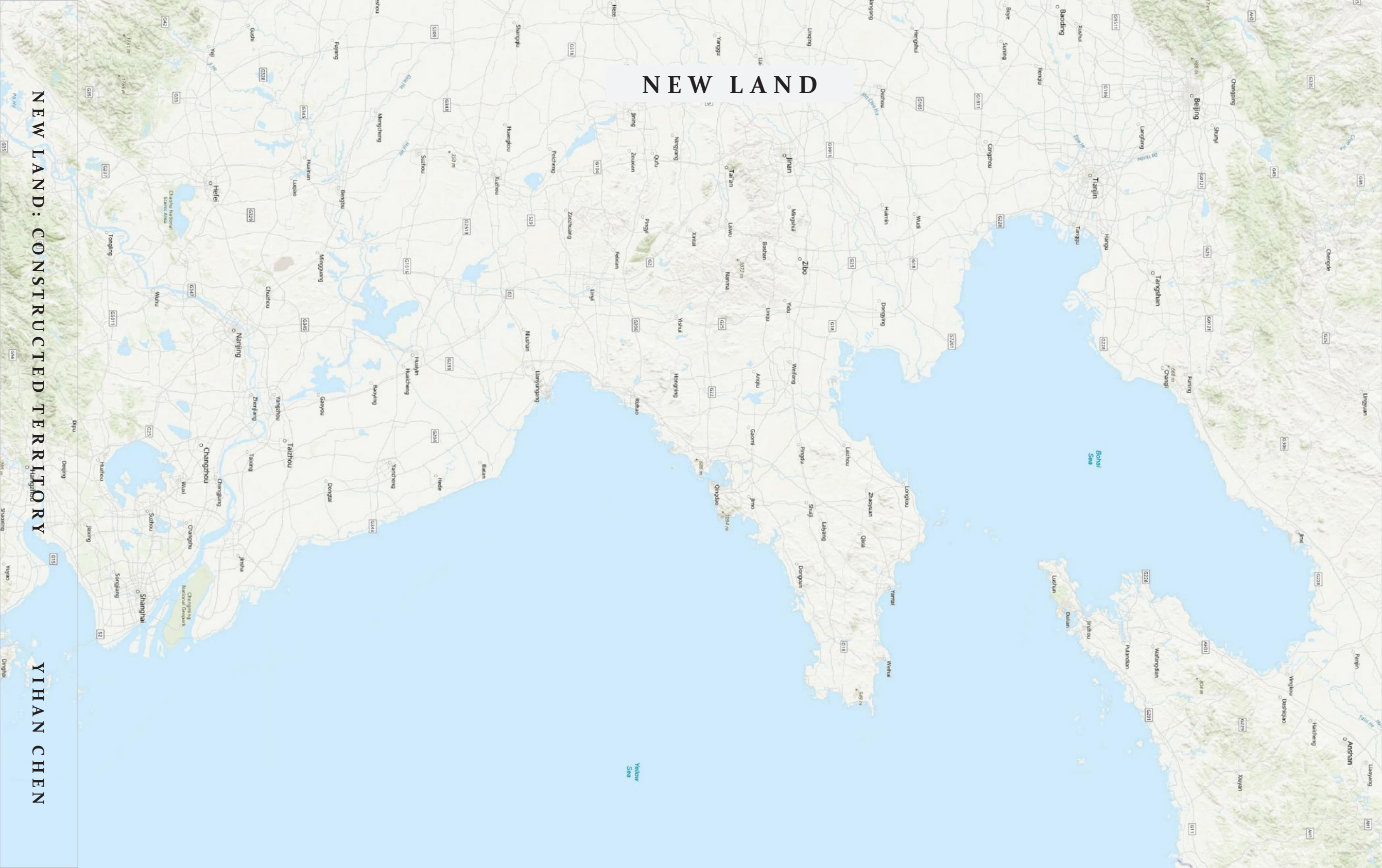


NEW LAND



NEW LAND: CONSTRUCTED TERRITORY

YIHAN CHEN

NEW LAND

Constructed Territory

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INTRODUCTION

The ocean plays an essential role in the progress, cultural and economic development of countries worldwide. Over recent decades, due to land shortages caused by rapid economic growth and urbanisation, all coastal cities and provinces in China have experienced extensive land reclamation, which spans the country's entire terrestrial coastline of 18,000 kilometres. The work in this book focuses on land reclamation being undertaken by the Chinese government in nine major bays, and examines how these areas have changed and the forces driving these transformations.

Land Reclamation

Land reclamation is the process of artificially creating new land from the sea, riverbeds or lake beds. It typically involves constructing cofferdams, enclosing coastal areas and dumping sand and gravel. The new land can be used for various purposes, including housing, agriculture, industry and infrastructure. Whilst land reclamation contributes to economic development, it has also brought substantial, and in some cases irreversible, negative impacts to the ecological environment of China's coastal areas. The most direct consequence is the permanent destruction of coastal wetlands, including tidal flats, salt marshes, mangroves and coral reefs – ecosystems of enormous ecological value. These areas serve as spawning, feeding and nursery grounds for numerous marine species such as mudskippers, shellfish, shrimp and fiddler crabs. They also constitute important stopover sites and feeding grounds for migratory birds during their journeys. Over the past half-century, more than 60% of China's coastal wetlands have been destroyed. According to a report released by the Paulson Institute in October 2015, China's temperate coastal wetlands have declined by 53%, mangroves by 73% and coral reefs by 80%. These wetlands have now been replaced by agricultural land such as fish ponds and salt fields (mainly distributed in northern China), or industrial and infrastructure zones including chemical plants, power stations, ports and cross-sea bridges (mainly distributed in southern China). For example, chapters 1 and 3 shows sea cucumber farms in Liaodong Bay and salt fields in Laizhou Bay, while chapters 5 and 8 shows the cross-sea bridge system in Hangzhou Bay and the construction of ports and highways in Lingdingyang Bay.

Land reclamation projects also disrupt the interdependent relationship between

land and sea. As shown in the images on pages 9, 21 and 31, curved natural coastlines have been transformed into artificial straight lines, leading to the reduction of bay and estuary areas. This in turn changes tidal patterns, exacerbates erosion in other coastal zones, and disrupts natural sediment flows. Subsequent chapters of this book examine in detail the specific transformation processes, driving forces and resulting consequences of land reclamation in the nine bays.

Aerial Photography and Power

Aerial photography's origins are rooted in the mechanics of control. Emerging from the balloon-mounted cameras of nineteenth-century colonial topographers and reconnaissance experiments of the First World War, the elevated gaze transformed landscapes into strategic datasets. This technological way of seeing abstracts territory into conquerable space, which privileges verticality and detachment in the service of imperialism, colonialism and capitalism. Within this framework, aerial photography is both a literal tool of power and an epistemological tool that dehumanises the terrain, erases the presence of indigenous people and constructs what Derek Gregory terms the 'God's eye view' - a perspective that is inherently aligned with domination and power.

This book employs aerial photography at oblique and vertical angles, combined with comparisons of satellite imagery from 2000 and 2025, to express the concept of political power in the control of landscape. Meanwhile, eye-level images documenting the lives of indigenous people alongside their testimonies are included to avoid dehumanising the landscape. However, even with the eye-level perspective, the inherent detachment of aerial photography is deliberately preserved: the camera consistently maintains a distance from local residents.

