

三峡工程生态与环境

ECOLOGY AND ENVIRONMENT OF THE THREE GORGES PROJECT

长江流域水资源保护局 编

By Yangtze Valley Water Resources Protection Bureau



项目法人：中国长江三峡工程开发总公司

Project Legal Entity: China Yangtze Three Gorges Project Development Corporation



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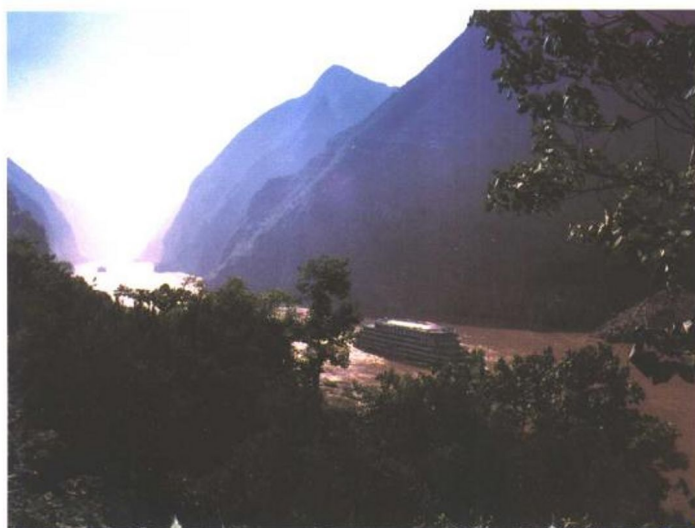
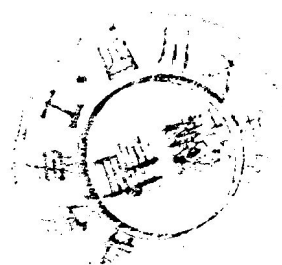
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基本馆藏



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内 容 提 要

三峡工程规模宏大, 具有巨大的防洪、发电与航运等综合效益, 是开发、治理长江的骨干工程。工程将对生态与环境带来广泛而深远的影响, 为国内外所关注。

本图集介绍了三峡工程对生态与环境的影响以及工程所采取的环境保护措施, 可供水利及环保工作者参阅。

Abstract

The Three Gorges Project (TGP) is the largest hydropower project in the world. Possessing comprehensive benefits, mainly for flood control, power generation and navigation improvement, it is a vital and backbone project in harnessing and developing of the Yangtze River.

TGP will exert wide and profound impacts on environmental and ecological system which have attracted world wide attention. This picture album described the impacts of TGP on environment and the remedial measures to mitigate the negative impacts. It could be referred for water resources and environmental protection engineers and officials as well as the public.

三 峡 工 程 生 态 与 环 境

长江流域水资源保护局 编

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序 言

长江流经四川盆地以后，汇成滔滔巨流，劈开崇山峻岭，冲破巍巍夔门，夺路东下，形成举世闻名壮丽奇特的大峡谷——三峡。

“西控巴渝收万壑，东邻荆楚压群山”，三峡由于得天独厚的自然条件，不仅风光壮丽，而且资源丰富，成为综合开发长江水资源，兴建大型水利枢纽工程的最佳河段。正在兴建中的三峡水利枢纽是当今世界上最大的水利水电工程，也是治理、开发长江的一项关键工程。从保护长江中下游广大平原地区人民的生命财产和长江流域社会经济可持续发展而言，也是一个宏伟的生态与环境工程。它将有效地控制上游洪水，提供巨大的电能，改善川江的航运，具有十分显著的综合效益。

规模宏大的三峡工程对生态与环境的影响及如何采取保护措施，一直是我国政府、科学界、工程技术界及建设部门十分重视的问题，同时也是国内外公众关注的热点。几十年来，围绕三峡工程对生态与环境的影响及保护，有关方面进行了大量的调查研究工作，所持续时间之长，工作量之浩瀚，研究范围之深广，投入力量之雄厚，涉及机构之多，堪称中国之最，举世罕见。

