技术支持：

WWF for a living planet®

赞助：

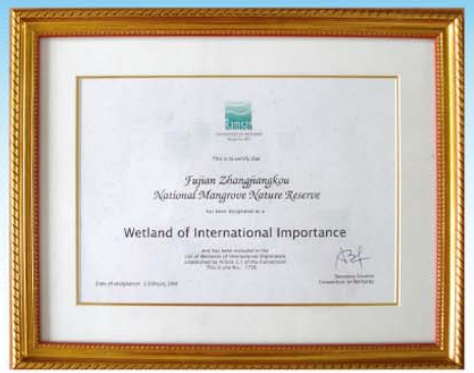
HSBC 汇丰

汇丰/世界自然基金会
福建漳江口湿地保护项目

HSBC / WWF
Fujian Zhangjiangkou Wetland Conservation Project

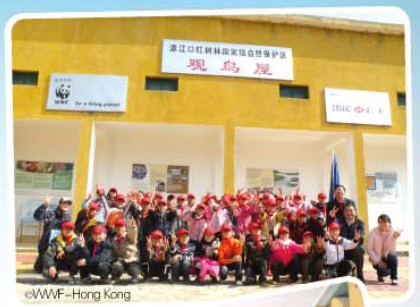
福建漳江口红树林国家级自然保护区管理局
Fujian Zhangjiangkou National Mangrove Nature Reserve Management Bureau

项目亮点 Project Highlights



■ 福建漳江口红树林国家级自然保护区于2008年正式被列入为国际重要湿地

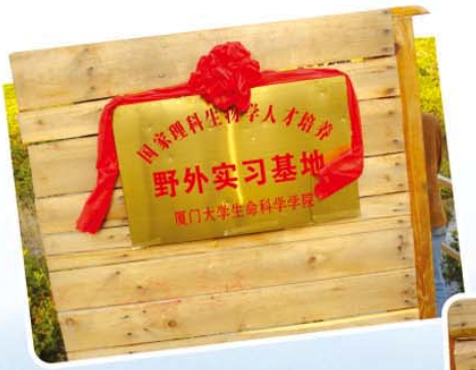
Fujian Zhangjiangkou National Mangrove Nature Reserve was designated as a Ramsar Site in 2008

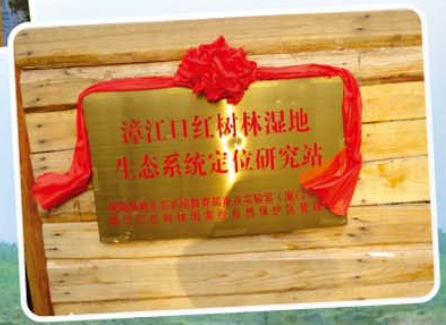


©WWF-Hong Kong

■ 已修建设备完善的宣教中心和观鸟屋等设施，编写可持续发展教育校本教材。

Education facilities such as education centre and bird hide and materials for Education for Sustainable Development were prepared



