
深圳红树林湿地博物馆

展陈大纲

(简本，仅供参考)

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服务协助方：深圳市观筑建筑发展交流中心、
中外建工程设计与顾问有限公司

2020 年 8 月



Shenzhen Mangrove Wetland Museum

Exhibition Outline

(Simplified, for reference only)

**Tenderee: Guangdong Neilingding Futian National Nature Reserve
Administration Bureau**

**Service: ATUChina,
CIEDC ShenZhen**

August 2020

概 要

红树林是生长在热带、亚热带海岸潮间带的木本植物群落，能在海水中生长，素有“海上森林”之称。由于红树林在维护生物多样性、防风消浪、保持土壤、净化海水、储碳固碳等方面发挥重要作用，又享有“海岸卫士”的美誉。红树林主要分布在非洲、亚洲、美洲、澳洲，在我国分布在广东、海南、广西、福建、浙江、香港、澳门和台湾等地。随着沿海地区经济社会的快速发展和人口的急剧增长，海洋资源开发强度日渐加大，海岸工程建设、围垦养殖、沿岸污染物排放等人类活动日益加剧，红树林大面积消失，红树林生态系统处于濒危状态。保护红树林、保护海洋生态，促进沿海生态与社会经济协调发展，成为我国红树林湿地可持续发展亟待解决的关键问题。2017年4月，习近平总书记在广西北海金海湾红树林保护地考察时强调，一定要尊重科学、落实责任，把红树林保护好。

科普宣传教育是保护红树林的重要手段之一，通过大众化的科普，让公众了解红树林、认识红树林、特别是红树林的重要生态功能及其对人类社会的贡献，形成全民的红树林保护意识，有助于提升红树林的保护。作为大型专题类自然博物馆，红树林博物馆集红树林生态保护、陈列展览、收藏保护、科普教育、科学研究与娱乐休闲为一体，是深圳市未来重要文化及公共服务设施之一，是具有独特意义的深圳城市文化名片。红树林博物馆将从红树林前世讲到红树林今生，从红树林外表讲到红树林内部结构，从一棵红树林讲到一片红树林，从中国红树林讲到全球红树林，从红树林生态功能讲到红树林保护等等，以大量的标本（文物）、实物模型、图片、模型以及声光电等多种高科技情景式互动式展项，形成动静结合、全景式、全方位展示红树林的进化、生理生化特征、生活生态习性、生态功能及保护价值等，以寓教于乐的方式向大众传播红树林相关的知识，提升全民的红树林保护意识，促进我国红树林保护事业的发展。



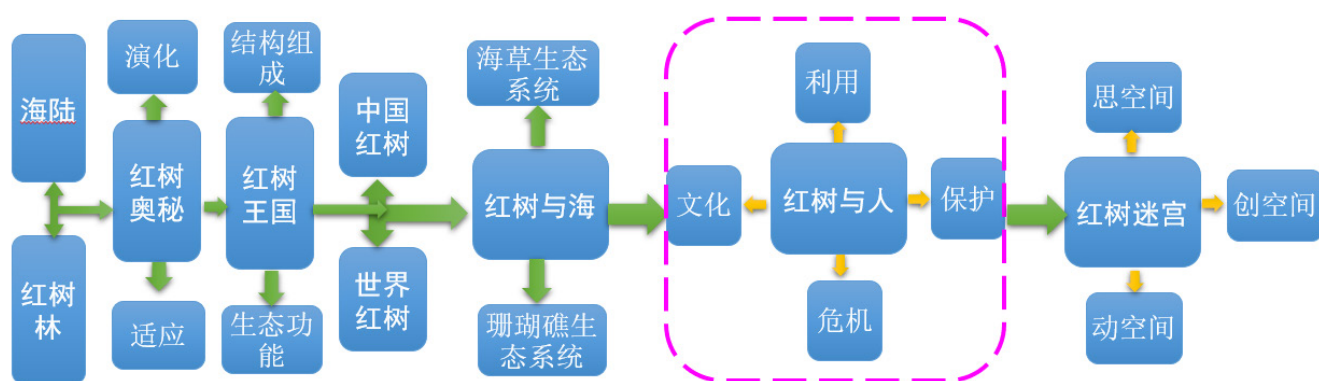
Abstract

Mangroves are woody plant communities growing in the coastal intertidal zones on tropical and subtropical coast, known as "Forest in the Sea". Due to their important roles in the maintenance of biodiversity, wind prevention and wave attenuation, soil conservation, seawater purification, carbon storage and fixation and others, mangroves also enjoy a good reputation of "Coastal Guard", which are mainly distributed in Africa, Asia, America and Australia and in Guangdong, Hainan, Guangxi, Fujian, Zhejiang, Hongkong, Macao, Taiwan and other provinces and cities in China. With the rapid socioeconomic development and the population explosion in coastal areas, large areas of mangroves are disappeared and the mangrove ecosystem is endangered by increasing exploitation intensity of marine resources and the growing human activities such as coastal engineering, reclamation and coastal pollutants discharge. To this end, it has become a top priority to protect mangroves & marine ecology and promote the coordinated development of coastal ecology and social economy. In April, 2017, during President Xi Jinping's visit to the Golden Bay Mangrove in Beihai, Guangxi, he emphasized that we must respect science and discharge our responsibilities to protect mangroves.

Science popularization education is one of the important means to protect mangroves, which is intended to improve the public awareness of mangroves protection by educating the public about mangroves, especially about the important ecological function and the contribution of mangroves to human societies, and to better protect the mangroves. As a large thematic nature museum, Mangrove Museum, integrating the ecological protection of mangroves, exhibition, collection and protection, science popularization education, scientific research and recreation & entertainment, will be one of the important cultural and public service facilities in the future in Shenzhen and also a special cultural landmark of Shenzhen. From their past to their present, from their appearance to their interior structure, from a mangrove to many mangroves, from the mangroves in China to the mangroves in the world and from their ecological function to their protection, Mangrove Museum is designed to display the evolution, physiological and biochemical characteristics, biological and ecological habits, ecological function, protection value and other facets of mangroves comprehensively and panoramically with the support of multiple high-tech interactive devices such as specimens (cultural relics), physical models, pictures, models, acoustic and optics systems and others, so as to communicate the knowledge of mangroves to the public in an entertaining way and improve the protection awareness of the public for the purpose of protecting mangroves.

为了达到红树林博物馆的科普传播目的，在展陈大纲的内容上进行了科学设置，共分为七个展区，各展区既各自独立成体系，重点展示红树林某一领域知识，同时这些展区又相互联系，形成互补，共同讲述完整的红树林故事。

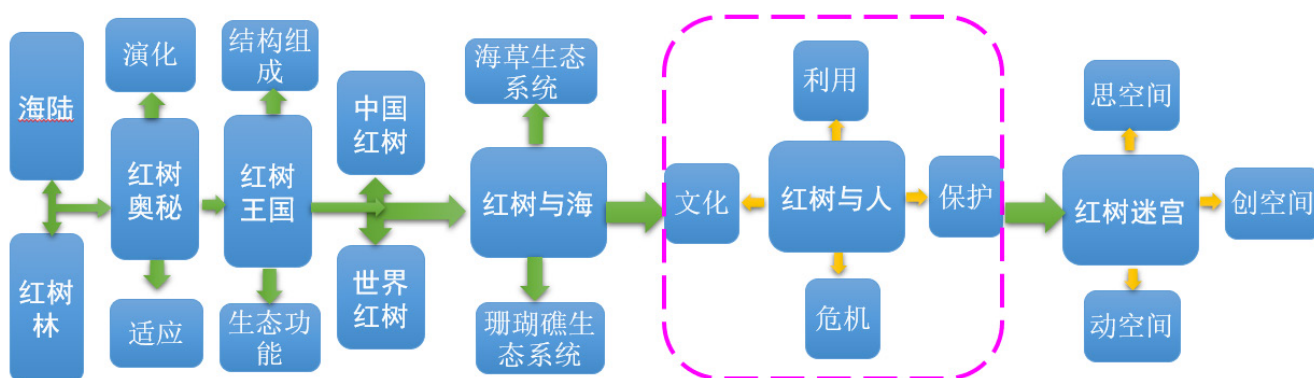
总体而言，红树林博物馆所传达的中心思想：红树林是一个复杂而神奇的生态系统，对于自然界，对于人类社会，都起到至关重要的作用！红树林博物馆主要讲述红树林生态系统内各生物、生物与环境因子关系、生物之间的关系，以及该系统对人类社会的影响，具体划分如下图：





For the purpose of science popularization, in the Exhibition Outline, Mangrove Museum is well organized and divided into seven exhibition halls which are not only self-contained to focus on a specific aspect of mangroves, but also correlated and complementary to tell the entire story of mangroves.