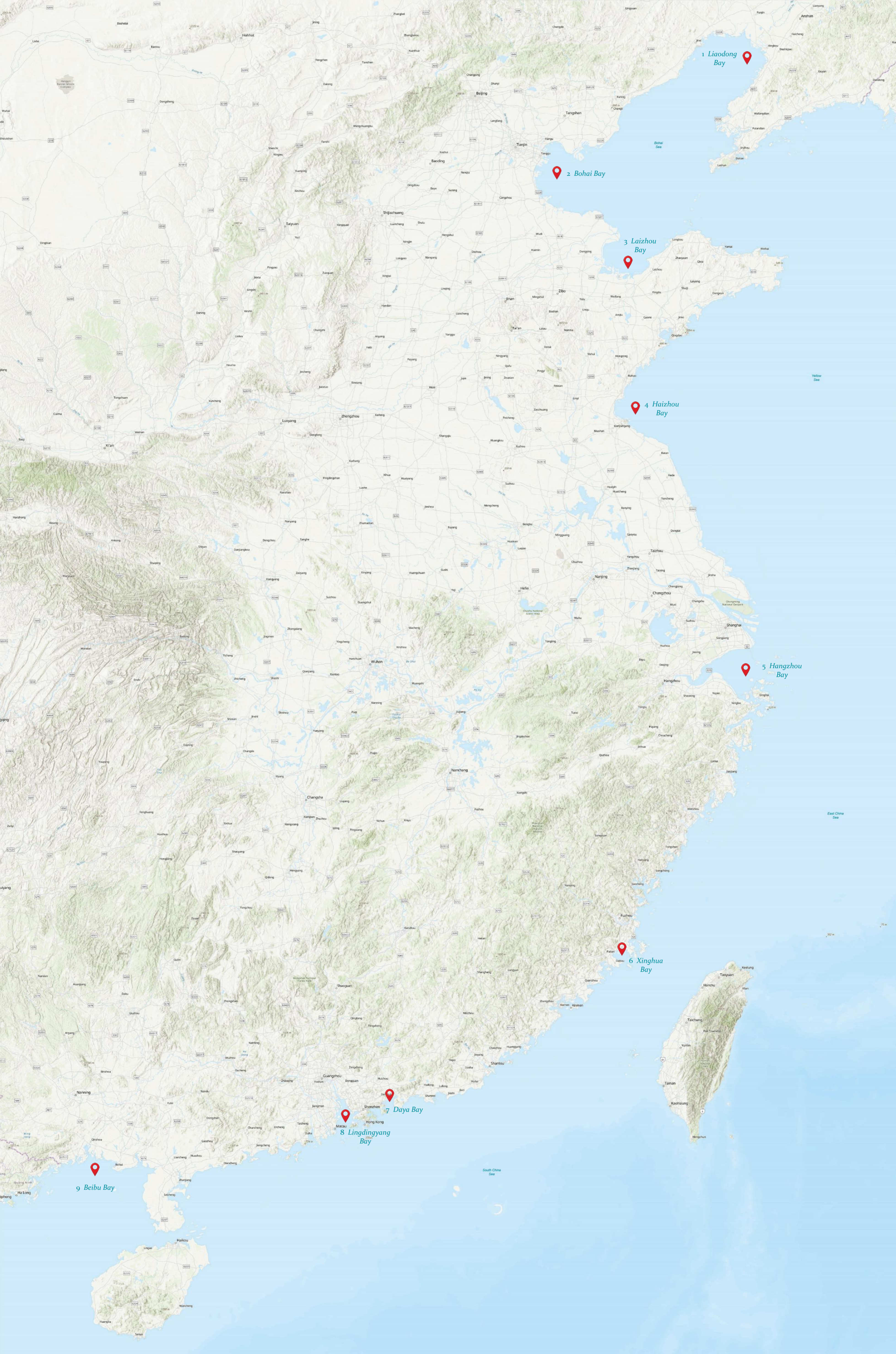
Through aerial and documentary photography, comparisons of satellite imagery, analysis of government documents and testimonies from local residents, *New Land: Constructed Territory* visualises the intervention into the control of landscape by man, and represents the scale of the subject matter and of China's ambition economically and politically.

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MAP OF CHINA'S COASTLINE



1 Liaodong Bay

2 Bohai Bay

3 Laizhou Bay

4 Haizhou Bay

5 Hangzhou Bay

6 Xinghua Bay

7 Daya Bay

8 Lingdingyang Bay

9 Beibu Bay

1 Liaodong Bay

Liaodong Bay is located in the northern part of the Bohai Sea in China, at 39°46.5' north latitude and 120°45.7' east longitude. It starts from the Daqing River estuary in Hebei Province in the west and ends at Dalian City on the western side of the Liaodong Peninsula in the east. It is one of the three major bays of the Bohai Sea and the northernmost bay in China. Liaodong Bay has a coastline of approximately 1,300 kilometres and a sea area of approximately 14,600 square kilometres, featuring a variety of shore types, including bedrock coasts, sandy coasts, and extensive mudflats. There are several major rivers flow into Liaodong Bay, the largest of which is the Liaohe River, followed by the Daling River and the Xiaoling River. These rivers bring rich sediment and nutrients which shapes a unique estuarine wetland ecosystem. This area boasts vast reed marshes and a rare 'red beach' formed by vast expanses of seepweed (*Suaeda glauca*). Liaodong Bay is renowned for its abundant marine resources, including sea cucumbers, scallops, abalone, tiger prawns, oysters and other seafood. It is also the only breeding ground for spotted seals in Chinese waters in the western Pacific.

The land reclamation activities in Liaodong Bay are not driven by a single reason, but have gradually emerged along with the development of the Bohai Rim Economic Belt. Its fundamental driving force is the huge demand for land resources, which are used to build ports and port-side industrial zones, such as large deep-water terminals, warehousing and logistics zones, petrochemical bases and equipment manufacturing parks; and aquaculture. For example, the development of Liaodong Bay New Area in Yingkou City (visible in the satellite image on page 11 as the triangular peninsula beyond the yellow line) involves extensive land reclamation works.

According to several research reports, between 2000 and 2015 alone, more than 3,000 square kilometres of land was reclaimed in the Bohai Rim region (including Liaodong Bay, Bohai Bay and Laizhou Bay). The *China Ocean Development Report* issued by the former State Oceanic Administration noted that the Bohai Sea is the region in China where land reclamation is most concentrated. Although it accounts for only 2.6% of China's jurisdictional maritime area, it represents over one-third of the country's total reclaimed land area.

The photographic works in this book on Liaodong Bay focus primarily on aquaculture industry. As evident from the satellite imagery on page 11, extensive coastal mudflats and wetlands at the estuaries of the Liaohe River and Daling River in Panjin City and Yingkou City have been converted into sea cucumber farms. Farmers can dig aquaculture ponds on coastal mudflats without any restrictions. This has resulted in the destruction of vital coastal wetlands, such as Panjin's reed beds and seepweed (*Suaeda glauca*), salt marshes and intertidal habitats, as well as the breeding ground of spotted seals. Aquaculture companies can build dams on coastal wetlands to form large aquaculture reservoirs, right next to the Liaodong Estuary National Nature Reserve. The water source of the reservoirs is natural seawater introduced through gates. The bottom of the reservoir is naturally muddy and sandy, and rich in benthic diatoms and other microorganisms, which provides a large amount of natural bait for sea cucumbers. Wastewater from the reservoirs is discharged directly into the sea. These reclamation projects cause the bay to be compressed and water flow to slow down, resulting in reduced capacity for pollutants to disperse. Combined with wastewater discharge, the pollution problem in the Bohai Sea becomes increasingly serious.

The Bohai Sea is a semi-enclosed inland sea with an average depth of only 18 metres, resulting in extremely poor water exchange capacity. Research indicates that it takes over 30 years for the entire body of water to undergo a complete exchange with the open sea. This inherent geographical constraint means that pollutants entering the sea are easily retained and accumulated, and are difficult to disperse or dilute. As previously discussed, large-scale land reclamation projects have severely damaged coastal wetlands. These wetlands act as natural 'water purifiers', which filter and purify pollutants from land. However, the loss of wetlands has effectively weakened the ocean's self-purification capacity, which further exacerbates the pollution problem.



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2 Bohai Bay

Bohai Bay is located in the western part of the Bohai Sea in China, at 38°35.6' north latitude and 118°12.6' east longitude. It starts from the Daqing River estuary in Hebei Province in the north and ends at the Yellow River estuary in Shandong Province in the south. It is one of the three major bays of the Bohai Sea. Bohai Bay has a coastline of approximately 1,400 kilometres and a sea area of approximately 15,900 square kilometres. The coastline is relatively straight and predominantly composed of muddy beaches with extensive tidal flats, which are formed by the Yellow River and Haihe River carrying large amounts of sediment into the sea.

