



Kadoorie Farm & Botanic Garden

ANNUAL REPORT 2013

To harmonise our relationship with the environment

Contents

About KFBG	02
KFBG Mission and Vision	03
Foreword	04
Sustainable Living	06
Holistic Education	14
Nature Conservation	22
Holistic Estate Management & Minimal Eco-Footprint	38
An Evolving Organisation	44
Members of the Board and Senior Management	49
Appendix	50

Kadoorie Farm and Botanic Garden Annual Report 2013

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Cover photo: A view of the Rainbow Pavilion surrounded by the trees in the Upper Farm area. Up at the Rainbow Pavilion, there are magnificent views over the Great Falls.

About KFBG

Kadoorie Farm and Botanic Garden (KFBG) is situated in the rural New Territories, on the northern slopes of Tai Mo Shan, Hong Kong's highest mountain. Two steep spurs enclose its deep-set valley. Within KFBG are streams, woodlands, orchards, vegetable

gardens, walking trails, live animal exhibits, floral exhibits, sustainable agriculture demonstration plots, art exhibits, a wild animal rescue centre, a native tree nursery, and, other conservation and education facilities.

In the post-war years, Hong Kong was flooded with destitute immigrants. Many had traditional knowledge of crop production and livestock farming but no stock, others had land but no experience. They required support to rebuild their lives. In 1951, in response to these pressing human needs Lawrence and Horace Kadoorie established the Kadoorie Agricultural Aid Association (KAAA), which became a key partner of the Hong Kong Government in devising and implementing a plan to help Hong Kong feed itself. The Kadoorie brothers, part of a well-established business family, saw wealth as a sacred trust to benefit mankind. With such aid, thousands of people received agricultural training; thousands of pigs, chickens and ducks were bred and given to farmers or sold to them on credit; thousands received micro-loans; and numerous wells, irrigation channels, roads, footpaths, bridges, pigsties and farm houses were built. The farm site at Pak Ngau Shek was established in 1956 as a base for livestock breeding and distribution, agricultural research, farmers training, public education and recreation. The barren slopes were terraced and planted with orchards and vegetable gardens. The development of the botanic garden began in 1963 and the plant conservation programme from 1972.

On 20th January, 1995, the Legislative Council of Hong Kong passed an Ordinance (KFBG Chapter 1156) incorporating KFBG as a non-profit corporation designated as a conservation and education centre. It is a unique public-private partnership, for while the KFBG Corporation is a public organisation, it is privately funded by the Kadoorie Foundation (over HKD 80 million per year); these funds are supplemented by small donations from the public and occasional project-related Government grants that enable us to extend our work.

Since 1995, KFBG has been conducting a wide range of nature education, nature conservation and sustainable living programmes both on-site, and, throughout Hong Kong and South China.

In a time of severe global crisis – including the inter-related issues of widespread disconnection from nature, each other and self; the ever-increasing exploitation of, and unwise over-reliance on the world's dwindling resources to support unsustainable lifestyles; climate change; shrinking of natural habitats and species loss – KFBG, as an organisation, raises awareness, undertakes rigorous science-based species conservation and ecosystem restoration, and offers new ways of thinking and living to respond to the world's problems. Hence, our work brings hope and improvement by focusing on nature conservation, sustainable living and holistic education that re-connects people with nature. By working together with the public, Governments, academia, NGOs and businesses, we can protect our common future.

Mission & Vision

MISSION

To harmonise our relationship with the environment.

VISION

A world in which people live sustainably with respect for each other and nature.

VALUES

Sustainable Living

Appreciating the impact of our actions with regard to current and future generations. Having awareness of our connection with the environment. Valuing simple and responsible lifestyles.

Justice

Being fair and accountable. Valuing socially equitable systems that protect the health of the planet, the people and their way of life. Protecting future generations.

Love

Having self-awareness and understanding of the inter-relationship of all things. Having compassion and respect for all life. Recognising that outer discord is a reflection of inner discord. Striving for inner silence.

Participation

Engaging mentally, physically, emotionally and spiritually; fostering respect for different viewpoints, openness, dialogue and teamwork.

Professionalism

Being a role model of caring, integrity, commitment, professional standards and best practices for partners, organisations, individuals and communities.

Learning

Being adaptive and flexible to changing circumstances. Having a holistic outlook. Being practical, objective, creative and insightful.

Happiness

Appreciating that our happiness lies in creating and sharing happiness with others.

Foreword

A recent visitor to KFBG commented:

"Most organisations today seem to focus on individual bits of the story, and that inevitably means treating symptoms rather than root causes. What really excites me about [KFBG] is that you are not afraid to look at the big picture, bridging those all-too-common divides between the spiritual/inner and political/outer, between East and West, the social and environmental, the urban and rural, the practical and theoretical, the grassroots and establishment."

This welcome feedback goes right to the heart of KFBG's mission and vision. Only by understanding the connections between the different dimensions of our lives on this planet - "Soil, Soul and Society", as another KFBG partner puts it - can we hope to devise solutions to the pressing challenges which face us. This is KFBG's niche and great strength; in each of our core programmes - Nature Conservation, Sustainable Living and Holistic Education - we are pushing the boundaries of human understanding and capacity, with great staff who are dedicated to making a difference in this world.

As long as the 'inner' world is polluted with misinformation and divisive values, it will find its reflection in the 'outer' world, in social unrest and ecological degradation - fuelled by regimes of regulation that promote the expansion of the global economy for the benefit of the few, at the expense of the majority of people and the planet.

This is why, in addition to its focus on 'ecology' (the etymology of which suggests 'knowledge of home'), KFBG also focuses on 'economy' ('management of home'). This is one reason for the development of KFBG's new facility, the 'Green Hub', which will open in Tai Po in 2014. In addition to being a venue for workshops, courses and retreats, through its vegetarian cafe and community markets, the Green Hub aims to help model the development of local economics and community resilience as an answer to the world's problems; less waste, more locally-oriented jobs and happier people!

If you have not yet become a 'Friend of KFBG' and subscribed to our newsletter, 'Connections', then I warmly invite you to do so (information is available on our website). In this way you will become aware of the many, varied programmes we operate and ways to contribute to them. Please join our family!

Thank you.

Andrew McAulay

Chairperson

Sustainable Living

KFBG collaborated with government and other organisations to promote sustainable living in 2013. We held numerous training courses and

workshops throughout the year, with organic resource recovery a prominent focus in our efforts. Our new teaching initiatives on Farmers' Reskilling, Aquaponics and Beekeeping also proved to be very popular. Our trial aquaponics scheme progressed positively, and work on the Green Hub project, at the Old Tai Po Police Station took off with the commencement of the main building contract in May. We rounded out a successful year with our Good Life Festival in November.

Raising public awareness for sustainable living

The **Sustainable Living and Agriculture** department initiated our **Z Carbon Pioneer** project, which aims to raise community awareness of the impacts of Peak Oil and Climate Change through film screenings and discussions.

On the Farm estate, six **Dai Hua Bai piglets**, donated by the National Livestock Science Research Centre in Guangzhou, were put on display at the Piggery to promote awareness about sustainable agriculture and the impacts of industrial farming.



Our new education ambassadors, Zoe, Clio, Izzie, Dragon, Bao and Andrew have been visited by tens of thousands of visitors since they reported duty in September.



Traditional puppetry remained the highlight of the Good Life Festival.



Uncle Lee, our beekeeper, telling participants of the Good Life Festival why the native bee is the most sustainable choice for our apiary.

Our popular Lifestyle of Health and Sustainability (LOHAS) exhibition, previously displayed at the Peak Galleria in 2012, was relocated to the LOHAS Cheung Chau education centre, which opened on 17th November 2013. We are also advisors to LOHAS Kwai Tsing, which was launched on 22nd December.



Young participants making pesto with locally produced herbs in Good Life Festival's Herbal Experience Workshop.

The **Good Life Festival**, held in early November, attracted almost 3,300 visitors in spite of the *Strong Wind Signal No.3* being hoisted for most of its two days. Visitors were able to shop at the green market, enjoy a range of music and drama performances and attend sustainable living workshops.

For several years we have engaged the public on the issue of carbon dioxide emissions through two dedicated websites. Our **One Tonne Challenge** website (www.climatechange.hk), which encourages members of the public to reduce their carbon-dioxide-generating activities, now has more than 28,000 registered users, with a cumulative total of over 92,500 tonnes of pledged carbon dioxide reduction. Meanwhile, the **www.lowcarbonliving.hk** website, of which KFBG is a project partner, received 12,300 hits in 2013.

Reskilling for sustainable living

We organised a number of courses on various aspects of sustainable farming throughout the year, for new and existing farmers. This year we were able to expand our programme with a new course on beekeeping, and workshops on aquaponics and reskilling for farmers. We also gave training in sustainable agriculture and organic resource recovery to staff and volunteers of the Environmental Association (Formerly the Tai Po Environmental Association) in March and taught part of the Sustainable Ecological Ethical Development (SEED) Foundation's 'Hong Kong Organic Farming Introductory Course' in October.



Sustainable Living and Agriculture Department (SLA)'s 'Growing Vegetable Sustainably with Solar Rhythms' course.



SLA's regular Introductory Course on 'Sustainable Agriculture for City Farmers' is one of the most popular farming courses in Hong Kong.

SUSTAINABLE FARMING COURSES AND WORKSHOPS ORGANISED IN 2013:

Course Title	Date	Number of Courses	Venue	Number of Participants
Beekeeping	Aug	2	KFBG	34
Aquaponics Training Workshop	Jun; Aug	2	KFBG	52
3-day Sustainable Agriculture Course for City Farmers	Mar – Apr; Sep – Oct	2	KFBG	48
1-day Sustainable Farming Course	12 Jan 2014	1	KFBG	21
Farmers' Reskilling Workshop	Jul – Aug	4	KFBG	36
Community Farming (1-day course)	16 Feb; 28 Sep	2	KFBG	43
Growing Vegetables Sustainably with Solar Rhythms	May	1	KFBG	38

PUBLIC WORKSHOPS AND TALKS ORGANISED IN 2013:

Event	Date (and Number of Workshops)	Venue or Organisation	Number of Participants (estimated)
LOHAS Square	16 Dec 2012 – 31 Dec 2013 (15)	Central Star Ferry Pier	365
Good Life Sundays	Nov – Dec	Central Star Ferry Pier	220
growFOOD@HOME workshop	19 Jul (1) 18 Oct (1)	Chinese University of Hong Kong Baptist Wing Lung Secondary School Parent Teacher Association	36 22
Low-carbon diet talk	5 Jan (1) 23 Nov (1)	Yuen Long Public Library Chinese University of Hong Kong Faculty of Medicine	25 22
LOWcarbonDIET@HOME workshop	Jan – Nov (5)	At KFBG or various venues provided by participating organisations for staff training or public participation	163
One Tonne Challenge talk	24 Aug (1)	Yuen Long Public Library	40
Easy Energy Save with Carbon Audit talk	31 Oct (1)	Eco Expo Asia	80

Our aquaponics trial (combined fish and vegetable production) went well this year and we shared our experiences with a group of mainland China members of the Aquaponics Association of Asia-Pacific and other food production enterprises, to facilitate their planning of aquaponics projects in China. In March, two of our staff visited Chongqing Health Culture Revival in China to evaluate and give advice on a no-tillage mulching experiment for vegetable production.



Participants of a growFOOD@home workshop.

Facilities supporting sustainable living

KFBG lent its expertise to Macau's Civic and Municipal Affairs Bureau to help develop **Macau's first community farm** at Coloane, scheduled to open in 2014. We provided advice on farm design and water and organic waste management, including large-scale kitchen waste composting and bio-charcoal technology for wood waste recovery. KFBG also developed training and interpretation resources, training programmes for Bureau staff, an exhibition and a series of public lectures and community workshops jointly with the Bureau.

We maintain an advisory role at a community farm, jointly organised by Tai Po Market Public School and the Salvation Army Tai Po Multi-service Centre for senior citizens, and have also been advising City University of Hong Kong (CityU) on technical matters related to a project in which a team of university students have set up a roof garden at the campus for food production.

The Sunday **Central Farmers' Market** (formerly Farmers' Market@Central), which fosters mutual support between local food producers and consumers, was convened 50 times in 2013. Eleven or twelve farmers participated each week, and their average market day sales exceeded HK\$2800 per farmer – an increase of 33% over the preceding year. The Market continued to provide a venue for city-dwellers to engage in, and learn more about, sustainable living activities through workshops and non-food stalls.



A public training session for Macau's first community farm at Coloane.



A market tour at the weekly Central Farmers Market, to provide an orientation about local organic farmers, for new customers.

Mobilising the community

We continued our efforts to engage the community and to build sustainable living partnerships with other groups, organisations and government departments. A full list of our activities in this regard is provided in **Appendix 1**.



Hong Lok Yuen residents joined to swap workshop to share their home-grown produce and home-made food.

The inaugural **Food Waste Recycling at Housing Estates** project at Hong Lok Yuen, Tai Po, has been a great success in encouraging residents to grow their own organic food at home, making use of domestically-generated 'waste' and reducing their carbon footprint. KFBG staff are actively engaged in the project, which is funded directly by the Environmental Protection Department (EPD), and in 2013 we organised five workshops for the participants on the themes of composting, organic planting and edible herbs. We also facilitated swap activities for residents to share skills and home-grown produce, laying the groundwork for further community sustainability initiatives.

Our **WasteReduction@TaiPo** project, generously funded by Tai Po District Council (TPDC), was wrapped up in March 2013. The project raised community awareness of food waste recovery and green consumption in Tai Po, through tours, workshops, newsletters and production of a series of green maps; the Environmental Protection Department subsequently recommended the green map concept to all district councils in Hong Kong as a model for promoting community action.



One of the green maps that SLA produced to introduce small shops in Tai Po to raise public awareness of localized shopping.



The newsletter of the WasteReduction@TaiPo project.

KFBG organised another TPDC-funded project, **Eat Well Ambassador**, toward the end of the year. This project involved six half-day workshops on sustainable food systems and waste reduction, and – in conjunction with our other efforts in the district – has helped build up a core group of Tai Po residents supporting community transition to sustainable living.

We assisted the Correctional Services Department in establishing a food waste composting programme at Tai Lam Correctional Institution, and helped Drainage Services Department (DSD) set up a trial to investigate the feasibility of composting in on-site treatment of sewage sludge at the Peng Chau Sewage Treatment Plant.

Our staff participated in the Environmental Campaign Committee (ECC)'s Summit on Community Participation Programme on Environmental Protection in February, highlighting the importance of agriculture in promoting organic resource recycling, and we have also been active participants in a government consultation exercise on implementing a municipal solid waste charging system that would further encourage community waste reduction.



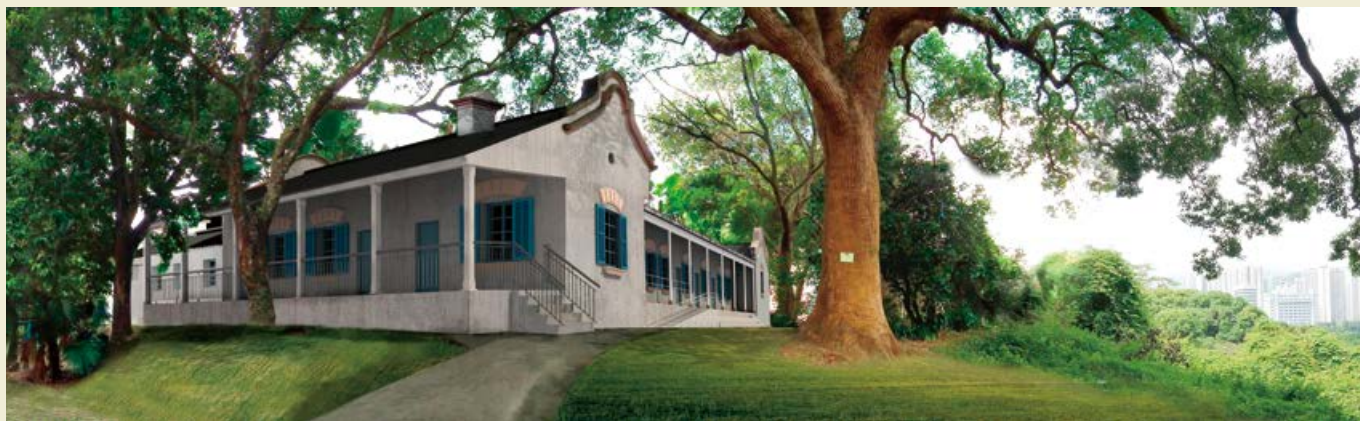
SLA's Eat Well Ambassador participated in Food Grace's food rescue programme at Tai Po Market.