1994年工程正式开工以来，中国长江三峡工程开发总公司和长江水利委员会以及施工单位紧密配合，遵循国家有关环境保护政策法规，为保护生态与环境开展了大量工作，使工程的环境保护正在有序地进行。

为便于海内外各界人士更好地了解三峡工程，充分展现这一功在当代，利及千秋的宏伟工程的生态与环境问题以及工程所采取的环境保护措施，我们委托编制了这本《三峡工程生态与环境》画册，希望读者能略见三峡工程对生态与环境保护的重视一斑。

PREFACE

The Three Gorges, controlling thousands of valleys in the west and adjoining Hubei and Hunan provinces in the east, is not only magnificent in scenes but also rich in hydropower potential. The exceptional and excellent natural conditions formed the best section for building a large water project to develop the Yangtze hydropower. The Yangtze Three Gorges Project (TGP), now being under construction, is the largest water project in the world, also the key project for developing and harnessing the Yangtze River. In addition, the TGP is a huge ecological project to harness and develop the Yangtze River and ensure the people's safety in the plain area in middle reach of the Yangtze, and the sustainable development of the basin. After completion, it will effectively control the floods from the upstream, and produce huge electrical power, significantly improve the navigation condition and fishery of the Yangtze, making remarkable and comprehensive benefits.

The Chinese government, the scientific and engineering-technology circles in China, have been paying great attention to the impacts of TGP on ecology and environment as well as their remedial measures, which also have become one of the hot topics both at home and abroad. For last several decades, a series of studies on the impacts and the remedial measures have been systematically conducted. Regarding the duration, scope, the depth and the number of institutions involved for a single project, the study on ecology and environment for TGP not only ranks the first in China, but also is rare in the world.

Since the commencement of TGP's construction in 1994, China Yangtze Three Gorges Project Development Corporation (CTGPC), the legal entity of the Project, Changjiang Water Resources Commission (CWRC), the Project designer, and the construction contractors have been working closely for protecting the ecology and environment in the progress of the construction according to the relevant laws and regulations in the nation. All the mitigation measures proposed in EIS or preliminary design have been in progress step by step.

In order to let the public both at home and abroad better understand the ecological and environmental issues, as well as the corresponding mitigation measures related to the TGP, we entrusted to compile this picture album, "ECOLOGY AND ENVIRONMENT OF THE THREE GORGES PROJECT". Hope it will help the readers understand how TGP keeps eyes on ecological and environmental issues related.



陆佑楣

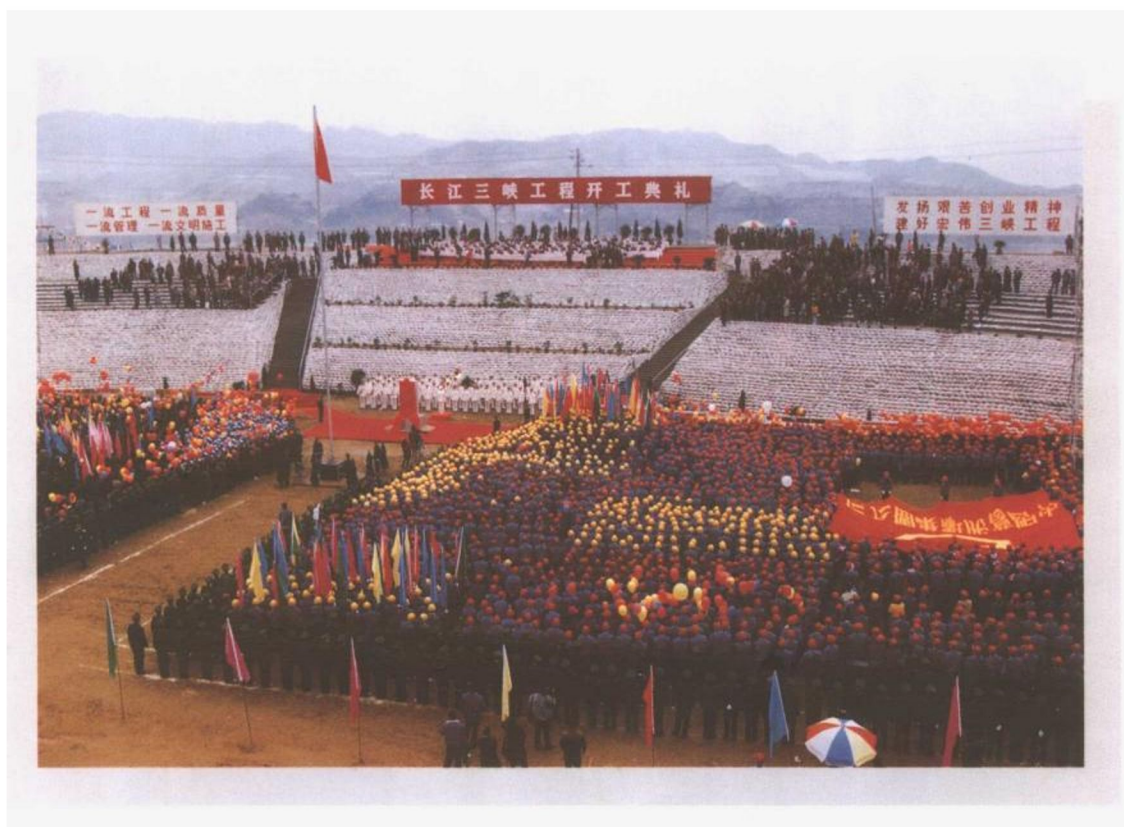
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Lu Youmei
President of CTGPC