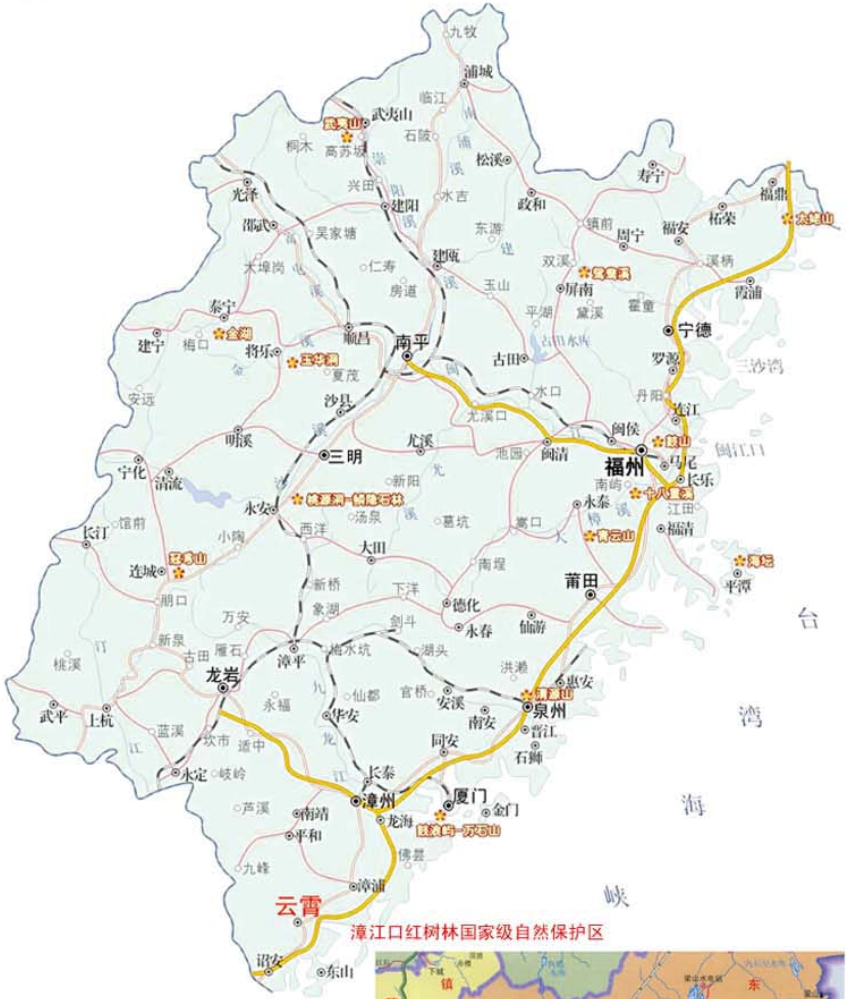


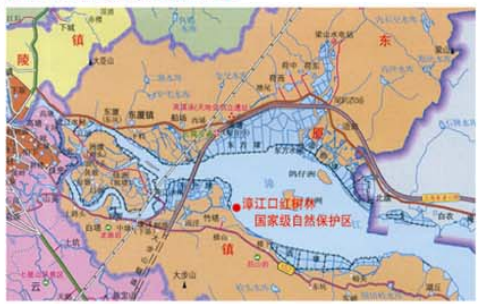
■ 建立鸻鹬类高潮位栖息地，执行生态监测计划，推动生态养殖，促进湿地保护和合理利用，被厦门大学生命科学学院列为国家理科生物学人才培养野外实习基地。

A high-tide roosting site for shorebirds was constructed. The reserve is now conducting regular ecological monitoring surveys and promoting eco-aquaculture method so as to better protect the wetlands and use the wetland resources wisely. The School of Life Sciences of the Xiamen University established a field practice base in the reserve to train students studying biology

福建漳江口红树林国家级自然保护区位置示意图

Location map of Fujian Zhangjiangkou National Mangrove Nature Reserve





目 录
CONTENTS

前言

福建漳江口红树林国家级自然保护区位于云霄县漳江出海口，在漳江口石矾塔以西广阔的滩涂地（东经117°24’07” – 117°30’00”，北纬23°53’45” – 23°56’00”），面积2,360公顷，其中核心区面积700公顷，缓冲区450公顷，实验区1,200公顷。保护区的天然红树林面积为117.9公顷，是中国北回归线以北地区生长最好种类最多的红树林天然群落。福建漳江口红树林国家级自然保护区内野生动物资源丰富，初步查明的鸟类种类达154种，包括国家II级保护的黄嘴白鹭、小杓鹬和小青脚鹬等。77种和41种分别列入中日、中澳保护协议的名录中。

福建漳江口红树林国家级保护区于1997年经福建省人民政府批准为省级自然保护区。2003年6月，经国务院批准为国家级自然保护区，并于2008年2月正式被列入为国际重要湿地名录，其重要性不言而喻。保护区的主要保护对象是红树林湿地、湿地水鸟、东南沿海优良经济水产资源种质基因库。

Foreword

The 2,360 hectare Fujian Zhangjiangkou National Mangrove Nature Reserve is located on a large area of mudflats, on the western side of Shifanta. This area is in the Zhangjiang Estuary in Yunxiao County – the map coordinates are: 23° 53’ 45” to 23° 56’ 00” N and 117° 24’ 07” to 117° 30’ 00” E.

With a natural mangrove area of 117.9 ha, the reserve is where the greatest mangrove species number can be found in the northern section of the Tropic of Cancer. For management purposes, the reserve is divided into three zones: the Core Zone (700 ha), the Buffer Zone (450 ha) and the Experimental Zone (1,200 ha).

The Zhangjiangkou Mangrove National Nature Reserve is rich in wildlife. It is home to 154 bird species, including Second Class Protected Species of National Importance such as Swinhoe’s Egret, Little Curlew and Nordmann’s Greenshank. Of the species found at the reserve, 77 are listed in the appendix of the China–Japan Protection Agreement and 41 species in the appendix of the China–Australia Protection Agreement.