Tianjin Port is located at the mouth of the Haihe River in Tianjin Municipality on the west coast of Bohai Bay. It has a long history. In 1860, the tenth year of the Xianfeng's reign of the Qing Dynasty, Tianjin Port was opened to foreign trade and became a treaty port. Construction of the Tianjin New Port at Tanggu began in 1952. Since the reform and opening-up, port development accelerated, and Tianjin New Port has become the gateway to the Beijing-Tianjin-Hebei region. Through extensive land reclamation, Tianjin Port has successfully constructed numerous wharves, berths, storage yards and logistics parks, and transformed itself from a regional port into one of the world's top ten ports. It now has 176 berths for containers, ore, steel, large equipment, bulk grain and international cruise ships. The main port area of Tianjin Port is not a natural harbor, but rather the world's most advanced artificial deep-water port constructed over nine years through land reclamation by sand dredging and channel excavation upon a silty shoal. The main channel has a water depth of -22 metres, which enables the free passage of 300,000-tonne giant ships.

The construction of Tianjin Port is one of the most important and core driving forces of land reclamation in Bohai Bay. It has catalysed a regional wave of reclamation projects. Centred on Tianjin Port and the Tianjin Binhai New Area, these reclamation activities have expanded northwards and southwards, encompassing Caofeidian and Huanghua Port in Hebei Province, as well as parts of coastal Shandong Province. This has formed a 'reclamation economic belt' in the western Bohai Sea. Since the 1950s, the total land reclamation area in Bohai Bay is estimated to exceed 2,500 square kilometres, though a more conservative estimate is likely to be over 1,500 square kilometres. The Dongjiang Port Area alone (the core zone of the Tianjin Free Trade Zone) accounts

for over 30 square kilometres of reclaimed land. The total area of land reclaimed at Tianjin Port (shown as a red dot on the satellite image on page 23), combined with the industrial and residential land supporting the Binhai New Area, is approximately 1,000 square kilometres. Where the Binhai New Area has reclaimed 330 square kilometres of land over the past 40 years, during which time its GDP surged from 11.2 billion yuan to 876 billion yuan. Caofeidian in Hebei Province (shown in the upper right corner of the satellite images on pages 22 and 23), originally a small offshore sand island, has been reclaimed to create over 200 square kilometres of land connected to the mainland. Its planned reclamation area could eventually reach over 1,000 square kilometres.

The total cost of land reclamation in Bohai Bay is astronomical and cannot be accurately calculated. If all infrastructure investments are taken into account, some experts estimate that the total investment may be on the scale of 'trillions or even tens of trillions of yuan'. The infrastructure investment for the first and second phases of Tianjin Port alone exceeded tens of billions of yuan. The investment in the 30 square kilometres of land reclamation in the Dongjiang Port Area is at the level of hundreds of billions of yuan. In 2009, the government invested 1.5 trillion yuan in the development of ten key areas within the Binhai New Area, including Nangang and Lingang of Tianjin Port.

The rapid reclamation and development of Tianjin Port, coupled with a long-term lack of safety awareness, a malfunctioning regulatory system, unclear political and business relationships, and irrational urban planning, led to a major industrial safety accident that caused significant casualties and property losses – the Explosion accident in Tianjin Binhai New Area on 12 August 2015. According to the State Council's investigation report, the total energy of the explosion was approximately 450 tons of TNT equivalent. This accident caused a total of 165 deaths, 8 missing persons and 798 injuries; 304 buildings, 12,428 commercial vehicles and 7,533 containers were damaged, with an estimated direct economic loss of 6.866 billion yuan. At the end of 2015, Tianjin's permanent population was 15.47 million. As of 2013, the number was 13.63 million, a decrease of nearly 2 million people compared to eight years earlier. Local residents believe this is the direct result of the explosion accident.



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3 Laizhou Bay

Laizhou Bay is located in the southern part of the Bohai Sea in China, at 37°25.6' north latitude and 119°29.6' east longitude. It starts from the Yellow River estuary in Shandong Province in the west and ends at the high corner of Qimu Island in Shandong Province in the east. It is one of the three major bays of the Bohai Sea and the largest bay in Shandong Province. Laizhou Bay has a coastline of approximately 320 kilometres and a sea area of approximately 6,060 square kilometres. Before the Yellow River moved north in 1855, Laizhou Bay and Bohai Bay were located on the same smooth coast. After 1855, the Yellow River Delta continued to silt up from the original bay top and the sea, split the unified bay into two independent bays – Bohai Bay and Laizhou Bay, making Laizhou Bay the youngest bay in China. Laizhou Bay is shallow and silty. The abundant nutrients brought by the Yellow River have made it a major fishing ground in China, particularly renowned for its shrimp. Its coastal areas also have significant reserves of oil and brine.

From 1980 to 1983, the Shandong Salt Industry Science Research Institute conducted an investigation and experimental research on the underground brine resources along the coast of Laizhou Bay. The findings indicate that the six counties along the Laizhou Bay coast – Kenli, Guangrao, Shouguang, Hanting (formerly known as Weifang), Changyi and Laizhou – contain the province's largest and most concentrated underground brine reserves. Within the 80-metre-deep soil layer, located along a flat coastal zone 120 kilometres long from east to west and 10-20 kilometres wide, covering an area of 1,500 square kilometres, the brine typically has a salinity of 9-16 degrees Baume (salinity of 100-176 grams per litre), with total reserves of approximately 7.4 billion cubic metres. The state has invested in the construction of two million-ton salt fields in Laizhou City and Hanting District, Weifang City.

Salt production has been taking place in Laizhou Bay since as early as the Spring and Autumn Period (770-476 BC). To create stable evaporation and crystallisation ponds, the ancients began constructing dams and enclosing land on the mudflats. This can be considered the earliest, small-scale land reclamation. With China's rapid economic development, the purposes for land reclamation have diversified. Salt fields are only one of the main drivers. Key driving forces include aquaculture, where the high economic returns of seafood like shrimp and shellfish lead to the reclamation of vast

tidal flats into aquaculture ponds, a trend particularly prevalent in the 1980s and 1990s; agricultural land for the cultivation of salt-tolerant crops like cotton and wheat; and industrial and port development. From the 1970s to the end of the 2010s, the total area of land reclaimed along the coast of Laizhou Bay exceeds 2,000 square kilometres.

The photographic works in this book on Laizhou Bay mainly focus on salt fields and the lives of their workers. As evident from the satellite imagery on page 32 and 33, there has been a significant shift of coastline towards the Bohai Sea. The reclaimed land are mainly used for building salt fields and aquaculture ponds, and is generally owned by large companies. These companies employ numerous local and out-of-town workers, and provide simple accommodations near the salt fields. Some companies have aunties who cook and wash clothes for the workers, while others provide lunch and dinner delivery. The workers, both men and women, range in age from 20 to 60 years old. Some have two generations working in the same salt fields, while others have three brothers working in the same field. Their daily wage is 80 yuan, though sometimes wages are delayed. While they find the salt fields work hard and tiring, they cherish the job opportunities afforded by land reclamation.

Instead of drawing water directly from the sea, workers dig 120-metre-deep wells to extract underground brine and then pump it into evaporation ponds. According to the workers, due to the high concentration of brine, the cycle from brine to salt crystallisation is greatly shortened, which usually takes three months. They can have three cycles per year. As the most serious environmental and geological consequence of large-scale extraction of underground brine, seawater begins to seep inland, and salinises freshwater resources and causes soil salinisation. This directly impacts agricultural production and residents' livelihoods.