谨以此画册

献给关心长江三峡工程生态与环境保护的人们

This album is dedicated to the persons with great interest in ecological and environmental protection of TGP



1994年12月14日三峡工程开工典礼
Celebration ceremony for commencement of the TGP construction on Dec 14, 1994.

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目 录

Contents



开 篇

1

Introduction

生态与环境效益

8

Ecological and Environmental Benefits

移民安置及生态与环境保护

18

Resettlement and Ecology-Environment Protection

物种资源保护

30

Protection of Species Resources

自然景观与文物古迹

52

Protection of Natural Landscape, Cultural Relics and Historical Heritage

水质保护

62

Protection of Water Quality

环境地质

68

Protection of Environmental Geology

水库泥沙

76

Reservoir Sedimentation

施工区环境保护

84

Environmental Protection in Construction Sites

生态环境监测与管理

100

Monitoring and Management of Ecology and Environment

开 篇


自从孙中山先生在1919年提出建设三峡工程的构想以来，在长江险峻的三峡河段，修筑大坝，防洪发电，造福人民，一直是中国几代人治理和开发长江梦寐以求的目标。毛泽东、邓小平和江泽民等三代国家领导人都非常关注三峡工程的规划设计工作，国内外的许多专家、学者亦为此倾注了大量心血。经过几代人的努力，1992年4月3日，第七届全国人大第五次会议通过兴建长江三峡工程的决议；1994年12月，三峡工程正式开工；1997年11月8日，成功地实现了长江截流。在三峡工程建设的同时，三峡工程的生态与环境保护工作也在紧张有序地实施。三峡工程的兴建对保护长江流域生态与环境，促进社会经济可持续发展将发挥重要的作用。

Introduction

Since Dr. Sun Yat-sen (1866-1925), the pioneer of China's democracy, first proposed the conception of building TGP in his "Industrial Plan" in 1919, it has long been a dream for Chinese people to construct a high dam at the Three Gorges section of the Yangtze, the third largest river in the world, to control floods and generate electricity. After founding of People's Republic of China, the three generations of state leaders, Mao Zedong, Deng Xiaoping and Jiang Zemin, have paid close attention to the TGP's survey, planning, design, including ecology-environmental protection. Great deal of work has been conducted by experts at home and abroad. Through generations' efforts, the motion of constructing TGP was approved at the Fifth Plenary Session of National People's Congress on April 3, 1992. In December 1994, the construction of TGP was formally commenced. On November 8, 1997, the grand channel closure was successfully conducted. Meanwhile the ecological and environmental protection measures are being implemented simultaneously along with the project construction. It is expected that TGP will play an important role in protecting the ecology and environment and ensuring the sustainable development of the Yangtze basin.