With the ratification from the Fujian People’s Provincial Government, the Zhangjiangkou Mangrove Nature Reserve was established in 1997. In June 2003, the reserve was upgraded to a National Nature Reserve by the State Council and its official name was then changed to the “Zhangjiangkou National Mangrove Nature Reserve”. The designation of the reserve as a Ramsar Site in 2008 reflects its international importance. Currently, mangroves, waterbirds and the reserve’s excellent aquaculture resources are the top priority protection targets of the reserve.

项目回顾
Project review

2005年7月，福建漳江口红树林国家级自然保护区（简称“漳江口保护区”）与世界自然基金会香港分会合作，开展为期一年的”汇丰/世界自然基金会福建漳江口湿地保护项目”试验计划。由于效果良好，香港上海汇丰银行有限公司续拨款350万港元，资助2006至2010年的项目计划。

汇丰/世界自然基金会福建漳江口湿地保护项目的实施，不但促进保护区的管理以及生物多样性的保护，更带动周边社区的可持续发展及当地学校的环境教育工作。

项目的五个目标如下

1. 促进保护区的有效管理
2. 减少保护区内的人为干扰
3. 提高公众生态环境保护意识
4. 提高周边社区的生活水平
5. 为政府部门、当地居民等各利益相关者提供交流和对话的平台

■ 汇丰/世界自然基金会福建漳江口湿地保护项目正式启动
The launch of the HSBC / WWF Fujian Zhangjiangkou Wetland Conservation Project

Thanks to a generous donation from HSBC, in July 2005, the Fujian Zhangjiangkou National Mangrove Nature Reserve (hereafter referred to as ‘the reserve’) began cooperating with WWF–Hong Kong and launched a one–year pilot project called the “HSBC/WWF Zhangjiangkou Wetland Project”. The success of the pilot project resulted in a further donation of about HKD 3.5 million from HSBC to support a longer term project, running from 2006 to 2010.

This project was also a success. Not only has it improved the management of the reserve and the conservation of its biodiversity; it has also brought the idea of sustainable development to the local community and the idea of education for sustainable development (ESD) to local schools.

The five objectives of the project were as follows

1.To improve the management of the reserve through training local reserve staff and developing and implementing a management plan;
2.To reduce human disturbance to the area by working closely with local communities including through co–management;
3.To raise public awareness through Education for Sustainable Development; and
4.To help raise the living standard of local communities by providing alternative livelihoods and improving social welfare of the local community;
5.To provide a dialogue platform for the different stakeholders.

■ 2010年10月举办的汇丰/世界自然基金会华南湿地项目经验交流会
HSBC/WWF South China Wetlands Project Experience Sharing and Promotion Activity held in October 2010

第一章 促进保护区的有效管理

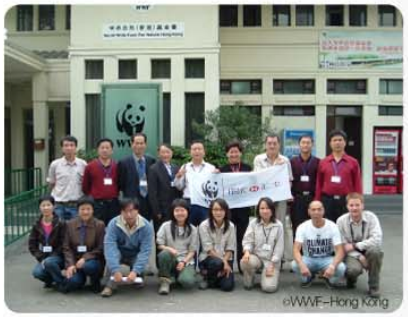
Chapter 1: To improve the management of the reserve through training local reserve staff and developing and implementing a management plan

1.1 进行湿地管理培训

1.1 To train local staff on wetland conservation and management at Mai Po

为提高漳江口保护区的湿地管理成效，保护区工作人员、有关的政府人员，以及保护区周边社区的村委会代表参加了在香港米埔自然保护区举办的两次湿地管理培训课程。除此之外，为了提高保护区工作人员水鸟调查的能力，保护区派员专程到米埔接受4天的水鸟辨认和水鸟调查培训。

在参与培训外，保护区工作人员还到访广东湛江红树林国家级自然保护区和广东海丰公平大湖省级自然保护区，促进湿地管理的经验交流。



■ 2007年11月福建省各政府人员在米埔参加湿地管理培训
Different government officials of Fujian Province attending the wetland management training course in Mai Po in November 2007

■ 2008年9月到访湛江红树林国家级自然保护区进行考察，参观宣教中心及观鸟屋
A study tour to Zhanjiang Mangrove National Nature Reserve organized in September 2008. The education centre and bird hide in the reserve were visited during the tour

■ 2008年11月共管委员会成员在米埔接受社区共管培训
Representatives from the village committee learning about the co-management of wetlands in Mai Po in November 2008

■ 2009年6月养殖户代表在米埔接受湿地管理培训
Local fishermen being trained in Mai Po to learn about wetland management in June 2009

To improve the effectiveness of the reserve's wetland management, reserve staff, related government officials and representatives from the surrounding village committee took part in two wetland management training courses at the Mai Po Nature Reserve in Hong Kong. Several reserve staff were also sent to Mai Po for a four-day waterbird identification and survey training workshop so as to improve their waterbird surveying abilities.