Generally speaking, Mangrove Museum is intended to illustrate that, as a complex and magical ecological system, mangroves play very important roles, whether in the natural world or in human societies. Mangrove Museum mainly talks about the relationship among biological species in the ecosystem of mangroves, the relationship between biological species and the environment and the relationship among biological species and the impact of the system on human societies as follows:



第一展区 红树奥秘（红树林的奥秘厅）

一、展厅条件

位于展馆建筑一层，净高 7 米，面积约 1000 平方米。

二、展陈策划

1、传播目标

红树林是一种特殊的植物生态群落，由多种植物组成，广泛分布于全球热带、亚热带的滨海沿岸，构成一种独具特色的生态系统。与很多植物不同，红树林生长在滨海高潮与低潮之间的潮间带中，因此为了适应海水所带来的高含盐量环境，它们进化出了各种特殊的生理结构，成功地占领了这一其他植物不敢涉足的生态位置。红树林的特殊生态占位也使其成为一种最为特殊的生态聚落。

2、展示内容

这是红树林博物馆最开始部分，首先让到了博物馆的观众了解到什么是红树林，红树有那些特征等等。因此，在这一展区，重点讲述红树林演化、生理结构、发育、与生态习性，特别是其对恶劣环境的适应性，如高盐环境，适应高低潮间隙，适应海陆交界带的生理构造。让观众了解红树植物独特的生态构造和生理习性，了解红树植物如何适应潮间带恶劣生存环境的根本原因。该展区实际是让观众了解红树林的生命过程，向观众展现的是一棵红树林。

3、展示方式

以标本、实物、模型、图片、多媒体等，特别是在本展区运用大量的投影、全息投影、触摸屏等互动展项，生动地展示红树的生理特征、生态习性等，以动静结合的方式展现，让展览活起来。



Exhibition Hall 1 The Mystery of Mangroves (Mystery Hall of Mangroves)

Exhibition hall

The exhibition hall is located on the first floor of the exhibition building with a clear height of 7 m and an area of around 1000 m².

Exhibition scheme

1. Purpose of exhibition

Mangrove is a special plant ecological community composed of multiple plants and widely distributed in the global tropical and subtropical coastal areas, which constitutes an ecological system with unique characteristics. Unlike plenty of plants, mangroves grow in the coastal intertidal zones on tropical and subtropical coasts; therefore, they have evolved kinds of special physiological structures to adapt to the highly salty seawater environment and successfully occupy the ecological niche where other plants dare not to enter. Mangroves have become the most special ecological communities due to their special ecological niche.

2. Content of exhibition

The exhibition hall is where the Mangrove Museum starts and helps to define and characterize mangroves to the visitors of the museum. Consequently, the exhibition hall will focus on the evolution, physiological structures, development, and ecological habit of mangroves, especially the adaptation of mangroves to the severe environment such as the environment with high salinity, high and low intertidal zones and the physiological structures between the transitional zone of the sea and the land, so that the visitors could understand the unique characteristics, physiological habits and the root cause for mangroves to adopt the severe environment in intertidal zones. In the exhibition hall, it actually exhibits the life process of mangroves to the visitors through a mangrove.

3. Way of exhibition

In the exhibition hall, it will vividly exhibit the physiological characteristics and ecological habits of mangroves through specimens, physical models, pictures, multi-medias and other mediums, especially plenty of projections, holographic laser projection, touch screens and other interactive exhibition, injecting vitality to the exhibition.

4、展示亮点

红树林的生存智慧：通过标本、放大模型、直观展板解读、视频动画以及 VR、AR 等多媒体技术，让观众直观的了解红树植物独特的生态构造和生理习性，了解红树植物如何适应潮间带恶劣生存环境的根本原因。

附：大纲文本框架

1 什么是红树林

1.1 红树林名字由来

1.2 红树植物的家族组成

1.2.1 真红树植物

1.2.2 半红树植物

1.2.3 红树林伴生植物

1.3 全球的红树林

1.3.2 东方群系和西方群系

2 红树林的演化历程

2.1 海陆先驱

2.1.1 植物演化历程

2.1.2 红树植物的起源及地质分布

2.2 沧海桑田 自然选择

2.3 化石走廊

2.4 演化历程

3 所有的海岸都可以生长红树林吗？

3.1 气候

3.2 海岸地质地貌

3.3 土壤

3.4 潮汐和洋流

3.5 盐度

4 红树植物的生存智慧

4.1 独特的生理构造

4.1.1 红树植物根（白骨壤根的解剖构造）

4.1.2 红树植物枝干部（桐花树茎的解剖构造）

4.1.3 红树植物叶（秋茄、木榄和红海榄叶片结构）

4.2 红树植物的避盐机制



4. Highlight of exhibition

The survival wisdom of mangroves: in the exhibition hall, it visually displays the unique ecological structures and physiological habits of mangroves and the root cause for mangroves to adapt to the severe environment in the intertidal zones through specimens, enlarged models, visualized interpretation on display boards, video-based animation, VR, AR and other multimedia systems.

Annex: Outline Frame

1 Definition of mangroves

1.1 Origin of the name of mangroves

1.2 Composition of mangroves

1.2.1 True mangroves

1.2.2 Semi-mangroves

1.2.3 Mangrove associates

1.3 Mangroves in the world

1.3.2 Eastern formation and western formation

2 Evolution of mangroves

2.1 Pioneer on the sea and the land

2.1.1 Evolution of plants

2.1.2 Origin and distribution of mangrove plants

2.2 Natural selection over vicissitudes of time

2.3 Corridor of fossil

2.4 Evolution

3 Can mangroves grow along all coasts?

3.1 Climate

3.2 Geological landform of coasts

3.3 Soil

3.4 Tide and ocean current

3.5 Salinity

4 Survival wisdom of mangrove plants

4.1 Unique physiological structure

4.1.1 Roots of mangrove plants (the anatomic construction of *avicennia marina* root)

4.1.2 Branches of mangrove plants (the anatomic construction of *aegiceras corniculatum* stem)

4.1.3 Leaves of mangrove plants (leaf structures of *kandelia candel*, *bruguiera gymnorhiza* and

4.2.1 泌盐现象

4.2.2 拒盐现象

4.3 独特的繁殖方式——胎生现象

4.3.1 红树林胎生现象

4.3.2 红树林隐胎生和显胎生

4.4 胎生苗高超的生存本领

4.5 皮孔

4.6 发达的地上根系

4.6.1 支柱根或板状根

4.6.2 呼吸根

4.6.3 缆状根和表面根



rhizophora stylosa)

4.2 Salt avoidance mechanism of mangrove plants

4.2.1 Salt excretion

4.2.2 Salt exclusion

4.3 Unique reproduction mode --- Viviparity

4.3.1 Viviparity of mangroves

4.3.2 Cryptoviviparity and exposed viviparity of mangroves

4.4 Survival skill of viviparous plantlets

4.5 Lenticel

4.6 Strong root system on ground

4.6.1 Brace root or buttress root

4.6.2 Respiratory root

4.6.3 Cable root and surface root

第二展区 红树王国（红树林生态系统）

一、展厅条件

位于展馆建筑一层，净高 7 米，面积约 1000 平方米。

二、展陈策划

1、传播目标

作为全球一个重要的生态系统，它里面有哪些成员，它的功能是怎么样的，并不为公众所知。本展厅通过展示红树林生态系统里的成员（生物种类），以及成员与环境之类的关系。同时，讲述红树林生态系统的功能是如何发挥的。让公众了解红树林生态系统的重要性。

2、展示内容

在观众对红树林自身认识的基础上，在这一展区将让观众重点了解红树生态系统，特别是红树林生态系统结构（各种动植物种类）。通过大量的动植物标本突出红树林具有极高的生物多样性。同时，将讲述红树林生态系统中各成员之间以及成员与环境之间的关系。最后讲述红树林生态系统的功能。让公众了解红树林生态系统的重要性。该展区实际是了解红树林生态系统各个成员及其之间的关系，向观众展现的是一片红树林。

3、展示方式

为了突出红树林具有极高的生物多样性，同时增加可看性，本展厅将以大量的标本实物来展现这一特点。对红树林生态系统功能而言，则通过模型、声光电等多媒体展项结合标本展示出来。在表现形式上，以展柜为主，设置必要的互动展项，形成补充和延伸，同是增加与观众的互动性。



Exhibition Hall 2 Mangroves Kingdom (Ecological System of Mangroves)

Exhibition hall

The exhibition hall is located on the first floor of the exhibition building with a clear height of 7 m and an area of around 1000 m².

Exhibition scheme

1. Purpose of exhibition

Mangroves serve as an important ecological system, however, its composition and function are not known by the public. Therefore, in the exhibition hall, it will elaborate on the function of mangrove ecosystem by showing the composition (biological species) and the relationship between the biological species and the environment in mangrove ecosystem, so that the audience can understand the importance of the mangrove ecosystem.

2. Content of exhibition

After the visitors gain some understanding of the mangrove itself, the exhibition hall will focus on the ecosystem of mangroves, especially the ecosystem structure of mangroves (including all kinds of plants and animals), highlighting the extraordinary level of biodiversity of mangroves through plenty of wildlife specimens and showing the relations among biological species, the relationship between such biological species and the environment in mangrove ecosystem and the importance of the mangrove ecosystem. The exhibition hall actually exhibits the biological species in the mangrove ecosystem and their relationship through mangroves.

