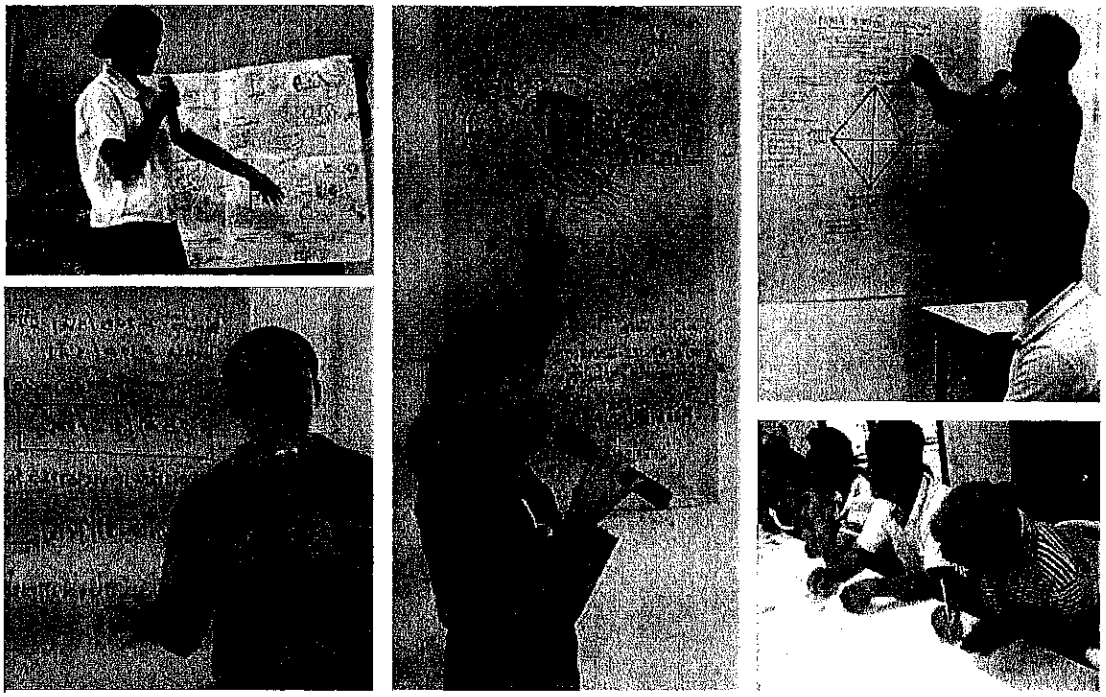
e) Sharing survey findings with villagers, including students



Sharing survey findings with community leaders and fellow villagers to see the practical implications on the map of the area



One of the feedback sessions, at the local secondary school, led by the teacher responsible for geography and biology.



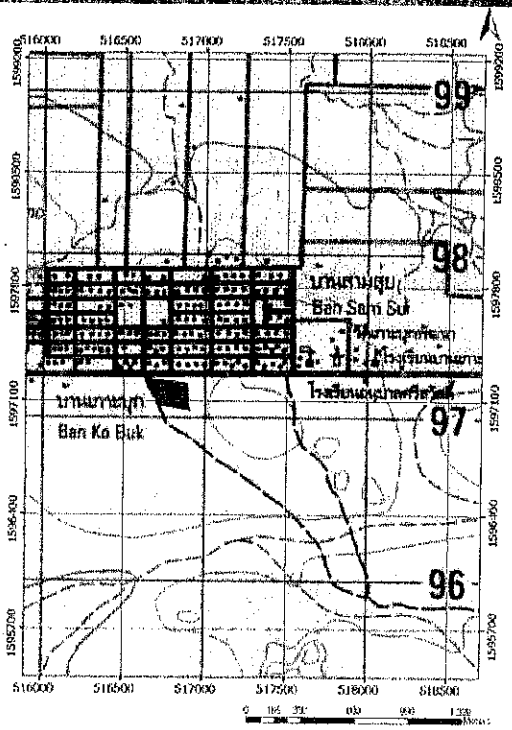
Students, villagers and village leaders come together to tell each other about the status of their community forest area.

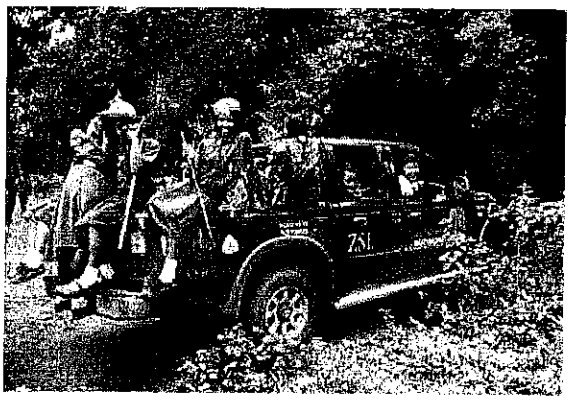
f) Forest restoration











Two areas of degraded forest (above/below left) have been planted with indigenous tree saplings raised by our community nursery in Kaeng Plakod village. On planting days, students and villagers have a fun time!



