



嘉道理農場暨植物園（本園）位於香港最高山脈大帽山（957米）北坡下。園內清溪匯流，翠林環抱，還有不少果園和梯田，以及各種保育及教育設施。本園現今是一家獨特的公私營合作機構。

1995年1月20日，香港立法局（現為立法會）通過嘉道理農場暨植物園公司條例（第1156章），本園正式成為保育及教育中心。本園雖為公共機構，但經費是來自私營的嘉道理基金。自1995年起，本園致力於推廣香港和中國內地的保育及永續生活，並推行各類計劃促進動植物保育和有機農業。本園的使命是「大眾與環境和諧並存」。

Kadoorie Farm and Botanic Garden (KFBG) is situated on the northern slopes of Hong Kong's highest mountain – Tai Mo Shan (957 metres). Within KFBG are streams, woodlands, orchards and vegetable terraces – together with conservation and education facilities.

KFBG, today, is a unique public-private partnership, incorporated and designated as a conservation and education centre by Ordinance (Chapter 1156) in the Legislative Council of Hong Kong on 20th January, 1995. While KFBG is a public organisation, it is privately funded by the Kadoorie Foundation. Since 1995, KFBG has been focusing on promoting conservation and sustainable living in Hong Kong and Mainland China, with programmes on flora and fauna conservation and the promotion of organic agricultural practices. KFBG's mission statement is "To harmonise our relationship with the environment".

嘉道理中國保育 Kadoorie Conservation China

嘉道理農場暨植物園 Kadoorie Farm & Botanic Garden

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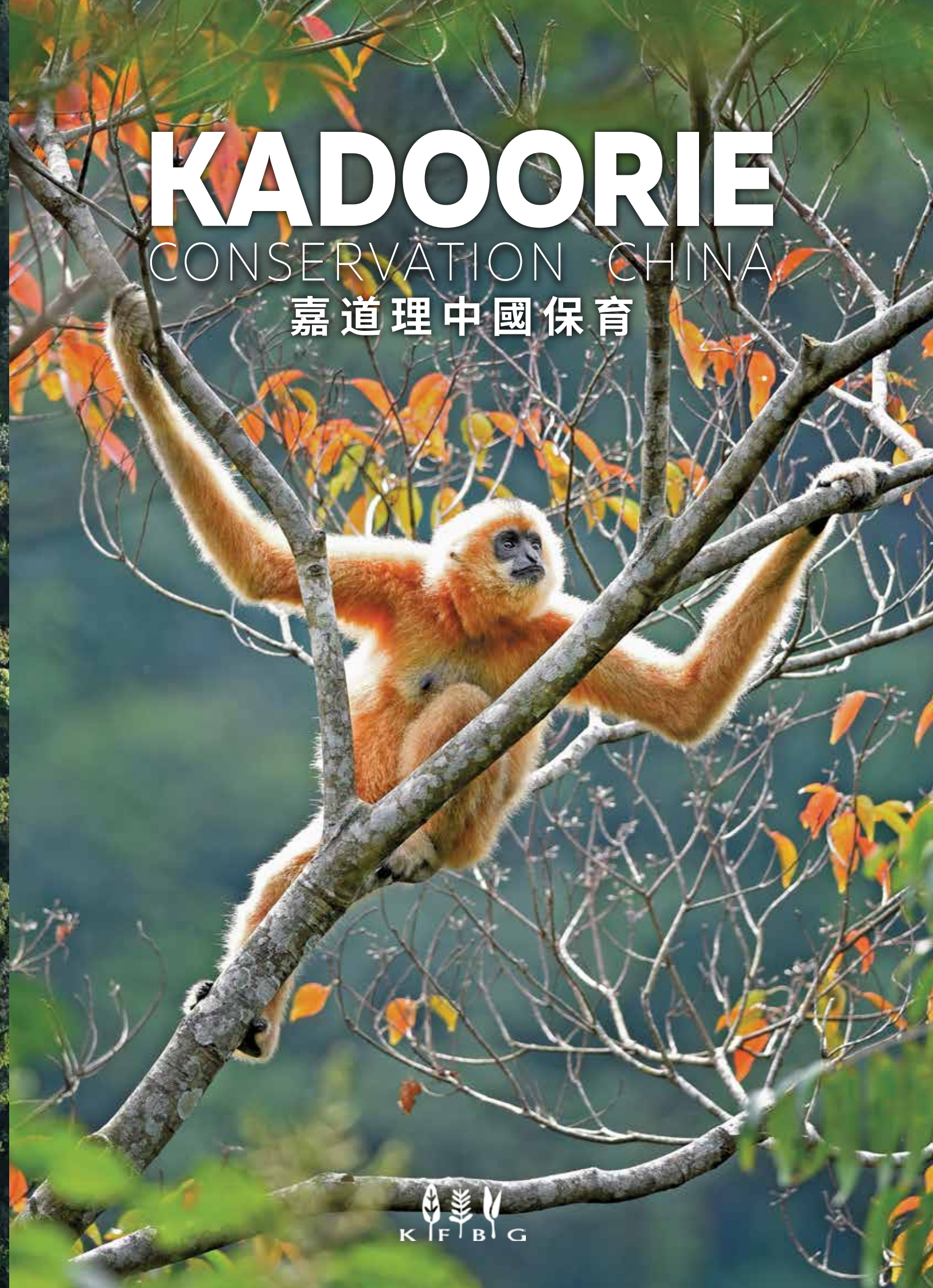
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KADOORIE

CONSERVATION CHINA

嘉道理中國保育





我們的歷史里程(1998-2018)

Our Timeline from 1998 to 2018

嘉道理中國保育（KCC）為香港環保機構「嘉道理農場暨植物園」的轄下部門之一，成立於1998年。我們以緩減中國生物多樣性消失和推廣可持續理念為宗旨，在國內外開展各類保育項目，包括保護森林生態系統及瀕危物種、培育當地人才，提高社區保育意識和推廣可持續生活模式。

KCC前身為「華南生物多樣性研究隊（SCBT）」，主要對華南林區進行快速生物多樣性調查，用作制定長遠保育策略。2011我們更名為嘉道理中國保育，以更準確反映我們的工作目標和方向。KCC現正開展的項目遍佈中國的海南、雲南、廣東、廣西、四川，以及柬埔寨。

Kadoorie Conservation China (KCC) is a department of KFBG – a Hong Kong based environmental NGO. Founded in 1998, we aim to minimise the loss of biodiversity and promote sustainability in China. On-going projects include protection of natural forests, conservation of endangered species, capacity building, awareness-raising and promotion of sustainable living in local communities.

KCC was previously known as the South China Biodiversity Team (SCBT) and focused on rapid biodiversity assessments around South China to formulate our conservation strategy. SCBT was renamed KCC in 2011 to better reflect our focal area and direction. We currently have projects in Hainan, Yunnan, Guangdong, Guangxi, Sichuan of China, and Cambodia.

KCC六大策略方向：
Our Strategic Directions:

物種保護
Species Conservation
生境保護
Habitat Conservation
推廣永續理念
Sustainability Promotion
生物多樣性評估
Biodiversity Assessment
人才培育
Capacity Building
提高公眾意識
Awareness Raising



2000 開展為期三年的廣東省野生動物市場調查，為研究野生動物貿易問題提供重要資料。
Launched a 3-year wildlife market survey in Guangdong and published a report which is heavily referenced by wildlife trade researchers.

2004 在保護區周邊鄉村推廣永續生活成為我們的工作方向之一。
Promoting sustainable living in villages around nature reserves became our focal area.

2003 組織海南年度水鳥調查。至今有很多重要發現及保護了不少瀕危鳥類的棲息地。
Launched the Hainan annual waterbird survey which continues today; discovered numerous significant findings and protected many critical habitats for threatened species.

2005 與海南霸王嶺保護區合作成立海南長臂猿監測隊。
Established the Hainan Gibbon monitoring team with Hainan Bawangling Nature Reserve.

2005 組織海南鸚哥嶺生物資源大調查，發現大片原始林及豐富生物多樣性，引起各界高度關注。
Co-organised a biodiversity expedition at Yinggeling of Hainan, discovered extensive intact forest and high biodiversity which drew much public attention.

2006 鸚哥嶺保護區管理團隊正式成立，KCC的陳韋樂博士被任命為特別副站長。
Management of Yinggeling Nature Reserve established, Dr. Bosco Chan of KCC was appointed as a Special Deputy Director.

2006 主辦海南石灰岩生物多樣性研討會以喚醒各方對此獨特生態系統的關注。
Organised a workshop on Hainan limestone habitats and their biodiversity to raise awareness of this unique ecosystem.

2003 在霸王嶺保護區正式開展海南長臂猿保育項目。
Launched the Hainan Gibbon conservation project in Bawangling Nature Reserve.

1998 SCBT正式成立，在接下來的5內考察了華南超過50個林區。
SCBT formally set up and surveyed over 50 forest sites in South China.

2002 首次在野外使用紅外線相機，是中國首批使用此技術的團隊之一。
First application of camera traps in field survey; one of the first teams to deploy this technique in China.

2009 在廣西西大明山開展冠斑犀鳥保育項目。
Launched the Oriental Pied Hornbill conservation project in Xidamingshan, Guangxi.

2008 由2005至2008年間，在霸王嶺種植了八萬棵長臂猿喜食本土樹種。
Planted 80,000 native gibbon food trees in Bawangling from 2005 to 2008.

2012 在鸚哥嶺道銀村舉辦禁漁區推廣研討會，並重新引進已在當地滅絕的倒刺鯪。
Organised a workshop at Daoyin village in Yinggeling to promote fish sanctuary and reintroduced locally-extirpated Red-faced Giant Barb.

2016 與雲南高黎貢山保護區合作成立高黎貢長臂猿監測隊。
Established the Gaoligong Gibbon monitoring team with Yunnan Gaoligongshan Nature Reserve.

2011 開展「雨林使者」公民科學項目，鼓勵公眾直接參與，為保護海南島豐富多彩的雨林出一分力。
Launched the "Rainforest Ambassador" Citizen Science Programme with the aim to encourage public participation and foster support for protection of tropical rainforests in Hainan.

2014 與雲南高黎貢山保護區合作，為雲南重新發現30年不見蹤跡的雲貓。
Collaborated with Yunnan Gaoligongshan Nature Reserve and rediscovered the Marbled Cat in Yunnan after 30 years.

2015 在海南邦溪保護區開展項目以拯救海南坡鹿。
Launched the Hainan Eld's Deer conservation project in Bangxi Nature Reserve, Hainan.

2017 與海南吊羅山保護區合作成立全國首支水獺監測隊。
Established the nation's first otter monitoring team with Hainan Diaoluoshan Nature Reserve.

2017 與雲南銅壁關保護區合作，在盈江利用紅外線相機拍攝到馬來熊在中國的首批影像。
Collaborated with Yunnan Tongbiguan Nature Reserve and obtained the first images of Sun Bear for China in Yingjiang.

2018 在柬埔寨開展了首個海外保育項目。
Launched the first overseas project in Cambodia.

海南長臂猿成年雄猿通體黑色；而母猿呈金黃色，頭頂有黑色斑塊。海南長臂猿擁有穩定的一雄兩雌家庭結構，家庭成員亦較多。Mature male Hainan Gibbon is completely black and female is golden-buff with a black crown. They form stable one male-two females pairing systems and have bigger family groups.