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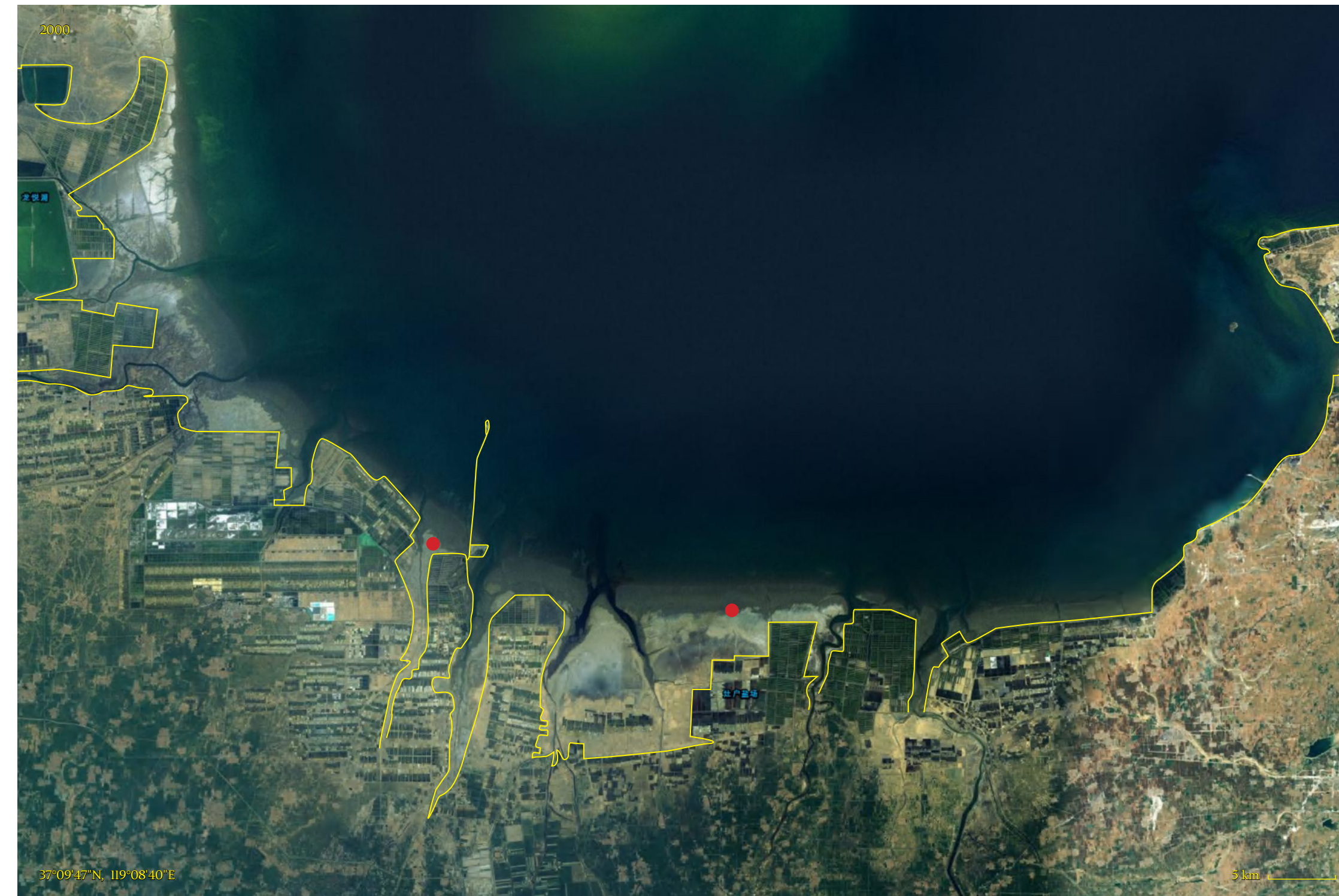
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4 Haizhou Bay

Haizhou Bay is located in the western part of the Yellow Sea in China, at 34°54.4' north latitude and 119°18.9' east longitude. It starts from the Foshouzui in Rizhao City, Shandong Province in the north and ends at Gaogong Island in Lianyungang City, Jiangsu Province in the south. It is a typical open bay. Haizhou Bay has a coastline of approximately 87 kilometres and a sea area of approximately 876 square kilometres. The coastline is primarily silt sand, followed by bedrock and sandy coasts. As one of China's eight major fishing grounds, Haizhou Bay Fishery is rich in commercial species such as yellow croaker, hairtail, swimming crab and prawns. Since 2008, the bay has been developing marine ranching, a form of aquaculture that involves creating and managing underwater farms in the open ocean to grow marine life. Through artificially increasing and releasing fish, and attracting natural fish populations, the fish populations in the waters can be managed like sheep on a grassland. Haizhou Bay is also an important coastal tourist destination in eastern China, with its unique scenery where mountains and sea complement each other.

The construction of ports and marine ranches is one of the starting points and core driving forces of land reclamation in Haizhou Bay. Since the 21st century, Lianyungang Port has undertaken large-scale reclamation projects to develop into a major port in eastern China. For example, the construction of its Qitai Port Area and Xuwei Port Area relies almost entirely on reclaimed land. The total area of land reclaimed in the bay (mainly Lianyungang City) is estimated to be between 250 and 300 square kilometres.

Lianyungang City is the largest and most economically developed city along the coast of Haizhou Bay. It is also an important coastal open city and port city in China. The Port of Lianyungang plays a pivotal role in China's Belt and Road Initiative. It serves as a logistics cooperation base with Kazakhstan, and a maritime gateway for member states of the Shanghai Cooperation Organisation. The local government does not view the port merely as a closed industrial zone, but has developed and integrated it as a tourism resource. Visitors can take cruises to see giant container ships, gantry cranes and automated terminal operations in the port. This unique harbour tourism economic development model has created a virtuous cycle where the port drives tourism and tourism develops the port. In 2024, Lianyungang City received a total of 55.86

million domestic and foreign tourists, a year-on-year increase of 12.6%, and the total tourism revenue was 71.5 billion yuan, a year-on-year increase of 8%. According to the *Lianyungang City Cultural Tourism Industry High-Quality Development Action Plan (2024-2026)*, the city aims to receive 80 million tourists by 2026, generate 100 billion yuan in total tourism revenue, and achieve an added value of 72 billion yuan in the cultural tourism industry, accounting for more than 12% of the city's GDP.

The aerial image on page 43 shows the Lian Island Scenic Area to the left of the port, and the Lianyun Ancient Town and Yuntai Mountain Scenic Area to the right. These tourist attractions were all developed and constructed by the local government. Standing on the viewing platform of Yuntai Mountain Scenic Area, visitors can overlook Lianyun Ancient Town, Lianyungang Port, Lian Island and the sea, which forms a magnificent picture of 'mountain, sea and port city'. Lian Island Scenic Area is one of the most successful examples of harbour tourism economy. A reclaimed 6.7-kilometre-long seawall, the longest in China, connects the city centre and Lian Island, and seamlessly integrates the port's functional areas with the tourist area. Visitors can enjoy various water activities on the beach while experiencing the port's industrial history. The island has approximately 3,500 permanent residents, 80% of whom are engaged in tourism-related industries. Local specialty products account for 30% of total tourism revenue, mainly including seaweed and shell handicrafts. Located on Yuntai Mountain next to the port, Lianyun Ancient Town is a living fossil of the port's development history. In the 1930s, with the construction of Lianyungang Port (then called Laoyao Port), a large number of engineers, workers and traders gathered and gradually formed this small town. To protect and use this precious historical heritage, the local government formulated a unified plan and renovated the town, including restoring the stone-paved roads, updating the water and electricity supply networks, improving fire protection facilities, and introducing business models suited to the town's characteristics, such as guesthouses, restaurants, and cultural and creative industries. This has provided numerous jobs for local residents, such as scenic area management, security guards, cleaners, tour guides, guesthouse owners, restaurant servers and specialty product sellers.



4 Haizhou Bay

Haizhou Bay is located in the western part of the Yellow Sea in China, at 34°54.4' north latitude and 119°18.9' east longitude. It starts from the Foshouzui in Rizhao City, Shandong Province in the north and ends at Gaogong Island in Lianyungang City, Jiangsu Province in the south. It is a typical open bay. Haizhou Bay has a coastline of approximately 87 kilometres and a sea area of approximately 876 square kilometres. The coastline is primarily silt sand, followed by bedrock and sandy coasts. As one of China's eight major fishing grounds, Haizhou Bay Fishery is rich in commercial species such as yellow croaker, hairtail, swimming crab and prawns. Since 2008, the bay has been developing marine ranching, a form of aquaculture that involves creating and managing underwater farms in the open ocean to grow marine life. Through artificially increasing and releasing fish, and attracting natural fish populations, the fish populations in the waters can be managed like sheep on a grassland. Haizhou Bay is also an important coastal tourist destination in eastern China, with its unique scenery where mountains and sea complement each other.