In addition to attending training courses, the reserve staff also visited the Guangdong Zhanjiang Mangrove National Nature Reserve and the Guangdong Haifeng Bird Provincial Nature Reserve to exchange their experience and knowledge of wetland management.

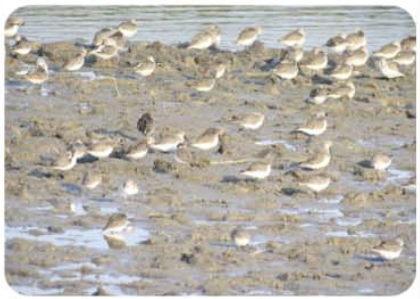
1.2 建立鸻鹬类高潮位栖息地

1.2 To create a high-tide roosting site for shorebirds

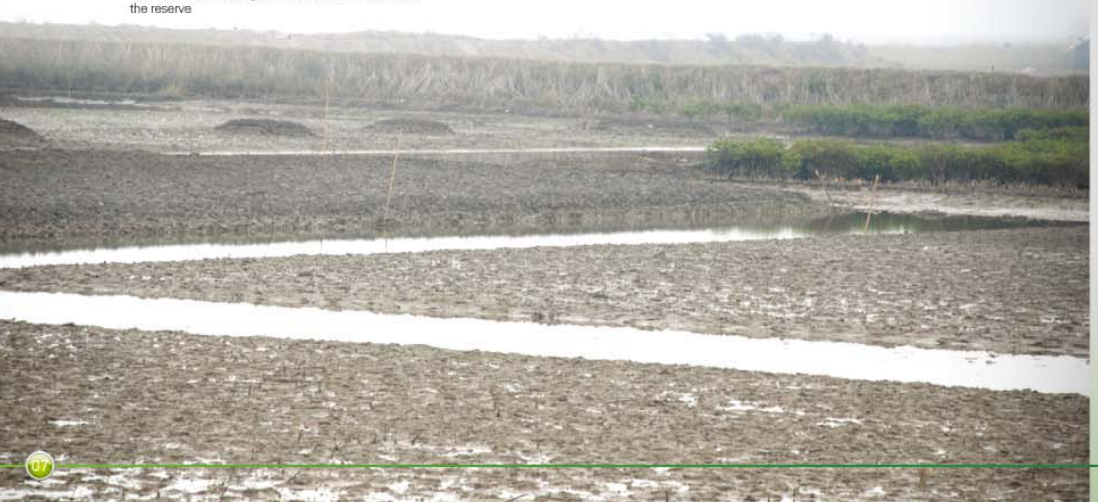
涨潮时，滩涂会被海水淹没，鸻鹬类因而暂时失去可停歇之地，因此保护区特别建造了一块 7 公顷的高潮位栖息地供鸻鹬类水鸟栖息。为了解鸻鹬类水鸟使用高潮位栖息地的情况，保护区工作人员定期在栖息地旁的观察站进行水鸟监测工作。

During high tide at the reserve, the mudflat is covered by seawater so the area that can be used by shorebirds disappears. In view of this, a 7-ha high-tide roosting area was built inside the reserve to provide a suitable habitat for shorebirds. At the same time, a bird hide was built next to the high-tide roosting area to enable reserve staff to conduct waterbird surveys regularly without disturbing them.

■ 栖息地牌
Panels introducing the high-tide roosting site



■ 在保护区内建造的鸻鹬类高潮位栖息地
The hide-tide roosting site for shorebirds built inside the reserve



1.3 制定和执行生态监测计划

1.3 To develop and implement an ecological monitoring programme

制定生态监测计划后，保护区工作人员每月在滩涂、养殖池塘、高潮位栖息地及大洲四个不同生境各作两次水鸟调查。2007年12月，首次在保护区记录到全球濒危的黑脸琵鹭。

After developing the ecological monitoring programme, the reserve staff conducted monthly waterbird surveys in four types of habitats, namely exposed mudflat, aquaculture ponds, the high-tide roosting site and a mix of mudflat, water bodies and ponds. In December 2007, the globally endangered Black-faced Spoonbill was recorded in the reserve for the first time. Chinese White Dolphins were also seen in the water channel of the reserve in 2008.