海南霸王嶺國家級自然保護區內的原始熱帶雨林是海南長臂猿最後的家園。The primary rainforest of Bawangling National Nature Reserve is the last home for the Hainan Gibbon.

Hainan Gibbon

Nomascus hainanus

海南長臂猿

海南長臂猿為海南島特有種；過去無序的棲息地被破壞和打獵使牠們數量銳減，目前只殘存於海南霸王嶺國家級自然保護區一片狹小的原始熱帶雨林內，是世界上最瀕危的靈長類。2003年，KCC獲得海南省林業廳邀請參與海南長臂猿的保育工作；我們統籌了一次種群數量大調查，並召開首屆海南長臂猿保育研討會，制定長遠保護行動計劃。調查中只能確認2群13隻長臂猿，並識別了牠們面對的主要威脅，包括棲息地面積過小及破碎化，關鍵的低海拔森林嚴重退化，和強烈的人為干擾等。為了恢復海南長臂猿種群，我們聯同保護區實施了一系列就地保育措施、開展科學研究和社區宣傳及教育工作。

監測和研究

為了杜絕破壞行為和深入瞭解長臂猿的數量變化和生態習性，自2005年起，KCC支持保護區成立了海南長臂猿監測隊，堅持長期監測猿群。在此基礎上，我們從2011年起在距離長臂猿棲息地最近的白沙縣青松鄉成立了社區監測隊，協助保護區進行涵蓋所有已知猿群的長期監測。此外，KCC至今共資助了6名科研人員進行有關海南長臂猿的生態、食性、種群動態、潛在棲息地、棲息地恢復和保育管理的研究，研究成果有助我們完善海南長臂猿的保護行動。

棲息地恢復和保護

為了修復退化和破碎化的長臂猿棲息地，KCC培訓及資助保護區建立苗圃，採集種子培育長臂猿愛吃的本土樹種幼苗。我們已在150公頃退化的低地生境種植了51種，共8萬多棵長臂猿喜食本土樹苗，擴闊長臂猿未來的生活空間。KCC一直與村民建立良好關係，減少任何對長臂猿及其棲息地造成傷害的人為干擾和衝突。如在青松鄉推廣永續農業改善村民生計，減少過度依賴森林資源的壓力。經過十多年的努力，至2017年長臂猿數量已經增加到4群至少27隻。

Hainan Gibbon is only found on the tropical island of Hainan, China. Destruction of rainforest and rampant poaching in the past have put the species on the brink of extinction; it is the most critically endangered primate on earth, currently only confirmed in a small patch of primary forest in Bawangling National Nature Reserve (BNNR). In 2003, KCC was invited by the local authorities to take an active role in saving the Hainan Gibbon, and we launched the first population census survey as well as a conservation workshop. During the survey and workshop, we only confirmed the presence of 13 individuals in 2 groups, and identified the major threats to its survival, namely limited and fragmented habitat, poor quality of the critical lowland forest, and high human disturbance pressures. To save the species from extinction, together with BNNR we implemented a series of in-situ conservation actions, conducted researches and outreach activities.

MONITORING AND RESEARCH

To prevent illegal activities and gain a better understanding of its ecology and population, KCC has been sponsoring BNNR to conduct regular gibbon monitoring since 2005. We established a community monitoring team at the Qingsong neighbourhood in 2011, covering the home ranges of all known gibbon groups. KCC funded six research projects to study the ecology, population dynamics, potential habitat, habitat restoration, and conservation management of Hainan Gibbon; these scientific studies help us to refine our conservation actions for the species.

HABITAT ENHANCEMENT AND PROTECTION

KCC trained and supported BNNR to set up gibbon food tree nurseries in a hope to expand the usable habitat for Hainan Gibbon. Over 80,000 fast-growing gibbon food trees of 51 native species have been planted in 150 hectares of degraded lowland habitat. KCC also built trust with the local communities. We launched sustainable agriculture programmes in the Qingsong neighbourhood, aiming to reduce human pressures on the nearby forests likely to be used by the gibbons. With our determined effort, it is heartening to see the gibbon population increased to four groups of at least 27 individuals in 2017.





海南坡鹿是中國國家一級重點保護野生動物，卻備受忽略。雄性坡鹿繁殖期時長有一對獨特的弓形鹿角。

Hainan Eld's Deer is a Class I protected species in China but is largely overlooked. The males carry unique and elaborate bow-shaped antlers during mating season.



利用航拍機監測保護區生境質素有助我們更瞭解保護區的管理需要，以及周邊社區的土地利用狀況。

We use conservation drone to evaluate habitat quality of the reserve, and the land-use pattern of surrounding communities.

Hainan Eld's Deer

Rucervus eldii

海南坡鹿

坡鹿是一種生活於東南亞低地乾旱開闊林的瀕危鹿類。由於數量稀少，人們對坡鹿的分類及生態都缺乏深入研究，保育工作難以開展。國際上普遍認為坡鹿共有三個亞種，而海南的種群隸屬中南半島的 *siamensis* 亞種，但中國專家從形態及基因上指出海南種群有其獨特性，而且獨立演化時間久遠。

海南坡鹿曾廣佈於海南島沿海低地，但隨著人口劇增，土地過度開發，加上一些民眾迷信其藥用價值而遭大量獵殺，坡鹿種群迅速減少，至1976年只剩下不足50頭。為了有效控制打獵等破壞行為，坡鹿最後的棲息地只能用圍欄保護，坡鹿數量亦逐漸恢復，現已脫離滅絕的厄運。然而，牠們的未來仍然充滿挑戰：由於保護區面積有限，海南坡鹿的數量早已遠超保護區的承載能力，植被長期被過度啃食，生態系統退化，而圍欄外合適的土地大多已被開發利用。

自2015年起，KCC與海南邦溪省級自然保護區開始合作，引進了等高儲水溝、計劃輪牧、混合種植坡鹿喜食本土植物等措施改善生境，並資助修建巡邏便道和管理點、為保護區人員提供培訓等以提高保護區的整體管理水準。同時也開展社區及學校的宣傳和教育工作，希望取得周邊社區支持。KCC與中國、泰國、老撾和柬埔寨的管理部門及科研單位合作，以最先進的基因研究，分析各地坡鹿種群間的分類地位和遺傳多樣性，提供更科學的種群管理依據。

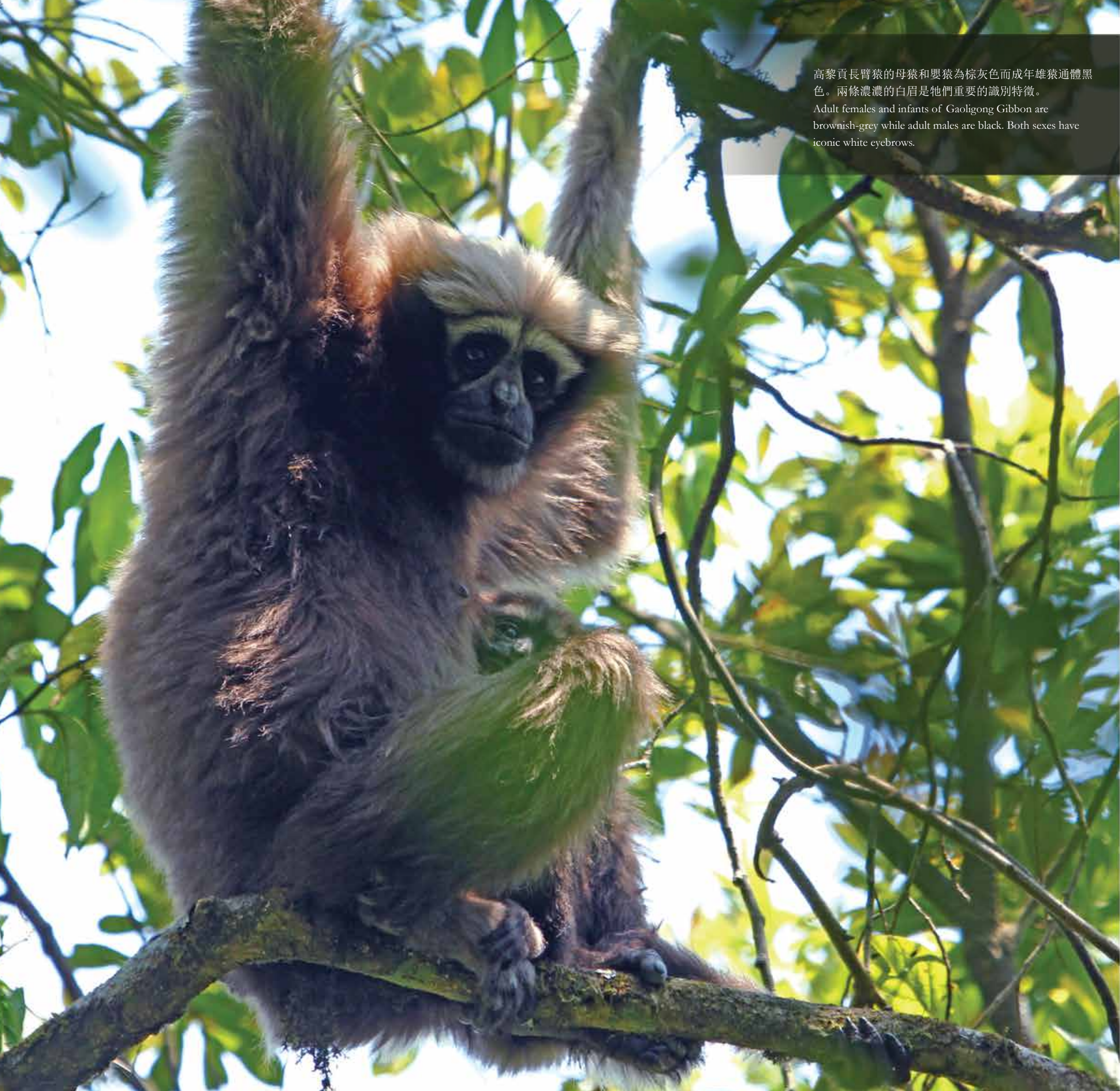
Eld's Deer is an Endangered deer species found in open dry forests of lowland Southeast Asia. Due to its rarity, little is known about its taxonomy and ecology, hampering conservation of the dwindling populations. Three subspecies of Eld's Deer are widely recognised, with the Hainan population considered part of the subspecies *siamensis*.

However, Chinese scientists showed that the Hainan Eld's Deer is morphologically and genetically distinct, and has long been isolated from continental populations.

Hainan Eld's Deer occurred across coastal lowlands of the island, but habitat loss and hunting became severe with the influx of mainland immigrants. The deer population undergone a precipitous decline with less than 50 deer remained in 1976. To control illegal activities more effectively, fences were built around the last habitats. The population bounced back and is today safe from imminent extinction risk. However, the long-term future of the Hainan deer is unclear – the deer populations have far exceeded the carrying capacity of the tiny protected areas with signs of ecosystem degradation, and most suitable habitats outside the fenced reserves have been developed.