3. Way of exhibition

In the exhibition hall, it will display plenty of specimens not only to highlight the extraordinary level of biodiversity but also to enhance the ornamental value of mangroves, while introducing multimedia systems such as models and acoustic and optics system to present the function of the mangrove ecosystem in combination with specimens. In the hall, we mainly use showcases for the exhibition, while arranging necessary interactive exhibitions to mutually complement and extend the interactivity with the visitors.

4、展示亮点

展示亮点是红树林生态结构，通过大量的动植物标本展示红树林生态系统极高的生物多样性，突出红树林生态系统的生态功能，让观众对红树林生态系统有全新的认识。

附：大纲文本框架

1. 生态系统

1.1 生态系统构成

1.2 生态系统成员关系

1.2.1 食物链

1.2.2 食物网

1.3 生态系统功能

1.3.1 物质循环

1.3.2 能量流动

1.3.3 信息传递

1.4 生态系统演替

1.5 生态平衡

1.5.1 生态平衡破坏表现

1.5.2 人类改变生态平衡

(1) 将自然生态系统变成人工生态系统

(2) 过度利用自然资源

(3) 向生态系统排放污染物

1.6 生态系统类型

(1) 海洋生态系统

(2) 森林生态系统

(3) 湿地生态系统

2 湿地生态系统（简单）

2.1 湿地类型

2.2 湿地功能

2.3 湿地生物（以内陆的淡水湿地为主）

2.3.1 湿地植物

(1) 常见具有观赏价值的湿地植物（原色标本）

(2) 食虫植物

2.3.2 无脊椎动物（虾蟹螺蚌等）



4. Highlight of exhibition

The exhibition hall focuses on the ecological structure of mangroves, showing the extraordinary level of biodiversities and highlighting the ecological function of the mangrove ecosystem through plenty of wildlife specimens, so that visitors could have a better understanding of the mangrove ecosystem.

Annex: Outline Frame

1. Ecosystem

1.1 Ecosystem constitution

1.2 Relationship among the biological species in the ecosystem

1.2.1 Food chain

1.2.2 Food web

1.3 Ecosystem function

1.3.1 Material cycle

1.3.2 Energy flow

1.3.3 Information transfer

1.4 Ecosystem succession

1.5 Ecological balance

1.5.1 Disturbance of the ecosystem

1.5.2 Change of the ecological balance by human beings

Change the natural ecosystem into an artificial ecosystem

Overexploitation of natural resources

Discharge pollutants to the ecosystem

1.6 Ecosystem type

(1) Marine ecosystem

(2) Forest ecosystem

(3) Wetland ecosystem

2 Wetland ecosystem (simple)

2.1 Wetland type

2.2 Wetland function

2.3 Organism of the wetland (mainly fresh water inland wetland)

2.3.1 Wetland plant

Common wetland plants with ornamental value (unbleached specimens)

Insectivorous plants



(1) 节肢

(2) 软体

2.3.3 鱼类

2.3.4 鸟类

3 红树林生态系统

3.1 红树林生态系统结构

3.1.1 非生物

3.1.2 生产者

3.1.2.1 藻类

(1) 微藻（用模型）

(2) 大型藻

3.1.2.2 高等植物

(1) 真红树

(2) 半红树

(3) 伴生植物

3.1.3 消费者

3.1.3.1 红树林浮游动物

3.1.3.2 底栖动物

(1) 软体动物

(2) 节肢（虾蟹）

(3) 多毛类（沙蚕）

(4) 星虫（泥虫）

(5) 棘皮动物

3.1.3.3 昆虫

3.1.3.4 鱼类

3.1.3.5 两栖

3.1.3.6 爬行动物（蜥蜴、海龟、鳄、蛇）

3.1.3.7 鸟类

(1) 泛游水面的游禽

(2) 涉水而居的涉禽

(3) 健步如飞的陆禽

(4) 擅长攀爬的攀禽

(5) 爱好唱歌的鸣禽



2.3.2 Invertebrate (shrimp, crab, paludina, clam, etc.)

- (1) Arthropod
- (2) Mollusk

2.3.3 Fish

2.3.4 Bird

3 Mangrove ecosystem

3.1 Mangrove ecosystem structure

3.1.1 Non-living being

3.1.2 Producer

3.1.2.1 Algae

- (1) Microalgae (in models)
- (2) Large algae

3.1.2.2 Higher plants

- (1) True mangrove
- (2) Semi-mangrove
- (3) Mangrove associates

3.1.3 Consumer

3.1.3.1 Zooplankton in mangroves

3.1.3.2 Benthonic animal

- (1) Mollusc
- (2) Arthropod (shrimp and crab)
- (3) Polychaetes (clam worm)
- (4) Insect (dryopidae)
- (5) (Echinoderm)

3.1.3.3 Insect

3.1.3.4 Fish

3.1.3.5 Amphibious

3.1.3.6 Reptile (lizard, sea turtle, alligator and snake)

3.1.3.7 Bird

- (1) Waterfowl
- (2) Shorebirds
- (3) Terrestores
- (4) Scansores



(6) 心狠手辣的猛禽

3.1.3.8 哺乳动物

(1) 陆生

(2) 海兽

3.1.4 分解者（用模型）

3.1.4.1 细菌

3.1.4.2 放线菌

3.1.4.3 真菌

3.2 红树林生态系统特点（利用展项）

3.2.1 高度开放（在不同生态系统的交错带）

3.2.2 高敏感（易被破坏）

3.2.3 高生产力

3.2.4 高返还（叶子大部分回到泥中）

3.2.5 高分解率

3.2.6 高生物多样性

3.2.7 独特食物网

3.3 红树林生态系统生态功能（利用展项）

3.3.1 护岸卫士（防浪护堤）

3.3.2 促淤造陆

3.3.3 净化作用（水质、土壤、大气）

(1) 大气净化

(2) 水体净化

(3) 土壤净化

3.3.4 生物多样性保护

(1) 林内生物多样高

(2) 鸟类多且是迁徙路线

(3) 鱼类多

3.3.5 蓝碳



(5) Songbird

(6) Raptor

3.1.3.8 Mammal

(1) Terrestrial

(2) Sea mammal

3.1.4 Decomposer (in model)

3.1.4.1 Bacteria

3.1.4.2 Actinomyces

3.1.4.3 Fungus

3.2 Features of mangroves ecosystem (with exhibited items)

3.2.1 High openness (ecotone in different ecosystems)

3.2.2 Hypersensitivity (easy to be disturbed)

3.2.3 High productivity

3.2.4 High restoration (most of leaves are restored to the mud)

3.2.5 High decomposition rate

3.2.6 High biodiversity

3.2.7 Unique food web

3.3 Mangrove ecosystem function (with exhibited items)

3.3.1 Dam protection guard (Wave prevention and dam protection)

3.3.2 Siltation promotion and reclamation

3.3.3 Purification (water quality, soil and atmosphere)

(1) Atmospheric purification

(2) Water purification

(3) Soil purification

3.3.4 Biodiversity protection

(1) High biodiversity in mangroves

(2) Large number of birds and migration routes

(3) Large number of fishes

3.3.5 Blue carbon

第三展区 中国红树（中国的红树林）

一、展厅条件

位于展馆建筑一层，净高 7 米，面积约 1000 平方米。

二、展陈策划

1、传播目标

让公众了解中国红树林。

2、展示内容

在观众了解红树林生态系统之后，知道了红树林生态系统的组成成员等知识。由此会产生一个新的问题，不同地区的红树林会是怎么样？我们中国的红树林？有哪几种类型呢（非指树种）？是怎么划分呢？为了让观众对我国的红树林有一个深刻的认识，在本展区，从地学的角度将中国红树林分为溺谷湾、潟湖、河口和开放海岸等四种典型的红树林，并以各个典型的红树林为原型制作景观，通过逼真的大景观方式展现中国红树林，让观众足不出户就可以有如临其境的感觉，在博物馆就可以感受中国不同的红树林类型。形成与前两个展区的完全不同体验方式。同时，作为红树林博物馆所在地的深圳，也有大量的红树林分布，特别是其又是发达的城市，因此增加介绍深圳红树林的专题，加深了观众对中国红树林的认识。

3、展示方式

《中国红树》以中国四大典型的红树林生态系统为原型，以模特地为原型，通过大景观的方式展现中国红树林，让观众足不出户就可以有如临其境的感觉。不同区域的红树林差异通过景观和动物来表现。深圳红树林部分不以场景展示，而以大量的标本实物展现深圳红树丰富的生物资源以及独特的生态功能。在表现形式上，设置必要的互动展项，让公众参与和体验，寓教于乐。



Exhibition Hall 3 Mangroves in China (Mangroves in China)

Exhibition hall

The exhibition hall is located on the first floor of the exhibition building with a clear height of 7 m and an area of around 1000 m².

Exhibition scheme

1. Purpose of exhibition

It aims to ensure that the visitors understand the mangroves in China.