The construction of ports and marine ranches is one of the starting points and core driving forces of land reclamation in Haizhou Bay. Since the 21st century, Lianyungang Port has undertaken large-scale reclamation projects to develop into a major port in eastern China. For example, the construction of its Qitai Port Area and Xuwei Port Area relies almost entirely on reclaimed land. The total area of land reclaimed in the bay (mainly Lianyungang City) is estimated to be between 250 and 300 square kilometres.

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5 Hangzhou Bay

Hangzhou Bay is located in the western part of the East China Sea on the middle-eastern coast of China, at 30°27' north latitude and 121°08' east longitude. It borders Shanghai to the north, Ningbo City in Zhejiang Province to the south, the Ningbo-Shaoxing Plain to the west, and the Zhoushan Islands to the east. It is a funnel-shaped estuary formed by the Qiantang River flowing into the East China Sea. Hangzhou Bay has a coastline of approximately 258 kilometres and a sea area of approximately 5,000 square kilometres. Its seabed is flat, shallow, with high sediment content and abundant mudflat resources. These mudflats and intertidal zones serve as spawning, feeding and nursery grounds for numerous marine species, and crucial stopover points for millions of migratory birds along the East Asian-Australasian Flyway.

The total area of land reclamation in Hangzhou Bay reaches thousands of square kilometres, which has fundamentally changed its geographical outline and economic pattern. For example, the Nanhui New District in Shanghai covers a total area of 152 square kilometres, 60% of which is reclaimed land. Between 2003 and 2017, Jiaying City, located on the northern shore of the bay, added more than 200 square kilometres of new land through reclamation. Zhejiang Province alone has reclaimed over 1,000 square kilometres. This is a long-term process driven by historical survival needs for agricultural land, and gradually evolves into one dominated by modern economic and strategic demands. Although land reclamation in Hangzhou Bay was not initially undertaken for the Strategy for integrated development of the Yangtze River Delta (one of the highest-level national strategies), it has now become a key carrier for the implementation of the strategy. This strategy covers Shanghai Municipality, Jiangsu, Zhejiang and Anhui provinces. They accounts for approximately 2.2% of China's land area, supports about 16.7% of the national population, and generates nearly a quarter of the national economic output. It is one of the most economically vibrant, open and innovative regions in China. The core objective of this strategy is to break down administrative barriers and promote a closer 'community of shared future' among these three provinces and one municipality, to achieve coordinated planning, industrial collaboration, infrastructure connectivity, shared public services, and joint environmental governance.

The Zhoushan Cross-Sea Bridge system is a crucial and strategically significant component of the Yangtze River Delta integration, particularly in the integration of transportation infrastructure. The Zhoushan Archipelago, comprised of 1,390 islands, has long relied entirely on ferries for transportation to the mainland. This has severely restricted its economic development and resource flow, and placed it at the end of the transportation network. This situation changed with the successful completion of eight cross-sea bridges over 21 years: Cengang Bridge (793 metres, 2000), Xiangjiaomen Bridge (951 metres, 2004), Taoyaomen Bridge (888 metres, 2006), Xihoumen Bridge (5.3 kilometres, 2009), Jintang Bridge (21.02 kilometres, 2009), Yushan Bridge (8.2 kilometres, 2018), Fuchimen Bridge (2.01 kilometres, 2019), and Zhoudai Bridge (26.8 kilometres, 2021), with a total investment of approximately 26.8 billion yuan. This cross-sea bridge system directly connects Zhoushan Island and its main islands to the mainland highway network. It enables efficient cross-island allocation of port equipment, materials and personnel, and integrates previously scattered island port areas into a highly efficient super port cluster. Without this bridge system, the cargo throughput of Ningbo-Zhoushan Port would hardly have reached such an astonishing scale - ranking number one in the world for 16 consecutive years. These bridges also connect the Zhoushan Green Petrochemical Base located on Yushan Island in Zhoushan City. The base is the world's second largest green petrochemical base. It requires a large amount of raw materials and produces chemicals products, all of which need to be closely connected to the mainland's supply chain and markets through these bridges.

While the construction of cross-sea bridges brings enormous economic and social benefits, it also comes with drawbacks that cannot be ignored. The bridge piers are essentially obstacles in the ocean, which alter tidal currents and their speed, potentially causing erosion near the piers while accelerating siltation in other areas. This alters the natural shape of the coastline and leads to the degradation of tidal flats and wetlands. For marine life, the dense array of piers fragment their habitats, and affect the migration and exchange of migratory fish and benthic organisms. Exhaust fumes, particulate matter, oil spills, heavy metals, and other pollutants emitted by vehicles on the bridges are directly discharged into the sea with rainwater, which becomes a continuous source of pollution.



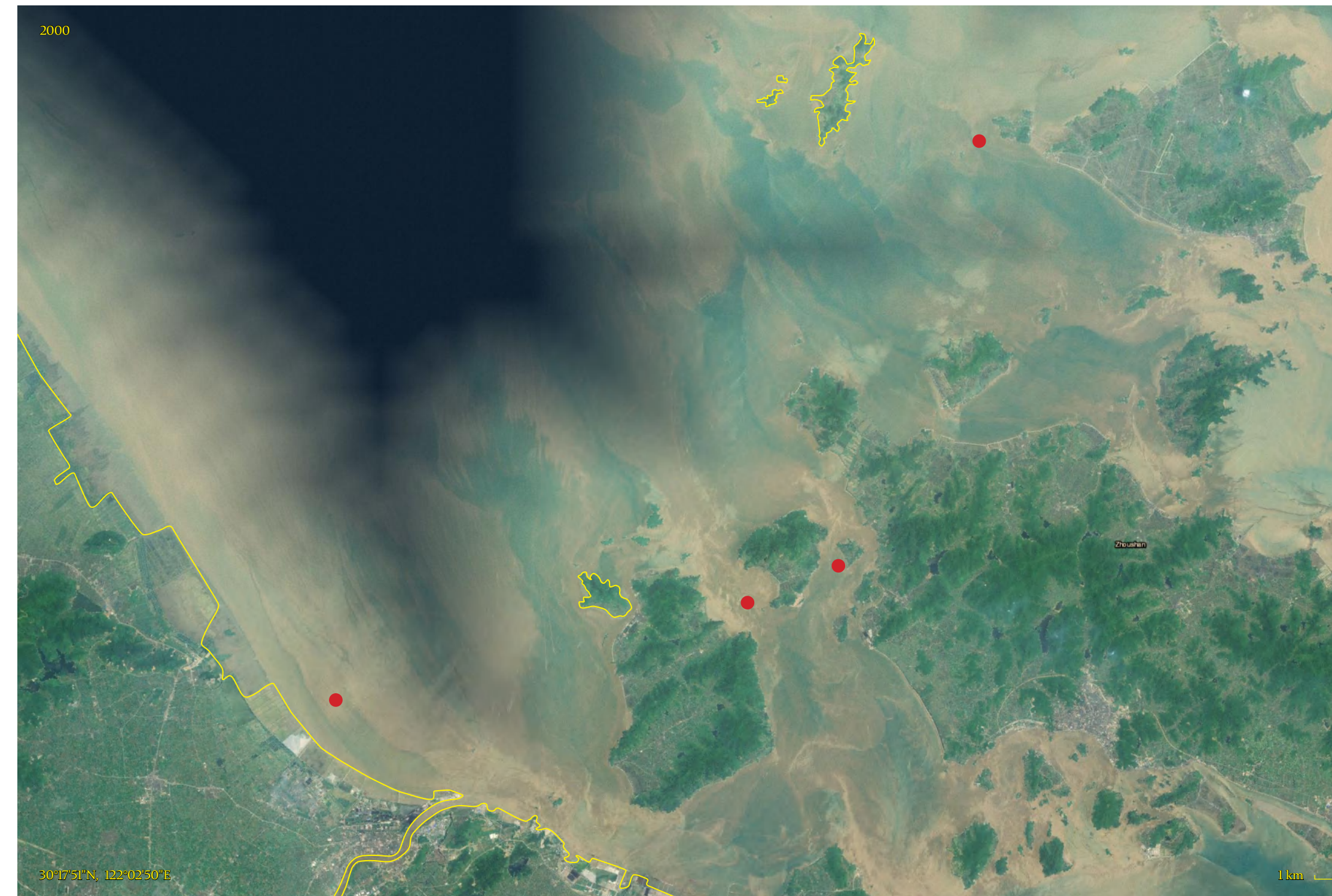
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6 Xinghua Bay