KCC kicked off a project in Bangxi Provincial Nature Reserve in 2015 to develop a habitat enhancement strategy, in which we constructed water-retention contour ditches, started rotational grazing and conducted mixed planting of native forage plants. We helped improve reserve management by building patrol routes and guard posts, and provide the staff with relevant training. We also launched community work in the surrounding villages and school in order to gain local support. Moreover, KCC collaborates with various authorities and research institutions in China, Thailand, Laos and Cambodia on a conservation genomic study of different populations for the subspecies. Through this cutting-edge research, we are hoping to design more effective protection and population management plans for the species.





高黎貢長臂猿的母猿和嬰猿為棕灰色而成年雄猿通體黑色。兩條濃濃的白眉是牠們重要的識別特徵。
Adult females and infants of Gaoligong Gibbon are brownish-grey while adult males are black. Both sexes have iconic white eyebrows.

Gaoligong Gibbon

Hoolock tianxing

高黎貢長臂猿

高黎貢長臂猿，又名天行長臂猿，過往被視為東白眉長臂猿（*Hoolock leuconedys*）最東面的種群。2017年，研究人員透過基因和形態學研究把其提升為獨立種。高黎貢長臂猿在中國現在僅分佈於雲南省保山、騰衝以及盈江地區。最新的野外調查顯示中國的數量不足200隻，其野外生存狀況不容樂觀，急需加強保護管理。

監測和保護

KCC與雲南高黎貢山國家級自然保護區騰衝分局於2016年底開展長臂猿種群數量同步大調查，記錄騰衝保護區範圍內有7群20隻長臂猿。這是目前中國已知高黎貢長臂猿最大的種群，對於該物種的保護至關重要。有見及此，KCC協助保護區建立了長臂猿監測隊，以長期保護和監測當地的長臂猿種群，並開展基礎生態學研究。KCC也會定期向監測隊提供相關的培訓和在周邊社區舉辦以長臂猿為主題的宣傳及教育活動。

Gaoligong Gibbon, also known as Skywalker Hoolock Gibbon, was previously considered as the easternmost population of the Eastern Hoolock Gibbon (*Hoolock leuconedys*). In 2017, it was described as a distinct species based on its molecular and morphological differences. Currently, the Gaoligong Gibbon is only found in Baoshan, Tengchong and Yingjiang of Yunnan Province in China. The latest survey revealed that there are less than 200 individuals left in China, thus urgent conservation effort is needed.

MONITORING AND CONSERVATION

KCC and the Tengchong Bureau of Gaoligongshan National Nature Reserve conducted a gibbon population survey in 2016 and confirmed 20 individuals in 7 groups, representing the largest known subpopulation in China, and highlights the importance of Tengchong to the survival of the species. In view of this, KCC supported the Reserve to establish a gibbon monitoring team to monitor and protect the remaining gibbons, and conduct basic ecological study to better understand the species. KCC also provides relevant training to the monitoring team and delivers gibbon-themed outreach activities in local communities.





雙角犀鳥雄鳥
Male Great Hornbill

中國分佈有五種犀鳥，包括雙角犀鳥、棕頸犀鳥、花冠皺盔犀鳥、冠斑犀鳥和白喉犀鳥；牠們曾廣佈於桂西南、滇南及西南、和藏東南的熱帶森林內。
China is home to five hornbill species, namely Great Hornbill (*Buceros bicornis*), Rufous-necked Hornbill (*Aceros nipalensis*), Wreathed Hornbill (*Rhyticeros undulatus*), Oriental Pied Hornbill (*Anthracoeros albirostris*), and Austen's Brown Hornbill (*Anorrhinus austeni*). They used to be widespread across the tropical forests of southwest Guangxi, south & southwest Yunnan and southeast Tibet.

Hornbills of China

中國的犀鳥

犀鳥是大型熱帶鳥類，巨大的鳥喙能吞食大型果實，加上優秀的飛行能力，是森林中重要的種子傳播者，對維持和恢復熱帶森林十分重要。同時，由於犀鳥只在大型的自然樹洞營巢繁殖，牠們對生境破壞極為敏感。偷獵及毀林等活動令犀鳥在中國的分佈區和數量大為萎縮，現今只殘存在少數偏遠林區，數量稀少，保護行動刻不容緩。有見及此，KCC與廣西西大明山省級自然保護區及雲南銅壁關省級自然保護區自2009年起開展各項犀鳥保育工作。

中國犀鳥保育國際研討會

中國野生犀鳥的保護一直未受到重視，為了引起政府及社會各界的關注及促進交流，KCC分別在2011和2015年召開「中國犀鳥保育國際研討會」；國內外專家藉此交流犀鳥保育與研究經驗，並向內地保護區和相關政府部門提出保育建議。首屆研討會由KCC和廣西野生動物保護協會共同舉辦，共有30多個國內外代表參加；第二屆由KCC與雲南省盈江縣人民政府合辦，50多名中外代表在研討會中聯署加強中國犀鳥保護的「盈江宣言」，為保護這些雄雋的熱帶鳥類訂立行動計劃。

Hornbills are highly specialised tropical birds and important dispersers of large-fruited trees since they have the biggest gape size amongst all forest birds of the region. They nest almost exclusively in large natural tree cavities, thus are extremely vulnerable to forest destruction. Hunting and forest loss have greatly decimated their populations in China and nowadays only survive in a few remote forest tracts. With the disappearance of hornbills, the future health of tropical forest in China is also jeopardised. KCC has been collaborating with Guangxi Xidamingshan Provincial Nature Reserve and Yunnan Tongbiguan Provincial Nature Reserve to save these majestic birds from extinction since 2009.

INTERNATIONAL WORKSHOPS FOR HORNBILL CONSERVATION IN CHINA

In order to raise awareness for Chinese hornbill conservation amongst government officials and civil society, and facilitate information exchange, KCC organised two workshops on hornbill conservation in 2011 and 2015, respectively. Chinese and international experts shared their experience in hornbill conservation and research, and made conservation recommendations to relevant protected areas and government departments. The first workshop was co-organised with the Wildlife Conservation Association of Guangxi; more than 30 Chinese and international delegates participated. The second workshop was co-organised with the People's Government of Yingjiang County in Yunnan. The “Yingjiang Declaration” calling for enhanced conservation effort for Chinese hornbills was signed by more than 50 Chinese and international delegates, and an action plan was formulated.



廣西一隻雄性冠斑犀鳥把食物帶回樹洞喂飼雌鳥及雛鳥。
A male Oriental Pied Hornbill feeding his partner and young enclosed in a tree cavity in Guangxi.



雲南盈江是中國唯一有花冠皺盔犀鳥分佈的地點。
The Wreathed Hornbill only occurs in Yunnan's Yingjiang in China.



中國水獺的數量及分佈範圍已經大規模萎縮，只在偏遠地區和某些管理較好的保護區或偷獵受控制的大城市周邊，依然存活著零星的種群。
China's otters have suffered a massive decline, only remnant populations are surviving in remote areas, certain well-protected reserves and cities where poaching is effectively controlled.

Otters of China 中國的水獺

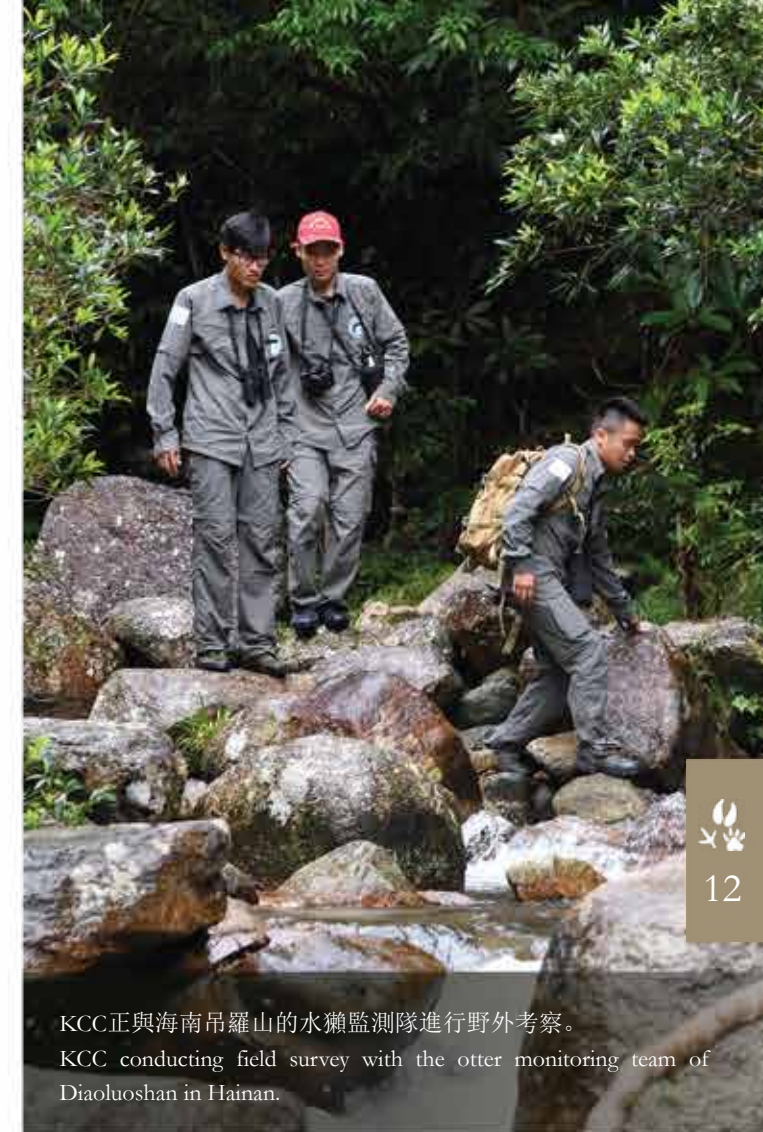
中國共分佈有三種水獺：歐亞水獺（*Lutra lutra*）、亞洲小爪水獺（*Aonyx cinereus*）以及江獺（*Lutrogale perspicillata*）。由於其皮毛及藥用價值，曾被大量獵殺，至上世紀80年代，中國大部分地區的水獺種群已經急劇減少，甚至出現區域性滅絕。雖然自1989年起，三種水獺皆被列為國家II級重點保護野生動物，但牠們的處境至今仍未被重視，也鮮有任何針對水獺的具體保護行動及研究。相反，在歐美地區的水獺種類早已成為重要的研究和保育對象。

2012年起，KCC開始有系統地調查中國水獺的狀況。2016年，我們不僅在雲南省盈江拍攝到亞洲小爪水獺在中國的首批生態影像資料，還在人口密集的珠江口發現歐亞水獺的殘存種群。2017年初，我們與海南省吊羅山林業局合作成立了中國首支水獺監測隊，開始對林區的亞洲小爪水獺進行長期調查與監測。此外，KCC與國際自然保護聯盟（IUCN）物種生存委員會水獺專家組及四川唐家河國家級自然保護區在2019年合辦第14屆《國際水獺研討會》，希望引起更多人關注中國水獺的保育狀況。

Three species of otters are known from China: Eurasian Otter (*Lutra lutra*), Asian Small-clawed Otter (*Aonyx cinereus*) and Smooth-coated Otter (*Lutrogale perspicillata*). They once occurred throughout the country, however, due to excessive hunting for their furs and as traditional medicine, otter populations have dramatically declined, with many local extinctions reported as early as the 1980s. Although all 3 otter species are Class II National Key Protected Species in China since 1989, there has been little conservation attention. On the contrary, their counterparts in western countries have long been popular subjects for research and conservation.