■ 在观鸟屋内进行鸟类监测
Conducting bird monitoring work inside the bird hide

■ 野外鸟类监测进行中
Outdoor bird monitoring work in progress

■ 在保护区内记录得到的全球濒危鸟种 – 黑脸琵鹭
Globally endangered Black-faced Spoonbill recorded in the reserve

■ 高潮位栖息地的鸟类监测站
The site for monitoring the waterbirds in the high-tide roosting site

第二章 减低保护区内的人为干扰

Chapter 2: To reduce human disturbance to the area by working closely with local communities including through co-management

2.1 检讨及改善当地的蛏子养殖技术

2.1 To review and improve the current razor clam culture techniques

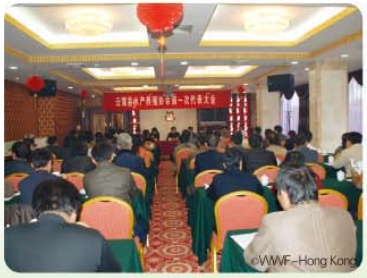
漳江口的滩涂是迁徙水鸟栖息的主要生境，但同时亦是当地居民养殖蛏子和讨小海的场所。为减少人们在滩涂上的活动频率及对水鸟的干扰，项目邀请福建师范大学生命科学院及厦门大学海洋与环境学院专家调查保护区周边水产养殖的情况，并提出数种生态综合养殖的可能模式。保护区与厦门大学海洋与环境学院的合作研究证明生态综合养殖在降低养殖风险、减少用药用肥等养殖成本的同时，还能提高产品质量及产量、减少有机物的残留；以生态综合养殖模式养殖出来的产品，已经获得福建省海洋与渔业厅的无公害农产品认证，间接增加这些产品在市场上的销售价值。项目希望可以藉此吸引当地居民在养殖池塘进行生态综合养殖，从而减少对滩涂的依赖，促进湿地的合理利用。

为了改善池塘养蛏的技术，专家除带领当地居民到福建其它地方及浙江进行考察外，还出版养殖科普书《缢蛏养殖及其水色控制》和《生态综合养殖无公害管理操作手册》。同时成立了云霄县养殖协会，更好推广生态养殖的经验。

2009年青蟹综合养殖实验
The ecological aquaculture experiment conducted in 2009

召开养殖户座谈会，收集养殖方面存在的问题及意见建议
Talking to the locals to understand what aquacultural problems that they were facing

厦门大学专家为养殖户现场指导
Experts from the Xiamen University providing advice on-site to the locals



2009年，召开水产养殖协会第一次代表大会
The first meeting of the Yunxiao Aquaculture Association organized in 2009

The mudflat at Zhangjiangkou is an important habitat for migrating waterbirds, but it is also a place where local people earn a living. In order to reduce the human disturbance caused by digging for bivalves and other organisms on the mudflat, experts from the College of Life Sciences of the Fujian Normal University and the College of Oceanography and Environmental Science of Xiamen University were invited to review the aquaculture situation near the reserve.

After observing the site, these experts helped to develop several eco-aquaculture models which were more environmentally friendly. A study conducted jointly by the reserve and the experts showed that the new ecological aquaculture models not only reduced risks, reduced drug and fertilizer use and reduced production costs, they also improved the quality and quantity of produce and decreased the amount of organic pollutants released into the environment.

Produce cultured by using the new ecological aquaculture models were awarded the 'Non-Harmful Produce Certificate' by the Fujian Provincial Department of Ocean and Fisheries. It is hoped that this project can encourage local people to earn their living through the eco-aquaculture models in the future, so that their dependence on the mudflat can be reduced and the wetlands can be used wisely.

To improve current razor clam culture techniques, study tours to other sites in Fujian Province and Zhejiang Province were organized for locals, to help them learn eco-aquaculture techniques for use in ponds. Booklets introducing the control of water quality and ecological aquaculture methods were also produced for local people's reference. The establishment of Yunxiao Aquaculture Association could provide a platform to promote the ecological aquaculture methods.