Xinghua Bay is located in the middle of the coast of Fujian Province, China, at 25°24.3' north latitude and 119°19.8' east longitude. It borders Fuzhou City to the north, Hanjiang District to the west, and Xiuyu District and Quangang District to the south. It is the largest bay in Fujian Province. Xinghua Bay has a coastline of approximately 223 kilometres and a sea area of approximately 619 square kilometres. It is a typical tectonic bedrock bay, surrounded by low mountains and hills and numerous islands. The bay has excellent water depth and good shelter conditions. After the launch of the Fujian Province Large Deepwater Port Protection and Development Plan in 2006, Xinghua Bay became one of the core areas of the West Coast Economic Zone of the Taiwan Strait. The Three Gorges Group built the world's first high-power offshore wind power test site and industrial park in the bay, which promotes the capacity of domestically produced wind turbines to 16 megawatts.

Due to large-scale land reclamation and port-related industrial development, the coastline of Xinghua Bay is in a state of constant modification. Many original natural coastlines have been transformed into artificial shorelines, such as port dams and breakwaters, and their length and shape have changed dramatically compared with decades ago (shown in the satellite images on pages 68 and 69). Its core driving force is the huge demand for land resources brought by rapid economic development, especially to serve the Jiangyin Deepwater Port and the strategic emerging industries behind it, such as port-based heavy chemical industry, energy industry and offshore wind power, etc. Since the early 2000s, more than 100 square kilometres of new land has likely been reclaimed to serve ports and industry, and this figure is still growing.

From the satellite image on page 69, the red dot on the right is Jiangyin Port City Economic Zone in Fuzhou City, where Jiangyin Deepwater Port is located. There were seven natural coastal towns built on the mountains until the land reclamation projects for the port and industries began. 'The coast once belonged to us was taken away by the government,' said Mr. Li from Shatang Village, 'They promised to give each person 20,000 yuan in demolition compensation, but in the end, each household only received 2,000 yuan.' Mr. Li was initially suspicious of the camera and kept questioning why an outsider would be interested in the demolition situation in his town. After repeated

assurances that he would not be filmed or recorded, he gradually relaxed and provided a considerable amount of information. To facilitate the port and industry construction, all natural villages in Jiangyin Port City Economic Zone will be demolished, and the government will provide housing for the locals who agree to relocate. 'What happens if someone does not want to relocate?' 'They will cut off your electricity and water supply.'

Mr. Li said that they could hear the construction noise every day, from morning to night, even at 10 p.m. 'Are they demolishing the village?' 'Yes, both demolition and reclamation. You should go and see.' However, according to the 2018 *Notice of the State Council on Strengthening the Protection of Coastal Wetlands and Strictly Controlling Sea Reclamation*, there should be no new land reclamation activities in Xinghua Bay. As the *Notice* indicates that except for major national strategic projects, the approval of new land reclamation projects will be completely stopped. The image on page 71 shows the ongoing land reclamation project. Mr. Li stated that this new land will be sold to either Wanhua Chemical or Three Gorges Group. Both companies fall under the category of 'major national strategic projects' as defined in the *Notice*, and therefore have received special approval and policy support from the state.



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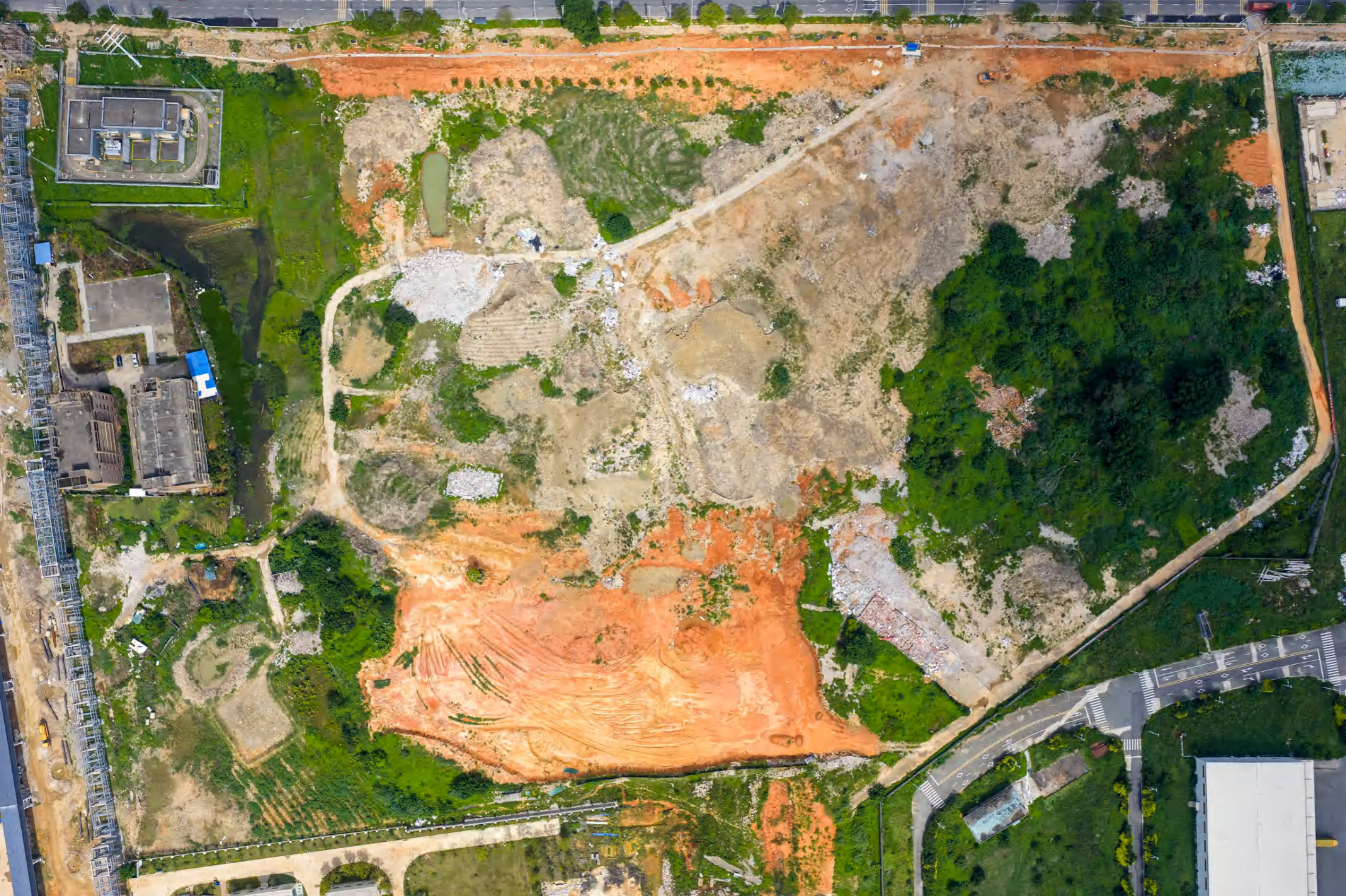
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7 Daya Bay

Daya Bay is located in the northern part of the South China Sea in China, at 22°40.1' north latitude and 114°39.2' east longitude. It borders Pingshan District of Shenzhen City in Guangdong Province to the west and Huiyang District of Huizhou City in Guangdong Province to the north. It is one of the finest bays along the coast of Guangdong Province. Daya Bay has a coastline of approximately 200 kilometres and a sea area of approximately 650 square kilometres. It is semi-enclosed, with a narrow entrance and a wide interior, surrounded by land on three sides and containing more than 100 islands. Its coastal topography is a mixture of bedrock, sandy and silty coasts, but bedrock coasts are the main feature. China's first large-scale commercial nuclear power plant is located here.