Since 2012, KCC has been systematically studying otters across China. In 2016, we obtained the first photographs of wild Asian Small-clawed Otter for China at a remote stream in Yunnan's Yingjiang, and discovered a population of Eurasian Otter in a busy delta of Guangdong Province. In 2017, we established the nation's first otter monitoring team in Diaoluoshan, Hainan Province with the aim to monitor and protect the dwindling population of Asian Small-clawed Otter. In 2019, we partner with the IUCN Species Survival Commission Otter Specialist Group and Sichuan Tangjiahe National Nature Reserve to convene the 14th International Otter Congress, hoping to raise the awareness of otter conservation in China.

亞洲小爪水獺
Asian Small-clawed Otter



KCC正與海南吊羅山的水獺監測隊進行野外考察。
KCC conducting field survey with the otter monitoring team of Diaoluoshan in Hainan.

放置紅外線相機是調查行蹤隱秘的水獺的有效方法。
Camera trap is a useful tool to survey the elusive otters.



Other species we work on...

我們關注的其他物種：





Kratie Province

Cambodia

柬埔寨桔井省

柬埔寨是全球生物多樣性熱點，是巨鸛（*Thaumatibis gigantea*）、南亞鴉（*Houbaropsis bengalensis*）、白臀野牛（*Bos javanicus*）等眾多全球瀕危野生動物的重要棲息地。柬埔寨東部的落葉龍腦香林（DDF）更被譽為「亞洲的塞倫蓋提草原」，是東南亞保存最完好和面積最大的旱生森林；DDF的生態特性極具特色，為很多動物提供居所，亦是保育學家近年關注的特別生態系統。

20世紀70年代，柬埔寨的森林覆蓋率曾超過70%，但近年已下降至低於50%。導致森林大規模消失的主因之一，是柬埔寨政府的「經濟特許地」政策，允許國內外投資商砍伐天然林以發展大型農場。特許地政策對柬埔寨的生物多樣性、環境、農村生計等多方面產生的負面影響在國際上引起了很大的爭議。自2017年起，KCC受海南省農業廳邀請，為在東中資特許地提供以科學為基礎的生態保育意見；期望通過科學、創新、合理、永續的發展規劃，在柬埔寨東部的桔井省共同打造一個生態友好型的熱帶生態農業示範區，為柬埔寨特許地尋求一種可持續的經營模式。

The Kingdom of Cambodia is a global biodiversity hotspot, home to many globally endangered wildlife, such as Giant Ibis (*Thaumatibis gigantea*), Bengal Florican (*Houbaropsis bengalensis*) and Banteng (*Bos javanicus*). Being depicted as the “Serengeti of Asia”, the deciduous dipterocarp forest (DDF) of eastern Cambodia is the largest intact block of dry forest in Southeast Asia, holding great biodiversity that attracts the focus of much conservation attention in recent years.

In the 1970s, over 70% of Cambodia was covered by natural forest, but this figure has plummeted to less than 50%. The proliferation of Economic Land Concessions (ELCs) is regarded as one of the major drivers of deforestation in recent years. Under the ELC policy, domestic and international investors are granted permissions to clear large tracts of natural forest for agroindustry. This practice has drawn a lot of criticisms due to the impacts on biodiversity, environment and local livelihoods. In 2017, KCC was invited by the Hainan Provincial Department of Agriculture to provide input for biodiversity conservation for Chinese-owned ELCs in Cambodia. We are working with an ELC in Kratie Province of eastern Cambodia to explore innovative, practical and sustainable agriculture development that preserves the biodiversity value of the site, hoping to develop a model for other ELCs.

- 1** 落葉龍腦香林 Deciduous dipterocarp forest
- 2** 黑腿白臀葉猴 Black-shanked Douc (*Pygathrix nigripes*)
- 3** 半常綠季雨林 Semi-evergreen rainforest
- 4** 綠孔雀 Green peafowl (*Pavo muticus*)
- 5** 白腹黑啄木鳥 White-bellied Woodpecker (*Dryocopus javensis*)
- 6** 白臀野牛 Banteng (*Bos javanicus*)





Yinggeling

Hainan Province

海南鹦哥嶺

海南中部的鹦哥嶺位置偏僻，以往沒有進行過深入的科學考察。2003年，KCC團隊首次進入鹦哥嶺，發現華南最大連片的原始熱帶森林，古木參天的雨林裡蘊含著豐富的生物多樣性。2005年，海南省林業廳和KCC聯合組織國內外多個科研單位的專家60多人，先後三次深入林區，開展了歷時三個多月的綜合資源考察，發現大量珍稀物種，包括科學新種如鹦哥嶺樹蛙（*Rhacophorus yinggelingsensis*）、中國新紀錄如輪葉三棱櫟（*Trigonobalanus verticillata*），和超過160個海南新紀錄如伯樂樹（*Bretschneidera sinensis*）等；充分顯示了鹦哥嶺無可替代的保育價值。但同時，生態系統亦受到偷獵、濫伐等人為干擾而逐漸退化。有見及此，KCC在海南省林業廳邀請下，自2006年起全

力參與規劃及發展鹦哥嶺自然保護區，更派遣專家直接參與保護區管理工作，以成為國際水準的保護區為目標。經過數年努力，保護區在資源管理、科研監測、社區參與式保育等方面都取得顯著成效，並於2014年晉升為國家級自然保護區。這過程中如何解決種種挑戰的經驗，值得地區內其他保護區借鑒。

Yinggeling (YGL) sits deep in the interior mountains of Hainan Island, and was never properly studied by scientists. KCC conducted a pilot survey of the area in 2003, and was amazed by the extent of primary rainforest and rich biodiversity. In 2005, the Provincial Forestry Department of Hainan and KCC led a three-month expedition to study the area's biodiversity value. The team of over 60 scientists discovered a wealth of exciting biodiversity, including species new-to-science such as the Yinggeling Treefrog (*Rhacophorus yinggelingsensis*), new China records such as the tropical tree *Trigonobalanus verticillata*, and over 160 new Hainan records such as the subtropical tree *Bretschneidera sinensis*. These findings underlined the irreplaceable conservation importance of YGL. However, like many

other forest areas, YGL was slowly being degraded by illegal activities such as poaching and logging. To preserve this unique biodiversity asset, KCC has wholeheartedly supported the Provincial Forestry Department of Hainan to develop YGL into a world-class nature reserve, even assigning a conservation biologist to assist in reserve management since 2006. In a span of few years, YGL has accomplished significant achievements in reserve management, research and monitoring, and community-based conservation, and was upgraded to a national nature reserve in late 2014. The experience gained and challenges tackled in managing YGL prove invaluable as a model for enhanced management of other protected areas in the region.

1 鹦哥嶺擁有華南最大連片的原始熱帶森林。Yinggeling has the largest continuous primary rainforest in South China. **2** 豐富的附生植物以及氤氳的水霧是原始熱帶雨林的特徵。Mature continuous rainforest is always misty and cloaked with epiphytes. **3** KCC在鹦哥嶺發現的科學新種——鹦哥嶺樹蛙。The new-to-science species Yinggeling Treefrog (*Rhacophorus yinggelingsensis*) discovered by KCC.



鸚哥嶺是海南兩大江河——南渡江及昌化江的重要水源涵養地。自2007年起，KCC聯同保護區，向當地社區推廣禁漁區的理念，以達到恢復魚類種群和增加可持續漁獲的雙贏目標。經多次引導交流，白沙縣道銀村在2008年訂立村規民約，自發把流經村裡的南開河最寬最深、魚類最集中的河段劃為禁漁區。我們在2012年於道銀村舉辦「禁漁區推廣研討會」，邀請周邊鄉村參觀交流，同時重新引入已在當地消失多年的大型魚類——倒刺鯮（*Spinibarbus denticulatus*）。隨著禁漁區在道銀獲得成功，越來越多村落接受這個嶄新的環保理念。現已有10多個村落建立了自己的禁漁區。為了提高年輕一代的保育意識，我們還在附近的學校舉辦有關魚類和淡水生態保育的環境教育活動。

KCC和保護區在鸚哥嘴管理分站建立了一個人工濕地用以處理污水。人工濕地的第一部分是一個篩檢程序，過濾出來的物質能用作堆肥。本土觀賞植物則用作濾床植物，締造怡人的景觀。經過處理的污水流進一個生態池，池裡放養一些本土魚類以控制蚊蟲滋生。因原生魚類對水質敏感，牠們的存活是污水處理系統有效運作的最佳指標。設計上也充分利用水向低流的原理，以減少抽水的能源耗用。鸚哥嘴的人工濕地污水處理系統具有很高的實用價值，同時也是向公眾傳達環境責任觀念的重要工具。

KCC和保護區在2010年引進印度的夯土建築技術，就地取材，利用含5%水泥的夯土建造了一間有傳統黎族建築風格的道銀社區中心。夯土牆壁堅硬防水，所消耗的能源僅是一般燒磚的八分之一，大大減低對環境的壓力。村民也學會使用受聯合國教科文組織認可，印度奧羅維爾夯土建築學院（Auroville Earth Institute）所設計的歐立壓（Auram Press）來建造房屋。

Yinggeling (YGL) is an important watershed for Hainan's two largest river basins – the Nandu River and Changhua River. In 2007, KCC together with YGL started to encourage local communities to consider setting up no-catch zones to restore fish populations and increase catch outside

4 道銀禁漁區內成群的野生光倒刺鯮。A school of wild Giant Barb (*Spinibarbus caldwelli*) in the Daoyin Fish Sanctuary. 5 與村民攜手重新引入已在道銀消失多年的大型魚類倒刺鯮。Reintroducing the locally-extirpated Red-faced Giant Barb (*Spinibarbus denticulatus*) in Daoyin Fish Sanctuary together with the villagers. 6 為保護區周邊學校舉辦魚類和淡水生態保育的宣傳及教育活動。Introducing the local fish species and freshwater ecosystem during a school outreach activity.

those zones. We began the project in Daoyin Village, Baisha County. After lengthy discussions, Daoyin villagers selected the widest and deepest section of Nankai River with the highest fish concentration to be their Fish Sanctuary (FS) in 2008, governed by community rules and regulations. We hosted an FS promotion workshop in Daoyin in 2012 and reintroduced the extirpated Red-faced Giant Barb (*Spinibarbus denticulatus*). The success of Daoyin FS has convinced more villages to accept this novel conservation idea and a dozen or so FSs have been established around the Reserve. In addition, education programmes on fish and freshwater ecosystem conservation were held at nearby schools to raise awareness amongst the younger generations.

KCC and the Reserve designed and built a constructed wetland to treat wastewater at Yinggezui substation. A strainer made up the first stage of treatment and the residue can be used for composting. Ornamental local plants filled the filter bed to absorb the pollutants in the wastewater. The cleaned water is discharged to a polishing pond that is stocked with native fishes to control mosquito larvae. As native stream fishes are sensitive to pollution, their survival is an indicator of the efficiency of the system. The constructed wetland system has high practical value and serves as an effective public education tool to instill environmental responsibility. The local topography was considered in the design to utilise gravity, avoiding the use of electric water pumps and saving energy.

KCC also introduced earth ramming technique from India in 2010 to Daoyin Village and built the Daoyin community centre with village members, using 5% cement stabilised rammed earth. The design preserves the traditional architectural style of the Li minority. The strong, waterproof walls require only 1/8 the energy consumption of fired bricks. The villagers also learned how to make unfired stabilised earth bricks using the Auram Press designed by India's Auroville Earth Institute, that serves as UNESCO Centre for earth building.