2008年，养殖户代表在温州学习先进养殖技术
The locals visiting Wenzhou to learn about the advanced aquaculture techniques there in 2008

2.2 鼓励减少或停止杀虫剂的使用

2.2 To demonstrate new techniques which use less harmful insecticide for razor clam cultivation on mudflats

在滩涂进行的缢蛏附苗的养殖过程中，需要使用消毒药物以清除滩涂中不利于蛏苗附着的其它生物。虽然大部份养殖户使用的三唑磷成本较低，但长久使用会造成有机磷的大量残留,破坏环境。为此，保护区跟世界自然基金会合作，在漳江口的养殖池塘和滩涂分别开展为期一年的生态养殖实验。结果表明，使用较少残留的菊酯类替代三唑磷进行消毒，生产速度和产量都较好。

该实验探讨了替代消毒在滩涂推广使用的可行性，同时对保护区周边社区群众宣传生态养殖方面作了一个很好的示范。除此之外，厦门大学海洋与环境学院的专家还在缢蛏滩涂附苗前进行了消毒药物的集中培训，推广低残高效农药的使用。云霄县人民政府颁布的《漳江口保护区管理办法》已经明令禁止在养殖中使用三唑磷。

厦门大学和基金会专家与养殖户交流养殖试验进展
Experts from the Xiamen University and WWF-Hong Kong sharing the results achieved in the experiment with the locals

厦门大学海洋学院教授为养殖户讲授生态养殖
Experts from the College of Oceanography and Environmental Science of Xiamen University introducing eco-aquaculture for the locals

2007年替代消毒实验
The experiment using pyrethroid pesticide to replace triazophos in 2007

When culturing razor clams on mudflats, pesticides are used to eliminate organisms harmful to the clams. The commonly-used triazophos pesticide is cheaper, however its long-term use leads to a serious organic phosphorus residue problem. To alleviate this pollution problem, the reserve partnered with WWF-Hong Kong to conduct experiments in aquaculture ponds and on the mudflat. The results showed that pyrethroid pesticide worked as effectively as triazophos and at the same time, reduced the pesticide residue problem. The experiment proved that replacing triazophos with pyrethroid was feasible and also acted as an excellent demonstration for local people of how ecological agriculture works.

养殖协会为养殖户提供养殖知识培训，推广生态养殖
The Yunxiao Aquaculture Association promoting the eco-aquaculture

In order to encourage locals to use the less polluting pyrethroid pesticide, training was provided to help them understand the correct usage procedures. The management regulations, which were announced by the Yunxiao County Government recently, clearly state that the usage of triazophos on mudflats is prohibited.

厦门大学专家为参加闽港台交流会专家汇报生态综合养殖成果
Experts from the Xiamen University sharing the experimental results with experts from Hong Kong and Taiwan

第三章 提高公众意识

Chapter 3: To raise public awareness through Education for Sustainable Development (ESD)

3.1 培训漳江口教育工作者和保护区工作人员

3.1 To train reserve staff and local educators in Hong Kong

超过 20 名保护区工作人员及周边学校教育工作者分批到香港米埔自然保护区接受可持续发展教育训练。通过室内讲座、野外考察、到访世界自然基金会香港分会的不同教育中心、参观香港的绿色学校，参加者学习了可持续发展教育的理念和经验，同时也提高教育工作者的环境意识和对环境保护的认识。

为加强带领户外活动的能力，20名教育工作者和保护区工作人员参加了在漳江口保护区举办的培训活动。参加者不但认真参与各活动，且在讨论活动计划时提供了很多有参考价值的意见。

More than 20 educators and officers from the local government attended two training courses in Hong Kong organized by WWF–Hong Kong. Through indoor talks, excursions and visits to "green" schools and WWF's education centres, participants learned various important concepts and skills for ESD. The educators who participated expressed the view that the courses enriched their knowledge about the environment and its protection.

To further improve their activity leading skills, 20 educators and reserve staff took part in a training activity at the Zhangjiangkou Nature Reserve. The participants paid careful attention to every activity and provided valuable opinions and suggestions about some possible ESD activities to be held inside the reserve during the discussion session.