In January 2025, Daya Bay was selected as one of the third batch of outstanding examples of 'Beautiful Bays' in China. The Ministry of Ecology and Environment called it a typical case of coordinated development of petrochemical zones and ecological protection. The white paper *Marine Ecological Environment Protection in China*, released by the State Council Information Office in July 2024, calls for a comprehensive deployment of the construction of beautiful bays. Taking bays as the basic unit, and aiming to create beautiful bays characterised by 'clear waters, clean beaches, abundant fish and seagulls, and harmonious coexistence between humans and the sea.' The 'one bay, one policy' approach is adopted to coordinate and promote nearshore marine pollution prevention and control, ecological protection and restoration, and coastal environmental remediation, systematically improving the ecological environment quality of bays. The *Opinions on Comprehensively Promoting the Construction of a Beautiful China* incorporates beautiful bays into the overall construction of a beautiful China, explicitly requires that the completion rate of beautiful bays reach approximately 40% by 2027 and that beautiful bays be basically completed by 2035. The *14th Five-Year Plan for Marine Ecological Environment Protection* focuses on the main theme of beautiful bay construction, and divides nearshore waters into 283 bay construction units and implements key tasks, measures, and goals for each bay. Currently, the construction of beautiful bays is progressing steadily. By the end of 2023, nearly half of the 1,682 key tasks and engineering measures had been completed, with a cumulative restoration and remediation of 475 kilometres of coastline and 16,700 hectares of coastal wetlands. The proportion of excellent water quality in 167 bays exceeded 85%.

Land reclamation in Daya Bay is mainly to meet the land needs of infrastructure such as ports and roads, as well as industrial areas near ports including petrochemical zones and nuclear power plants. The main reclamation area in the bay is the petrochemical project area of the Economic and Technological Development Zone, covering approximately 20 square kilometres. These reclamation activities have directly destroyed inter-tidal ecosystems along the coast, such as mangroves, mudflats and coral communities, which are habitats and breeding grounds for many marine organisms. The 'Beautiful Bay' policy is supposed to be a reflection and correction of China's past extensive development model, with emphasis on protection, restoration and sustainable use. For example, the local government of Daya Bay has invested over 1.3 billion yuan in ecological protection and restoration: constructed 18 kilometres of ecological seawalls; created a 16.6-hectare coastal leisure belt, with a natural coastline retention rate of approximately 65.7%; established first national-level marine ranch demonstration zone, with 688 artificial reefs deployed and 100,000 corals planted to achieve underwater coral reef cultivation; and released more than 80 million fish, shrimp, shellfish, and other economically important species.

However, the beautifully constructed straight seawalls and coastal leisure belts have altered the original natural coastline. Uneaten feed and fish excrement from aquaculture release high concentrations of nutrients such as nitrogen and phosphorus into the surrounding waters. If marine ranches are located in bays with poor water exchange, such as Daya Bay, pollutants cannot be quickly diluted and dispersed, which leads to high concentrations in local sea areas. This 'still water' environment is a breeding ground for red tides, as shown in the images on pages 79 and 83. Not to mention the sewage discharged from the high-density residential areas along Daya Bay. Due to the extreme market downturn, local residents can only rent out their sea-view apartments for 600 yuan per month, and they largely rely on summer tourists to recoup some of their losses. They complain that the real estate development here has been a complete failure, as the 100-metre-high buildings are being eroded by the sea winds, making the houses increasingly worthless. Local real estate agents say that more than 18 residential projects remain unfinished.



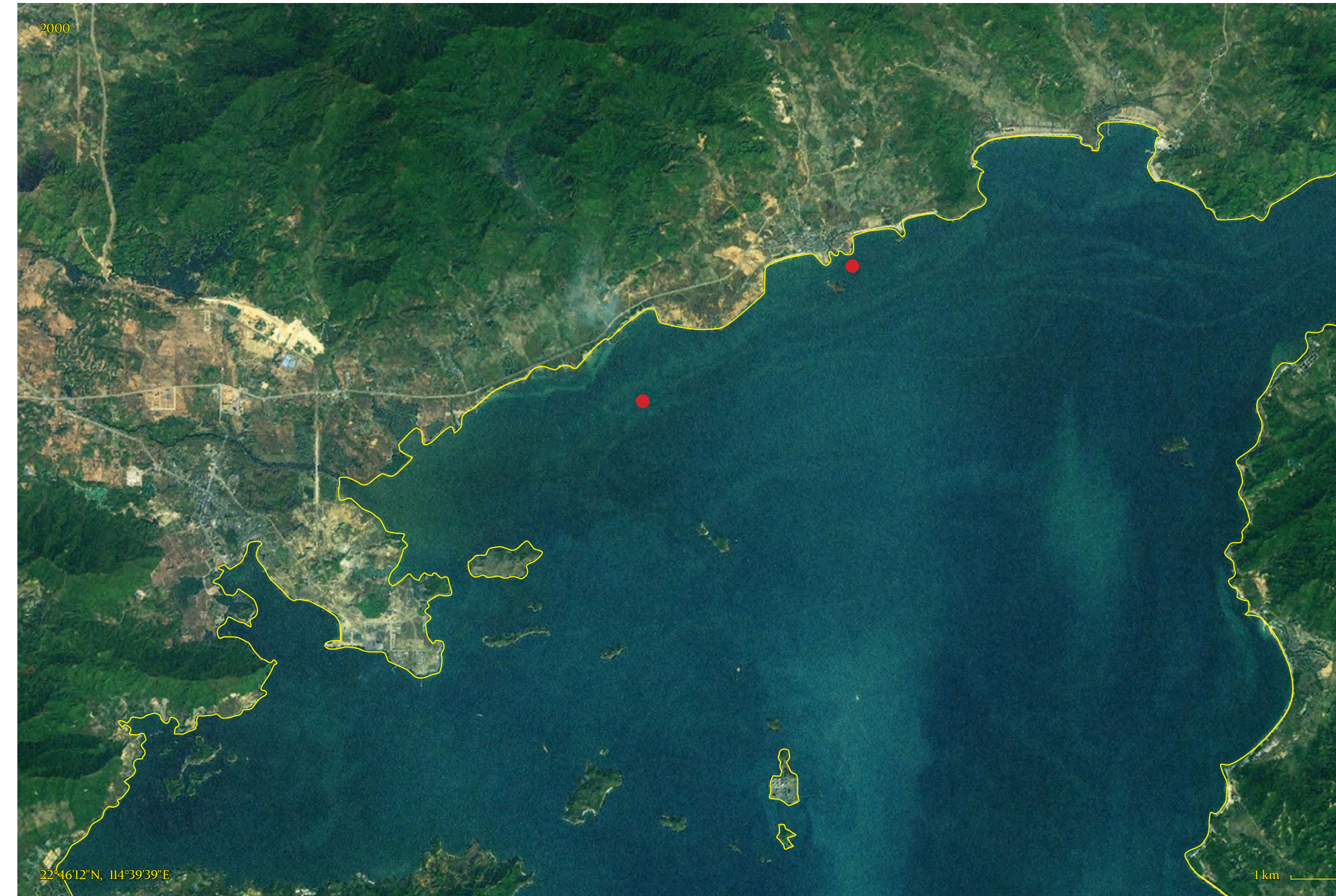
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8 Lingdingyang Bay

Lingdingyang Bay is located in the centre of the Pearl River Delta in Guangdong Province, China, at 22°46.0' north latitude and 113°03.0' east longitude. It starts from Humen in Guangdong Province in the north and ends in the waters near the Hong Kong and Macao Special Administrative Regions in the south. It is an estuary bay of the Pearl River mainstream. Lingdingyang Bay has a coastline of approximately 330 kilometres and a sea area of approximately 2,100 square kilometres. Its underwater landscape primarily consists of the Lingding Channel, mudflats and islands. These areas have extensive mangroves and wetlands which provides a vital habitat for migratory birds and marine life. It is also a breeding ground for Chinese white dolphins.