The Drainage Services Department set up a trial to explore sludge treatment through composting at Peng Chau.

The Green Hub

After detailed negotiations with several Government Departments and a protracted tendering process, the Old Tai Po Police Station was finally officially handed over to KFBG in May 2013, and renovation works to turn this fine old site into a **Green Hub for Sustainable Living** commenced. While these works are ongoing, we are busily developing the educational resources for our future Green Hub programmes, including a Heritage Trail, which is being planned with help from the Chinese University of Hong Kong's Centre for Architectural Heritage Research. The Green Hub will be a focus for our community-based projects in Tai Po, as well as a venue for workshops and permaculture courses and should open in the spring of 2015.



The facade of the Green Hub (photomontage).

Working demonstrations of sustainability

IN 2013, THE FOLLOWING AGRICULTURAL PRODUCE WAS HARVESTED AT KFBG:

Type of Produce	Eggs	Fruit (kg)	Vegetables (kg)	Coffee (kg)	Green Tea (kg)	Chrysanthemum (kg)	Roselle (kg)	Fruit Tree Seedlings	Potted Plants	Compost (kg)	Honey (litre)
Yield	171,166	6,807	23,132	4	35	14	49	272	1,624	52,600	84

The KFBG estate features many working examples of sustainable agricultural activities. These are embodied in the **'One Dou Farm'**, which provides visitors with an opportunity to observe a wide range of integrated traditional organic or permacultural farming techniques in practice. This year we initiated a one-year trial project with 'The Mushroom Initiative', a local NGO, to explore use of food waste compost in organic mushroom cultivation. The trial was set up at the KFBG Chicken Area and has been producing fresh mushrooms for consumption in the Farm canteens since June 2013.



Product of the trial project which uses food waste compost as the medium (soil) for mushroom growing.

Our trial **aquaponics system**, which combines fish production and vegetable cultivation with high organic resource recovery, yielded its first fish harvest (of Jade Perch) in April. The system has attracted much interest and we are advising two local schools in development of their own aquaponics trials.



Jade Perch harvested from SLA's aquaponics trial project.

We have been producing **bio-charcoal** from wood waste since late 2010. This year we fed some 3.4 tonnes of woody waste, generated from on-site tree management and horticultural practices, into our kiln, for a yield of almost ¾ tonne of bio-charcoal. Both products were on sale in our Farm Shop, and were also available to participants of our Farmers' Reskilling courses and to those attending the two-day Good Life Festival. The bio-charcoal can be used for soil enrichment (after loading with nutrients by soaking in compost) humidity control and odour removal. The wood vinegar can be diluted for use as fungicide and soil conditioner; we are also assessing its use as a general disinfectant.



Bamboo bio-charcoal produced by KFBG is put on sale at the Farm Shop.



Red Lady, the non-GM papaya variety chosen for the NO-GMO pilot project, performed well in adaption and yield.



'NO GMO' Press Conference was held on 2nd December, 2013.

The **Non-GM Papaya Zone** pilot project, which seeks to replace genetically modified papaya plants with uncontaminated papaya plants in four New Territories villages (Hok Tau and Sze Tau Leng in Fanling; San Uk Tsai and Fung Yuen in Tai Po) proceeded with KFBG sampling and mapping papayas in the project areas and supplying more than 400 non-GM papaya seedlings to farmers and smallholders. The project is a collaborative effort with Produce Green Foundation, O-farm and the Environmental Association (formerly TPEA), and is supported by the Heung Yee Kuk, a statutory advisory body representing the interests of indigenous villagers in the New Territories. Interim findings of the project, released in December 2013, indicate that a majority of papaya-growers in the four villages are engaging with it and that it is proving effective in controlling and lowering the spread of GM-contaminated papayas.

Several inspections of projects in our mainland China **Sustainable Agriculture Pioneers** programme were made in 2013. Our monitoring of the no-tillage mulching experimental sites run by Prof. Lu from Sichuan Academy of Agricultural Science in Shuanghe village, Sichuan, indicated that the vegetable plot with the thickest straw mulch performed best, with higher yield, stronger growth, richer soil and superior water holding capacity than tilled (dug and turned over) sample plots. Guangxi University's rice-duck farming method promotion site in Gaoqiu village near Nanning is proving successful and similar sites have been established in Longan and Pinggou counties, with more farmers adopting the rice-duck system of organic rice production.

SCIENTIFIC PROJECTS RECEIVING FUNDING SUPPORT (IN 2013) UNDER THE SUSTAINABLE AGRICULTURE PIONEERS (SAP) SCHEME

Name of Scientist/ Farmer	Affiliation	Research Topic	Project Timeframe
Fang Yuan	Guangxi Agricultural University	Promotion of rice-duck technology	2 years
Chen Yun	HeChuRen Farm	Promotion of no-tillage farming	2 years
Lu Shihua	Sichuan Academy of Agriculture	Applied research in conservation tillage in organic rice production	1 year

Holistic Education

Students, teachers, workshop participants and other visitors continued to be drawn to our diverse and stimulating programme of learning events, both on-site and in the community, in 2013. At KFBG, we commissioned and put on a series of shadow puppet plays showing the story of the Little Fish, performed in a makeshift theatre during Easter, while our Dancing with Snakes exhibition in Shek Kip Mei was a popular public activity over the summer. We continued to offer transformative workshops for those seeking a deeper experience with nature. Dr Satish Kumar, the co-founder of Schumacher College, again visited KFBG late in the year to give talks to corporate leaders, Government officers and students; and to lead a sharing session with like-minded NGOs from Hong Kong, China, the Philippines and Sabah.

Themed programmes

The **Happy Hours with Plants** programme was run for different schools and organisations, in the early months of the year. Participants were given the opportunity to learn about the wonder of plants through a set of experiential activities which included exploring the Woodland Trail, making herbal soaps, pot planting and seed collection. A special programme was also organised in November for 24 teenage students from the Hong Kong Academy for Gifted Education to spend a day enjoying nature while learning about conservation, holistic education, organic farming and tree census work.



KFBG staff explaining the features of a snake to members of the public in the 'Dancing with Snakes' Exhibition and Art Workshops held from 4th July to 22nd July, 2013.



A volunteer demonstrating how to draw a snake by applying 'Indian Henna' on the arm of a young participant.

Off-site, our **Dancing with Snakes Exhibition and Art Workshops** ran for three weeks in July at the Jockey Club Creative Arts Centre (JCCAC) in Shek Kip Mei, Kowloon, receiving over 3,300 visitors. The exhibition explored the relationship between people and snakes through holistic perspectives including ecology, conservation, myth, music and art. We were then invited to conduct the same exhibition and art workshops in Macau by the Civic and Municipal Affairs Bureau of the Macau Government. Around 100 Macau citizens joined the event, which was held in August at the Macau Science Museum. Through these efforts we have encouraged a more sympathetic and appreciative attitude to these beautiful, often maligned and misunderstood creatures. The exhibition activities were very well run by our team of interns.



KFBG was invited to conduct the Dancing with Snakes exhibition talks and art workshops on 24th August in Macau by the Civic and Municipal Affairs Bureau of the Macau Government. Around 100 Macau citizens joined the event which was held in the Macau Science Museum.

Changes in exhibits

Our popular live animal exhibits are in a constant state of flux, with new arrivals and departures every year and various issues necessitating the occasional relocation within our premises. We try to release back to the wild as many of the rescued animals as we can, some of those animals that cannot be released or rehomed are put on display for public education.

A Sun Conure parrot is now on display at the **Parrot Sanctuary**, after being confiscated by staff of the government Agriculture, Fisheries and Conservation Department (AFCD) and passed to the KFBG Wild Animal Rescue Centre (WARC). It was hand-reared and enjoys interacting with people, making it a popular guest. In February, we moved our White-bellied Sea Eagle from the **Raptor Sanctuary** to **Raptor Roost** in order to give her a bigger aviary and the company of other birds of prey. The bird has settled in well to her new



A tame Collared Scops Owl being trained for the Animal Encounters activities.

home. A Tawny Owl which had been confiscated by AFCD from a local resident was put on display in our Raptor Sanctuary, while a Collared Scops Owl was homed at the **Owl Sanctuary**, having been judged too tame to be released. This bird is currently being trained for future use in our popular **Animal Encounters** activities. Meanwhile, our endangered juvenile Clouded Monitor Lizard is now in residence at the **Piers Jacobs Wildlife Sanctuary**, having been transferred from the **Sun Garden Animal Exhibit** where it had outgrown its enclosure.



An exotic Clouded Monitor seized from the illegal trade is on display at the Piers Jacobs Wildlife Sanctuary.

Sadly, our last Pallas's Squirrel passed away at the ripe old age of 14 years – three years short of the oldest captive record in the global database for this species – and one of our three displayed Eurasian Eagle Owls also died, aged 21.

Elsewhere, the **Never Never Trail** above Magnolia Falls and Orchid Haven, named for its magical Peter Pan 'Neverland' quality, was renovated and reopened, having been closed for many years. Vegetation encroaching onto the **Sky Trail** was cut back to improve visitor access, and several trees were planted in the **Walter Kerr Memorial Gardens** to eventually enhance the canopy, which has been naturally depleted as old trees have died and been removed.

In order to keep our visitors informed and up-to-date with the continually evolving state of our exhibits, our creative design staff were regularly called upon to produce new temporary or permanent signs around the KFBG estate, to our distinctively holistic design standards. In 2013, three new permanent signs and 13 temporary ones were designed and installed.

Visitor activities

KFBG welcomed a total of 157,607 visitors in 2013, eager to explore the Farm's numerous exhibits, demonstrations and beauty spots. These included the Chief Executive of the Hong Kong SAR, Mr. C.Y. Leung and his family, who spent a late March afternoon visiting KFBG.



Chief Executive C.Y. Leung and his family visited the Wild Animal Rescue Centre and learnt about KFBG's Golden Coin Turtle conservation work.



Dr. Roger Kendrick demonstrating night moth trap to visitors during the Night Safari on 16th March.

A considerable number of visitors chose to augment their KFBG experience by participating in one or more of our wide range of organised visitor activities. We operated 108 **general tours** in the course of the year, attended by 3,908 participants who were able to benefit from meeting and interacting with our knowledgeable staff and volunteers. There were also more formal visits by groups from various community organisations, government departments and local and overseas institutions. We hosted 27 such tours in 2013, for some 421 people.

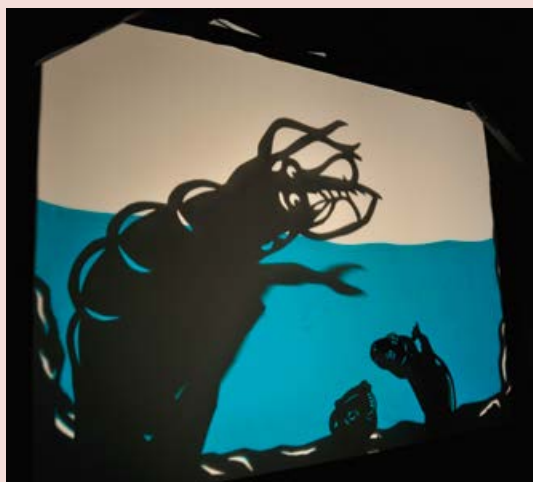


Discovery Tables, a monthly educational programme which raises awareness about different animal species and the effects of the animal trade.

Our **Animal Keeper Talks**, primarily aimed at kindergarten and primary school children, are a great way for visitors to learn about some of the animals that are present at KFBG, such as wild boar, raptors, pythons, macaques and mules. KFBG's animal keepers delivered 48 informative talks to a total of 1,657 visitors in 2013. Those wishing to get more up close and personal with the animals could participate in our programme of **Animal Encounters** sessions, which were held on 18 Sundays throughout the year, attended by 1,727 people. The **Discovery Tables** set up opposite to the Art House or at the Piers Jacobs Wildlife Sanctuary, and manned by our dedicated volunteers, enabled visitors to examine confiscated reptile, bird and mammal specimens on several Sundays over the course of the year.

Those seeking a healthy and uplifting experience immersed in nature, made use of KFBG's extensive network of well-maintained scenic footpaths, including the new Sky Trail and the Never Never Trail.

Our **Solo in the Trees** programme included a reflective solo walk in addition to an encounter with mules, sharing of stories and experiences in nature, drawing and making music. Invited guests of a more adventurous bent joined our **Night Safaris** in search of nocturnal wildlife on the KFBG estate. This programme was held 11 times for various special groups of academics and professionals who were thrilled to observe wild animals such as porcupines, barking deer and bats in their natural setting.



Shadow Puppet Show – A scene from the professional production 'The Little Fish' put on at KFBG.

The **Art House** was the venue for numerous art and craft activities utilising natural materials. 4,650 children spent time constructively fashioning objects such as pencil holders, bookmarks and herbal bags in 2013.

In late March and early April the Taiyuan Puppet Theatre gave a series of shadow puppet cultural and educational programmes at the Farm. These included performances of the **'Little Fish' shadow play**, based on a story inspired by KFBG. There were also shadow puppet workshops and an exhibition on the history of Guangdong puppets. In spite of very poor weather, 14 day-time and eight outdoor evening performances of the shadow play were given, to a total audience of more than 550. In addition, 123 young children participated in 14 sessions of the workshops. 905 visitors viewed the exhibition during its ten-day run.



'Show Time' for all participants to demonstrate their own creation of puppets. What a fairy tale!



Members of Taiwan Taiyuan Puppet Theatre Company preparing the exhibits at Art House for 'The History of Guangdong Puppets' Exhibition. It was one element of the 'Shadow Puppet Cultural and Educational Programmes' from 29th March – 7th April, 2013.



Members of the public were invited to sit within the display and try their hands at botanical art and Chinese art.

At the Hong Kong Flower Show, in March, we presented a display showcasing the various ways in which human culture has been shaped by nature. Our multi-faceted display contained original artwork by our own Kelvin Yeung and Mark Isaac-Williams; engravings of poetry and quotations by famous scholars whose work drew inspiration from the natural world and panels inviting the public to consider our relationship with nature. Our floral artists conducted demonstrations in which visitors could try their hand at Chinese ink painting and more formal botanical art.



The KFBG display at the HKFS 2013 celebrated the role of plants in shaping human culture.

KFBG in the media

The **Sustainable Living and Agriculture** department co-hosted eight programmes for RTHK Digital Channel's Community Involvement Broadcasting Service from July to September, with features on farmers' markets, community farming, community supported agriculture (CSA), sustainable diet, food waste recovery and the One Tonne Challenge projects.

KFBG was featured in 245 published newspaper articles, of which 40 were related to our work in mainland China, 16 magazine articles, 12 television programmes and 12 radio broadcasts.

Stories included: aspects of our conservation work in Hong Kong and Hainan; our Wild Animal Rescue Centre receiving certain wild animals; sustainable living ideas; wildlife smugglers being convicted of their crimes, whilst the smuggled animals came into our care; and living in harmony with nature.

Development of the new website (www.kfbg.org.hk) continued throughout the year.