■ 2005年漳江口的教育工作者参观香港的绿色学校
Educators from Zhangjiangkou visiting a green school in Hong Kong in 2005

■ 保护区工作人员在香港参加可持续发展教育培训
Reserve staff attending the ESD training course in Hong Kong

■ 2006年漳江口的教育工作者在香港海下湾接受可持续发展教育培训
Educators from Zhangjiangkou attending an ESD training course in Hoi Ha Wan, Hong Kong, in 2006

■ 世界自然基金会香港分会的教育专家到漳江口开展可持续发展教育培训
Experts from the Education Department of WWF–Hong Kong conducting ESD training in Zhangjiangkou

■ 基金会专家在漳江口与教育工作者探讨主题教育
Experts from the Education Department of WWF–Hong Kong discussing about the theme of ESD to be carried out in Zhangjiangkou with the local educators

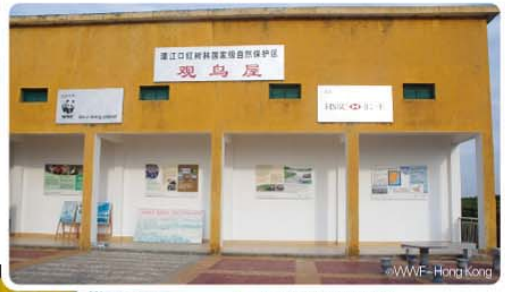
3.2 修建必要的教育设施

3.2 To construct necessary educational facilities

为使保护区有效地执行可持续发展教育的工作，项目支持及协助保护区建设观鸟屋及教育小径，并在办公大楼内设置宣教中心。宣教中心包括展板、实物展示、模型、标本及多媒体介绍等多样的展示媒介。这些教育设施已经成为参观者的必到之地。

To facilitate the delivery of education programmes in the reserve, a bird hide, an educational trail and an education centre inside the office building were constructed. The education centre is decorated with exhibition boards, models and specimen and equipped with multimedia facilities. These facilities have been well–received by visitors.

■ 教育中心的启用仪式
The opening ceremony of the education centre



■ 项目建设的观鸟屋
The bird hide built inside the reserve

■ 观鸟屋的启用仪式
The opening ceremony of the bird hide

3.3 执行学校可持续发展教育项目

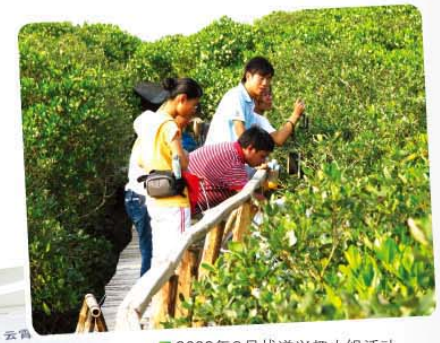
3.3 To provide schools with ESD programmes

在4年时间里，保护区在11所学校里举办超过35次活动，包括室内讲座、保护区参观活动、学生义工活动以及绿色生态科普夏令营等，参与活动的学生及老师人数达二千多人。

在世界自然基金会、保护区和云霄县教育局的指导下，云霄县第一中学编制了《走近湿地——福建漳江口红树林国家级自然保护区》可持续发展教育校本教材套，协助当地老师在校内开展适合的可持续发展教育活动，把可持续发展的先进理念带到年青一代。

■ 2008年8月组织夏令营观鸟活动
Birdwatching summer camp organized in August 2008

■ 2009年7月竹塔中学夏令营活动
Birdwatching summer camp for the Zhuta Secondary School organized in July 2009



■ 2009年8月栈道兴趣小组活动
An interest group studying mangroves on the boardwalk in August 2009

■ 2008年，教材套发放仪式
A ceremony held for distributing education materials to the local schools in 2008

Over the past four years, more than 35 activities were organized for 11 schools. More than 2,000 teachers and students participated in these activities, which took different forms such as indoor talks, reserve visits, student voluntary activities and green summer camps.

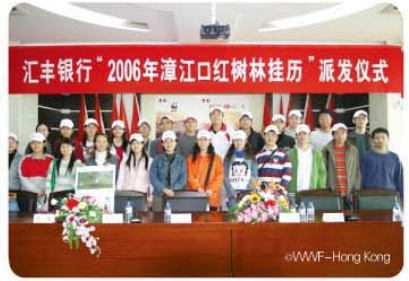
With technical support from WWF-Hong Kong, the Zhangjiangkou Nature Reserve, the Education Bureau of Yunxiao County and Yunxiao First Secondary School produced an ESD education pack called Get Close to Wetlands. The aim of the pack is to help teachers organize ESD activities in their schools in order to bring the concept of sustainable development to younger generations.