©鸚哥嶺國家級自然保護區 Yinggeling National Nature Reserve

1 KCC利用環保夯土建築技術建成的道銀社區中心。The Daoyin community centre was built with eco-friendly earth ramming technique introduced by KCC. 2 鸚哥嘴人工濕地污水處理系統的生態池。The wildlife pond of the constructed wetland at Yinggezui. 3 道銀村禁漁區。The Fish Sanctuary in Daoyin Village.



©雲南高黎貢山國家級自然保護區保山管理局騰衝分局 Yunnan Gaoligongshan National Nature Reserve (Tengchong Bureau)

Gaoligongshan

Yunnan Province

雲南高黎貢山

高黎貢山與緬甸山水相連，北接青藏高原，向南申延至中南半島，亦是伊洛瓦底江和怒江的分水嶺，是不折不扣的生物多樣性寶地。2014年起，KCC與雲南高黎貢山國家級自然保護區保山管理局騰衝分局開展合作，首要目標是對當地的生物多樣性進行系統調查，對保護區各級人員進行能力培訓和優化宣傳教育工作，並針對保護區內的高黎貢長臂猿進行監測及保護（見前文）。為期超過四年的生物多樣性調查帶來不少驚喜，包括發現了中國獸類新紀錄紅鬃羚（*Capricornis rubidus*）、為雲南在30年後再次記錄到的雲貓（*Pardofelis marmorata*）、及發現多個科學新種及中國新紀錄，充分突顯了高黎貢山作為「世界物種基因庫」的價值。

Gaoligongshan is located in western Yunnan bordering Myanmar, extending from the Tibetan Plateau to Indochina, and is the watershed of the Irrawaddy and the Salween Rivers; as such, Gaoligongshan is considered one of the world's richest biodiversity hotspots. Since 2014, KCC has been collaborating with the Tengchong Bureau of Gaoligongshan National Nature Reserve (GLGS). We started off with a 4-year field survey to inventory the biodiversity of this majestic forested massif, yielding a number of exciting discoveries, including the first record of Red Serow (*Capricornis rubidus*) for China, rediscovery of the Marbled Cat (*Pardofelis marmorata*) for Yunnan after 30 years, and discovered a number of new-to-science species and new records for China. Capacity building of GLGS staff, enhancement of education & publicity materials and monitoring of the Gaoligong Gibbon are other aspects of our collaboration.



- 1 保護區連綿的森林延申至遠處的緬甸。Vast forest of the Reserve extends across the international border to Myanmar at the background.
- 2 雲貓 Marbled Cat (*Pardofelis marmorata*)
- 3 騰衝擬髭蟾 *Leptobrachium tengchongense*

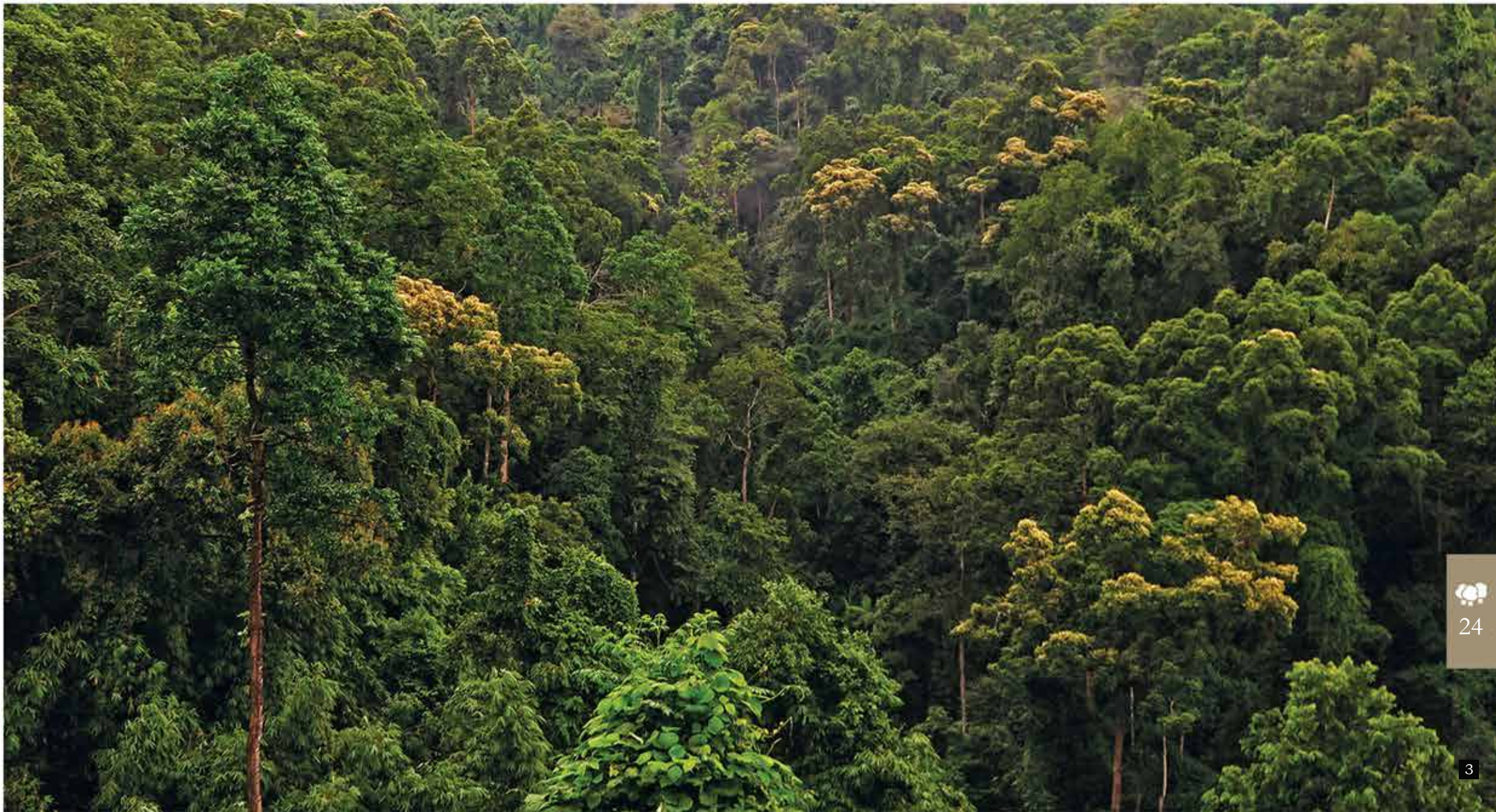


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Hong Kong Bird Watching Society

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Tongbiguan

Yunnan Province

雲南銅壁關

銅壁關省級自然保護區位於雲南省西南邊陲，處於古北界與東洋界的過渡地帶，不同成份的動植物在此交匯融合，生物多樣性極其豐富。保護區擁有中國面積最大的龍腦香熱帶雨林，許多熱帶動植物如孟加拉巨蜥（*Varanus bengalensis*）、鹿角蕨（*Platycerium wallichii*）和花冠皺盔犀鳥（*Rhyticeros undulatus*）等，在中國僅狹域分佈於此。銅壁關也是中國唯一已知有花冠皺盔犀鳥、雙角犀鳥（*Buceros bicornis*）和大灰啄木鳥（*Mulleripicus pulverulentus*）繁殖的地方。保護區周邊世居景頗、阿昌、德昂等少數民族，其生活模式對森林資源的依賴程度較高，對保護區及周邊森林構成巨大壓力；加上與保護區相鄰的緬甸林區近年破壞嚴重，整個區域的生態系統正在逐漸退化。有鑑於此，KCC與保護區開展合作以更好地保護當地獨特的生物多樣性。KCC也在保護區周邊的那邦鎮、銅壁關鄉和太平鎮積極推動社區參與式保護，通過建立社區保護地、生態旅遊和可持續農林項目，凝聚社群力量，共創生態及社區建設雙贏局面。

Tongbiguan Provincial Nature Reserve (TBG) sits in the southwestern corner of Yunnan Province, it lies at the crossroad of the Palearctic and Indo-Malayan Realms, supporting a rich and unique biodiversity. The largest patch of dipterocarp rainforest in China is found in TBG, and species such as Bengal Monitor (*Varanus bengalensis*), Staghorn Fern (*Platycerium wallichii*) and Wreathed Hornbill (*Rhyticeros undulatus*) are found nowhere else in China. TBG is also the only site in China where breeding of the Wreathed and Great Hornbills (*Buceros bicornis*) and Great Slaty Woodpecker (*Mulleripicus pulverulentus*) is currently confirmed. The ethnic minority groups of Jingpo, Achang and De'ang have been living in the area for centuries and they rely heavily on forest resources, posing huge pressures to the Reserve and surrounding forest. The once verdant rainforests across the river in Myanmar have experienced severe deforestation, and the ecosystem of the whole region is being degraded. KCC has been actively collaborating with TBG in a hope to better protect its unique biodiversity. In search of a sustainable conservation initiative, KCC has also been promoting community protected areas in the adjacent Nabang, Tongbiguan and Taiping towns by developing land trust, ecotourism and sustainable agroforestry programmes with local communities.



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- 1 鹿角蕨 Staghorn Fern (*Platycerium wallichii*) 2 灰孔雀雉 Grey Peacock-pheasant (*Polyplectron bicalcaratum*) 3 龍腦香熱帶雨林 Dipterocarp rainforest 4 菲氏葉猴 Phayre's Langur (*Trachypithecus phayrei*) 5 巨松鼠 Black Giant Squirrel (*Ratufa bicolor*)



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海口羊山濕地擁有很高的保育價值，濕地類型多樣化，堪稱「天然濕地博物館」。隨著海南經濟高速發展，海口市拉開了大開發的序幕，引入了多個大型房地產和高爾夫球場等項目。由於人們對羊山的生態及保育價值不瞭解，一些珍稀物種可能在被我們瞭解記錄之前就滅絕。為此，KCC在2012–2013年組織及培訓了一班公民科學家義工，對羊山濕地進行生物多樣性調查。結果顯示，羊山地區動植物種類豐富，分佈有不少在中國唯海南獨有的東南亞熱帶物種，同時具有獨特的景觀和文化價值。這結果引起大量傳媒報導，讓公眾和有關部門瞭解保護羊山濕地的重要性及迫切性，有關部門已落實了保護羊山濕地的一系列措施。

Yangshan Wetland in Haikou, Hainan's capital city, has very diverse wetland types, and has been coined a “natural wetland museum”. With Hainan being developed into an international tourism destination, infrastructure projects for real estates and golf courses have escalated in recent years. However, the biodiversity values of Yangshan Wetland was so little known that sensitive species may disappear before they are discovered and documented. KCC recruited and trained a team of dedicated Haikou volunteers to conduct citizen science biodiversity survey in Yangshan Wetland from 2012 to 2013. The survey recorded high biodiversity including a suite of tropical species found nowhere else in China, highlighting the high ecological, cultural and aesthetic values of Yangshan Wetland. Our survey results received wide media coverage and raised conservation awareness of Yangshan Wetland amongst general public and the authorities, and conservation plans have been formulated to protect this threatened wetland.