中华人民共和国第七届





全国人民代表大会第五次会议

1992年4月3日第七届全国人大第五次会议通过兴建长江三峡工程的决议
The motion of constructing TGP was approved by the 5th plenary
session of 7th NPC on April 3, 1992.



在化學工業中，電力是極重要的。對於往來運輸和各種礦產的開採，如果沒有電，也是不可能的。俄國江蘇州以上，便有多數河川，經過兩旁各地方，有伏流波濤。這個電力，可以發生一百萬匹馬力的電。其他俄國的雅列河也有很多的水流計算，有人可以發生一百萬匹馬力的電。其像黃河的淮河也有很多的河流。也以利用來發生電力。再像黃河北部的之北江。按工程師的調查說，可以發生幾百萬匹馬力的電力。用這個電力，漢口與湖北省各市的電燈和各工廠的工作，足敷用了。甚至把專運煤炭到外國新式的動力，完全化完。都足以應用。又像鴨綠江上游的，其電力更甚大。有人考據由宜興到高麗一帶的水，可以產生三千餘萬匹馬力的電力。像這樣大的電力，比現在各國所生產的電力都要大得多。不僅是可以供給全國軍用和各種工之用。而且可以用來煉大鋼和肥料，又做農民的織門也可以生千萬匹馬力的電力。由此可見自然的天然蘊藏是很豐富的。如像獅子江、黃河的電力，用什麼方法來發電？大約可發生一億四千萬匹馬力。如果是位於八個強人的地方，有一萬四千萬匹馬力便有八千萬匹馬力的工作。照現在我國舊有的規定，每天是用點點鐘。如用人力工作，多過了八個鐘頭，從工人

A



B



Introduction



D

为充分利
中国水利
资源的水
利建设
三峡水利
枢纽的建
设目标而
奋斗
周恩来
一九五八年二月

C

- A 孙中山先生早年在《三民主义》论述中，提出建设三峡工程的构想

Dr. Sun Yet-sen and his "The Three People's Principles", in which he first proposed the conception of building TGP.

- B 1958年3月毛泽东主席视察长江三峡
The late Chairman Mao Zedong examining the Three Gorges reaches on March 1958.

- C 周恩来总理的题词
The inscription of late Premier Zhou Enlai.

- D 1958年2月周恩来总理视察三峡坝址
The late Premier Zhou Enlai inspecting the TGP dam site on Feb. 1958.

- E 邓小平关心三峡工程
Mr. Deng Xiaoping concerned with TGP.

- F 1990年7月中共中央总书记、国家主席江泽民视察三峡坝址

Jiang Zemin, the General Secretary of CPC and President of PRC inspecting the TGP dam site on July 1990.



E



F



A



B



Introduction



C



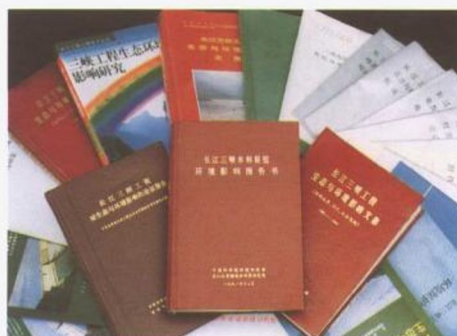
D



E



F



G

- A 江泽民主席在三峡工地
President Jiang Zemin in the construction sites of TGP.
- B 李鹏委员长在三峡工地环保公园植树
Chairman of NPC Li Peng planting tree in the Environmental Protection Park.
- C 朱镕基总理在三峡工地环保公园植树
Premier Zhu Rongji planting tree in the Environmental Protection Park.
- D 国内环保专家考察三峡工程坝址
Domestic environmental experts examining the TGP dam site.
- E 国外专家考察三峡工程
Foreign experts examining the TGP dam site .
- F 张光斗教授在《三峡工程环境影响报告书》评审会议上
Professor Zhang Guangdou at the conference of reviewing the EIS for TGP.
- G 三峡工程生态与环境研究、评价、环境保护规划设计部分成果
Part of the achievements in study , assessment, planning and design of ecological and environmental protection for TGP.