■ 汇丰银行厦门分行嘉宾与学生一起阅读教材
The representative from the HSBC Xiamen Branch reading the education handbook with a local student

3.4 针对公众的可持续发展教育项目

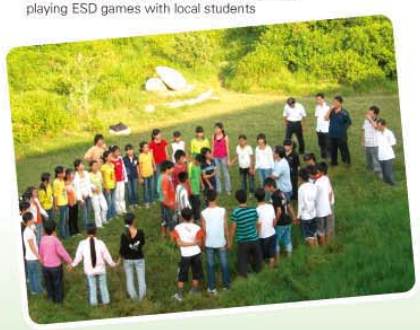
3.4 To provide ESD programmes to the public

为了让社会各界了解湿地在人类生产生活和经济社会发展中所起的不可替代的功能以及保护野生鸟类的重要性，增加人们对漳江口保护区的认识和重视，保护区印制了多种形式的宣传材料。另外，保护区还在爱鸟周、世界环境日和世界湿地日等节日与县教育局及周边学校合作，举办不同类型的公众宣传活动。



■ 2006年漳江口挂历派发
Distributing nature-themed calendars to the local community in order to raise the public awareness of the importance of wetlands in 2006

■ 世界自然基金会香港分会的教育主任对学生开展环境保护教育
An Education Officer from WWF-Hong Kong playing ESD games with local students



Different promotional materials were produced to raise the public's awareness about the importance of wetlands and bird conservation and the role played by the nature reserve. In addition, the reserve cooperated with the Education Bureau and nearby schools to organize public awareness activities during the 'Love Bird Week', the World Environment Day and the World Wetland Day.

第四章 提高当地小区的生活水平

Chapter 4: To help raise the living standard of local communities by providing alternative livelihoods and improving social welfare of the local community

4.1 建设环保洗手间

4.1 To build an eco-friendly toilet

自观鸟屋等设施完成后，到访保护区的游客日渐增多，同时增加了对当地洗手间的需求。因此，项目在保护区边沿兴建了一座环保洗手间，供当地村民及游客使用。

Owing to an increase in the number of visitors to the reserve after the construction of the birdwatching hide and other buildings, an eco-friendly toilet was built at the edge of the reserve, which can benefit both visitors and local villagers.

■ 供当地村民及游客使用的环保洗手间
An eco-friendly toilet built to serve both visitors and local people

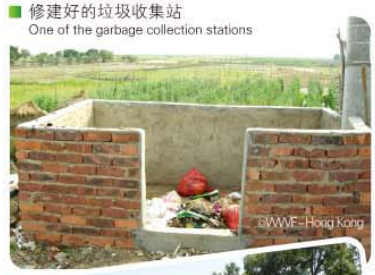
4.2 建立垃圾收集系统

4.2 To build a garbage collection system

位于保护区周边的竹塔村和船场村一直缺乏垃圾收集系统,造成垃圾乱堆乱放的问题。为改善当地的公共卫生情况,项目在竹塔村和船场村分别建造了18及16所垃圾收集站,同时购置垃圾运输车,定期把垃圾箱内的垃圾运送到各收集站。保护区周边地区的环境卫生得到极大的改善。

Zhuta and Chuanchang villages, located next to the reserve, lacked an adequate garbage collection system. This resulted in many years of improper handling and disposal of waste. To improve the hygiene of the village, 18 and 16 garbage collection stations were built in Zhuta and Chuanchang villages respectively. Garbage bins and vehicles to transport the garbage from the bins to the garbage stations were also purchased.

■ 修建好的垃圾收集站
One of the garbage collection stations



■ 垃圾运输车定期把垃圾箱内的垃圾运送到各收集站
Garbage vehicles transporting the garbage collected to the stations regularly

第五章 为各利益相关者提供交流和对话的平台

Chapter 5: To provide a dialogue platform for the different stakeholders

为增加保护区内各利益相关者之间的沟通和联系、促进各保育及管理措施的执行，漳江口保护区共管委员会于2007年6月正式成立。在同年的第一次会议中，委员会在讨论后修改管理措施、印制有关管理措施的文件并发放至不同村落、学校及各政府部门，加深各方对措施的认识。目前，共管委员会的年度会议已成为当地各利益相关者的重要沟通平台。

To improve communications between the different stakeholders of the reserve and to help smoothly implement both conservation and management regulations, the Zhangjiangkou Nature Reserve Co-management Committee was established in June 2007.

At the first meeting, the committee agreed to revise the management regulations, print the regulations out, and distribute them to different villages, schools and government departments. The co-management committee remains an important platform for stakeholders to communicate and share their thoughts.

■ 2009年共管会议
Co-management Committee meeting in 2009

■ 2010年共管会议
Co-management Committee meeting in 2010