2 羊山濕地的珍稀水生植物水菜花。
The rare aquatic plant *Ottelia cordata* in Yangshan Wetland.

Protecting threatened habitats

保護受威脅的生境

海南島缺乏大面積的喀斯特石灰岩景觀，但零星散落在島西部的石灰岩森林卻擁有不少特有物種。隨著農墾開發和水泥廠對原材料的需求日益增加，石灰岩森林遭受前所未有的嚴重破壞，但針對這種獨特生態系統的保育和研究甚少。為促進這種生態系統的保育工作，KCC自2004年起積極探索海南石灰岩森林的保育價值；我們資助的科學家發現大片原始熱帶雨林及眾多珍稀物種，包括不少科學新種及中國新紀錄。我們與海南省林業廳於2006年舉辦《海南石灰岩生境保護研討會》，會後將一封由60多個國內外專家簽署的聯署信送呈海南省政府，呼籲重視海南石灰岩森林的狀況，並籌建石灰岩森林保護區。自2009年以來，KCC積極保護海南面積最大、林相最好的俄賢嶺石灰岩森林，資助建設保護管理站、培訓當地護林員和提供設備、資助科研人員和利用紅外線相機進行生物資源及違法活動的長期監測，並協助林業部門將俄賢嶺申報成為正式的自然保護區。

Hainan Island has limited area of limestone karst landscape, but these limestone gems, scattered mainly in west Hainan, support many species found nowhere else on earth. Sadly, the ever-expanding demand for agroindustry and cement factories are putting unprecedented pressures on these limestone forests, and very little have been done in studying and preserving this unique ecosystem. Since 2004, KCC has been working with partners to study Hainan's limestone forest and its conservation values; researchers we supported found pristine rainforest, many new-to-science species and new China records. To conserve the limestone ecosystem of Hainan, KCC and the Provincial Forestry Department co-organised the workshop “Hainan Limestone Habitats and their Biodiversity” in 2006; declaration signed by over 60 ecologists from China and abroad was sent to the Provincial Government, highlighting the conservation needs of limestone

habitats in Hainan, and calling for the establishment of limestone forest nature reserves. KCC has been heavily involved in protecting the Exianling limestone forest, which is the largest limestone outcrop in Hainan with the best-preserved forest. Since 2009, we have sponsored the construction of a ranger station, provided training and equipment to local wardens, and monitored its biodiversity and threats by camera trapping and field research. We work with the Provincial Forestry Department in efforts to gazette Exianling as a formal nature reserve.

1 海南保存最完好、面積最大的石灰岩森林——俄賢嶺。
Exianling – the largest and best-preserved limestone forest in Hainan.



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1 海南青松鄉苗村後方呈淺綠色的是橡膠人工林，與海南長臂猿棲息地毗鄰。橡膠純林佔海南島16%土地，對當地生態構成重大威脅。仿自然橡膠混農林系統模仿天然林多層次結構種植，可減少對環境的負面影響。Rubber plantations (light green-shaded vegetation) behind the Miao village of Hainan's Qingsong Township are adjacent to the Hainan Gibbon habitat. Monoculture rubber occupies 16% of Hainan's land area, posing a major threat to the island's ecosystems. Diversifying plantations using analogue agroforestry that mimics the multi-layer structure of natural forest reduces the negative impact. **2** 底層作物益智及海南柃葉間種在仿自然橡膠混農林系統裡，可為村民提高收入同時，豐富人工林的生物多樣性。Understorey crops cardamom and dumpling leaves intercropping with rubber in the analogue agroforestry can diversify income sources to farmers and biodiversity of the agro-ecosystem. **3** KCC林下套種益智項目的受惠農戶。The beneficiaries of our rubber analogue agroforestry programme.

Making agro-ecosystems sustainable

永續農業生態系統

仿自然橡膠混農林系統

橡膠是中國重要的經濟作物，海南和雲南西雙版納是其主要產區。在海南，橡膠種植是海南史上最成功的扶貧項目，大量天然林被單一種植的橡膠林取代，成為農戶的主要收入來源。膠農大量噴灑除草劑清除林下植被，污染水源和減少生物多樣性；林下缺乏植被覆蓋導致土壤有機質含量和保水能力下降，進一步減低橡膠林的生態系統服務功能，對保護區的生態也構成重大威脅。

模仿多層次天然林的農林混作系統能提高土地利用率，是遏制橡膠林持續擴張和提高生態系統服務功能的有效途徑。自2010年起，KCC聯同海南的合作保護區一起推廣在橡膠林下套種耐陰的本土經濟作物，包括益智（*Alpinia oxyphylla*）和海南柃葉（*Phrynium hainanense*）等。此外，我們也鼓勵當地村民加入降香黃檀（*Dalbergia odorifera*）及土沉香（*Aquilaria sinensis*）等本土樹種，以增加村民經濟收益、農作物多樣性以及農地效益。林下作物也能防止水土流失和增加土壤有機質，並降低村民使用除草劑的需要，增加人工林內的生物多樣性。

RUBBER ANALOGUE AGROFORESTRY SYSTEM

Rubber is considered a strategic crop in China with Hainan and Xishuangbanna of Yunnan Province being its largest local production bases. Almost every rural household in Hainan depends on rubber as the major income source and it is the most successful poverty alleviation programme locally. Extensive natural forests were cleared to establish mono-crop rubber plantations, herbicides are heavily used to clear vegetation, polluting the water sources and reducing biodiversity. The lack of ground cover also reduced soil organic matter and its water retention capacity, further reducing the ecosystem services provided by rubber plantations; this ongoing practice poses a major threat to the ecosystem health of protected areas.

One approach is to intensify rubber plantations with agro-forestry system that mimic the multi-storey structure of natural forest. This improves the ecosystem services and increase income that curtails the further expansion of rubber plantations. Together with our partner nature reserves in Hainan, we promote the planting of shade-tolerant and economically viable native herbs such as bitter cardamom (*Alpinia oxyphylla*) and dumpling leaf (*Phrynium hainanense*) as understorey crops in existing rubber fields. We also integrate the planting of high-value native trees particularly rosewood (*Dalbergia odorifera*) and agarwood (*Aquilaria sinensis*). In addition to income improvement, the introduction of rubber agroforestry increases crop diversity and land use efficiency, prevents soil erosion, accumulates carbon that improves soil fertility and soil moisture retention, deters the use of herbicides and improves biodiversity.



保育海南本地蜜蜂和無刺蜂

濫用農藥導致蜜蜂數量急劇下降，果園現需依賴昂貴的人工授粉，近年引起全球關注。海南島擁有特有種東方蜜蜂海南亞種（*Apis cerana hainanensis*）及兩種無刺蜂——黑胸無刺蜂（*Trigona pagdeni*）和黃紋無刺蜂（*T. ventralis*）。與一般商業蜂場引進的外地東方蜜蜂和西方蜜蜂（*Apis mellifera*）相比，海南蜜蜂的蜂群較小，產蜜量較低，採蜜範圍也遠比西方蜜蜂小且逃蜂的傾向較高，但卻是南藥益智（*Alpinia oxyphylla*）等眾多本地植物的主要傳粉者，對本地生態系統十分重要。

要說服農民改養較低產量的本地蜂甚具挑戰，但我們仍積極在保護區周邊村落推廣生態養蜂，希望村民能從養殖本地蜜蜂中獲得實際收益，從而保存村邊的天然林。我們根據蜜蜂的習性設計了「多層式」和「直立式」蜂箱，為蜂農提供培訓，協助他們達到有機蜂蜜的生產標準。此外，我們推廣少人關注卻在熱帶地區有重要傳粉功能的無刺蜂，專門設計了「兩段式」蜂箱，讓蜂群在收蜜時不受干擾。無刺蜜的蜂蜜有其獨特風味，比一般蜂蜜有更高市場價值。我們也與蜂農一起研發蜂蜜酒，為蜂蜜產品增值。把養蜂結合到橡膠混農林系統裡，更可為益智傳粉，提高產量，達至多贏局面。

CONSERVING THE HAINAN NATIVE BEE AND STINGLESS BEES

The indiscriminate use of pesticides have caused marked global decline of bee populations in recent years, and fruit plantations now resort to the more expensive artificial pollination. Hainan has an endemic subspecies of honeybee (*Apis cerana hainanensis*), and two species of stingless bee (*Trigona pagdeni* and *T. ventralis*). The Hainan honeybee forms small colonies with low honey production compared to other “commercial” bees like the Chinese bee from the mainland and the exotic Western honeybee (*Apis mellifera*). The foraging range of Hainan honeybee is far shorter than that of western honeybee, and has a very high tendency to abscond. Despite these shortfalls, Hainan honeybee is

the major pollinator of many native plants, including valuable herbs like the cardamom (*Alpinia oxyphylla*), therefore is important to the local ecosystem.

Although it was quite a challenge to convince beekeepers to go for the more delicate and less productive local bee, we promoted the idea to farmers around nature reserves in an attempt to provide incentives for villagers to preserve their community forests. We designed the “pagoda type” and “vertical type” beehives to suit the natural behaviours of bee, and train beekeepers to meet organic honey production standards. Besides, we promote keeping the little-known stingless bees of Hainan, which are largely neglected although they are major pollinators in the tropics. We designed a “2-chambers bee box” so that the brood is not disturbed during harvest. The unique tasting stingless bee honey is much more expensive than the usual honey and we are exploring production of honey wine as a value-added product. We also encourage beekeepers to put their beehives under the rubber agroforestry system as these insects pollinate the cardamom and improve yield.

稻鴨共育

為減少種植水稻所需的農藥，KCC在海南和廣西引進了稻鴨共育技術來協助除蟲和除草。鴨子的排泄物為水稻提供養分，游泳時翻動淤泥又能提高土壤含氧量，有助促進水稻生長。引入鴨子不但能節省人力，在水稻收割之時牠們也能成為桌上佳餚。

INTEGRATING DUCKS IN RICE FARMING

To minimise the use of harmful chemicals in rice paddy, KCC introduced the rice-duck farming technique in Hainan and Guangxi to control pests and weeds. Duck’s droppings fertilise the rice and their swimming actions aerate the soil for better rice growth. More importantly, it saves labour and the ducks can be consumed in time with the rice harvest festival.