2. Content of exhibition

After the exhibition of the mangrove ecosystem, the visitors also learn about the composition of the mangrove ecosystem and other knowledge. However, visitors would raise doubts about, for example, how the mangroves in different areas (especially the mangroves in China) would differ, how the mangroves in China look like and how they are classified (not referring to the species). Therefore, in order for the visitors to deeply understand the mangroves in China, the exhibition hall classifies the mangroves in China into four types from the perspective of geosciences, including drowned valley bay mangrove, lagoon mangrove, estuary mangrove and open coast mangrove. And, by taking each of the typical mangroves to create a landscape, it vividly exhibits the mangroves in China so that the visitors could feel the difference between the different types of mangroves in China through an immersive experience in the museum. The China Mangrove Museum is located in Shenzhen, such a developed city, which is also home to plenty of mangroves. So, such thematic museum can give visitors a deeper understanding of mangroves.

3. Way of exhibition

Mangroves in China exhibits the mangroves in China as large landscapes, taking the four typical mangrove ecosystems in China and models as prototypes, so that the visitors could have an immersive feeling. The difference for the mangroves in different areas is reflected through landscapes and animals. Instead of creating multiple scenes, plenty of physical specimens are used to display the diversified biological resources and unique ecological function of the mangroves in Shenzhen. Besides, necessary interactive exhibitions are arranged for the visitors to participate and experience in an entertaining way.

4、展示亮点

展示亮点是以模特地为原型，通过复原大景观的方式展现中国四大典型的红树林类型，在场景制作上要求逼真，让观众有如临其境的感觉，在博物馆就可以感受中国不同的红树林类型。

附：大纲文本框架

1 红树林在中国

1.1 红树林面积

1.2 种类分布

2 中国典型红树林

展示形式建议：在 2.1、2.2、2.3、2.4 四部分展示了中国典型的四大类型的红树林，为了让观众真实感受，均采用景观式展示手段，按理说，所有标本都应该在景观中展示，还原生物本来的生活面貌，这对于大型标本而言，如鸟类、兽类（大型海兽）等，效果较好，观众也可以很好的欣赏。但对于小型的标本，特别红树林无脊椎动物，如小螺、小型贝类等，把它们放入大景观中，观众就很难看到了。鉴于这些客观的原因，建议做如下处理：

（1）对于大型的标本，置于景观中，如鸟类在树上，兽类在树上或树丛中。

（2）建议景观有部分剖面景观，可把小型的螺类、贝类等置于此，即形成水下景观，一是真实原来红树林水下世界，二是也让观众近距离看到标本。

（3）也可以将景观做成观众可以进入的形式，小型标本在观众脚下，上面有玻璃，再加声光电等技术，形成水下世界。

（4）小型标本的选择要精而有特点，可看性强的种类。



4. Highlight of exhibition

The highlight of the exhibition is to take the model lands as prototypes, display the four typical types of mangroves in the vivid scenes by restoring large landscapes so that the visitors could understand the different types of mangroves in China in an immersive experience.

Annex: Outline Frame

1 Mangroves in China

1.1 Area of mangroves

1.2 Species distribution

2 Typical mangroves in China

Form of exhibition: the four typical types of mangroves in China are exhibited in part 2.1, 2.2, 2.3 and 2.4, and displayed through landscapes in order to bring real experiences to the visitors. In theory, all specimens shall be exhibited in landscapes to restore the original appearance of biological species, which will be very useful for large specimens such as birds, mammals (large sea mammals) and others and good for the visitors to appreciate. However, if small specimens, especially invertebrates in mangroves such as small snails, small shellfishes and others, are integrated into large landscapes, it will be difficult for the visitors to find them. For such objective reasons, we suggest to take the following measure:

(1) The large specimens are placed in the large landscapes, for example, birds in the trees, mammals in the trees or among the trees

(2) It is suggested to arrange some sectional landscapes containing small snails and shellfishes to create underwater landscapes, which not only creates a real underwater world of mangroves, but also provides opportunities for the visitors to take a closer look at the specimens.

(3) Alternatively, it could be designed into a walk-in landscape area, where the visitors could walk in, with small specimens under the floor and decoration glass on the roof to create an underwater world supported by acoustic and optics technologies.

(4) For the selection of small specimens, they should be eye-catching and entertaining.

2.1 河口红树林（广东珠江口红树林）

河口营养物质丰富，红树林生长迅速，形成茂密的林地。密茂的红树林将河水及潮流带来沙泥截留在红树林海滩上，而在退潮、退浪时还不能将泥沙带走，形成只进不出的局面，结果是红树林海滩不断扩大，而后演变成红树林平原，继而形成埋藏红树林平原（矾田或反酸田）。

【场景描述】以珠江口的典型红树林：淇澳岛、横琴等地的红树林为模特地，进行制作。

【形式要求】采用大景观的布展，景观由多个场景共同组成，讲述一个完整的生物故事。

2.1.1 红树植物及伴生植物

（1）红树植物

（2）伴生植物

2.1.2 无脊椎动物

（1）环节动物

（2）软件动物

（3）节肢动物

【场景描述】以珠江口的典型红树林：淇澳岛、横琴等地的红树林为模特地，进行制作。

【形式要求】采用大景观的布展，景观由多个场景共同组成，讲述一个完整的生物故事。

2.1.3 鱼类

2.1.4 爬行类

2.1.5 鸟类

2.1.6 海兽

2.2 溺谷湾红树林

溺谷湾由于其海岸线曲折蜿蜒，受风浪干扰小，沉积物淤积较稳定，成为红树林生长的良好场地，呈现海上森林景观。

【场景描述】以海南东寨港、文昌清澜港等为模特地。

【形式要求】采用大景观的布展，景观由多个场景共同组成，讲述一个完整的生物故事。



2.1 Estuary mangrove (the mangroves at Pearl River Estuary, Guangdong)

At the estuary, with the nourishing of rich nutrient substances, the fast-growing mangroves would form a thick forest quickly to deposit the sand and mud brought by the river water and tide on the beach of mangroves. However, such sand and mud could not be washed away as the tide ebbs. Therefore, the mangrove beach could extend continuously to evolve into a mangrove plain and then in-ground mangrove plain (alum peld or acid sulphate peld).

【Scene description】 The scene takes the typical mangroves at Pearl River Estuary as the model land, which are the mangroves at Qi'ao island, Hengqin and others.

【Form requirements】 Large landscapes composed of multiple scenes are used to tell an entire biological story.

2.1.1 Mangrove plants and associates

- (1) Mangrove plants
- (2) Mangrove associates

2.1.2 Invertebrate

- (1) Annulata
- (2) Mollusc
- (3) Arthropod

2.1.3 Fishes

2.1.4 Reptilia

2.1.5 Birds

2.1.6 Sea mammals

2.2 Drowned valley bay mangrove

Drowned valley bay has stable settlements and winding costal lines that reduce the disturbance by winds and waves, and such enabling environment has facilitated the growth of mangroves and created the forest-like landscape on the sea.

【Scene description】 The scene takes Dongzhai Harbor, Wenchang Qianglan Harbor and other places in Hainan as the model lands.

【Form requirements】 Large landscapes composed of multiple scenes are used to tell an entire biological story.

2.2.1 植物

2.2.2 无脊椎动物

(1) 环节动物

(2) 软件动物

(3) 节肢动物

2.2.3 鱼类

2.2.4 鸟类

2.3 潟 (xì) 湖型红树林

被沙嘴、沙坝或珊瑚分割而与外海相分离的局部海水水域，海水受不完全隔绝或周期性隔绝，风浪相对较小，有机丰富，让生长在这里的红树林得到了充分的发育，形成了与众不同的最古老的红树林景观。

【场景描述】以三亚铁炉港保护区为模特地，突出红树多、种类全、古老、高大的特点。

【形式要求】采用大景观的布展，景观由多个场景共同组成，讲述一个完整的生物故事。

2.3.1 植物

2.3.2 水生无脊椎动物

2.3.3 鱼类

2.3.4 鸟类

2.4 开阔海岸红树林

开阔海岸由于无遮挡、风浪大、海水循环良好、底泥常年受到潮水的反复淘洗，形成了中细砂为主的海滩。这里的红树林不仅要适应这种底质的海滩，也要适应潮水反复冲刷的考验，往往形成与其他地区不同的沙质红树林景观。

【场景描述】以广西北海金滩红树林为模特地，进行制作。

【形式要求】采用大景观的布展，景观由多个场景共同组成，讲述一个完整的生物故事。

2.4.1 植物

2.4.2 无脊椎动物

2.4.3 鱼类



2.2.1 Plants

2.2.2 Invertebrate

- (1) Annulata
- (2) Mollusc
- (3) Arthropod

2.2.3 Fishes

2.2.4 Birds

2.3 Lagoon mangroves

Lagoon is a local sea water area separated by sand spits, sandbanks or corals from open waters, where the seawater is isolated incompletely or periodically. With small waves and rich organics in lagoon, the mangroves could develop well to create the different but most ancient landscape of mangroves.

【Scene description】 It takes Tielu Port Reserve, Sanya city as the model land and highlights its tall, ancient and diversified mangroves.

【Form requirements】 Large landscapes composed of multiple scenes are used to tell an entire biological story.