'Animal Highlights', featuring interesting wildlife sightings at KFBG, were uploaded to the website and KFBG Facebook page on a monthly basis, along with lists of flowers currently blooming on the estate. Other KFBG-related reports and video links were regularly uploaded to keep our website and facebook users informed about our activities and projects. The KFBG Facebook page had reached 5,386 'Likes' by the end of the year.

Transformative workshops and events

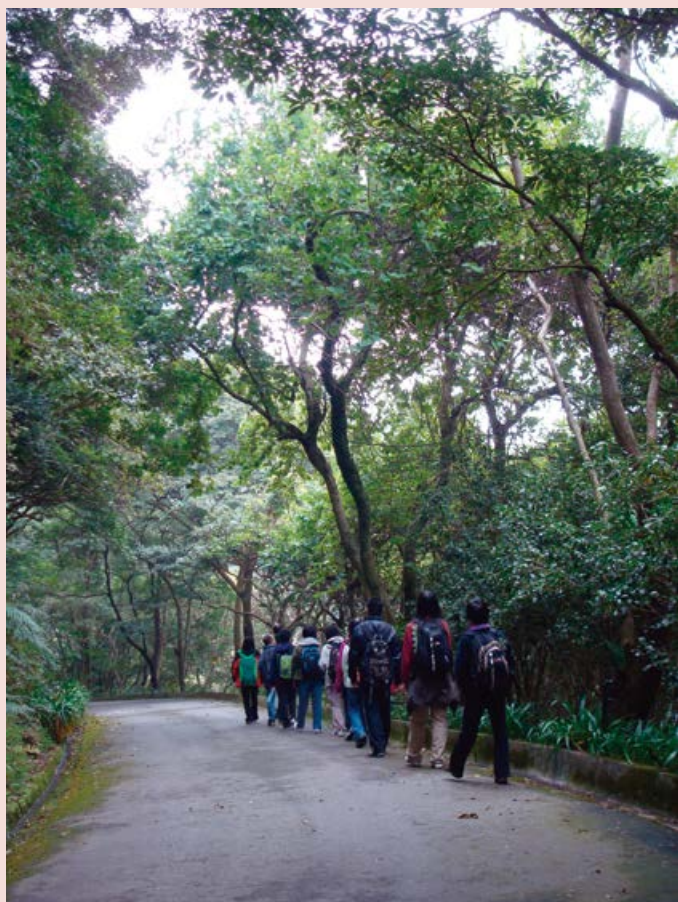
Our **Mindfulness in Nature** programme was conducted two times in 2013, once for a group of school headmasters and once for a group of secondary school teachers and pupils. The programme aimed to instil an appreciation of the natural world – and our inseparability from it – through tranquil reflection. Programme activities included an introduction to food ecology, organic farming, mindful eating, relaxation techniques and walking in silence through natural surroundings using all five senses to experience nature. A similar programme, entitled **An Appointment with Nature**, was held for a group of 22 headmasters, teachers and counsellors from Po Leung Kuk Primary Schools' Student Counselling Group in April. This programme helped to revive fatigued bodies and minds through a range of 'mindfulness in nature' activities.



Headmasters from the Wong Tai Sin District Liaison Committee visited the Eco-Garden in a 'Mindfulness in Nature' programme on 16th January, 2013.



A lively group photo at Kwum Yum Shan after re-charging in the 'Appointment with Nature' Programme on 16th April, 2013.



Walking in silence in the 'Dragon Workshop' on 12th January, 2013.

The **Little Fish Workshop – A half-day of silence** in nature, our elementary-level transformative workshop, which teaches participants how to engage more deeply with nature, was run eight times with totally 89 participants. The **Dragon Workshop**, an intermediate-level workshop, was run in January, for 13 participants.



Stretching exercise session of the 'Little Fish Workshop' on 13th April, 2013.



Sharing Session at Kwun Yum Shan in the 'Little Fish Workshop' on 19th January, 2013.



Mr Pracha Hutanuwatr sharing with KFBG staff on 25th October, 2013.

Pracha Hutanuwatr, Chairperson of Ecovillage Transition Asia and Vice-chairperson of Young Awakening Institute, visited KFBG on 25th October, giving a talk to 35 KFBG staff and friends on **Inner Resources in Working for External Change**. Pracha is an authority on the unwanted effects of globalisation. He teaches eco-village design, education for sustainability, and facilitating for empowerment.



Group photo of 'Day of Sharing' with Satish Kumar on 7th December, 2013.

Satish Kumar, the editor of 'Resurgence & Ecologist' magazine and co-founder of Schumacher College, visited KFBG in early December. He gave various talks about holistic ideas such as living a low impact life, searching for one's life path and other subjects, to Hong Kong corporate bodies, a Government unit and schools, including Swire, HSBC, CLP, Jebsen, the Government's Efficiency Unit, City University, Chinese International School and Gaia School. A **Day of Sharing** was subsequently held on 7th December with Satish and like-minded NGOs from Sabah, the Philippines and Hong Kong. The 35 participants shared information on their projects and initiatives, exchanged experiences and discussed challenges.

Also in December, Dr Claire Elouard from Sukh Bhumi, India returned to conduct a five-day **Energy of Nature** workshop for 12 members of the public and two KFBG staff, the purpose of which was to cultivate a deep awareness and intuitive relationship with nature.



Participants from Forever Sabah sharing a song with others in 'Day of Sharing' on 7th December, 2013.



Claire Elouard facilitated workshop participants to express their feelings towards trees at the 'Energy of Nature' Workshop from 13th – 17th December, 2013.



Participants touching trees at the 'Energy of Nature' Workshop from 13th – 17th December, 2013.

Nature Conservation

2013 was another year of strong progress in KFBG's nature conservation efforts. Our Chinese Golden Coin Turtle breeding project received five additional turtles from a US breeding centre, while individuals of several other species were re-homed from KFBG to overseas conservation facilities. Our partnership with the China Wildlife Conservation Association enabled us to embark on a capacity-building drive to raise the standard of government-managed animal rescue centres in China, and we also gave training in conservation genetics to five staff of mainland China botanic gardens. Our Hong Kong orchid work continued apace, with AFCD granting us a permit to collect leaf samples from wild specimens of 65 local species, facilitating our new project to establish a genetic barcode for Hong Kong's entire native orchid flora. We also collected seeds and cuttings from rare and endangered trees, shrubs and herbaceous plants for conservation and restoration. Mapping of the KFBG forest plot was completed in collaboration with our partners at Hong Kong University, and thousands of tree saplings were planted as part of our major experimental forest rejuvenation project. We commented on numerous local development planning applications and Environmental Impact Assessments over the course of the year.

Managing species and populations

The **Fauna Conservation** department was kept very busy this year, with the **Wild Animal Rescue Centre** witnessing numerous animal arrivals and departures during 2013. A number of, mainly exotic, turtles in our care were rehomed to various institutions around the world for conservation breeding and/or education purposes, as approved by the HK SAR Government. All of the species involved are of conservation importance and variously ranked as Vulnerable (VU), Endangered (EN) or Critically Endangered (CR) by the International Union for the Conservation of Nature (IUCN). Three chelonians – a **Burmese Star Tortoise** (*Geochelone platynota*; CR), an **Impressed Tortoise** (*Manouria impressa*; VU) and a native **Big Headed Turtle** (*Platysternon megacephalum*; EN) – were shipped to Rotterdam Zoo on 6th March for conservation breeding. A total of 28



An American Wood Turtle, an endemic species in North American, was sent to a US conservation centre to join a captive breeding programme.



An endangered Yellow-headed Temple Turtle was sent to Ostrava Zoo in the Czech Republic to join other turtles that are part of their conservation programme.

Malayan Box Turtles (*Cuora amboinensis*; VU) and five **Yellow-margined Box Turtles** (*Cuora flavomarginata*; EN) were sent for rehoming at the Turtle Survival Alliance in the USA on 19th August. Also, one of a pair of North American **Wood Turtles** (*Glyptemys insculpta*; EN) was rehomed to the Savannah River Ecological Center, South Carolina USA, 13 **Radiated Tortoises** (*Astrochelys radiata*; CR) were rehomed at Parken Zoo in Sweden, and a **Yellow-headed Temple Turtle** (*Heosemys annandalii*; EN) was sent to Ostrava Zoo in the Czech Republic. In addition, our **Red and White Giant Flying Squirrel** (*Petaurista alborufus*) was sent to Singapore Zoo to join a conservation breeding programme on 29th January and a group of five **Rhinoceros Iguanas** (*Cyclura cornuta*; VU) were rehomed to Taiping Zoo & Night Safari in Malaysia later in the year.



One of the three Rhinoceros Iguanas safely arrived at Taiping Zoo, Malaysia to join the zoo's conservation breeding programme for the species.

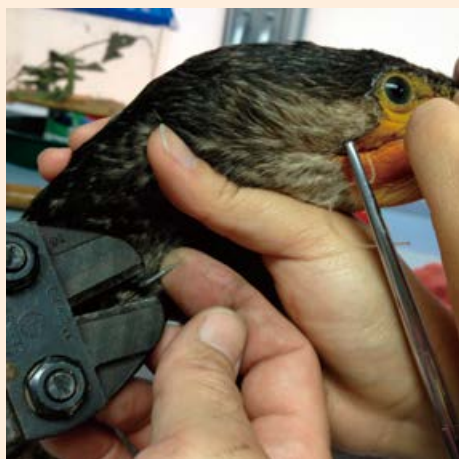
New exotic arrivals at the rescue centre included a **Tawny Owl** (*Strix aluco*) and a **Black-eared Marmoset** (*Callithrix penicillata*), a Central American monkey, both delivered by AFCD in January. The Tawny Owl was found to be in good general health, but the marmoset became very ill with a facial abscess in December. Our veterinary team ensured it made a full recovery and it is likely to be rehomed at Singapore Zoo where there is a conservation breeding programme for this species. On 3rd October, a huge consignment of 332 endangered **Black Pond Turtles** (*Geoclemys hamiltonii*; VU) illegally imported from Thailand, was received from AFCD for temporary holding.



A Tawny Owl, a non-native owl species, confiscated by AFCD is now on display at the Raptor Sanctuary.

Our assurance colony of critically endangered **Chinese Golden Coin Turtles** (*Cuora trifasciata*) received an injection of valuable new bloodlines when we received five captive-bred individuals from the Behler Chelonian Center in the USA – the first import made into the project. The move attracted local and international press attention and hopefully marks the start of a long term collaboration. A wild juvenile specimen was also recruited to the project after its discovery by AFCD staff on Lantau Island. Egg and hatchling production in our colony was, however, significantly lower in 2013 than in 2012, for reasons which we do not yet fully understand, as there had been no change in our protocols.

With AFCD permission, our staff collected approximately 40 **Romer's Tree Frog** tadpoles from Tai Po Kau Country Park and Sai Kung Lions Nature Education Centre in September. The tadpoles were reared in captivity and will eventually be released into designated site at KFBG with the plan to establish a new and hopefully sustainable population.



A fish hook being removed from a Great Cormorant rescued at Mai Po.

Hundreds of sick or injured birds were admitted to our **local wildlife rehabilitation programme** in 2013, including a number of interesting cases of resident or migrant species. A Greater Painted-snipe with head trauma, picked up in Western District, recovered well and was released in early November. In late October, several migrant species were treated in the veterinary hospital, including Eurasian Woodcock, Oriental Scops Owl and Eastern Buzzard. In November AFCD delivered an adult Great Cormorant,

rescued from a fish pond in Mai Po. The bird had swallowed a fish hook, but was released back at Mai Po Marshes after successful treatment. Two bedraggled Eurasian Eagle Owls – one from Hong Kong Island and one from Lantau – were admitted and subsequently released into Country Parks close to their capture locations, while two Crested Goshawks were also ready to be released late in the year, after surgery for wing fractures. Two Grey Herons admitted with fish hook or net injuries were successfully rehabilitated; a third is still in our care. A young Orange-bellied Leafbird chick was picked up on the KFBG premises, suggesting that this attractive forest species breeds on our estate.



A Grey Heron recovering at KFBG after being caught up in fishing line near the HK Wetland Park.



An Eagle Owl was released in collaboration with AFCD at Tai O Lantau on 30th July, 2013.



The Grey Heron release at Mai Po on 22nd November, 2013.



Confiscated pangolin scales received from AFCD for a trial in extracting DNA.

Native mammal admissions included a juvenile Masked Palm Civet found on the KFBG estate which unfortunately died, and an adult Malayan Porcupine rescued from a drain by AFCD in October. This animal had severe wounds to its rear and legs and required several weeks of care, but was eventually released at Sha Lo Tung. Of particular note were two **Chinese Pangolins** admitted within a week of each other in the summer. Both animals passed their health checks and were released at night, on the same day they arrived, after valuable DNA reference material had been extracted. Radio transmitters were fitted underneath their scales and the animals were subsequently tracked by AFCD. Also of note, two Big-headed Turtles were delivered to the hospital by a member of our conservation staff after being confiscated from a trapper on Tai Mo Shan. Both animals had ingested fish hooks. The hooks were surgically removed but one animal died from injury complications the following day.

In 2013 the veterinary team vaccinated and collected blood samples from all relevant resident birds to ensure that sufficient levels of avian influenza protection are being maintained. Annual veterinary checks were also made on various birds, reptiles and mammals in our keeping.

Our animal record data, including more than 1,000 active records, was switched to Zoological Information and Management System (ZIMS) this year, giving improved functionality to our animal database. Over 30,000 animals have passed through the Wild Animal Rescue Centre since its establishment in 1994.

TOTAL NUMBER OF ANIMALS RECEIVED BY THE WILD ANIMAL RESCUE CENTRE FROM 1994 TO 31st DECEMBER 2013

Mammals	634
Birds	2,729
Reptiles (excluding snakes via HK Police)	20,923
Snakes (via HK Police up to December 2013)	5,769
Grand Total	30,055

THE STATUS OF ANIMALS RECEIVED BY THE WILD ANIMAL RESCUE CENTRE, 15th DECEMBER, 2012 TO 31st DECEMBER, 2013

	Total in Collection at 15 th December, 2012	Received/ Captive Bred	Released/ Relocated	Died/ Euthanised	Total in Collection at 31 st December, 2013
Birds	93	311	145	161	101
Mammals	111	58	25	62	106
Reptiles*	671	545	186	354	683
Amphibians	6	2	2	2	4
Fish	204	0	0	153	51
Total	1,085	916	358	732	945

* Excluding stray snakes received from the HKSAR Police

In July KFBG was commissioned by AFCD to run a research project studying the home ranges of **Burmese Pythons** in Hong Kong. The study involved radio-tracking three pythons for six months. The results will aid the management of the species in Hong Kong and contribute useful information toward its conservation. We found that a Burmese Python released close to its place of capture did not travel far from there after release; whilst an individual released far from its place of capture travelled a large distance, including swimming across two significant bodies of water.

On Hainan Island, our **Kadoorie Conservation China** (KCC, a Department of KFBG) staff joined the monitoring team at Bawangling National Nature Reserve in April to conduct a monthly survey for the **Hainan Gibbon conservation project**. We located all three family groups of this incredibly rare primate, which is found nowhere else. We subsequently co-organised a comprehensive six-day gibbon survey with the Hainan Wildlife Conservation Bureau and Bawangling Nature Reserve in October, involving nearly 80 participants, including six journalists. All three family groups and some solitary gibbons were located. Encouragingly, two new-born babies were recently confirmed, and there are now officially at least 23 individuals in the population.



The installation of this Hainan Gibbon display board helped the Qingsong community, bordering Bawangling National Nature Reserve, to understand how they can contribute to gibbon conservation.