永續農業推廣

自2010年起，KCC與多位合作夥伴不斷探索，以促進永續農業在中國的研究和發展。課題包括「稻田和氣候變化」以減少稻田所排放的溫室氣體。我們分別對稻鴨共育、稻鴨施砂、稻魚共育、旱稻以及水稻覆膜等農業技術與溫室氣體減排效應進行研究，並向農戶推廣成功的技術。其中一項創新技術是水稻覆膜系統，即以覆蓋膠膜保持土壤溫度和水分，增加微生物活性，有利農作物生長。水稻覆膜技術令有機水稻的產量從每公頃5.2噸大幅提升到10.8噸，減少66%的肥料投入及11%的溫室氣體排放，又能節省水和人力。這技術的應用面積已超過400,000公頃。2012年，我們與四川省農業科學院共同開展以「覆蓋免耕和農林混作」為主題的研究，發現覆蓋免耕系統可以減少農業成本和勞動力的投入，同時還能增加產量和土壤的有機質含量。

2015年，我們開始推廣輪牧系統以作為退化草場的永續土地管理方法。在海南一個退化的坡鹿棲息地中，我們嘗試利用分區輪剪方法，鼓勵坡鹿隨嫩草的生長移動，模仿非洲大草原中草食動物的移動方式。試驗結果顯示，剪草比燒地和犁地更有效地提供坡鹿喜食的食物，也符合生態效益。

SUSTAINABLE AGRICULTURE PROMOTION

KCC has been collaborating with various partners to research and promote the multiplication and advancement of sustainable agriculture in China. We started in 2010 with a study on “Rice and Climate Change” that focused on reducing greenhouse gases in paddy fields. We looked into the methane emission of rice-duck, silicon-rice-duck, rice-fish, aerobic rice, and rice-plastic mulch technology, and promoted the successful models to the wider farming community. One of those innovative and encouraging techniques is the rice-plastic system, in which a layer of plastic mulch could keep the soil warmer, retain moisture and make the soil more biologically active, speeding up crop growth. Rice mulch dramatically increases organic rice yield from 5.2 t/ha to 10.8 t/ha, reduces fertiliser use by 66% and greenhouse gas emission by 11%, as well as reducing irrigation water and labour. The adoption rate had now reached

more than 400,000 hectares. The succeeding research topic was “Mulch-No Till and Agroforestry” in 2012 in collaboration with the Sichuan Academy of Agricultural Sciences, and proved mulch-no till system could reduce farm inputs, labour, increase productivity and retain more carbon in the soil.

In 2015, we started to promote rotational grazing as a sustainable management system for the recovery of degraded rangeland. In a degraded habitat of Hainan Eld’s Deer (*Rucervus eldi*), we piloted rotational mowing of the grassland to encourage movement of the deer looking for young grass shoots, mimicking the natural movement of herding ungulates in African savannahs. We found out that mowing is more eco-friendly than burning and ploughing.



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Biodiversity assessments

生物多樣性調查

華南地區面積遼闊，長期受嚴重人為干擾，保存較完好的森林都隱藏於偏遠山區深處。要評估區域內的保育重點和動植物的最新分佈和狀況，由一隊固定的生物多樣性專家對不同林區進行快速調查是一項比較簡單高效的方法。自1998年起，KCC與夥伴機構合作，在華南地區超過60個林區進行調查，至今共出版了40個調查報告和一系列相關的科學文章，發現和描述了不少中國昆蟲、魚類、兩栖爬行類、鳥類和獸類科學新種及新紀錄，為研究和保護華南的生態狀況提供最新資料。華南森林生物多樣性調查報告系列可於嘉道理農場網頁下載。

海南年度越冬水鳥調查

海南島是東亞——澳大利亞候鳥遷飛路線上的重要一站，島上大面積多樣化的濕地生境為各種水鳥提供理想的棲息地，可惜大部份濕地並未受保護，其保育價值也未被認識。自2003年起，KCC連同海南省林業廳及其他夥伴，每年冬季在全島超過70個濕地進行水鳥調查，發現了大批新紀錄，和確認一些全球瀕危物種包括黑臉琵鷺（*Platalea minor*）新的越冬地。這些濕地的重要保育價值也因此被有關部門認識，並因而建立新的濕地保護區。調查同時為海南培養了一批鳥類調查人員，他們當中有不少已經成為保護區和NGO的骨幹成員。

The extensive South China region has experienced sustained and severe human impacts. The remaining good-quality forests are scattered in remote mountainous areas. Rapid survey by a fixed team of biodiversity specialists is an efficient method to prioritise conservation interventions and understand the current status and distribution of the region's flora and fauna. Since 1998, KCC and partners have been carrying out rapid biodiversity assessments in over 60 forest areas throughout South China. We have published 40 field reports and a series of scientific publications, including the discovery of many insects, fishes, amphibians, reptiles, birds and mammals which are new-to-science or new to the provinces, updating the conservation values and threats of South China. South China forest biodiversity report series can be downloaded from the KFBG website.

HAINAN ANNUAL WINTERING WATERBIRD SURVEY

Hainan is an important stopover along the East Asian-Australian Flyway for migratory birds. Its diverse and extensive wetland ecosystems provide suitable wintering ground for different waterbirds. Many of these sites are unprotected and their conservation values are not fully recognised. Since 2003, KCC partnered with the Hainan Provincial Forestry Department and other collaborators to conduct annual wintering waterbird survey in over 70 sites throughout the island. These surveys yielded many new island records and discovered new wintering sites for globally threatened species, such as those of the Black-faced Spoonbill (*Platalea minor*). The conservation values of these sites have since been recognised and some have been designated as nature reserves. The surveys also trained up local birders, some of whom are now core members of nature reserves and NGOs.



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1 KCC團隊深入雲南林區放置紅外線相機。The KCC team crossing a rapid to install camera traps in Yunnan. 2 魚類調查中水下拍攝的海南異鱾。An underwater photo of *Parazacco fasciatus* taken during a fish survey. 3 鳥類對環境變遷極為敏感，調查所累積的資料可以見證海南在這個劇變時代的環境變化。Birds are very sensitive to environmental changes which make them a good indicator of ecosystem health of Hainan. 4 KCC帶領護林員在高黎貢山進行生物多樣性調查。KCC leading the wardens to conduct biodiversity survey in Gaoligongshan. 5 夜間考察是KCC野外調查的常規活動。Night survey is part of the routine fieldwork for KCC.

KCC團隊發表的科學新種

Number of New-to-science
Taxa Described by KCC

48+

Opsitotropis laui

Leptolalax tengchongensis

Talcaea tyensani

Cnidopus yingchongensis

Terniopsis daoyinensis

Gekko kwangsiensis

Brachytarsophrys popoi

Emberiza pusilla

Porphyrio porphyrio

Siphodon atropurpureus

Triibibys albonubes

Chrysoglyphus vittatus phoopen

Opisthotropis maculosa

Capreomys rubidus

Calidris melanotos

KCC團隊發現的 國家/區域新紀錄

100+

Number of National/Regional New
Records Discovered by KCC



- 1 雲豹 Clouded Leopard (*Neofelis nebulosa*)
- 2 貢山麂 Gongshan Muntjac (*Muntiacus gongshanensis*)
- 3 培訓護林員使用紅外線相機。Teaching wardens how to set up camera traps.
- 4 紅腹角雉 Temminck's Tragopan (*Tragopan temminckii*)

紅外線相機調查

我們利用透過動物體溫觸發自動拍攝的紅外線相機來調查和監測野生動物。自2002年以來，KCC在海南、雲南、廣西、廣東、江西和安徽等多個省份採用此技術，是中國首批使用此野外調查技術的團隊之一。十多年來，我們的調查資料不僅為多個保護地提供了重要的本底資料和保護依據，同時也獲得了一系列中國珍稀瀕危動物（如馬來熊、水獺、雲豹和貢山麂等）的影像資料，並為這些動物的最新分佈及狀況提供了重要信息。

CAMERA TRAP SURVEY

We have been using camera traps to monitor wildlife in our surveys since 2002, and is one of the first teams to deploy this technique in China. We have been deploying camera trapping technology in Hainan, Yunnan, Guangxi, Guangdong, Jiangxi and Anhui provinces, which obtained invaluable information for the planning and conservation work in many nature reserves, and also collected rare images of some highly threatened species, such as Sun Bear, Clouded Leopard, otters and Gongshan Muntjac, providing us with solid evidence to update the status and distribution of many species.



Capacity building 人才培育

協助保護區提升管理質素是KCC的工作重點之一。除了直接參與海南鸚鵡嶺國家級自然保護區的管理工作外，我們也為不同保護區在功能區規劃、資源管理、科研監測和社區工作各個範疇提出針對性建議，並引入合適的先進保育理念，同時也安排保護區管理人員到國內外保護區及研討會學習交流。為提升合作保護區的士氣及歸屬感，我們為他們設計保護區標誌，用於宣傳和教育材料及團隊制服上。

KCC定期為保護區前線護林隊伍提供各種培訓，內容包括巡護和考察技巧、物種鑒定與調查，以及野外工具使用等。我們讓護林員參與野外調查和物種監測，表現優秀者更會接受進一步培訓，強化野外考察和物種鑒定的技巧，增值成為本土專家，參與科研工作。不少護林員來自當地鄉村，世代靠森林資源為生。我們長期參與前線工作，耳濡目染下對他們灌輸保育概念，將昔日破壞者轉化為森林守護者，並把這種風氣帶回社區。

自2013年起，KCC會選出一個廣泛被忽略的重要保育議題，並召開保育論壇，廣邀國內外專家及保護區管理人員出席交流，推動中國保育力量與國際接軌。論壇主題包括「紅外相機野生動物監測」、「中國生態保護本土機構發展」、「中國熱帶及鄰近地區獸類分類與保育」、「中國犀鳥保育」、「全球坡鹿保育」等。KCC也經常在國際保育研討會上分享中國及鄰近地區的保育狀況，讓各國人士更瞭解中國在生物多樣性保育方面取得的成就及面臨的挑戰。我們也積極與各地專家和保育機構交流最新信息

和尋找合作機會，多位成員獲邀擔任國際自然保護聯盟（IUCN）轄下物種生存委員會不同專家組的成員，更多次參與IUCN紅色名錄物種評估工作。

KCC被關鍵生態系統合作基金（CEPF）選為中緬生物多樣性熱點（簡稱中緬熱點）的中國區域執行團隊，負責管理所有在中國的資助項目，包括香港、澳門、海南島和廣東、廣西及雲南的南部地區。CEPF由法國國際發展署、保護國際基金會、歐洲聯盟、全球環境基金、日本政府、麥克亞瑟基金會以及世界銀行聯合發起，主要目的是推動民間組織參與生物多樣性保育。2013–2020年，CEPF在中緬熱點開展第二期項目，期間投資總計六千萬元人民幣，用於資助包括中國南部、緬甸、老撾、越南、柬埔寨和泰國六國的生物多樣性保護項目。如欲瞭解更多，請前往嘉道理農場網頁www.kfbg.org/chi/CEPF-main.aspx或以電郵方式與我們聯絡：cepf@kfbg.org。此外，KCC的專家也被邀請擔任中國阿拉善SEE基金會「勁草同行」項目的公益導師及澳洲保護區管理及培訓組織PALRC的督導委員會成員，協助促進本土NGO以及亞太地區保護地的能力建設。

Enhancing nature reserves’ management capacity is one of KCC’s priorities. In addition to direct involvement in managing Hainan Yinggeling National Nature Reserve, we advise different reserves in the aspects of reserve planning, resource management, research and monitoring, and community-based conservation. We recommend specific conservation interventions, as well as introducing appropriate advanced conservation approaches to reserve management. We also organise local and overseas study tours for our partners. To boost the morale of our partners, we designed a number of reserve logos which are proudly embedded in their education materials and team uniforms.

KCC also provides regular training programmes for frontline wardens; topics cover patrol and survey techniques, species identification and inventory, and use of field equipment. We involve wardens in field surveys and monitoring, and advanced training will be given to outstanding performers. Some of them are becoming local experts or “parataxonomists” and contributing to actual research work. Most wardens are local villagers with long tradition of forest resource use; we instil conservation concepts through working with them on a day-to-day basis, slowly transforming former hunters/loggers into forest guardians, who help spread conservation messages back in their communities.