生态与环境效益 ——长江可持续发展的生态与环境工程

三峡工程具有防洪、发电、航运、养殖、供水等巨大综合效益，其中防洪是三峡工程最主要的功能，也是其最大的生态与环境效益。三峡水库有防洪库容 221.5 亿立方米，通过水库调蓄，配合堤防、分蓄洪工程和其它非工程措施，可避免特大洪水造成荆江两岸堤防溃决、大量人员死亡、数百万人流离失所的毁灭性灾害；保护长江中下游平原地区数千万人免遭洪水威胁及洪灾造成的生态环境恶化，有效地保护中下游平原地区数千万人口的安全和生态环境，将对长江流域社会、经济和环境协调发展发挥举足轻重的作用。

水电是理想的清洁能源。三峡水电站每年能提供 846.8 亿千瓦·时电力，相当于 15 座装机 120 万千瓦的火电站和三座年产 1500 万吨的大型煤矿。相当于每年减少燃烧原煤约 4000 ~ 5000 万吨，少排放二氧化碳 1 亿吨、二氧化硫 120 ~ 200 万吨、一氧化碳 1 万吨、氮氧化物 37 万吨以及大量的飘尘、废热水和废渣。三峡水电站不仅将大大缓解华中、华东和重庆地区的能源紧张状况，而且避免了建火电站所造成的环境污染。

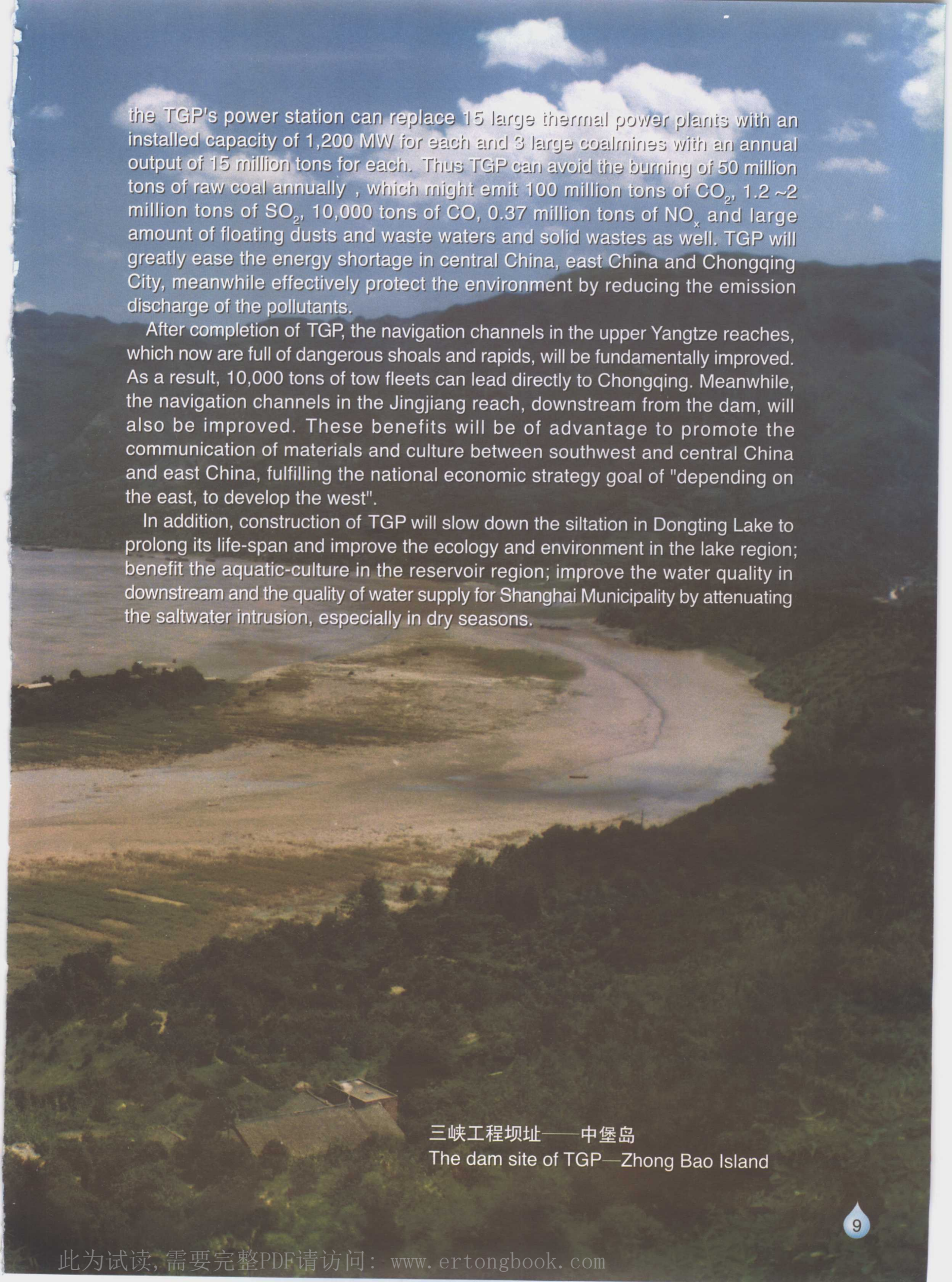
水库建成后，水流湍急、礁滩接踵的川江航道将得到根本改善，万吨级船队可直达重庆。中游荆江河道航运条件也将有所好转。这将有利于西南与华中、华东地区的物资、文化交流，实现我国经济发展“东靠西移”、“开发西部”的战略方针。