A female Hainan Gibbon (*Nomascus hainanus*) and her baby were closely monitored by the community wardens, who are sponsored by KCC. (Photo by Zhang Zhicheng)

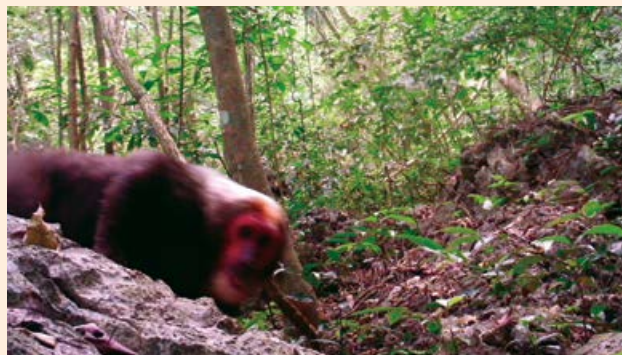
Camera trapping featured prominently in KCC's faunal surveys, with studies established in four different provinces. In **Hainan**, our camera trap survey at Exianling Nature Reserve is ongoing, with at least 16 species of mammals and ground birds, including state-protected species, having been photographed since 2012. Unfortunately the top predators are still missing from our photographs although some traditional game species are being photographed more frequently. We launched a camera trap study in the core area of Yinggeling Nature Reserve in May and July, and in November collaborated with Dongzhaigang National Nature Reserve (NNR) to conduct bird and mammal surveys (including mist-netting and transects in addition to camera traps) in habitats adjacent to the reserve, such as reed beds, fishponds and agricultural fields. Our staff photographed a Pectoral Sandpiper – the first record of this species for Hainan. The Jiayi Nature Reserve camera trap survey sponsored by KCC recorded at least 16 species, including the endangered Hainan Peacock Pheasant. In **Guangxi**, KCC staff visited Nonggang NNR during 25th September to 6th October, and relaunched a camera-trapping project covering the whole nature reserve area. A revisit in December revealed good progress with records of rare species not confirmed in the reserve for years, such as Stump-tailed Macaque and Chinese Forest Musk Deer. A KCC team visited **Yunnan's** Nangunhe NNR in May to establish another new camera-trapping project. The cameras were installed near the Burmese border to investigate the possibility of a cross-border eco-corridor. We also agreed to support camera trap projects conducted in Baimaxueshan NNR, Yunnan, in August. Two KCC staff visited a new partner, Tianma NNR in **Anhui**, in November to set up camera traps for possible Leopard sightings.



A Pectoral Sandpiper photographed during a survey conducted by KCC's Sung Yik Hei represents a new Hainan record.



A team from KCC with the local camera trap survey team at Nonggang NNR, Guangxi.



An adult stump-tailed macaque (*Macaca arctoides*) - a rare and state-protected species, was captured by KCC's camera trap in Nonggang NNR, Guangxi.



A male of the endangered butterfly *Teinopalpus aureus* was photographed at the summit of Wuzhishan during a montane butterfly survey conducted by KCC in May.

Our staff were involved in several more faunal surveys during 2013, including waterbird surveys in Hainan, montane butterfly surveys in Hainan at Wuzhishan and Jianfengling (during which a male of the state-protected and endangered butterfly *Teinopalpus aureus* was photographed), and unsuccessful surveys for Water Monitor Lizards in Jiayi and Yunnan Box Turtles in Yunnan.

Flora Conservation efforts continued to focus heavily on orchids and forest restoration. We have been collecting seeds of rare and endangered orchid species to build up a living assurance collection. As part of ongoing research into the biology of the locally endangered **Long-eared Dog Orchid** (*Bulbophyllum bicolor*), KFBG carried out intensive field research at eight known sites throughout Hong Kong during the flowering season from late April to early June. The aim was to confirm variation in flower colour, collect leaf samples for DNA analysis, and examine the extent to which plants invest in flowering and how successful they are at producing fruit. At three sites, we conducted detailed observations and experiments of pollination biology to try to understand why this species so rarely sets fruit. At the same time, we conducted laboratory trials using DNA samples of *B. bicolor* collected from plants in KFBG and elsewhere in Hong Kong, finding a surprising degree of genetic diversity at some sites. This is important as high genetic variability is necessary for the species to successfully fruit and reproduce. Our study confirmed that the species is limited in natural reproduction because of its self-incompatibility, and revealed that the species is highly dependent on pollinators to bring about fertilisation. Artificially hand pollinated plants can, however, produce copious amounts of seeds which germinate readily when propagated *in vitro*. We are now looking into sequencing chloroplast DNA for this species, to help inform a future conservation strategy.



Daisy Hu and Stephan Gale had a full field work schedule during the flowering season of priority orchid species *Bulbophyllum bicolor* from April to June. Here, Daisy is recording the results of pollination experiments designed to reveal the requirements for the species' successful reproduction.



Chow Pak Tai taking care of the micropropagation of *Bulbophyllum bicolor*, one of Hong Kong's priority orchid species.

Our field work on the rare **Hong Kong Slipper Orchid** (*Paphiopedilum purpuratum*) led to the discovery of a further two small populations. The known wild populations are being sampled for laboratory testing to examine how much genetic variation exists within and between them in Hong Kong. Other orchid survey work on Tai Mo Shan, Tai Tam and Peng Che confirmed the presence of two species not previously recorded from Hong Kong, while there is strong evidence that a species of the orchid genus *Gastrochilus*, found during our 2012 surveys, represents a taxon new to science.

Senior KFBG Flora conservation staff met with the Director and Deputy Director of the Wildlife Protection and Management Division of the Hainan Forestry Administration, and with the Deputy Director of Bawangling Nature Reserve Administration, in Haikou in July to discuss priorities and structure for our collaborative project on the conservation of the horticulturally important orchid **Doritis pulcherrima** in Hainan. We hope to be able to embark on this project in earnest from 2014.

Routine hand pollinations were carried out to propagate orchids of conservation concern as they came into flower in our collections. The capsules were then harvested as they ripened for micropropagation and storage in the KFBG **Orchid Seed Bank**. We propagated more than 20 rare orchids in our micropropagation laboratory, and well over 2,000 orchid seedlings were hardened in the newly renovated **Moth Orchid Shed**.



Renovation of the Moth Orchid Shed was completed in May. The new building is a huge improvement on its predecessor, with more table space, more room to hang mounted orchids, higher, ventilated roofing, and a more user-friendly environment.

We continued compiling all of our orchid accessions data into BG-BASE as part of a drive to database the full KFBG living plant collections, clearing a backlog of 1,200 entries. Work is now focusing on authenticating these existing records, labelling some unlabelled plants, and entering data for new plants as they come into the collections. We also updated the existing tree information in the database.

We worked with Prof. Ron Hill of Hong Kong University in setting up trials for an innovative project examining the potential for re-greening concrete slopes, created in the course of construction work, using native plant species. Prof. Hill asked KFBG to provide orchid seedlings as candidates. The trials are ongoing, but the seedlings of two orchid species raised from seeds collected within KFBG are doing surprisingly well at the research site at the Kadoorie Centre of HKU.

Forest Restoration for Conservation and Land Management

Our habitat management and restoration work requires that the right native plants are available in our nurseries. In 2013, we collected (under license from AFCD) more than 35,000 seeds of over 40 native tree and shrub species from the wild for our **Native Tree Nursery**, while a similar number of seeds were collected from over 50 native herb and shrub species for the **Native Herb and Shrub Nursery**. Cuttings were also taken from more than ten species. In addition, in order to expand the fern collection and ensure availability of stock for green roof planting, 17 selected fern species, including some of significant ecological value, were propagated by sowing spores.



Long term volunteers weeding and checking plant growth in the **Native Herbaceous and Shrub Nursery**.

Commencing on Earth Day (22nd April 2013), we have been conducting a major experimental **forest restoration** exercise, initially involving nearly 200 KFBG staff, at our tree planting site in the upper nature reserve area. From 2005 to 2008 we planted over 10,000 trees on highly degraded KFBG land and, under AFCD permission, on Country Park land – with very poor survival and growth rates. In 2013 an experimental tree-planting site was set up to measure different parameters. This site can be visited by walking along the Sky Trail. By June 2013, nearly 5,000 seedlings of 12 selected tree species had been planted using combinations of various parameters such as tree guards, tree shelters and different fertilisers. The seedlings will be monitored to determine which combination of factors yields greatest success over several years. By the end of 2013 initial results are very encouraging with very high survival and growth rates recorded. This is due, largely, to the use of a certain type of tree guard, which protects the tree seedlings from feral cattle and other animals; creates a conducive microclimate inside the tree-guard; and prevents grass from out-competing the seedlings. Non-organic fertilizer is also found to perform better than organic fertilizer. We continue to experiment with water drainage management and different forms of mulch; with woodchip currently performing better than cardboard in protecting against soil run-off. We will eventually publish the results of the experiments for replication.



Staff setting up the tree guards for the seedlings at the tree planting site at Tai Mo Shan.

In the Walter Kerr Garden a number of older trees have, sadly, come down in recent years. We have selected rare and special species and identified planting sites for canopy enrichment in the garden, and in other parts of the lower farm area. This will help us to have a range of species and ages of trees here in future decades. We will also collect the seeds for further dispersal.

Staff and volunteers worked hard to clear the invasive exotic creeper *Mikania micrantha* from various slopes and terraces in August.

We undertook genetic testing to confirm species status and examine within-species genetic diversity of commonly used ecological restoration species such as Bamboo-leaved Oak (*Cyclobalanopsis neglecta*) – a native tree in Hong Kong. The information will help in avoiding inbreeding (with resultant genetic bottlenecks) and guaranteeing healthy populations under a changing climate, which should give the trees more resilience to environmental impacts.

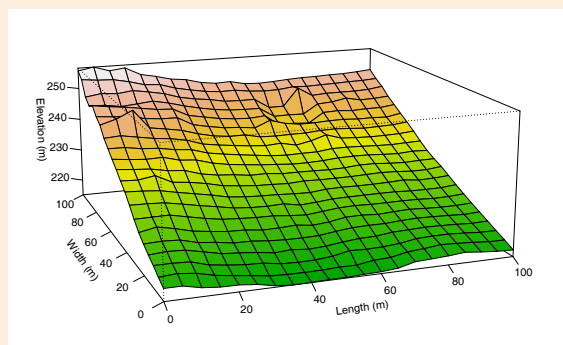
Detailed maps of the KFBG boundaries and localized land-use plots for the lower, middle and upper farm areas were developed using Global Information System technology. This has enabled us to plan the land-use much more effectively. As an ex situ conservation measure we are now planning a major project, taking perhaps 15 years, to convert the abandoned and non-productive lychee and Longan orchards into diverse native forest containing rare species otherwise missing from the forest. We will gradually remove the orchard trees, using the wood as bio-charcoal and mulch to enrich the depleted soil, and we plan to plant saplings of valuable and endangered **native tree species** on the terraces to provide a future source of seeds, habitat and fruit for animals and humans. In two plots we will create an orchid garden for medicinal use on these abandoned orchard terraces. This will involve thinning out the trees and establishing orchids on the remaining trees. This project can be an important model for Hong Kong and South China and we will share our methodology and experiences as we proceed.

In 2013 we also examined the bioclimatic similarity between Hong Kong, Guangdong, Guangxi and Hainan in order to determine which species from southern China were probably present but went extinct in Hong Kong during past deforestation. This information will allow us to propose species for possible reintroduction to Hong Kong.

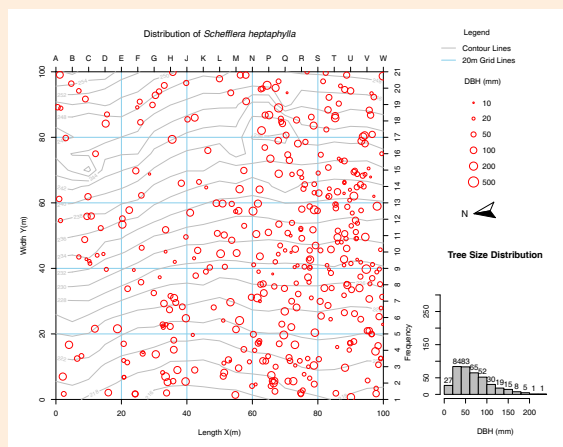
Meanwhile, senior staff visited Tai Om Fung Shui Wood in August to collect tree canopy data and to identify the tree species there so as to select appropriate native fung shui wood species for mixing into the woodland at KFBG.



A field survey at Tai Om Fung Shui Wood to collect tree canopy data.



Topography of KFBG's 1 ha forest monitoring plot.



Distribution and stem diameter classes at breast height (dbh) of *Schefflera heptaphylla* in the KFBG 1 ha forest monitoring plot.

A total of 240 important plant specimens were collected for the KFBG **Herbarium** during plant surveys and seed collections throughout 2013.

To assist with field surveys for the **Global Forest Observatory** project, which is a long-term collaboration with Hong Kong University, we gave training to nine volunteers at the 20-hectare Tai Po Kau forest plot. KFBG is taking over the management of this plot from HKU in the coming years. At our own one-hectare plot on the KFBG estate, we conducted several surveys over the year, collecting numerous tree specimen samples for analysis and drafting tree distribution maps. Our completed forest dataset for the one-hectare plot comprises more than 20,000 records and 66 species distribution maps.

We continued to lay the groundwork for our **ClimateWatch** programme, in which visitors to KFBG will be able to participate in attempting to detect climate-induced changes in plant phenology. The trail design and plant selection were completed, and plant tags and a field guide were under preparation. Twenty trees and other plants in the Lower Farm area will be targeted for monitoring by visitors.

Influencing policy and site development

Development pressure is an ever-present threat to Hong Kong's remaining natural environment, which faces a continual stream of new development or zoning proposals. We strive to ensure that the ecological impacts of such proposals are recognised, and mitigated or avoided. More than 300 comments on planning applications, and 14 letters on draft Development Permission Area (DPA) or Outline Zoning plans (OZP), were submitted to the HKSAR Government by KFBG's **Ecological Advisory Programme** (EAP) team in 2013. The team was active in meeting with officials of various government departments to discuss conservation issues and policies, and maintained its practice of making numerous site visits across the SAR for ecological destruction cases, gathering ecological information for submissions and general routine site checking. Some notable cases are outlined below.

Much of EAP's efforts in 2013 were focused on the issue of **Country Park enclaves**, which have been under threat from incremental haphazard development. These enclaves contain ecologically important habitats and are often hotspots of biodiversity. Draft DPA plans for the Yung Shue O and Chek Keng enclaves in Sai Kung were gazetted in 2012, followed in 2013 by draft DPAs for Yi O (Lantau), Pak Sha O and Ko Tong (Sai Kung) and three enclaves in Plover Cove Country Park (Kuk Po, Fung Hang and Yung Shue Au). Draft OZPs were gazetted for three other enclaves: So Lo Pun in Plover Cove, and Pak Lap and Hoi Ha in Sai Kung. We submitted comments to the Town Planning Board and attended its meetings, variously expressing support, raising concerns and making suggestions with the aim of further protecting the habitats and species of conservation importance found in these areas. We also published a technical report documenting the ecological and conservation importance of six Country Park enclaves – Nam Shan Tung, Pak Sha O, Pak Tam Au, Ko Tong, To Kwa Peng and Chek Keng – in October. The report, available on our website, provides detailed and up-to-date ecological information to help the relevant authorities make the right decisions on the land use planning for these areas.

Tung Chung on Lantau is another significant area in which we took an active interest in 2013. In KFBG's view, some ecologically important coastal and estuarine habitats are not adequately protected under current government proposals in the Tung Chung New Town Extension Study. In addition to providing comments to the relevant government departments, we published and circulated a technical report, in collaboration with other environmental NGOs, on the ecological importance and sensitivity of the area. Some positive changes were subsequently made by the Government planners.

We also engaged with the **Ting Kok Plus** project, originally proposed by the Environment Bureau (ENB), which aims to protect ecologically sensitive habitats in Tolo Harbour and to review their ecological value. KFBG attended meetings for environmental NGOs and experts and provided ENB and AFCD with information on ecologically sensitive areas.