2.3.1 Plants

2.3.2 Aquatic invertebrate

2.3.3 Fishes

2.3.4 Birds

2.4 Mangroves on the open coasts

On the open coasts, due to the unsheltered coasts, strong wind, big waves, well circulating seawater and repeatedly elutriated sediments, the beaches are mainly composed by medium-fine sand, where the mangroves adapt not only to the beach with such sediments, but also to the severe environment that is eroded repeatedly by the seawater. Finally, a unique landscape of sandy mangrove is formed here.

【Scene description】 It is arranged by taking Beihai Golden Bay Mangrove in Guangxi as the model land.

【Form requirements】 Large landscapes composed of multiple scenes are used to tell an entire biological story.

2.4.1 Plants

2.4.2 Invertebrate

2.4.3 Fishes

2.4.4 鸟类

3 专题：深圳湾红树林

深圳湾位于珠江河口伶仃洋的东岸，属于珠江口部分，其东南面紧邻我国香港特别行政区，北面是我国的经济特区深圳市。尽管承受着高度城市化的影响，然而，作为一个典型的河口海湾，特别是南北分布有山，对风暴大雨的袭击具有很强的减弱作用，加之大部分沿岸都是以潮滩地貌为主，且多为淤泥质，为红树林生长繁殖提供了良好的环境条件，同时也是鸟类理想的栖息地。

3.1 植物

3.1.1 红树种类

3.1.2 红树群落

3.1.3 生态序列（可以做展项，排列游戏）

3.2 无脊椎动物

（1）软体动物

（2）节肢动物

3.3 鱼类

3.4 两栖爬行动物

（1）两栖动物

（2）爬行动物

3.5 鸟类

（1）沿海水面类群

（2）沿海滩涂鸟类群

（3）围基鱼塘芦灌草类群

（4）乔灌树林草地农田鸟类群

3.6 兽类



2.4.4 Birds

3 Subject: Shenzhen Bay Mangroves

Shenzhen Bay in the east bank of Lingding Sea is part of Pearl River Estuary with Hongkong special administrative region in the southeast and Shenzhen special economic zone in the north. Despite rapid growth of urbanization, Shenzhen Bay, as a typical estuary bay, could effectively weaken the windstorm and heavy rain, especially with the help of the mountains in the north and south. Additionally, most of the beaches are tidal flats composed of muddy soil, which provides sound environment for mangroves to reproduce and for birds to inhabit.

3.1 Plants

3.1.1 Mangrove species

3.1.2 Mangrove communities

3.1.3 Ecological sequence (which can be exhibited in the form of sequencing games)

3.2 Invertebrate

(1) Mollusc

(2) Arthropod

3.3 Fishes

3.4 Amphibians and reptiles

(1) Amphibians

(2) Reptiles

3.5 Birds

(1) Coastal water group

(2) Coastal beach bird group

(3) Reed, shrub and herb plants group in dike psh pond

(4) Bird group in the trees, shrubs, forest, herbs and farmland

3.6 Mammals

第四展区 世界红树（世界红树林）

一、展厅条件

位于展馆建筑一层，净高 7 米，面积约 1000 平方米。

二、展陈策划

1、传播目标

让公众了解世界红树林的现状。

2、展示内容

与第三展区相呼应，集中展现除了中国之外的世界其他地区的红树林景观。将以世界各大洲最典型的红树林生态系统为原型。以地理位置为划分依据，分别从亚洲、非洲、美洲、澳洲选出四处极富代表性的红树林展现世界红树林的本来面貌，让观众能以全球的视野欣赏世界上最典型的红树林。展示手段与第三展区相似，以逼真大景观精确复原各地红树林特有的物种及其丰富的生物多样性，使参观者在博物馆中游览世界红树林，亲身体验、探究、发现世界各地红树林的特点与不同：

第一个区域是代表澳 - 亚大陆海岸的澳洲北部的凯恩斯红树林生态系统；

第二个区域是代表亚洲的印度 - 马来西来海岸的红树林生态系统。本区域主要选自苏门答腊婆罗州的 Greater Sundas mangroves 与孟加拉湾的 Sundarbans mangroves。在这一区域中，岛屿较多，陆地非常破碎。无数大小岛屿之间由错综复杂的浅海、水道、海峡、海湾等联系。这种特有的地理条件不但非常有利于红树林跨海繁衍，也有利于鸟类与海生动物拓展栖息地，从而使得本区域内红树林生态系统呈现出一定的共性，可以选择作为一个世界典型例子；

第三个区域的南非东部的红树林代表非洲东部海岸的红树林生态系统。这一地区的红树林较为高大，物种数量也偏多。

第四个区域以美国东岸的佛罗里达万岛群红树林代表美洲东部海岸的红树林生态系统，这是生活在大型河口沼泽地水网之中的红树林系统。



Exhibition Hall 4 Mangroves of the World (Mangroves of the World)

Exhibition hall

The exhibition hall is located on the 1st floor of the exhibition building with a clear height of 7 m and an area of around 1000 m².

Exhibition scheme

1. Purpose of exhibition

It aims to ensure that the public understand the current status of the mangroves in the world.

2. Content of exhibition

Unlike the Exhibition Hall 3, this exhibition hall focuses on the mangroves outside of China, taking the most typical mangrove ecosystem on all continents of the world as the prototypes. Geographically, we select four most representative mangroves in Asia, Africa, America and Australia to show the original appearance of mangroves so that visitors could appreciate the most typical mangroves with global vision. Like Exhibition Hall 3, it will also accurately restore the unique species and rich biodiversity of mangroves all over the world through large and realistic landscapes so that visitors could travel in the mangroves of the museum and personally experience, explore and discover the features and differences of the mangroves all over the world.

The 1st area is Cairns Mangrove Ecosystem representing the coast of Asia-Australia Continent in the north of Australia;

The second area is the mangrove ecosystems representing the India-Malaysia coast in Asia which are Greater Sundas mangrove in Sumatra Island and Borneo Island and Sundarbans mangrove in the Bay of Bengal. In this area, there are lots of islands and scattered lands which are connected by complicated shallow seas, water channels, straits, bays, etc. Such unique geographical condition is not only good for the sea-crossing reproduction of mangroves, but also good for the birds and marine animals to extend their habitats, so that the mangrove ecosystems in the area, with certain features in common, are selected as the typical example of the world.

The third area is the mangroves in the east of South Africa representing the mangrove ecosystem in the east coast of Africa, where the mangroves are tall with variety of species.

The fourth area is Ten Thousand Islands Mangrove of Florida representing the mangrove ecosystem

3、展示方式

考虑完全使用高仿模型和声光模拟环境来进行展示，这四个区域分别精确复原各地红树林的特有物种多样性，使参观者在博物馆中游历世界，亲身体验、探究、发现世界各地红树林的特点与不同。

4、展示亮点

展示亮点是以世界各大洲最典型的红树林生态系统为原型，使用高仿模型和声光模拟环境等方式分别精确复原各地红树林特有的物种多样性，使参观者在博物馆中游历世界，亲身体验、探究、发现世界各地红树林的特点与不同。

附：大纲文本框架

1 世界红树林概况

1.1 全球红树林

1.1.1 分布范围

1.1.2 分布区划分

1.2 世界各国红树林分布面积

1.2.1 印尼红树林多，印度种类多

1.2.2 发源地东半球红树林种类多

2 世界典型红树林

2.1 澳洲红树林

澳大利亚是一个大的岛国，海岸线长 3 万公里，澳大利亚红树林生态系统覆盖 20% 的海岸线，澳大利亚是红树林的天堂。在澳大利亚，大多数红树林位于澳大利亚北部和昆士兰州北部的沿海地区。澳大利亚的红树林包括 18 个科的 45 种植物（包括半红树植物），占世界红树林的一半以上。物种多样性最丰富的区域是在澳大利亚的北部和东北部，但丰富度随着纬度的增加而迅速下降。



in the east coast of America, which is growing in the water system of large marsh area at the estuary.

3. Way of exhibition

With high simulation models and acoustic and optical simulation environment during the exhibition, the four areas respectively restore the unique species diversity of mangroves all over the world, so visitors could travel around the world in the museum and personally experience, explore and discover the features and difference of mangroves all over the world.

4. Highlight of exhibition

The highlight of the exhibition hall is to take the most typical mangrove ecosystem as prototypes, accurately restore the unique species diversity of mangroves all over the world by applying highly simulated models and acoustic & optic simulation environment, so that visitors could travel around the world in the museum and personally experience, explore and discover the features and difference of mangroves all over the world.

Annex: Outline Frame

1 Introduction of mangroves in the world

1.1 Mangroves of the world

1.1.1 Distribution

1.1.2 Partition of distribution areas

1.2 Distribution area of mangroves of the world

1.2.1 There are plenty of mangroves in Indonesia and many species of mangroves in India.

1.2.2 There are many species of mangroves in the eastern hemisphere known as the origin of mangroves.

2 Typical mangroves of the world

2.1 Australia mangrove

Australia is a large island nation with the coastline of 30,000 km, where the mangrove ecosystem covers 20% of coastline, so it is the paradise of mangroves. Most mangroves grow along the coastal areas in the north of Australia and the north of Queensland. Australia mangrove covers 45 plants of 18 families (including semi-mangrove), accounting for half of mangroves in the world. The area with the richest species diversity is located in the north and the northeast of Australia, but the number of species reduces as the latitude increases.