三峡工程还有利于减缓洞庭湖泥沙淤积，延长洞庭湖寿命，改善湖区生态环境；有利于库区水产业的发展；有利于改善下游河段枯水期水质；有利于削弱长江口区枯水期咸水入侵，提高上海市供水的水质等。

Ecological and Environmental Benefits An Ecological and Environmental Project to Ensure the Sustainable Development in the Yangtze Basin

TGP possesses huge comprehensive benefits, including flood control, power generation, navigation improvement and fishery, etc. Among them, flood control is the key and also the essential one with the largest ecological and environmental benefits. With 22.15 billion m^3 of TGP reservoir regulating capacity and incorporating with embankment, flood diversion and other non-engineering measures, the bank failure along Jingjiang river section due to heavy floods, which usually cause huge mortality and million's homeless, can be effectively avoided. It can also protect millions people in downstream plain from flood menace and the consequent ecological and environmental destruction. The irreplaceable function of TGP for flood control will greatly ensure the harmonized development of social economy and environmental protection in the middle and lower reaches of the Yangtze, and play a decisive role in sustainable development of the Yangtze basin.

Hydropower is a kind of clean energy. With an annual output of 84.68 TWh,



the TGP's power station can replace 15 large thermal power plants with an installed capacity of 1,200 MW for each and 3 large coalmines with an annual output of 15 million tons for each. Thus TGP can avoid the burning of 50 million tons of raw coal annually, which might emit 100 million tons of CO_2 , 1.2 ~2 million tons of SO_2 , 10,000 tons of CO, 0.37 million tons of NO_x and large amount of floating dusts and waste waters and solid wastes as well. TGP will greatly ease the energy shortage in central China, east China and Chongqing City, meanwhile effectively protect the environment by reducing the emission discharge of the pollutants.

After completion of TGP, the navigation channels in the upper Yangtze reaches, which now are full of dangerous shoals and rapids, will be fundamentally improved. As a result, 10,000 tons of tow fleets can lead directly to Chongqing. Meanwhile, the navigation channels in the Jingjiang reach, downstream from the dam, will also be improved. These benefits will be of advantage to promote the communication of materials and culture between southwest and central China and east China, fulfilling the national economic strategy goal of "depending on the east, to develop the west".

In addition, construction of TGP will slow down the siltation in Dongting Lake to prolong its life-span and improve the ecology and environment in the lake region; benefit the aquatic-culture in the reservoir region; improve the water quality in downstream and the quality of water supply for Shanghai Municipality by attenuating the saltwater intrusion, especially in dry seasons.

三峡工程坝址——中堡岛

The dam site of TGP—Zhong Bao Island