We successfully argued for changes to the layout plan in the Environmental Impact Assessment study for the **Lok Ma Chau Loop**, including retention of reed beds and withdrawing a proposed road that would have had a significant ecological impact.

In early December, at Drainage Services Department's (DSD) invitation, we delivered a talk on the design of stream channels and the importance of maintaining natural stream settings for biodiversity conservation to an audience of more than 250, including DSD's most senior staff.

The Director, Deputy Director and Assistant Directors of the government Environmental Protection Department (EPD) visited KFBG on 14th December to exchange views on various conservation issues.

Engaging communities in conservation



Working closely with local community members is evidently essential to relieve encroachment pressure on the gibbon forest.

Community engagement is often crucial to the success or otherwise of conservation efforts, and this is particularly true in rural areas where villagers are accustomed to exploiting the surrounding natural resources in a manner not necessarily compatible with conservation of particular species or habitats. For such communities the benefits of conservation may not be obvious until explained and demonstrated – an

important aspect of Kadoorie Conservation China's (KCC) work. One such example is that of the Hainan Gibbon, which has been a keystone of our efforts in Hainan for many years. In 2013, we designed and installed two display boards in Qingsong Township near Bawangling to raise awareness of gibbon conservation, emphasising how local communities can help in protecting the critically endangered apes living around them. In December, we met with the township leader of Qingsong to discuss the value of gibbon conservation to local communities, and the possible impacts of agricultural activities near the reserve boundary. Our staff and the community wardens assessed the feasibility of further tree-planting work in disturbed lowland habitat near the villages.



A gibbon food tree (*Endospermum chinense*) planted by KCC in 2005 was growing well in Bawangling NNR, Hainan.

Another area of community engagement in which we are increasingly involved is the establishment of **fish sanctuaries** (no-fishing zones) to benefit village communities by making their local fishery more sustainable in the long term. In December we visited the fish sanctuary at Daoyin village in Yinggeling, Hainan reintroducing more Red-faced Giant Barbs to the protected area and drawing a large crowd with our scuba diving monitoring activity. In the same trip, we visited the remote Mohao village downstream of Daoyin, where villagers were enthusiastic about the idea of establishing their own fish sanctuary.



Bosco Chan of KCC sharing fish photos taken underwater in the Daoyin fish sanctuary; villagers were very excited to see the recovering fish population.

In May, a KCC team visited Daoyin and Gaofeng village in Yinggeling to communicate with villagers and meet with beekeepers engaged in the **native beekeeping project**, which we initiated with them in 2012. We followed this up in July with a visit to Gaofeng village to deliver seven pagoda-type bee boxes as a trial and to demonstrate how to operate them. We also discussed a newly drafted eco-beekeeping standard and half-year project targets with the Yinggeling community unit staff. A third visit was made in November to monitor the project, liaise with the beekeepers and deliver seeds of winter crops that villagers could grow after rice, and that could also serve as additional nectar sources for the Chinese honeybees.



A Gaofeng village beekeeper participating in the Yinggeling eco-beekeeping project showing his native species honey bee colony.



The newly introduced pagoda type bee box to be tried by beekeepers in Gaofeng. The design is supposed to be adapted to the natural behaviour of bees.

One more way in which we encourage Hainan villagers to farm in a more conservation-minded manner is in the raising of understorey cash crops in rubber plantations. This year, we organised a training exercise in Nankai town on growing cardamom under rubber trees for this nascent **rubber agro-forestry project**.

Building conservation capacity

Our skilled and experienced staff were involved in numerous and diverse capacity building activities in China over the course of the year. At the invitation of the China Wildlife Conservation Association, four members of our Fauna Conservation department provided training to 25 staff from 17 **Chinese wildlife rescue centres**, in sessions conducted in September at the Beijing Wildlife Rescue and Rehabilitation Centre. This marks an important step in improving the quality of care provided in such facilities across China. Meanwhile, the Flora Conservation department collaborated with Botanic Gardens Conservation International (BGCI) in a BGCI-KFBG Travel Scholarship Programme for five junior staff from three **botanic gardens** in mainland China, who were given two weeks of training by our senior personnel. The training comprised lectures and practical sessions covering key concepts, methods, case studies, laboratory techniques, data analysis and field excursion, all of which can be applied by the participants in their own botanic gardens.

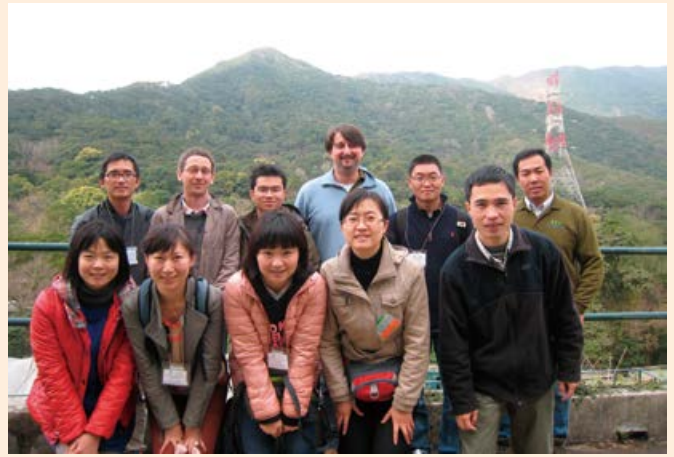
KCC was particularly active in building conservation capacity among **nature reserve wardens**, primarily in Hainan. Three of our staff gave lectures on target species, the role of nature reserve wardens in research projects, and the advantages of beekeeping during the Yinggeling Nature Reserve annual assembly on 21st January, attended by 200 staff and wardens from Yinggeling and other nature reserves.

Later the same month we facilitated four experienced Yinggeling wardens to join the annual patrol at Exianling Nature Reserve, where they were able to pass on their expertise in effective patrolling.

Together with staff of Yinggeling Nature Reserve we co-organised a **camera trap workshop for wildlife conservation and monitoring** at Yinggezui substation, Yinggeling, in early March. This was attended by more than 60 participants, including researchers and reserve staff from throughout China and from overseas.

This was immediately followed by an advanced field training course on butterflies and herpetofauna, delivered by KCC staff for ten wardens from Yinggeling and Exianling nature reserves.

In June we organised an exposure trip for eight wardens and officers from Yinggeling to a project site of our sister organisation, Partnerships for Community Development (PCD) in Deqin County, Yunnan. The wardens and Tibetan herders shared their experiences in setting camera traps and on how to preserve biodiversity using local culture.



BGCI course participants with Flora Conservation Department staff.



Wardens from Yinggeling Nature Reserve, Hainan and the Tibetan herders of northwest Yunnan shared wildlife photos taken by camera traps during the Yunnan exposure trip.



A group photo, including experts from Beijing, Hong Kong, Taiwan and Malaysia, of the 'Camera Trap Workshop for Wildlife Conservation and Monitoring Workshop' held in Hainan.



Setting camera traps in harsh high-altitude habitat in Deqin County, Yunnan is a completely different experience from tropical Hainan.

We gave radio-tracking training to eight wardens from Jiaxi Nature Reserve in July and August. At the second **Hainan Gibbon comprehensive survey** in October, co-organised by KCC and the local authorities at Bawangling, we ran workshops on survey methodology and field skills for studying the gibbons.

In November, we sponsored three Yinggeling staff to attend the **12th China Ornithological Conference** in Zhejiang. One of the wardens, a long-term KCC trainee, delivered an oral presentation; the first ever frontline warden to do so in this conference series.



One of the survey teams advised by a KCC team during the Oct 2013 Hainan Gibbon survey.



A Yinggeling warden delivered an oral presentation in the China Ornithology Conference; he was the first frontline warden to present in such an event.



A team from KCC attended the China Ornithological Conference, bringing together an officer and two wardens from Yinggeling NR.

We rounded off a productive year in Hainan with classroom and field training for 40 wardens of Jiaxi Nature Reserve from 17th to 19th December. Wardens were taught about biodiversity in Jiaxi, effective patrolling and camera trapping. Identification leaflets on various Hainan fauna and flora groups were distributed.

Elsewhere in China, on 29th January KFBG's Veterinarian accompanied KCC staff to Kunming to provide technical advice in relation to the breeding and husbandry of a Yunnan Box Turtle which was experiencing difficulty in laying eggs. The breeding programme for these critically endangered turtles is being run in partnership with KCC and the Kunming Institute of Zoology.



Wardens from Hainan's Jiaxi NR shared their experiences of wildlife observation with the aid of KCC's species ID leaflets.

At the invitation of Chongqing Jinyunshan National Nature Reserve, KCC staff attended the **Workshop on Nature Reserve Management and Eco-education** in Chongqing in March, giving presentations on the fish sanctuary project and the Rainforest Ambassador programme. Participants included State Forestry Administration officials and environmental educators from Canada, Taiwan and mainland China.

Our Fauna Conservation department sponsored two veterinarians from International Animal Rescue Indonesia to attend the 'One Health in Asia Pacific' Conference in Singapore in October, and in the same month gave professional training in reptile husbandry and care at KFBG to AFCD staff.



Roger Lee sharing KCC's experience of setting up Fish Sanctuaries in Hainan in the 'Workshop on Nature Reserve Management and Eco-education' in Chongqing.

Conservation capacity was also built up by training dedicated volunteers to assist in our conservation work both at KFBG and in China. Currently, the Flora Conservation department's **Conservation Volunteer** programme has 125 active volunteers participating in conservation activities on the KFBG estate. In our KCC **Rainforest Ambassador** volunteer programme in Hainan, we organised 46 nature-based activities during 2013, of which 16 were associated with the Hainan Gibbon Awareness Raising Programme in Bawangling town during October. Other major activities included the January Hainan Winter Waterbird Survey, in which 26 Rainforest Ambassadors participated, and three biodiversity assessments of the Yangshan wetland in Haikou City were conducted in February/March, August and September. Two Rainforest Ambassadors participated in eco-tour guide training in Guangzhou in July, and in August we organised a training session for Rainforest Ambassadors featuring a talk on ant introductions and the impact of Red Imported Fire Ant, use of camera traps and eco-tour guiding and environmental education programme planning.



A female Grey Bushchat recorded by KCC team during the Hainan Winter Waterbird Survey is a new record for Hainan.



Primary school students queuing to play games that were organized by our 'Rainforest Ambassador' volunteers in the Bawangling NNR fun fair.



Jay Wan of KCC introducing the use of camera traps to the Yangshan wetland ecological surveyors in Haikou.

Channelling knowledge into conservation planning

The Convention on Biological Diversity (CBD) was extended to Hong Kong in May 2011, and KFBG, together with other environmental NGOs and experts, was invited by the Environment Bureau to discuss the formulation of Hong Kong's first **Biodiversity Strategy and Action Plan (BSAP)**, with preliminary meetings held in January 2013 at the Tamar government offices.

A joint letter with other green groups relating to the government's compliance with the CBD was submitted to the Chief Executive. We then attended a meeting called by Civic Exchange in March to establish priorities on key tasks to be undertaken as part of the BSAP. During this meeting, thoughts and ideas were exchanged on the objectives of the proposed Biodiversity Working Groups. The outcome of these negotiations is that KFBG has staff representation on the Terrestrial Biodiversity Working Group and its associated Focus Groups (Status and Trends and Red List, Terrestrial Habitat and Terrestrial Impact Assessment), the Marine Impact Assessment and Marine Habitat Focus Groups, and the Awareness, Mainstreaming and Sustainability Working Group. We look forward to playing a full part in the development of the BSAP and to high-level, cross departmental support and buy-in from the Government.

KFBG staff made their valuable knowledge and information available to conservation planners at numerous international conferences and high level meetings in 2013. Dr Stephan Gale delivered an invited keynote lecture on delivering species- and habitat-specific conservation strategies for Indo-Burma's threatened orchids at the **11th Asia-Pacific Orchid Conference** in Okinawa, Japan, which took place in early February 2013. A large team of KCC staff and affiliates led by Dr Bosco Chan participated in the **Association for Tropical Biology and Conservation (ATBC) Asia-Pacific Chapter** meeting in Banda Aceh, Indonesia, in March. Bosco was elected as the China representative of ATBC during the meeting. Philip Lo attended the **International Symposium on Research and Conservation of Asian Butterfly Diversity** held in Taipei Zoo in October. He shared the latest progress of Hainan butterfly studies and conservation needs with international experts. Also in October, Dr Gunter Fischer and Dr. Jinlong Zhang attended the **5th Global Botanical Gardens Congress**, held in Dunedin, New Zealand. Gunter gave a lecture on the forest restoration project in KFBG.



Stephan Gale presented at the 11th Asia-Pacific Orchid Conference in Okinawa, Japan, from 2nd to 5th February.



Community wardens of the Conservation Response Unit employed by FFI in Aceh Indonesia, sharing their experience with KCC team.



Philip Lo of KCC attended the '2013 International Symposium on Research and Conservation of Asian Butterfly Diversity' organized by National Taiwan Normal University.

In August, Bosco Chan, Li Fei and Olivia Pang visited Beijing to meet with the **Ministry of Environmental Protection** Director Zhang Wenguo, Director-General Meng Sha of the **State Forestry Administration**, Chief Editor Zhong Jia of *China Bird Watch*, and partners from Wild China and Imaging Biodiversity Expedition. They shared experiences and discussed collaboration opportunities.

As part of KFBG's key involvement in the **Critical Ecosystem Partnership Fund (CEPF) for Indo-Burma**, Bosco and Olivia visited Kunming and met with Director Zi Shizha of Yunnan Provincial Forestry Department's Wildlife Conservation Bureau. Later in the month they met with Director Jiang Yinghong of Guangxi Provincial Forestry Department's Wildlife Protection and Nature Reserve Management Office, and partners from the Guangxi Forest Inventory & Planning Institute. They introduced CEPF and discussed collaborative conservation projects. A further visit to southeast Yunnan to discuss CEPF with staff from the Yunnan Forestry Department and nature reserves took place in November. On 26th November, Bosco met with Prof. Long Yongcheng, Regional Vice-chair (China) of the **International Union for the Conservation of Nature (IUCN) Primate Specialist Group** and Dr Jiang Xuelong of Kunming Institute of Zoology, in Kunming to discuss gibbon conservation.

Research for conservation

Laboratory-based DNA fingerprinting of various flora and fauna, most notably orchids, was a major emphasis of our conservation-oriented research work in 2013. We completed the leaf sampling of our entire collection of 347 orchid species at KFBG as part of efforts to generate DNA barcodes for an analysis of the identity and genetic diversity of our living collections. This information will feed into three ongoing orchid projects: **Barcoding of KFBG's Living Orchid Collection**, **Barcoding of Hong Kong's Native Orchids** and **Confronting the Wild Orchid Trade**. At the time of sample collection, the plants were formally identified and a voucher specimen was made from a flower or flowering shoot. The leaf sample was then passed to the KFBG **Conservation Genetics Laboratory** for DNA extraction. We have developed a secure storage method for our leaf DNA samples.

Of the 130 native orchid species in Hong Kong we have 65 in our collection. As part of our project to barcode Hong Kong's entire native orchid flora, official permission has been received from AFCD to collect leaf samples from the remaining 65 species of orchids in the wild. The aim is to generate genetic sequence data to identify each of Hong Kong's native orchid species as a way of aiding studies on the taxonomy, ecology and conservation of this rich botanical heritage. In 2013, DNA was extracted from more than 600 orchid samples of more than 30 orchid species including the endangered *Bulbophyllum bicolor*, *Paphiopedilum purpuratum* and *Coelogyne fimbriata*.



Lisa Li gave a poster presentation on her barcoding work at the Barcode of Life Conference in Kunming.