2.1.1 凯恩斯红树林

凯恩斯红树林是澳洲面积最大，被列为澳洲一类自然保护区的红树林区。这片红树林至少有 11 种红树类型，它们的根系十分发达，盘根错节屹立于滩涂之中。它们具有革质的绿叶，油光闪亮，与荷花一样，出污泥而不染。涨潮时，会被海水淹没，或者仅仅露出绿色的树冠，仿佛在海面上撑起一片绿伞。潮水退去，则成一片郁郁葱葱的森林。

【场景描述】以凯恩斯的红树林为模特地，红树植物以白骨壤、水椰、尖叶卤蕨为代表，半红树植物为黄槿、伴生植物为异种文殊兰。

2.2 东南亚红树林

2.2.1 孙德尔本斯红树林

孙德尔本斯，位于孟加拉国西部的库林纳地区，是一片由许多小岛组成的沿海林地，是世界上最大的红树林沼泽连续分布区。由于濒临着孟加拉湾，所以这里降水丰富，气候常年温暖湿润，这片随潮汐而生的森林和发达的水系为门类众多的植物群和动物群提供了适宜的生态环境。孙德尔本斯的植物资源丰富，其中最著名的是 27 种红树属植物。

【场景描述】以孙德尔本斯红树林为模特地，展示当地丰富的红树林植物及生活在红树林里以孟加拉虎为主的动物类群。代表性的红树林植物有白骨壤、澳洲木果楝、木果楝、无瓣海桑、木榄、十雄角果木、蜡烛果、红茄苳、水椰等，另需要重点展示主导物种银叶树。

2.2.2 婆罗洲的红树林

婆罗洲是世界第三大岛，这片位于赤道上的土地，没有四季，只有旱季和雨季之分，这里是地球上生物最丰富的地方之一。婆罗洲的红树林是一座隐藏的宝库，美丽又难以靠近，每天有两次涨潮，将红树林淹没，它们的特性也被掩盖。红树林有利于土地的生成，盘根错节的树根形成一个复杂的网络，留住水中的沉淀物，随着土地增多，新长出的红树林在继续延伸，红树林海岸成为各种海洋生物的育儿所。

【场景描述】以婆罗洲沙捞越红树林海岸为模特地，展示红树林里生活的丰富的动物资源，以及与红树林息息相关的热带雨林及珊瑚礁。



2.1.1 Cairns mangrove

Cairns mangrove, as the first-grade nature reserve, is the largest one in Australia. There are at least 11 types of mangroves standing in the intertidal zone, with developed root systems and leathery green leaves, rising unsullied from mud like lotuses. As the tide rises, it would be submerged by the sea or only green crowns are exposed like umbrellas standing on the sea. However, as the tide ebbs, a dense forest would emerge.

【Scene description】 Taking Cairns Mangrove as the model land, the mangrove plants are represented by *Avicennia marina*, *Sonneratia caseolaris* and *Acrostichum speciosum*, the semi-mangrove plants are represented by *Hibiscus tiliaceus* and the mangrove associates poison bulb.

2.2 Mangroves of Southeast Asia

2.2.1 Sundarbans Mangrove

Sundarbans, located at the region of Kulinna in west Bangladesh, is a coastal forest composed of many small islands and also is the largest continuous area of mangroves in the world. Due to its proximity to Bay of Bengal, there is abundant rainfall, with warm and humid climate. The forest growing in the tides and the developed water system provide a sound ecological environment for plenty of plants and animals. Sundarbans has rich plant resources, among which the most famous ones are the 27 species of mangrove plants.

【Scene description】 By taking Sundarbans mangrove as the model land, it displays locally abundant mangrove plants and the animals living in the mangroves represented by Bengal tiger. The representative mangroves are *Avicennia marina*, *Austrolixa xylocarpus granatum*, *xylocarpus granatum*, *Pagatpat*, *Bruguiera gymnorhiza*, *Ceriops decandra*, *Aegiceras corniculatum*, *Rhizophora mucronata*, *Sonneratia* and so on, especially the dominant species *Heritiera littoralis*.

2.2.2 Bornean Island Mangrove

Bornean Island in the equator is the third largest island in the world with dry and rainy season but no four seasons, and also is one of the places with richest species in the world. The mangrove in Bornean Island is a hidden treasure, beautiful and difficult to reach. Due to the two rising tides during a day, the mangroves are always submerged and their features are covered up too. Mangroves contribute to the formation of land, whose complicated root systems form a complex network to retain the sediments in the water. And then the newly growing mangroves extend as the land increases. The mangrove coast has become the place for marine lives to reproduce.

【Scene description】 Taking Sarawak mangrove coast as the model land, it displays the abundant animal resources living in the mangroves and the tropical rainforest and coral reef closely related to mangroves.

2.3 非洲红树林

在陆地与海洋之间，一条隐密的亚热带海岸线中部，生长着一片独特的森林——非洲红树林，这是地球上最富足、最严酷的生态系统之一。变幻莫测的潮汐支配着这里的一切，很多不同寻常的动物把家安在这里，它们每天都要在这片自然界最后的原始旷野中为生存而战。

【场景描述】以南非东部的红树林海岸为模特地，代表性的红树类群为黑皮红树和白皮红树。重点以场景复原的形式展示涨潮和落潮时不同动物在红树林海岸的生活方式。

2.4 美国万岛群红树林

万岛群红树林位于美国佛罗里达州西南海岸，是世界第二大红树林生态区，也是北美最大的红树林区。这个由红树植物构成的沼泽和树林的世界，绵延数百英里，从佛罗里达半岛的南端开始，沿着墨西哥湾一路北上，最终一直到达塞布尔角的北端，穿过整个万岛群岛，这是世界上最壮观的红树林沼泽之一，野性十足，人迹罕至。

【场景描述】以佛罗里达万岛群红树林为模特地，突出美洲东岸红树林植物的特点。



2.3 Africa mangrove

There is a special forest growing in the middle of hidden subtropical coastline between the land and the sea, which is Africa mangrove, one of the places with the richest and most severe ecosystem. The uncertain tide controls everything here. Many unusual animals settle here to fight for their lives in the last wilderness every day.

【Scene description】 Taking the mangrove coast in the east of South Africa as the model land that is represented by black mangroves and white mangroves, it displays the lifestyles of different animals on the mangrove coast as the tide rises and ebbs through scene restoration.

2.4 Ten Thousand Islands Mangroves in USA

Ten Thousand Islands mangrove located on the southwest coast of Florida is the second largest mangrove ecotope in the world and the largest one in North America. The marsh and forest composed of mangrove plants spread for hundreds of miles along Gulf of Mexico from the south end of Florida peninsula to the north end of Cape Sable Island, passing through the entire Ten Thousand Islands, which is one of the most spectacular mangrove swamps in the world as it is completely wild and untraversed.

【Scene description】 Taking Ten Thousand Islands Mangrove as the model land, it highlights the features of the mangroves on the east coast of USA.

第五展区 红树与海（海洋生物多样性）

一、展厅条件

位于展馆建筑一层，净高 7 米，面积约 1500 平方米。

二、展陈策划

1、传播目标

展览将围绕“海洋生物多样性”的主题，取材自然标本及其保存环境的研究成果，分析提炼，归纳整理，构建主题鲜明、内涵丰富，科学性、知识性、观赏性和趣味性俱强的自然展陈，重点展示潮间带、潮下带海洋生物多样性，与红树林生态系统有机衔接，从而构成一个完整的红树林 - 海草 - 珊瑚礁的典型海洋生态系统。

2、展示内容

前面四个展区集中展现了红树林自身的面貌，让观众对红树林有了深刻的认识。而这一展区，则是展现与红树林生态系统密切相关的两个生态系统——海草生态系统和珊瑚礁生态系统。这两个生态系统也是红树林的左邻右舍，共同形成了活跃的海岸带生态系统。而且三个生态系统相互关联，相互影响。这两个生态系统都有丰富的海洋生物物种，特别是一些观赏性特别强的物种，如五彩缤纷的珊瑚礁鱼类，给观众以强烈的视觉冲击，极大的提升了红树林博物馆的可看性。同时，红树林生态系统作为海洋的一部分，也展示了红树林生态系统与海洋的关系，突出了相互关联，相互影响的关系。

3、展示方式

力求展现自然物类的静态之美、动态之美以及大千世界的和谐之美，实现对观众“美的塑造”。在知识点的选择上，贴近大众生活，切入社会热点，穿插公众喜闻乐见的生活常识，以达到“生活科学化，科学生活化”的效果。

展陈手段以展柜实物为主，配以模型、图片、文字、影像及信息系统等多媒体形式，特别是可采用适量的声光电技术等。在表现形式上，设置必要的互动展项，让公众参与主体验，寓教于乐。



Exhibition Hall 5 Mangroves and Sea (Marine Biodiversity)

Exhibition hall

The exhibition hall is located on the first floor of the exhibition building with a clear height of 7 m and an area of around 1500 m².