Since 2013, KCC identifies major conservation issues which has been largely neglected and organises conservation forums, topics include “Camera trap in wildlife monitoring”, “Development of China’s grass-root conservation NGOs”, “Conservation strategy of overlooked mammals in tropical China”, “Conservation of hornbills in China” and “Range-wide conservation of Eld’s deer”, etc. The forum serves as a major platform for sharing and exchange amongst reserve managers and experts, in a hope to raise the capacity of China’s conservation practitioners to international standard. KCC also regularly shares information on conservation issues of China and surrounding areas in international conservation conferences so that the international community is kept abreast of the development in China. KCC maintains regular communications with the international conservation community

to exchange latest conservation news and seek opportunities for collaboration. Many of us are members of various IUCN Species Survival Commission Specialist Groups and contribute to many species assessments for the IUCN Red List.

KCC is the Regional Implementer for China’s Critical Ecosystem Partnership Fund (CEPF), responsible for managing all projects in South China includes Hong Kong, Macau, Hainan Island, southern parts of Yunnan, Guangxi and Guangdong. CEPF is a joint initiative of l’ Agence Française de Développement, Conservation International, the European Union, the Global Environment Facility, the Government of Japan, the John D. and Catherine T. MacArthur Foundation, and the World Bank. A fundamental goal is to ensure that civil society is engaged in biodiversity conservation. In the years 2013–2020, CEPF implemented the second phase investment within the Indo-Burma Biodiversity Hotspot, investing US\$10 millions in biodiversity conservation projects in South China, Myanmar, Laos, Vietnam, Cambodia and Thailand (More information is available on KFBG website: www.kfbg.org/eng/CEPF-main.aspx. For enquiries, please contact us: cepf@kfbg.org). Specialist from KCC is also invited to be the Advisor for the Chinese conservation NGO called “Society of Entrepreneurs & Ecology” to enhance the capacity of NGOs in China, and the steering group member of the Australia-based Protected Areas Learning & Research Collaboration (PALRC).





Awareness raising

提高公眾意識

讓藝術融入環境教育

近年興起將藝術融入環境教育，以另一角度引領大眾欣賞自然。2015年起，KCC在項目點周邊嘗試以壁畫形式宣揚保育訊息，毗鄰海南長臂猿棲息地的白沙縣青松鄉、海南邦溪省級自然保護區和海南省樂東縣一個有圓鼻巨蜥出沒的村落是我們進行壁畫創作的試點。我們與大學藝術系學生義工和村民在牆上描繪海南熱帶雨林的風光及特別的動植物，鼓勵村民珍視與他們為鄰的鳥獸蟲魚。壁畫除了有溫馨提示作用外，也為村落帶來更多色彩與話題，村民及保護區都十分受落。此外，我們也舉辦不同的藝術創作比賽，例如犀鳥繪畫比賽和國際水獺研討會標誌設計比賽等，希望喚起當地居民及市民大眾對生態保護的關注。

BRINGING ART INTO ENVIRONMENTAL EDUCATION

Encouraging the general public to appreciate nature through art is becoming a popular form of environmental education in recent years. Since 2015, KCC has started using murals as a soft approach to promote conservation messages. We selected several sites for our maiden mural works – villages in Qingsong Township that are privileged to live close to the Hainan Gibbons, Hainan’s Bangxi Provincial Nature Reserve, and the villages in Hainan’s Ledong County which are home of the Water Monitor Lizard. Together with art undergraduate volunteers, appealing paintings of Hainan’s tropical forests and impressive wildlife were painted on walls. Villagers were keen to participate in the murals through which we hope they would value the beauty of forests and biodiversity they live with. The murals might fade later, but hopefully the seeds of protecting nature could bear fruits. In order to raise public awareness on wildlife conservation, we also organise various design and drawing contests such as hornbill drawing competition and logo design competition for the International Otter Congress.

出版物及宣傳品

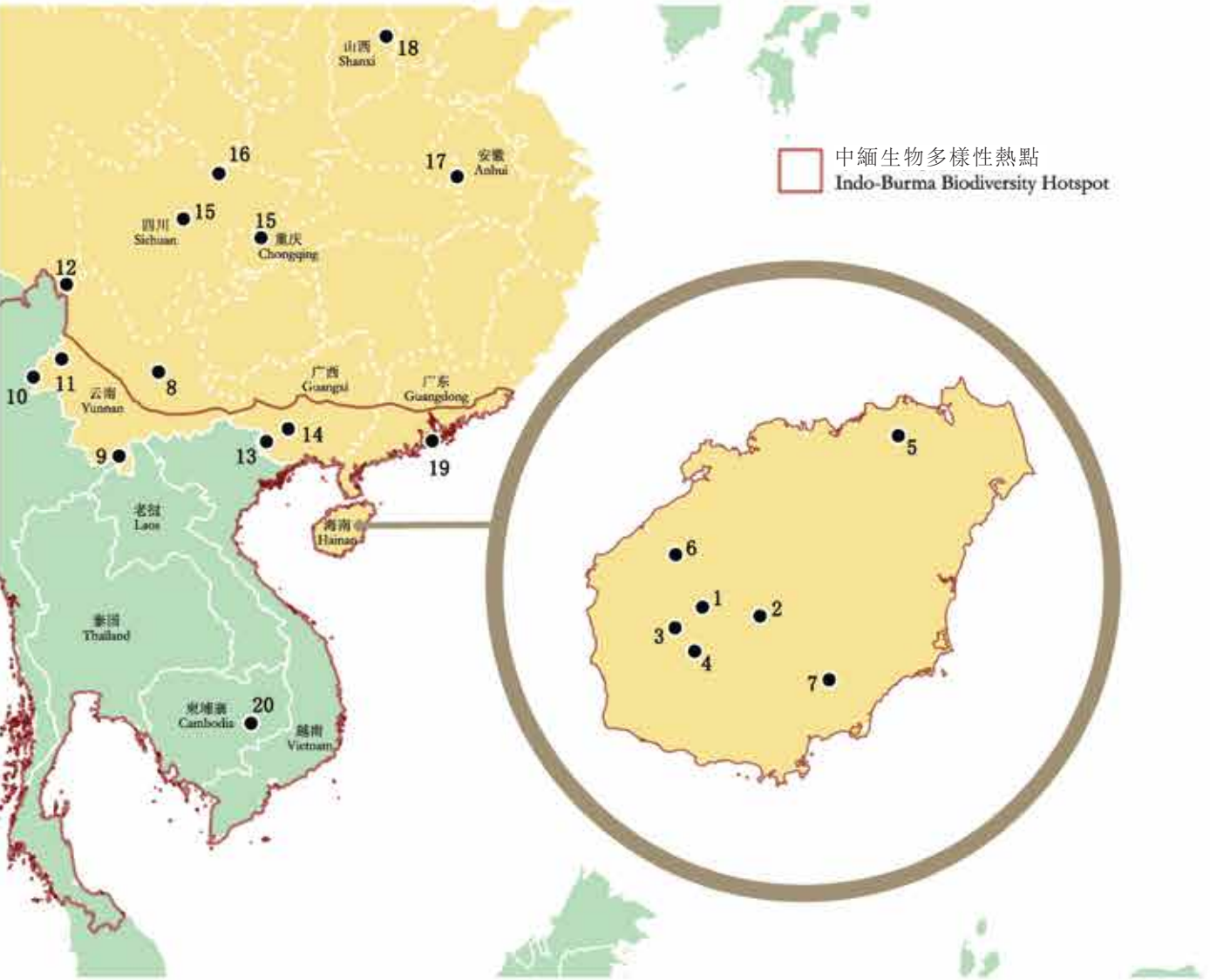
KCC會把項目點內發現的重要及珍稀動植物以文字及影像詳細記錄，通過社交媒體及出版各類書籍、報告及科學文章，讓同行、保護區工作人員及自然愛好者更加瞭解中國的生物多樣性及自然保育的現狀、進展和需要。籌備多年的海南自然圖鑑系列《樂賞大自然》涵蓋了海南主要的動物類群，各圖鑑由長期在海南進行研究的專家學者編著，附以大量在野外實地拍攝的活體彩照，是關注該地區生物多樣性人士的必備讀物。同類的出版物還有以我們歷時三年考察成果為基礎的《高黎貢山騰衝生物多樣性》。我們也編制不少面向大眾及小朋友的科普出版物及宣傳品，例如《森林樂猿》和《丘陵傳說》，把海南長臂猿和海南坡鹿的保育歷史和故事以簡單有趣的繪本形式展示。其他宣傳和教材包括宣傳單張、海報、壁報板、揮春、月曆、貼紙、T恤、環保袋以及您正在閱讀的資料冊。若對KCC的出版物感興趣，請聯絡我們：kcc@kfbg.org。

PUBLICATIONS AND PUBLICITY MATERIALS

KCC makes detailed written and audio-visual records of significant findings from our project sites, and shares these information with nature reserve staff, fellow conservation practitioners and nature lovers via social media, publication of books, reports and scientific papers. Our Hainan Wildlife Field Guide Series has taken years of preparation by specialists working in Hainan; it provides update information on major wildlife groups with colour photographs taken in the wild, and is essential reading for those interested in biodiversity of the region. A similar published field guide is based on our 3-year survey of the Tengchong forest of Gaoligongshan in Yunnan Province. We also produce popular readings and publicity materials for the general public and children, such as the Hainan Gibbon and Hainan Eld’s Deer storybooks which explain the conservation history of the two species in cartoon. Other publicity materials include brochures, posters, billboards, Chinese New Year red banners (Fai Chun), calendars, stickers, t-shirt, tote bags and of course, this information pack. Please contact us if you are interested in our publications: kcc@kfbg.org.

Project sites of Kadoorie Conservation China

嘉道理中國保育項目分佈圖



- | | | |
|---|---|---|
| 1. 霸王嶺國家級自然保護區
Bawangling National Nature Reserve | 8. 雲南閉殼龜保育
Yunnan Box Turtle Conservation | 15. 「永續農業先鋒」計劃
Sustainable Agriculture Pioneers Scheme |
| 2. 鸚哥嶺國家級自然保護區
Yinggeling National Nature Reserve | 9. 西雙版納國家級自然保護區
Xishuangbanna National Nature Reserve | 16. 唐家河國家級自然保護區
Tangjiahe National Nature Reserve |
| 3. 俄賢嶺石灰岩森林
Exianling Limestone Forest | 10. 銅壁關省級自然保護區
Tongbiguan Provincial Nature Reserve | 17. 天馬國家級自然保護區
Tianma National Nature Reserve |
| 4. 佳西省級自然保護區
Jiaxi Provincial Nature Reserve | 11. 高黎貢山國家級自然保護區
Gaoligongshan National Nature Reserve | 18. 山西華北豹保育
Shanxi North Chinese Leopard Conservation |
| 5. 海口羊山濕地
Haikou Yangshan Wetland | 12. 滇西北紅外線相機調查
Northwest Yunnan Camera Trap Survey | 19. 廣東水獺保育
Guangdong Otter Conservation |
| 6. 邦溪省級自然保護區
Bangxi Provincial Nature Reserve | 13. 弄崗國家級自然保護區
Nonggang National Nature Reserve | 20. 柬埔寨生物多樣性保育
Cambodia Biodiversity Conservation |
| 7. 吊羅山國家級自然保護區
Diaoluoshan National Nature Reserve | 14. 西大明山省級自然保護區
Xidamingshan Provincial Nature Reserve | |