In 2013 we generated DNA sequence data for 100 plants in our orchid living collections. Market samples of orchids for Traditional Chinese Medicine uses were also purchased and processed in our laboratory. Thirty such samples have been sequenced and identified. Once the plants are formally identified based on their morphology, the sequence data can be permanently linked to a valid name in a database, supporting analyses of their diversity and relationships. It allows us to unequivocally distinguish between species, and sometimes even between the populations or locations from which the plants originated. The findings were compiled and presented at the **Barcode of Life Conference** in Kunming in October. We have now successfully sequenced over 1,000 orchid samples with two specific gene regions for plant identification. The sequences are being compared with data in the GenBank sequence database.

DNA extraction was also conducted on more than a hundred samples collected from 40 tree species in the KFBG one-hectare forest plot for DNA barcoding, which will assist in identifying native tree species in Hong Kong. We used four genes for identifying tree species. The DNA sequences generated will be useful to construct a community phylogeny of the plot.

With permission from AFCD, a small number of pangolin scales were assayed in the Conservation Genetics Laboratory as a preliminary study. Valuable genetic material was extracted. In May and June, we successfully extracted DNA from four Hong Kong **Chinese Pangolin (*Manis pentadactyla*)** samples. The fact that pangolins could be identified to species using DNA extracted from their scales confirmed the value of this procedure as a law enforcement tool – pangolin are the subject of huge illegal trade. DNA barcoding trials were conducted to identify pangolin scales from four earlier confiscations held in our collection. The results were shared with AFCD and the findings were presented at the IUCN Species Survival Commission Pangolin Specialist Group meeting in June in Singapore and at the 5th International Barcode of Life Conference in late October. Most samples were confirmed as **Sunda Pangolin (*Manis javanica*)** and two were suspected to be species from Africa. We provided our pangolin DNA data to Dr Perry Ong from the University of the Philippines in July, to assist him in identifying a government-confiscated pangolin.

Tissue and blood samples of Eurasian Otter (*Lutra lutra*) were also received for analysis in the Conservation Genetics Laboratory, adding to our reference library. On 16th July, 23 wild animal tissue samples were donated to City University Hong Kong to aid the development of a DNA-based rapid species identification method. The new method allows users to identify multiple animal species in a sample simultaneously. The results will be published and also shared with KFBG. This method can be applied to testing meat samples in the wildlife trade.

Publications are an important means of disseminating information to conservation practitioners. The 600-page **Monograph on the Biodiversity of Yinggeling**, written by KFBG staff and associates, was published in May. The book provides comprehensive information on the flora and fauna of Yinggeling Nature Reserve, Hainan, and will be an invaluable reference resource for conservation managers and nature reserve staff not only at Yinggeling but elsewhere in Hainan and tropical southern China. More than a hundred copies of our nature reserve management guide book, **Sustaining the Pulse – Managing for Biodiversity Conservation in South China's Forest Nature Reserves**, were distributed to colleagues, partners or government officials from China, Taiwan, Vietnam, Malaysia, Indonesia, Japan, India, Australia and the USA in 2013. Another 300 copies of the Chinese version were printed.

Scientific publications of KFBG staff and partners during 2013 are listed in **Appendix 2**. Our services were also sought for peer reviews of papers submitted to many scientific journals, including *Asian Journal of Traditional Medicines*, *Biological Conservation*, *Bulletin of the National Museum of Nature and Science Series B*, *Chinese Science Bulletin*, *Diversity and Distributions*, *Ecology and Evolution*, *Herpetological Conservation and Biology*, *Hydrobiologia*, *Journal of Bombay Natural History Society*, *Journal of Systematics and Evolution*, *Journal of Threatened Taxa*, *Journal of Tropical Ecology*, *Malesian Orchid Journal*, *Notulae Scientia Biologicae*, *Phytotaxa*, *Rheedeia*, *Science Asia*, *Systematic Botany* and *Taxon*.



After hours of procedures, valuable DNA material is extracted from pangolin scales.



A small portion of pangolin scales confiscated by Agriculture, Fisheries and Conservation Department.



The carcass that helped to confirm the identity of the local otter species as the 'Eurasian Otter'.

Holistic Estate Management & Minimal Eco-Footprint








The Land Management Plan for KFBG was finalised this year after several years of development. Within our estate, the diversity of plants in our nurseries was widened to give more options for greening and education projects. Native ferns, orchids and other plants were used to green the roof at the General Administration Department buildings, the walls outside the public toilets and boulders in the Walter Kerr Memorial Garden; sixteen trees were planted in the latter to enrich the canopy cover in the lower farm.

We enhanced our renewable energy use by installing mat-type photovoltaic cells on the Reception roof and sun tracking solar lighting systems at the Facilities Department Office and the Conservation Building. In waste management, our new lamp crusher safely turns used fluorescent lamps into recyclable material. A study of the technical feasibility and environmental impact of new pipes and pumps to discharge wastewater to our wastewater wetland system was conducted.

Land Management Plan

In July and August the land management objectives and the Land Management Plan were endorsed by the Holistic Estate Management Forum, the HEMF Core Group and the Management Team. The six main management objectives for the plan relate to the strategic goals of **Sustainable Living** (Sustainable Yields and Healthy Planet), **Holistic Education** ('Head', 'Hands' and 'Heart'); **Nature Conservation** (Ecological Integrity and Species Recovery/ Management) and **Holistic Estate Management** (Supportive/ Integrated infrastructure). Land management zoning was agreed for most plots, with some to be decided in future years. The new land management plan covers the revitalisation of many abandoned orchards mainly in the middle and upper farm area. It will be a huge multi-year task to implement the plan; trial work has already begun. For more details of these plans please see the section on **Forest Restoration for Conservation and Land Management** above.

LAND MANAGEMENT OBJECTIVES

Strategic Goal	Land-management Objective	What we want the land to do (some examples)
A. Sustainable Living	Sustainable Yields: optimise ability to meet human material needs (=capacity for and delivery of Provisioning Ecosystem Services) 	Provide fruit, vegetables, honey, tea, herbs, water, timber, fibres etc.
	Healthy Planet: optimise other material roles beneficial to humans (=capacity and delivery of Regulating and Supporting Ecosystem Services) 	Sequester carbon, store water, limit landslips, curb surface soil-erosion, enable pollination, enable natural pest-control, buffer local weather-extremes, purify air/water, etc.
B. Holistic Education	Head: enhance understanding of relationships in and with nature, and how to harmonise them 	Awake visitors to ecological relationships, issues, threats, solutions, heritage etc.
	Hands: physical engagement with nature 	Enable positive engagement with nature.
	Heart: uphold the magic, beauty and inspiration for visitors 	Be beautiful, peaceful, calming, colourful, vibrant, fragrant, inspiring, pure, natural etc.
C. Nature Conservation	Ecological Integrity: optimise overall ecological integrity of ecosystems 	Return to ecological 'balances' appropriate to the region – natural patterns of presence, distribution, relationships & processes.
	Species Recovery/Management: optimise conditions (in situ and ex situ) for select species of conservation concern 	Allow survival & recovery of particular species at risk.
D. Holistic Estate Management	Supportive/integrated infrastructure: Support and integrate these objectives	Land Management Objectives

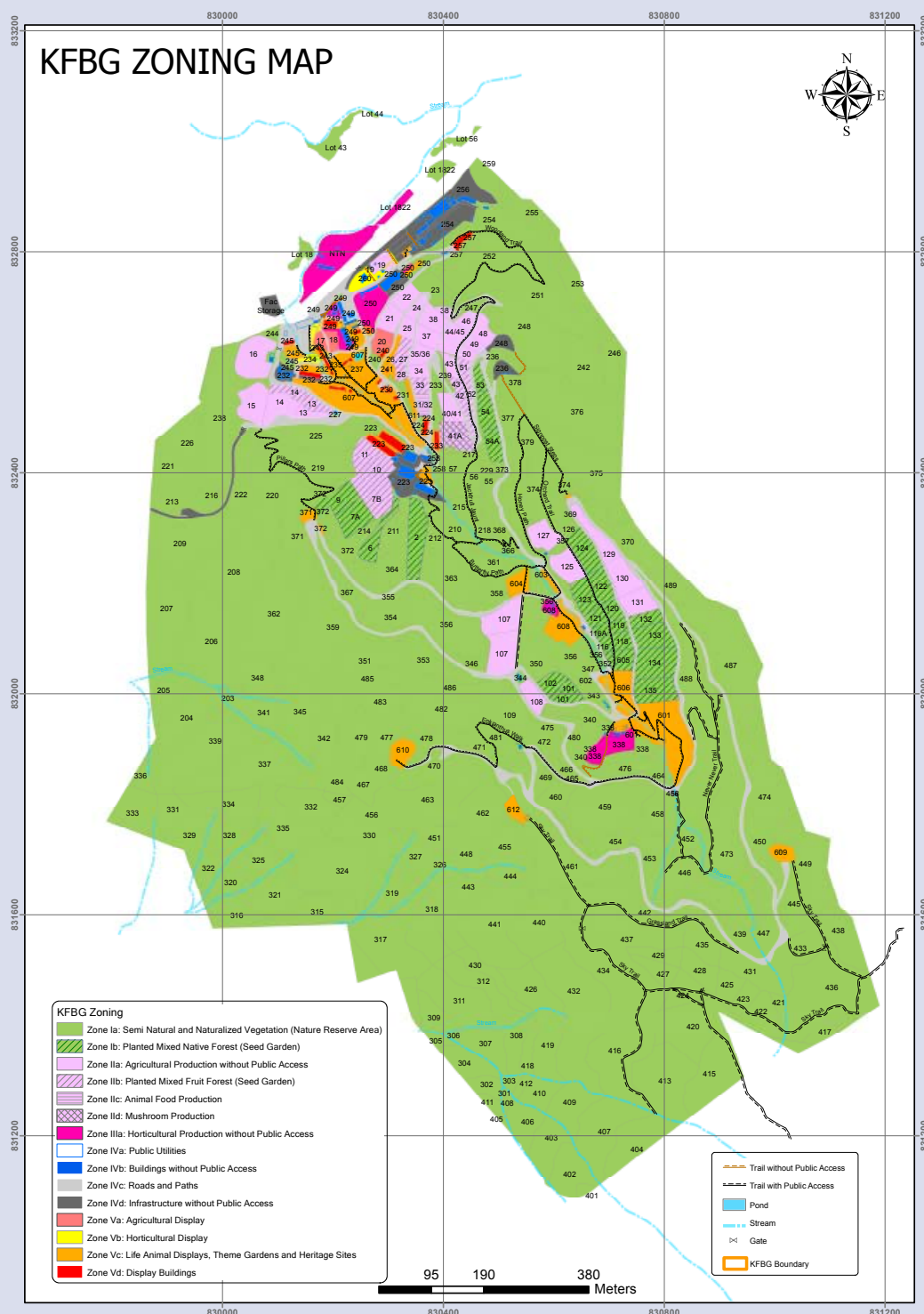
Ecological integrity of the KFBG estate

Several new colonies of **Red Imported Fire Ants** were found on the KFBG estate in 2013. The lawn at Misha's Bungalow and the helipad were the main affected sites, each with several visible ant mounds around 15 to 20 cm wide. Less severe infestations were also found on the road near the Kadoorie Brothers' Memorial Pavilion and near the Conservation Genetics Laboratory. We sourced eco-friendly fire ant bait, and after months of dosing and regular checks, this bait was seen to become effective as the weather warmed. Ant activities at most of the infested sites have been reduced; at some they have ceased. However, this is a pernicious and chronic pest and we will remain vigilant in detecting and controlling future infestations.

The KFBG **fire-break** was trimmed in October prior to the onset of the dry season. This is an essential annual task to reduce the fuel available to fire, in order to protect the KFBG estate from dry season hill fires, which regularly threaten the adjacent uplands.

With a prolonged dry season and natural food scarcer than usual, wild monkeys became something of a nuisance in 2013. Crops awaiting harvest were damaged by monkeys, while some nuisance monkeys even frequented the Reception Plaza to get a quick meal from the visitors' plates and bags. The **pest management team** used a suite of measures to contain this issue and have us living in harmony with the monkeys, who have ample food available in the forest, including equipping frontline staff with tools that make a loud noise, a trial using a dog to reinforce human patrols of the Plaza area, a giant rubber snake, visitor signage, verbal advice to visitors to keep food and bags away from macaques, and fast response training for the café and reception staff. The problem subsequently improved greatly.

Bird-nest ferns at Orchid Haven and areas nearby were damaged massively by wildlife from late January. Soap chips and bitter spray were applied to deter the attacks, but proved ineffectual. Alternative environmentally friendly deterrents are being sought. In the meantime, two surveillance cameras were installed to try to discover which wild animal causes the damage.



A visitor-friendly estate

The beautiful KFBG estate requires constant maintenance to ensure that it remains safe and attractive for the over 150,000 people who visit annually. The steep slopes of the estate are especially prone to tree-falls and small landslides. The **Tree Management Team** carried out regular inspections on all trees close to visitor and staff areas, keeping detailed records, and conducted more than a hundred operations in 2013, removing 38 hazardous trees and pruning back more than 200 others. Ground investigation works on 16 different slope features were conducted, and preventive and corrective maintenance works were ongoing on various other slopes around the estate.



With the help of a crane truck, the Tree Management Team removed the hazard tree located above the Parrot Sanctuary.

Building safety and maintenance is a major concern of the KFBG **Facilities Department** (FAC), which was kept continuously busy in 2013, making renovations, repairs and upgrades to dozens of buildings, display areas, walls and other structures around the estate. The Facilities Department completed a total of 1,686 requisitions for maintenance and repairs and 85 requisitions for small-scale capital works during the year.

Hundreds of **native plants** were used to beautify the newly renovated retaining walls and planters near to Mishas' Bungalow, the Golden Pavilion, the Post Office Pillars, and at numerous other sites around the estate, enhancing their aesthetic and ecological value. The **green walls** outside the public toilets near the Plaza were upgraded with more than 500 pots of **native ferns** in October and November. Also, hundreds of native fern plants were removed from various locations prior to commencement of engineering site inspections or reinforcement works on retaining walls and roadside slopes; the collected ferns were transplanted to Fern Walk and Convent Garden, replacing invasive exotic species there, or potted and nursed for future replanting, such as on the **green roof** of the **General Administration** (GA) building. We devised a list of native fern species suitable for growing in green roof microclimate conditions and 365 pots were planted in a natural arrangement on a small area of the GA green roof as a trial, replacing the exotic plant species formerly present. The newly enhanced roof is being monitored to observe the performance of native plants under the harsh roof conditions. A total of 30 native plants were also removed from slopes and transplanted to roadside planters or other sites.

Plant displays were maintained in the Orchid Greenhouse and Orchid Haven, with new orchids added as they came into flower. Tree branches with epiphytic ferns collected during tree work are on display along the path at Fern Walk to enhance its aesthetic appeal. Many of the orchids that the Orchid Conservation Section (OCS) team planted on the large stone wall beside the Art House and on rocks within the Walter Kerr Memorial Gardens last year came into flower during the spring and early summer months, providing a spectacular display. Given this success, we added 60 more individuals of ten different species, and continue to mount orchids of interest onto rocks and trees in the Walter Kerr Garden. The OCS oversaw the importation of a consignment of almost 1,000 artificially propagated and non-invasive orchids from Thailand, which will further diversify our displays. Meanwhile, more native larval food and nectar source plants were planted in the Butterfly Garden to attract butterflies. Rampant wild grass was trimmed at the Cascade Garden, near the Chicken Houses and the area tidied up for visitors.

To enhance the canopy in the lower farm area, about 20 sites were selected for planting trees native to Hong Kong or the region. In years to come, these trees will produce attractive flowers, nectar and fruits.



Native plants were used to upgrade the green wall outside the public toilets.



Before ornamental planting with ferns in Fern Walk.



After ornamental planting with ferns in Fern Walk.



Colleagues planting native ferns on the roof of GAD.



Following a spectacular flowering season in early summer, OCS staff added more orchids to the display below the Art House wall.



A 'Building Integrated Photovoltaic' system and related electrical works at the 'One Dou Farm'.