Exhibition scheme

1. Purpose of exhibition

Under the theme of "Marine Biodiversity", this exhibition hall will select nature specimens and use environment studies to analyze and display informative, entertaining and scientific exhibitions, focusing on the marine biodiversity in the intertidal zone and subtidal zone and the organic connection with the mangrove ecosystem, so as to form an entire typical marine ecosystem including mangroves, sea grasses and coral reefs.

2. Content of exhibition

The abovementioned four exhibition halls display the appearance of mangroves for visitors to get a better understanding of the mangroves. However, this exhibition hall will focus on the two ecosystems closely related to the mangroves, and they are sea grass ecosystem and coral reef ecosystem. The two ecosystems are the neighbors of mangrove ecosystem and form an active coastal ecosystem together. The three ecosystems are interrelated and mutually affected. In the two ecosystems, there are abundant marine species, especially the species with strong ornamental value such as colorful coral fishes, which not only produce strong visual impact for the visitors and greatly improve the ornamental value of Mangrove Museum, but also highlight the interrelated and mutually affected relationship between the mangrove ecosystem (as a part of the sea) and the sea.

3. Way of exhibition

In order to showcase the static and dynamic beauty of natural species and the beauty of harmony in the world and give visitors a better idea of beauty, we exhibit things that correlate to our daily life, hotspot issues and common sense loved by the public to integrate sciences into our lives.

Showcases are mainly used here, with the support of models, pictures, characters, images, information system and other multimedia, especially acoustic and optic technologies. Besides, some necessary interactive exhibitions are arranged for the public to participate and experience in an

4、展示亮点

展示亮点是用展品说话，以大量海洋生物标本（红树林种类除外），特别把典型的、可看性强的、来自珊瑚礁生态系统和海草生态系统的海洋生物标本集中展示出来，给观众震撼的感觉。增加的两个生态系统（珊瑚礁和海草床）的海洋生物标本，即把展览向潮下带延伸，把完整的海岸带生态系统（包括红树林、珊瑚礁和海草床）展现出来，突出了海洋生物的多样性。

附：大纲文本框架

1. 原生动物
2. 海绵动物
3. 腔肠动物
 - 3.1 水母
 - 3.2 海葵
 - 3.3 珊瑚
4. 扁形动物
5. 纽形动物
6. 环节动物
7. 星虫动物、螠虫动物
 - 7.1 星虫动物
 - 7.2 螠虫动物
8. 软体动物门
 - 8.1 多板纲
 - 8.2 腹足纲
 - 8.3 掘足纲
 - 8.4 双壳纲
 - 8.5 头足纲
9. 节肢动物门
 - 9.1 肢口纲
 - 9.2 颚足纲
 - 9.3 软甲纲
10. 苔藓动物门
11. 腕足动物门
12. 棘皮动物门
13. 脊索动物



entertaining way.

4. Highlight of exhibition

By exhibiting plenty of marine specimens (except mangroves), especially the typical and most eye-catching ones in coral reef ecosystem and sea grass ecosystem, it can produce visual impact to captivate the visitors. And then the marine specimens from the two new ecosystems (coral reef and sea grass beds) would bring the visitors to the subtidal zone where the entire coastal ecosystem (including mangroves, coral reef and sea grass beds) is displayed for highlighting the marine biodiversity.

Annex: Outline Frame

1. Protozoa
2. Spongia
3. Coelenterata
 - 3.1 Jellyfish
 - 3.2 Sea anemone
 - 3.3 Coral
4. Platyhelminthes
5. Nemertinea
6. Annelida
7. Sipuncula, Echiura
 - 7.1 Insects
 - 7.2 Echiuroidea
8. Mollusca
 - 8.1 Polyplacophora
 - 8.2 Gastropoda
 - 8.3 Scaphopoda
 - 8.4 Bivalvia
 - 8.5 Cephalopoda
9. Arthropoda
 - 9.1 Merostomata
 - 9.2 Maxillopoda
 - 9.3 Malacostraca
10. Bryozoa

-
-
- 13.1 尾索动物
 - 13.2 头索动物
 - 13.3 脊椎动物亚门
 - 13.3.2.2 鱼类身体结构
 - 14 海洋爬行类
 - 15 海洋鸟类
 - 15.1 雁形目
 - 15.2 鸽形目
 - 15.3 鹳形目
 - 15.4 隼形目
 - 15.5 潜鸟目
 - 15.6 鸕形目
 - 15.7 鸕形目
 - 15.8 企鹅目
 - 16 海洋哺乳动物
 - 16.1 鲸目
 - 16.2 海牛目
 - 16.3 食肉目



- 11. Brachiopoda
- 12. Echinodermata
- 13. Chordata
 - 13.1 Urochordata
 - 13.2 Cephalochordata
 - 13.3 Vertebrata
 - 13.3.2.2 Physical structures of Pshes
- 14. Marine reptiles
- 15. Marine birds
 - 15.1 Anseriformes
 - 15.2 Charadriiformes
 - 15.3 Ciconiiformes
 - 15.4 Falconiformes
 - 15.5 Galliformes
 - 15.6 Pelecaniformes
 - 15.7 Procellariiformes
 - 15.8 Sphenisciformes
- 16. Marine mammals
 - 16.1 Cetacea
 - 16.2 Sirenia
 - 16.3 Carnivora

第六展区 红树与人（红树林与人）

一、展厅条件

位于展馆建筑一层，净高 7 米，面积约 1000 平方米。

二、展陈策划

1、传播目标

《红树与人》从全球的角度出发，讲述人与红树林之间的故事。让公众了解红树对人类的重要性，以及人类对红树的影响，让人们了解红树与人之间的这种相互关系。

2、展示内容

人与自然是永恒的话题，红树林也不例外。红树林给人类很多物质或非物质的东西，同时人类也对红树林产生了破坏，而后又采取措施保护红树林。本展区将从全球的角度出发，讲述人与红树林之间的故事，重点关注红树利用、红树危机、红树保护、以及红树林文化。让公众了解红树对人类的重要性，以及人类对红树的影响，让观众了解红树与人之间的这种相互关系。特别要展现深圳在处理经济发展与红树林保护上所开创的创新理念及取得的伟大成就。

3、展示方式

以展柜实物为主，配以模型、图片、文字、影像及信息系统等多媒体形式，特别是可采用适量的声光电技术等。在表现形式上，设置必要的互动展项，让公众参与和体验，寓教于乐。



Exhibition Hall 6 Mangroves and Human (Mangroves and Human)

Exhibition hall

The exhibition hall is located on the first floor of the exhibition building with a clear height of 7 m and an area of around 1000m².

Exhibition scheme

1. Purpose of exhibition

Mangroves and Human tells the story of human and mangroves from a global perspective so that the public could understand the importance of mangroves to human beings and the impact of human activities on mangroves.

2. Content of exhibition

The relationship between human and nature is an eternal topic, with no exception for mangroves. Mangroves bring lots of material and non-material things to human, while human also take actions to protect mangroves after destroying them. This exhibition hall will tell the story of human and mangroves from a global perspective, focusing on the utilization, crisis, protection and culture of mangroves, so that visitors can understand the importance of mangroves to human beings and the impact human activities on mangroves. Besides, the innovative ideas created and great achievements made by Shenzhen amid the economic development and mangrove protection should be highlighted.

3. Way of exhibition

Showcases are mainly used here, with the support of models, pictures, characters, images, information system and other multimedia, especially acoustic and optic technologies. Besides, some necessary interactive exhibitions are arranged for the public to participate and experience in an entertaining way.

4、展示亮点

展示亮点是深圳红树林保护，通过深圳市在探索城市发展与红树林保护的矛盾中找到了平衡，实现了青山绿水就是金山银山，既要金山银山，又要绿水青山的发展理念，为经济发展与红树林保护并重提供了经验和借鉴模式。

附：大纲文本框架

1 红树利用

1.1 食用

1.1.1 果实

1.1.2 胚轴

1.1.3 叶

1.1.4 花梗

1.2 用材

1.2.1 木材

1.2.2 燃料用

1.3 药用

1.4 化工（染料等）

1.5 饲料

1.6 蜜源

1.7 绿肥

1.8 捕捞

1.8.1“讨小海”

1.8.2“讨大海”

1.9 养殖基地

1.9.1 围塘养殖 / 滩涂养殖

1.9.2 新型生产模式

（1）生态型水产养殖

（2）家禽养殖

1.10 生态旅游

2 红树危机

2.1 围填海

2.1.1 围塘养殖

2.1.2 农业和盐业的围海造田



4. Highlight of exhibition

The exhibition highlights the protection of Shenzhen mangrove. Shenzhen has explored and found its way to the right balance between urban development and mangrove protection and followed the conviction that "lucid waters and lush mountains are invaluable assets" amid urban development, which provides reference for the achievement economic development and mangrove protection at the same time.