Energy descent at KFBG

Our use of **solar power** as a means of generating electricity was significantly boosted in 2013. We completed the installation of a Building Integrated Photovoltaic system and related electrical works at the 'One Dou Farm' plot, and installed mat-type photovoltaic panels at the Reception Plaza glass roof. The new solar system is connected to the existing power grid and is able to generate 6.5 kWh of electricity. A solar lighting system was installed in the Facilities office as a trial to assess its performance. Optical fibres are used to transmit sunlight from the outdoor collector to its indoor light fittings to supplement electrical light. A simple solar sensor and clock mechanism tracks the sun as it moves across the sky from sunrise to sunset. Four sets of the light-tracking solar lighting system were subsequently installed at the roof of the Conservation Building, transmitting sunlight into 12 light fittings inside the newly renovated Education Department office. This system supplements electric light in what was a dim working space. We also purchased self-contained solar floor lights to be installed along the footpath between the Facilities office and the main gate, to provide basic illumination for staff leaving the site after dark. These lights are different to traditional solar-powered devices and do not require repeated battery replacement.



Four units of light-tracking solar lighting were installed at the roof of the Conservation Building to channel light to the Education Office.

We have seen a gradual **reduction of fuel usage** over recent years. A new fuel budget, by department and by vehicle, was recently agreed for the year. Our **mule team** continues to provide an alternative means of transportation within the KFBG estate, and during 2013 the mules moved hundreds of loads, amounting to a total of 7.5 tonnes, over a total distance of some 750 km. The loads primarily comprised general garbage from the upper farm, compost to various destinations and water to the Kadoorie Brothers Memorial Pavilion area during the winter.

Water and resource use

We are committed to making the most efficient use and re-use of our **water resources**. Replacement of worn-out pipes in the upper farm areas was ongoing in 2013, and new water pipes were laid at the Never Never Trail. We also completed the installation of a copper-free water supply system to the Wild Animal Rescue Centre. Water dispensers and sprinkler cooling systems with a sedimentation filtration set-up were installed at various chicken houses, and a new purified stream water dispenser was installed at the Reception for visitor use, with another to be installed at the newly renovated Native Tree Nursery office, removing the need for bottled water at that location. Improvement works to the sewage pumping system at the wetland equalisation tank were completed and our **wetland wastewater treatment facilities** continued to treat all used water.



New water pipes laid at the Never Never Trail.



A copper-free water supply system to the Wild Animal Rescue Centre.



Copper-free water supply system.

Periodic testing of stream water and wastewater is ongoing. After a small *E. coli* contamination was detected in the treated spring water at the roadside pond below Orchid Haven, we upgraded the UV sterilising unit at that location and the problem was eliminated. Periodic cleaning of water tanks at the 'Wildlife Walkthrough' and the Conservation Building was undertaken over the year.

We utilise as much KFBG produce as possible for animal feed. In order to reduce spoilage, off-cuts of vegetables are now provided as feed for herbivores on a daily, rather than weekly, basis. This does not feed our carnivorous animals, however; to that end, we have negotiated donations of rodents from the Chinese University of Hong Kong, which supplied us with several thousand mice in 2013. We have also sourced animal feed for pigs from a local supplier, ensuring a stable supply of fresher and specified feed, in smaller quantities with low food-miles. The ecological footprint of this feed is much lower than that of the feed formerly imported from the USA.

A large quantity of wood logs generated from tree pruning were transformed into wood chips for further uses such as mulch, while soil and rocks generated from cutting back the slope to the west of Orchid Haven were stored for re-use in future planting and hard landscaping, thus avoiding the need to transport it to the off-site landfill. We also re-used building materials whenever safe and feasible. Our recycling capacity was improved this year when we purchased a 'Bulb Eater' that crushes used fluorescent lamps of any length into 100 percent recyclable material while capturing over 99.99 percent of the toxic vapour released in the crushing process.



Wood logs from pruned trees being chipped into wood chips for mulching.



A staff member putting a used fluorescent lamp into a Bulb Eater.

An Evolving Organisation

Forums of knowledgeable officers and management staff were convened regularly to discuss and advise on our strategic goals, key responsibility areas, initiatives and actions throughout the year. A new Forum for Vibrant Culture and Great People was established.

Two Vibrant Culture Experience Programmes were run for our staff and various thought-provoking film shows organised. KFBG staff from various departments attended a range of capacity-building workshops and seminars in Hong Kong and overseas.

Dynamic Structure

Forums for Nature Conservation, Sustainable Living, Holistic Education, Holistic Estate Management, Vibrant Culture and Great People, and Minimum Eco-Footprint were held in 2013. The **KFBG Strategy** is being fine-tuned continuously, and all staff now have access to the strategy software and have agreed on individual actions, initiatives and Key Responsibility Areas. Jobs are accordingly becoming more aligned with the strategy and our staff can use the software to explore how they and others fit into the broad scheme of fulfilling KFBG's strategic goals. Project proposals are now compatible with strategic aims, and the system for the Management Team approving projects that have been endorsed by Forums and the Forum Core groups is becoming quite well established. The structure of the Education Department has been reviewed and adjusted.

Vibrant Culture

Various internal group activities were organised in 2013 to keep our staff fresh, challenged, and stimulated. Our Education team organised two more sessions of the successful Vibrant Culture Experience Programme, inaugurated in 2012, on 25th January and 15th August, for 51 and 65 staff members respectively, and on 25th July a staff gathering for sharing and exploration of management, policy and strategic issues was held, attended by 59 staff members. A member survey was carried out questioning how much of a 'Learning Organisation' we are, how 'Toxic' is our organisation and how strong is our 'Readiness to Change'. Results were compared with those of a similar survey conducted in 2006. They showed that good progress has been made in many areas while others still require improvement. The new Vibrant Culture and Great People Forum convened for the first time on 29th August.

During the year we held screenings of various films to facilitate exploration of values and deepening of perceptions among our staff. 'Transition 2', examined the subject of community transition to sustainable living, while inspiring messages were offered in 'Hwang Dae-Kwong's Lifepeace Philosophy – My True Place' (an interview by Keibo Oiwa) and 'Animate Earth' by Stephen Harding.

Great People

KFBG has a large and dynamic workforce of around 230 people. In 2013 we recruited 32 new members of staff, while 25 existing members left the Farm. Key changes occurred in the Education Department with Dr. Chiu Sein Tuck moving to head the Ecological Advisory Programme whilst Joshua Chan stepped up to become the Head of the Education Department. Several new staff joined the Education team.

Training and capacity building of our key staff, both externally and in-house, is a continuous process as we strive to meet present and future challenges, and this year a large number of staff benefited from these activities. Paul Crow and Tan Kit Sun of the Fauna Conservation department attended a Zoological Information and Management

System (**ZIMS**) training course hosted at the Singapore Zoo in January. The training was required prior to us migrating our animal holding data from ARKS to ZIMS on 1st February, and internal training for all users was conducted by Paul and Kit Sun on 14th and 28th January. Daisy Hu of Flora Conservation attended a two-week training programme on **laboratory techniques in conservation genetics** organised for the BGCI-KFBG Travel Scholarship from 21st January to 1st February. Sustainable Living and Agriculture staff attended sessions of a series of eight **'Local Green Economy'** lectures organised by Yew Chung Community College and embarked on a six-day training trip to Taiwan in March to study an aquaponics farm, farmers' markets, community-based sustainable living programmes and a Slow-Town Movement at Hualian. May Cheng also completed a two-day **Food**



SLA staff visiting Farmers' Kitchen, a co-op shop, during a study trip at Taiwan.

Hygiene Manager training course organised by Hong Kong Polytechnic University in July, as preparation for her future role at the Green Hub facility. Dr. Pankaj Kumar participated in the 31st New Phytologist Symposium and Workshop on **orchid ecology and conservation** in Italy, from 14th to 19th May. Research talks by some of the world's brightest orchid ecologists and field visits to some high profile Mediterranean orchid conservation sites provided insights into the successful planning and management of orchid research and conservation that can be applied to



A group photo taken when Pankaj Kumar was returning from one of the field works from Alps during The 31st New Phytologist Symposium and Workshop, from 14th to 19th May 2013.

our work at KFBG. On 3rd June, Stephan Gale, Lisa Li, Pankaj Kumar and Daisy Hu attended a one-day workshop at the National Orchid Conservation Center of China, Shenzhen, on **tools and approaches for pollination biologists**.

The workshop featured talks by world-renowned ecologists Steven Johnson and Lawrence Harder. In August, four Tree Management Team members attended a seminar held by Greening, Landscape and Tree Management Section of the Development Bureau, picking up useful knowledge on **plant health care and brown root rot disease**. Various Flora Conservation staff

attended the International Skyrise Greenery Conference in Singapore in November to learn about the latest technology and research focuses on **green roofs, green walls, façades and urban greenery**. Flora staff also attended a course on **plant disease and insect pests** organised by REACH Professional Training Skills Development Centre and a **rock climbing training course** run by the Hong Kong Rope Union to increase safety whilst conducting fieldwork. In-house, 12 staff were given training on seed collection, caring, sowing and seedling care for the Native Herb & Shrub Nursery and three staff received training on laboratory techniques for plant conservation work. Staff of various departments participated in a **workshop on review and evaluation of experiential educational experiences**, facilitated by Dr Roger Greenaway in April.

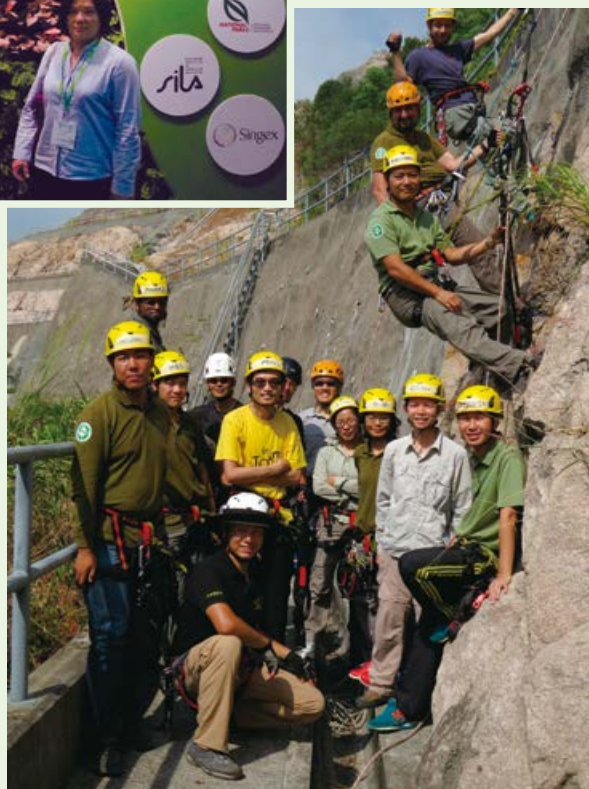
Formal training activities were augmented by **sharing sessions and team building exercises**. These included a talk and slide show about Singapore Botanic Gardens by Sharon Mar, a presentation by KFBG Board Member Ruy Barretto on the Convention on Biological Diversity and the role of NGOs in planning Hong Kong's conservation, a talk by SPCA's Fiona Woodhouse on animal welfare in Hong Kong, and one by Yi Liu, director of China Mangrove Conservation Network, on mangrove conservation and restoration in China.

Two **Journal Club** sessions for internal sharing of scientific knowledge were held in 2013, one on using functional traits to predict species performance in restoration projects, and one entitled 'Global change and the barcode of life: Challenges and Opportunities'.

In March, the Sustainable Living and Agriculture department organised two team building activities on Tap Mun Island, involving a total of 44 staff.



Caroline Law and Alice Hui attended the International Skyrise Greenery Conference in Singapore in November 2013 to learn about the latest technology and research focusing on green roofs, green walls and urban greenery.



FLO staff at the Rock Climbing Training on 7th November 2013.



The Director of China Mangrove Conservation Network, Yi Liu, gave a talk to KFBG staff at the sharing session on 26th September 2013.



Zeng Xueqin presented on 4th October 2013 at a Journal Club meeting organised by the FLO department.

Governance

We are governed by the laws and regulations in Hong Kong and the People's Republic of China, the Kadoorie Farm and Botanic Garden Ordinance (CAP. 1156), and we periodically update our internal policies to ensure compliance and best practice.

The audit for the year ending 31st March, 2013 was carried out in July 2013 by Price Waterhouse Coopers. The annual budgeting exercise for the Financial Year 2014-2015 and the revised Five-Year Plan was carried out in November and December 2013.

We thank the KFBG Board for their continued selfless support and wise advice.

We thank the Trustees of the Kadoorie Foundation for their trust and support of the work of KFBG. We also thank our public donors, the HK SAR Government and other donors for their grants and other contributions to our programmes.

NUMBER OF VISITORS TO KFBG OVER THE PAST 5 YEARS:

	2009	2010	2011	2012	2013
School Groups	38,475	42,543	48,430	47,385	49,212
Commercial Groups	19,809	19,321	22,283	13,032	9,834
NGO Groups	14,032	12,875	19,373	19,154	18,809
Individuals	57,531	55,078	66,281	76,070	79,752
Total	129,847	129,817	156,367	155,641	157,607

FINANCIAL FIGURES (excluding depreciation):

Expenditure (HK\$)	*Year Ended 31.3.13 (audited)	**Year Ended 31.3.14 (unaudited)
Capital	30,165,736	54,036,000 ***
Operating	69,392,289	75,051,000
Total	99,558,025	129,087,000

Income (HK\$)	Year Ended 31.3.13	Year Ended 31.3.14
Kadoorie Foundation	84,000,000	96,500,000
Shop Sales	2,065,944	2,073,896
Government and other funding (See breakdowns below)	4,052,795	13,496,543
Entrance Fees	1,085,020	1,346,940
Workshop Fees	665,104	653,687
Public Donations	32,844	55,076

* From Audited Accounts (expenditure includes commitments accrued and not yet settled).