Annex: Outline Frame

1 Utilization of mangroves

1.1 Edible value

1.1.1 Fruits

1.1.2 Plumular axis

1.1.3 Leaves

1.1.4 Peduncle

1.2 Materials

1.2.1 Timber

1.2.2 Firewood

1.3 Medicinal

1.4 Chemical engineering (dye, tec.)

1.5 Fodder

1.6 Nectar source

1.7 Green manure

1.8 Fishing

1.8.1 Fishing in the inland sea

1.8.2 Fishing in the open sea

1.9 Breeding base

1.9.1 Pond culture / Tidal Bat culture

1.9.2 New production model

(1) Ecological aquaculture

(2) Poultry production

1.10 Ecological tourism

2 Mangrove crisis

2.1 Sea reclamation

2.1.1 Pond culture

2.1.2 Land reclamation in agriculture and salt industry

2.1.3 城市的发展和港口的扩建

2.2 污染

2.2.1 石油污染

2.2.2 大型藻爆发

2.2.3 团水虱及病害爆发

2.2.4 底栖动物衰退

2.3 海堤修筑

2.4 过度利用

2.4.1 采集红树植物的果实

2.4.3 滥捕海鱼

2.4.4 收集饵料

2.5 放养家禽（食物链中断）

2.6 虫害

2.7 外来种入侵

2.8 极端气候与海平面上升

3 红树保护

3.1 全球行动

3.1.1 国际公约

3.1.2 联合国教科文组织

3.1.3 联合国人与生物圈

3.1.4 世界自然基金会（WWF）

3.1.5 世界自然保护同盟（IUCN）

3.1.6 湿地国际

3.1.7 国际红树林生态系统协会

3.1.8 国际红树林行动计划

3.1.9 全球环境基金（GEF）

3.1.10 生物小额信贷

3.2 中国行动

3.2.1 早期红树林保护

3.2.2 新中国红树林保护

3.2.2.1 领导关怀

3.2.2.2 专职机构

3.2.2.3 法制保护



- 2.1.3 Urban development and port extension
- 2.2 Pollution
 - 2.2.1 Petroleum pollution
 - 2.2.2 Large algae pollution
 - 2.2.3 Sphaeroma and disease outbreak
 - 2.2.4 Recession of benthonic animals
- 2.3 Seawall construction
- 2.4 Overuse
 - 2.4.1 Fruit collection of mangrove plants
 - 2.4.3 Overfishing
 - 2.4.4 Baits collection
- 2.5 Poultry farm (Food chain breaks)
- 2.6 Insect attack
- 2.7 Invasion of alien species
- 2.8 Extreme climate and sea level rise
- 3 Mangrove protection
 - 3.1 Global operations
 - 3.1.1 International convention
 - 3.1.2 UNESCO
 - 3.1.3 United Nation Man and Biosphere
 - 3.1.4 World Wide Fund for Nature (WWF)
 - 3.1.5 International Union for Conservation of Nature (IUCN)
 - 3.1.6 Wetlands International
 - 3.1.7 International Society for Mangrove Ecosystems
 - 3.1.8 International Mangrove Action Project
 - 3.1.9 Global Environment Facility (GEF)
 - 3.1.10 Biological microcredit
 - 3.2 China's action
 - 3.2.1 Early mangrove conservation
 - 3.2.2 Mangrove conservation in New China
 - 3.2.2.1 Leadership care
 - 3.2.2.2 Professional agency
 - 3.2.2.3 Legal protection
 - 3.2.2.4 National action plan
 - 3.2.2.5 China mangrove protection practice

3.2.2.4 国家行动计划

3.2.2.5 中国红树林保护实践

3.2.2.5.1 自然保护地保护

3.2.2.5.2 生态修复

3.2.1.5.3 中国红树林面积变化

3.2.2.6 合理利用

(1) 生态海堤

(2) 城市生态名片（城市种红树林）

(4) 红树林地埋管道原位养殖

(4) 红树林生态农场

(5) 生态旅游

3.2.2.7 国际合作

3. 3 广东行动

3.3.1 1949-1979：开发利用阶段

3.3.2 1980-2000：初始阶段

3.3.3 2001- 今：系统保护，成效显著

3.3.4 广东红树林保护经验

3.4 深圳行动

3.4.1 制定政策法规

3.4.2 划定保护区域

3.4.3 红树林环境保护和整治

3.4.4 实施修复工程

3.4.5 市树和红树林精神创建

(1) 市树

(2) 红树精神

3.4.6 创新保护模式

3.4.7 宣传科普教育

4 红树文化

4.1 传说

4.2 民俗

4.3 文学艺术



- 3.2.2.5.1 Natural protected area conservation
- 3.2.2.5.2 Ecological restoration
- 3.2.1.5.3 Variable area of China mangrove
- 3.2.2.6 Reasonable utilization
 - (1) Ecological seawall
 - (2) Urban ecological card (urban mangrove)
 - (4) In-situ culture of mangrove in buried pipes
 - (4) Ecological farm of mangrove
 - (5) Ecological tourism
- 3.2.2.7 International cooperation
- 3. 3 Guangdong action
 - 3.3.1 1949-1979: Development and utilization stage
 - 3.3.2 1980-2000: Initial stage
 - 3.3.3 2001 to now: System protection with good achievement
 - 3.3.4 Guangdong experience for mangrove protection
- 3.4 Shenzhen action
 - 3.4.1 Formulation of policies and regulations
 - 3.4.2 Definition of the protected zone
 - 3.4.3 Environmental protection and remediation of mangroves
 - 3.4.4 Restoration project
 - 3.4.5 Creation of city tree and the mangrove spirit
 - (1) City tree
 - (2) Mangrove spirit
 - 3.4.6 Innovative protection model
 - 3.4.7 Publicity on science popularization education
- 4 Mangrove culture
 - 4.1 Legend
 - 4.2 Folk culture
 - 4.3 Literature and art

第七展区 红树迷宫（探索体验厅）

一、展厅条件

位于展馆建筑一层，净高 7 米，面积约 1500 平方米。

二、展陈策划

1、传播目标

《红树迷宫》是教育、科普、互动等功能于一体的综合青少年互动中心，通过种种互动项目，以寓教于乐的方式提高青少年的思考能力、动手能力和创造力。同时，这些项目也是基本陈列的补充和延伸，使展览更加丰富和完整。

2、展示内容

分为三大部分，一是思空间，即科普教室，在科普教室开展各种教育活动，如讲座、活动等，培养青少年的思考能力。二是动空间，即青少年互动区，在该区域设置不同的互动项目（设备），互动项目以展陈项目为基础，是展陈项目的补充和延伸。三是创空间，即创作室，通过在创作制作标本、模型、以及其他等，培养青少年的创造力。

3、展示方式

遵循“探索、体验与发现”的科教理念，采用声、光、电技术，模拟仿真技术、信息化展示技术、互动技术以及相关高科技手段等。在表现形式上，设置必要的互动展项、让公众特别是青少年参与、体验，寓教于乐。

Exhibition Hall 7 Mangrove Maze (Exploration of Experience Hall)

Exhibition hall

The exhibition hall is located on the first floor of the exhibition building with a clear height of 7 m and an area of around 1500m².

Exhibition scheme

1. Purpose of exhibition

Mangrove Maze is a comprehensive teenager-oriented interaction center that integrates education, science popularization and other functions, which aims to inspire teenagers to think creatively and conduct more hands-on practices through such interactive programs in an entertaining way. At the same time, such interactive programs are also further development and extension of the basic exhibitions to produce a more diversified and complete set of exhibitions.

2. Content of exhibition

The exhibition hall is divided into three parts. The first one is the classroom for science popularization named Thinking Space, where kinds of education activities are arranged, such as lecture, to inspire teenagers to think creatively. The second one is the interactive zone named Action Space, where different interactive programs (facilities) are arranged for supplementing and extending the exhibitions (the interactive programs are based on the exhibitions). The third one is a workshop named as Innovation Space to develop the creativity of teenagers by making specimens, models and others.

3. Way of exhibition

Guided by the science education concept of "exploration, experience and discovery", it applies acoustic and optic technologies, simulation technologies, information display technologies, interactive technologies and other related high-tech means to the exhibition. Besides, necessary interactive exhibitions are arranged for the visitors, especially for the teenagers, to participate and experience in an entertaining way.

4、展示亮点

展示亮点是各种互动项目，通过观众的参与，使观众能成为展览的一部分，加深了观众对展览的理解，促进了红树林科普知识的传播。

附：大纲文本框架

1 思空间

通过教育活动培养的儿童的思考能力为目标。

1.1 生态讲堂

1.2 生态角

2 动空间

儿童动手互动区域，项目以海洋互动为主，以博物馆的展陈项目为基础，是展陈项目的延伸和补充。

3 创空间

培养儿童的创造能力



4. Highlight of exhibition

The highlight of the exhibition hall is the interactive program, with which visitors could get involved and be a part of the exhibition. To this end, not only can it help visitors understand the exhibition better, but also it can promote the science popularization of mangroves.

Annex: Outline Frame

1 Thinking space

It aims to cultivate children's thinking through education activities.

1.1 Ecological classroom

1.2 Ecological corner

2 Action space

It's a space where children can practice and interact with the ocean, and is further development and extension of the basic exhibitions in the museum.

3 Innovation space

It aims to cultivate children's creativity.