** From Management Accounts (expenditure includes commitments accrued and not yet settled).

*** Includes some of the costs of renovating the Old Tai Po Police Station into the Green Hub.

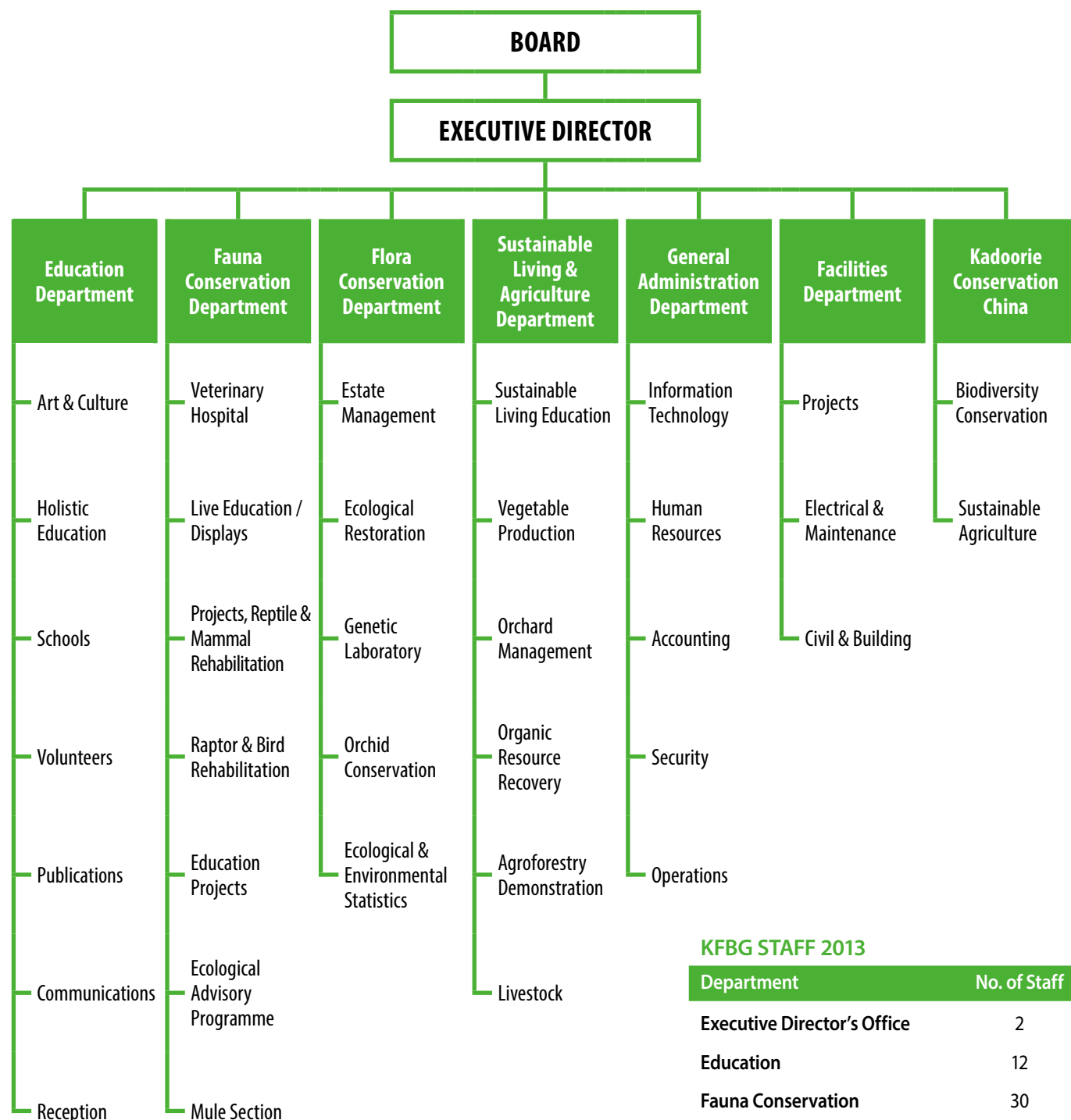
BREAKDOWN 1. GOVERNMENT FUNDING

Government Funding	Year Ended 31.3.13	Year Ended 31.3.14
Tai Po District Council (2013/14 Eat Well Ambassador)	104,409	95,497
AFCD (2013/14 Python Tracking Study)	Nil	96,936
Development Bureau (Renovation of the Old Tai Po Police Station into a Green Hub for sustainable living.)	3,763,586	12,868,449
Macau Government (2013/14 Macau Community Farm HKD100k; Snake Workshop and exhibition HKD170k)	184,800	270,000
Total	4,052,795	13,330,882

BREAKDOWN 2. OTHER FUNDING

Other Funding	Year Ended 31.3.13	Year Ended 31.3.14
BOC Charitable Foundation (2013/14 Workshop for students 'Centre for Environmental Education and Communication, Ministry of Environmental Protection' (China)	Nil	90,000
Critical Ecosystems Partnership Fund (Fee for administration of the mainland China CEPF programme)	Nil	75,661
Total		165,661

KFBG Organisation



KFBG STAFF 2013

Department	No. of Staff
Executive Director's Office	2
Education	12
Fauna Conservation	30
Flora Conservation	64
Sustainable Living & Agriculture	50
General Administration	29
Facilities	20
Kadoorie Conservation China	10
Total Number of Staff	217*

Note: *As at 31st December, 2013.

Members of the Board

of the Kadoorie Farm and Botanic Garden Corporation

Andrew McAulay (Chairperson)

Ian D. Boyce

Dr Lawrence Lee

Ruy Barretto, S.C.

Deborah McAulay

Daniel R. Bradshaw

Senior Management

of the Kadoorie Farm and Botanic Garden Corporation

Executive Director

Andy Brown

Heads of Department

Education Department

Joshua Chan

Facilities Department

Denis Ng

Fauna Conservation Department

Dr Gary Ades

Flora Conservation Department

Dr Gunter Fischer

General Administration Department

Florence Au

Kadoorie Conservation China

Dr Bosco Chan

Sustainable Living & Agriculture Department

Idy Wong

Appendix 1

The following table lists KFBG activities through 2013 aimed at building capacity in community organisations and partnerships for sustainable living.

Partner Organisation	Date	Programme Title	Location
Tai Po District Council	29 th December, 5 th January & 12 th January	WasteReduction@TaiPo educational tours	Tai Po/Ma Shi Chau/ KFBG
Hong Lok Yuen Property Management Ltd and Environmental Protection Department	12 th January, 16 th March, 13 th July, 10 th August & 16 th November	Food Waste Recycling at Housing Estates workshops	Hong Lok Yuen/ KFBG
Environmental Protection Department and Hong Kong Productivity Council	24 th January	Food Waste Recycling Partnership Scheme sharing session	Hong Kong Central Library
China Permaculture Association	2 nd February	One-day training on sustainable living	KFBG
Correctional Services Department	26 th February	Briefing on organic resource recovery	KFBG
Tai Po Environmental Association	17 th March	Training in sustainable agriculture and organic resource recovery	KFBG
Partnerships for Community Development	8 th April	Sustainable living outreach programme design and sustainable agriculture initiatives	KFBG
CityU HK	29 th April	An Orientation to Permaculture	KFBG and CityU
Center for Environmental Education and Communication, Ministry of Environmental Protection (China)	21 st July	Transition Training workshop	KFBG
Tai Po District Council	September - December	Eat Well Ambassador workshops	KFBG
Woodpecker Food Safety Center	24 th September	One-day training on community-supported agriculture	KFBG
Chinese Cuisine Training Institute	28 th September	Half-day introduction to edible landscaping and city farming	KFBG
Robyn Francis	30 th September	Tour and interflow session on permaculture and the importance of city farming	KFBG
Hong Kong Women Professionals and Entrepreneurs Association	9 th November	Half-day workshop on sustainable living in the Hong Kong context	KFBG
Forever Sabah and Partners of Community Organisations in Sabah	5 th - 7 th December	Two-day interflow and one-day workshop on sustainable living and education	KFBG/Tai Po

Appendix 2

Specialist scientific publications from **KFBG staff and consultants** (#) or collaborators/ project executants/Studentship holders (*) for 2013 are listed as follows:

Title	Authors	Journal / Publication
<i>Cordiglottis longipedicellata</i> (Orchidaceae), a new species from Vietnam	RK Choudhary, TT Bach, D. Hai, BH Quang, L. Nong, Pankaj Kumar , S-H Park, J Lee	<i>Annales Botanici Fennici</i> 50: 95-98
<i>Habenaria barbata</i> Wight ex Hook.f. – a new record for Central India	P Dash, Pankaj Kumar	<i>Zoo's Print</i> 28(7): 21–22
Studies in Asian <i>Nervilia</i> (Orchidaceae III): <i>N. khaoyaica</i> , a new species from eastern Thailand	Stephan Gale , S Suddee, S. Watthana	<i>Kew Bulletin</i> 68: 331–335
<i>Cheirostylis pusilla</i> (Orchidaceae), a new record for Hong Kong	Stephan Gale , Pankaj Kumar , A-Q Hu , KS Pang	<i>Kew Bulletin</i> 68: 325–330
<i>Nervilia brevilobata</i> sp. Nov. (Orchidaceae) from Taiwan and Hainan	S-I Hsieh, Stephan Gale , C-T Lee, C-R Yeh, C-S Leou, C-L Yeh	<i>Nordic Journal of Botany</i> 31: 403–407
Phylogenetic beta diversity of angiosperms in North America	H Qian, NG Swenson, JL Zhang	<i>Global Ecology and Biogeography</i> . (Online Preview, DOI: 10.1111/geb.12076)
Advances in methods for measuring patterns of endemic plant diversity	JH Huang, JL Zhang , Y Yang, KP Ma	<i>Biodiversity Science</i> 21 (1): 99–110 (DOI: 10.3724/SP.J.1003.2013.12175)
Delivering species- and habitat-specific conservation strategies for Indo-Burma's threatened orchids	Stephan Gale , Pankaj Kumar , J Li , A-Q Hu , H Zhang , PF Yang , Günter Fischer	<i>Proceedings of the 11th Asia-Pacific Orchid Conference & Okinawa International Orchid Show 2103</i> , pp. 32–36. Okinawa Churashima Foundation, Okinawa
Analysis of conservation status and extinction risk of the orchids of Hong Kong	Stephan Gale , MJ Wang, JJ Wang, AL Ngai	<i>Proceedings of the 20th World Orchid Conference 2011</i> , pp. 104–110. National Parks Board & Orchid Society of South East Asia, Singapore
Orchid diversity and distribution in Kanger Valley National Park, Chhatisgarh	A Kotia, Pankaj Kumar , UL Tiwari, JS Jalal, AN Prasad	<i>Journal of Economic and Taxonomic Botany</i> 37(1): 207–215
The rare terrestrial orchid <i>Nervilia nipponica</i> consistently associates with a single group of novel mycobionts	N Nomura, Y Ogura-Tsujita, Stephan Gale , A Maeda, H Umata, K Hosaka, T Yukawa	<i>Journal of Plant Research</i> 126: 613–623
Germination of the fully myco-heterotrophic orchid <i>Cyrtosia septentrionalis</i> is characterised by low fungal specificity and does not require direct seed-mycobiont contact	H Umata, Y Ota, M Yamada, Y Watanabe, Stephan Gale	<i>Mycoscience</i> 54: 343–352
How do mycobionts trigger the germination of the achlorophyllous orchid <i>Cyrtosia septentrionalis</i> ?	H Umata, Y Ota, Stephan Gale	<i>Proceedings of the 11th Asia-Pacific Orchid Conference & Okinawa International Orchid Show 2013</i> , pp. 209–214. Okinawa Churashima Foundation, Okinawa

Title	Authors	Journal / Publication
Histological and Micro-CT Evidence of Stigmatic Rostellum Receptivity Promoting Auto-Pollination in the Madagascan Orchid <i>Bulbophyllum bicoloratum</i>	A Gamisch, YM Staedler, J Schönenberger, Günter Fischer , HP Comes	PLoS ONE 8(8): e72688. doi:10.1371/journal.pone.0072688
<i>Chiromantis vittatus</i> . (Two-striped Pigmy Tree Frog). Parental Care	Jay Wan, Sung Yik-Hei, Bosco Chan Pui-Lok, Gang Lu	<i>Herpetological Review</i> 43(4): 630-631
<i>Chiromantis doriae</i> (Doria's Asian Treefrog). Predation	Sung Yik-Hei, Fei Li# , Hongxu Mi*	<i>Herpetological Review</i> 44(1): 120
A conservation experience in Yinggeling Nature Reserve, Hainan Island, China	Olivia Pang, Fei Li# , Hongxu Mi*	<i>Abstract of 2013 Asia-Pacific Chapter Annual Meeting of ATBC</i>
More with less: A case study of Fish conservation project on Hainan Island in China	Roger Ho Lee	<i>Abstract of 2013 Asia-Pacific Chapter Annual Meeting of ATBC</i>
Mammal diversity of South China after decades of intensive use	Jay Wan, Bosco Chan Pui-Lok	<i>Abstract of 2013 Asia-Pacific Chapter Annual Meeting of ATBC</i>
Herpetofaunal diversity of tropical limestone forest in South China	Jian-Huan Yang	<i>Abstract of 2013 Asia-Pacific Chapter Annual Meeting of ATBC</i>
Wetland birds of Hainan Island, China: results from winter waterbird surveys 2003-2013	Gang Lu#, Fei Li# , Hongxu Mi*	<i>Abstract of 2013 Asia-Pacific Chapter Annual Meeting of ATBC</i>
Conservation of the Eastern Black Crested Gibbon (<i>Nomascus nasutus</i>) in Guangxi Zhuang Autonomous Region, China	Bo Wang*	<i>Abstract of 2013 Asia-Pacific Chapter Annual Meeting of ATBC</i>
Report on Distribution Status of the Chinese Pangolin (<i>Manis pentadactyla</i>) in Guangxi Province, China	Haijing Wang*	<i>Abstract of 2013 Asia-Pacific Chapter Annual Meeting of ATBC</i>
<i>Necroscia perplexus</i> (Redtenbacher, 1908) comb. nov., a new species to China	George Ho Wai-Chun#	<i>Phasmid Studies</i> 18(1&2): 19-23
Description of female and egg of <i>Sinophasma hainanensis</i> Liu, 1987	George Ho Wai-Chun#	<i>Phasmid Studies</i> 18(1&2): 34-38
A new species and a new combination of the genus <i>Eutoria</i> from Hainan, China	George Ho Wai-Chun#	<i>Acta Zootaxonomica Sinica</i> 38(1): 78-80
Taxonomy of <i>Pachyscia redtenbacher</i> in China (Phasmatodea, Diapheromeridae, Necrosiinae)	George Ho Wai-Chun#	<i>Acta Zootaxonomica Sinica</i> 38(1): 81-83
Contribution to the knowledge of Chinese Phasmatodea I	George Ho Wai-Chun#	<i>Zootaxa</i> 3620(3): 404-428
Contribution to the knowledge of Chinese Phasmatodea II: Review of the Dataminae Rehn & Rehn, 1939 (Phasmatodea: Heteropterygidae) of China, with descriptions of one new genus and four new species	George Ho Wai-Chun#	<i>Zootaxa</i> 3669(3): 201-222
Population number and distribution of oriental pied hornbill in Guangxi, China	Philip Lo Yik Fui , AW Jiang, Bosco Chan Pui-Lok, Ng Sai Chit , NW Xie, TC Que, Fei Li#	<i>Biodiversity Science</i> 21(3): 352-358
Influence of surface water availability on mammal distributions in Nonggang National Nature Reserve, Guangxi, China	TB Chen#, Sung Yik-Hei, Bosco Chan Pui-Lok , YJ Meng#, Jay Wan	<i>Zoological Research</i> 34(3) 145-151

Title	Authors	Journal / Publication
New Distribution Records for <i>Sphenomorphus tonkinensis</i> (Lacertilia: Scincidae) with Notes on Its Variation and Diagnostic Characters	YY Wang, Jian-Huan Yang , Y Liu	<i>Asian Herpetological Research</i> 4(2): 147-150
A new species of the <i>Gekko japonicus</i> group (Squamata: Sauria: Gekkonidae) from the border region between China and Vietnam	TQ Nguyen, YY Wang, Jian-Huan Yang , T Lehmann, MD Le, T Ziegler, M Bonkowski	<i>Zootaxa</i> 3652(5): 501–518
A new species of the Genus <i>Opisthotropis</i> Günther, 1872 (Squamata: Colubridae: Natricinae) from Guangdong Province, China	Yang Jian-Huan, Sung Yik-Hei, Bosco Chan Pui-Lok	<i>Zootaxa</i> 3646(3): 289-296
Discovery of <i>Protobothrops maolanensis</i> in Guangxi, with taxonomic discussion	TB Chen, J Luo, YJ Meng, Wen Bo-Hao, K Jiang	<i>Sichuan Journal of Zoology</i> 32(1): 116-118
Demographic Evidence of Illegal Harvesting of an Endangered Asian Turtle	Sung Yik-Hei , NE Karraker, BCH Hau	<i>Conservation Biology</i> 27(6): 1421-1428
Updating the butterfly inventory of Hainan with introduction to their diversity and conservation	Philip Lo Yik Fui	<i>Proceedings of the 2013 International Symposium on Research and Conservation of Asian Butterfly Diversity</i>
Four new species of Diapheromeridae (Phasmatodea) from Hainan, China	George Ho Wai-Chun#	<i>Acta Zootaxonomica Sinica</i> 2013 (4): 820-824
An updated taxonomy of primates in Vietnam, Laos, Cambodia and China	C. Roos, R. Boonratana, J. Supriatna, John R. Fellowes #, A.B. Rylands & R.A. Mittermeier	<i>Vietnamese Journal of Primatology</i> 2(2): 13-26



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