Lingdingyang Bay is the central area of the Guangdong-Hong Kong-Macao Greater Bay Area, which includes the Hong Kong Special Administrative Region, the Macao Special Administrative Region and the cities of Guangzhou, Shenzhen, Zhuhai, Foshan, Huizhou, Dongguan, Zhongshan, Jiangmen and Zhaoqing in Guangdong Province, with a total area of 56,000 square kilometres. In 2024, the permanent population of the Greater Bay Area exceeded 87 million, and the total economic output increased from 10.8 trillion yuan in 2018 to 14.79 trillion yuan (about \$2.1 trillion) in 2024. Its total GDP exceeds that of more than 90% of the countries in the world, and is comparable to the GDP of countries such as Canada, Russia and South Korea. With less than 0.6% of the country's land area, it has created one-ninth of the country's total economic output. The *Outline Development Plan for the Guangdong-Hong Kong-Macao Greater Bay Area*, released in 2019, clearly stated that the region should be developed into a vibrant world-class urban cluster, an international science and technology innovation centre with global influence, an important support for the construction of the Belt and Road Initiative, and a demonstration zone for in-depth cooperation between the mainland and Hong Kong and Macao.

The Lingdingyang bay forms a natural barrier between the east and west coasts of Guangdong Province. To improve this inconvenient transportation pattern, the government has constructed three super-large cross-river passages in the upper, middle and lower reaches of the bay: the Humen Bridge, the Shenzhen-Zhongshan Link and the Hong Kong-Zhuhai-Macao Bridge. These bridges, combined with coastal highways, have broken the pattern of land traffic on both sides had to go north around

the top of the inner bay. The artificial islands and landing points of these bridge were created through land reclamation. The port cluster in the Greater Bay Area, including the ports of Shenzhen, Guangzhou and Hong Kong; the airport cluster, including the three major international aviation hubs of Hong Kong, Guangzhou and Shenzhen, also has significant amounts of reclaimed land. As shown in the satellite image on page 91, land reclamation in Lingdingyang Bay is not only a means of building the Greater Bay Area, but also the premise and foundation for its formation and development. Since the 1980s, more than 700 square kilometres of new land has been reclaimed from the bay, with some studies suggest the area is approaching 1,000 square kilometres. This means that more than one-third of the water area has been converted into land.

The Hong Kong-Zhuhai-Macao Bridge, a massive cross-sea passage connecting Hong Kong, Zhuhai, and Macao, is the world's longest cross-sea bridge with a total length of 55 kilometres. It consists of three navigation bridges, an undersea tunnel and four artificial islands. The total investment in the project is 126.9 billion yuan. The construction began in December 2009 and took nine years to complete. By October 2025, the number of passengers traveling between Guangdong, Hong Kong and Macao via the Zhuhai Port of the bridge has exceeded 93.34 million, and the cumulative number of vehicles has exceeded 19.42 million.

During the construction period, at least 20 people died and more than 600 were injured, some of whom were seriously injured. The casualties were mainly due to the high-risk offshore construction environment and multiple industrial accidents.

A study by the Hong Kong Dolphin Conservation Society shows that the population of the Chinese white dolphin declined by 40% between 2012 and 2017, from 80 to 33. The reclamation of artificial island has also had a severe impact on dolphins, with no sightings of them in northeastern Lantau Island for three years. According to the report *Long-term Monitoring of the Population Dynamics of Chinese White Dolphins in the Lingdingyang of the Pearl River Estuary*, after the construction of the Hong Kong-Zhuhai-Macao Bridge, the number of Chinese white dolphins dropped from 1,200 to 900, a 20% decrease. In the southern waters of the Lingdingyang, which overlap with the bridge, only 301 white dolphins were recorded in 2017-2018, a decrease of approximately 30% and 33% compared to 431 in 2015-2016 and 450 in 2005-2006, respectively.



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9 *Beibu Bay*

Beibu Bay is located in the northwestern part of the South China Sea in China, at 19°52.8' north latitude and 107°49.0' east longitude. It extends from the Leizhou Peninsula and the Qiongzhou Strait in the east, to Hainan Island in the southeast, to the Guangxi Zhuang Autonomous Region in the north, and to Vietnam in the west. It is a semi-enclosed bay, with its coastline jointly owned by China and Vietnam. Beibu Bay has a coastline of approximately 1,500 kilometres and a sea area of approximately 128,000 square kilometres. It has a generally good ecological environment, but also faces challenges such as nearshore pollution, mangrove degradation and biodiversity conservation.

The mangrove forests of Beibu Bay have historically been very abundant, mainly distributed on the mudflats of Beihai City, Qinzhou City, and Fangchenggang City of Guangxi Zhuang Autonomous Region. For a long time, these mangroves have formed a natural green wall along the coast. They effectively resist the erosion of seawalls and land by typhoons and storm surges, and protect the farmland, villages and aquaculture ponds behind them. Their intricate root systems provide excellent spawning, feeding and nursery grounds for fish, shrimp, crabs and shellfish. Many migratory birds also inhabit and forage here, resulting in extremely high biodiversity. In the era of traditional agriculture and fishing, local residents coexisted harmoniously with the mangroves. They obtained firewood and catching seafood from the forests, but on a limited scale, with a relatively small impact on the ecosystem.

The large-scale destruction of mangroves in Beibu Bay mainly occurred from the 1950s to the late 1990s, especially after the 1980s when the pace of destruction accelerated with rapid economic development. In the 1960s and 70s, guided by the policy of 'taking grain as the key link', a large-scale land reclamation campaign was launched, which transformed mangrove mudflats into paddy fields or salt pans. However, much of the newly reclaimed land became severely salinised and thus unsuitable for grain cultivation, which caused both ecological and economic losses. After the 1980s, with the development of the market economy, the demand for aquatic products such as shrimp boomed and brought extremely high economic benefits. Pond aquaculture became the main culprit in the destruction of mangroves. People cut down mangroves and dug aquaculture ponds, which was seen at the time as a

quick path to wealth. Through land reclamation, vast areas of mangroves were directly filled in and converted into land. According to historical data and satellite imagery, the mangrove area in Qinzhou City once decreased by more than 50%. Even without complete reclamation, large-scale coastal engineering projects, such as roads and dikes, fragment large areas of mangroves into isolated patches, which disrupt their ecological connectivity and affected species migration and exchange. Since the beginning of the 21st century, especially with the establishment of the China-ASEAN Free Trade Area and the Belt and Road Initiative, reclamation activities in the Beibu Bay have entered a new stage dominated by industrialisation and urbanisation. Based on various reports and satellite imagery analysis, the area of land reclaimed in Beihai City, Qinzhou City, and Fangchenggang City in Guangxi Province alone likely exceeds 300 square kilometres, primarily concentrated in the industrial port areas of Qinzhou City and Fangchenggang City.



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CAPTIONS

6 A removable map of China's coastline is inserted in the pocket.

8 ***Liaodong Bay***

9 Oblique view of the reclaimed road and farms, with seepweed (*Suaeda glauca*) by the roadside. Yingkou City, Liaoning Province, China, July 2025.

10 Satellite imagery of Liaodong Bay in 2000, with its coastline marked by yellow lines. Red dots show where the photos were taken.

11 Satellite imagery of Liaodong Bay in 2025, with yellow lines indicating the coastline as of 2000. Red dots show where the photos were taken.

12 Oblique view of sea cucumber farms.

13 Oblique view of the living quarters for caretakers at the sea cucumber farms.

14 Exterior of semicircular rammed-earth sheds with sea cucumber ponds inside.

15 Interior of the sheds with sea cucumber ponds.

16 Local residents are picking razor clams. A large area of seepweed (*Suaeda glauca*) and an artificial sea cucumber farm are in the background. Panjin City, Liaoning Province, China, July 2025.

17 Local residents returned from fishing. Their simple boats can only operate near the river mouth.

18 Close-up of seepweed (*Suaeda glauca*).

19 Vertical view of the giant 'tidal tree' pattern of seepweed (*Suaeda glauca*).

20 ***Bohai Bay***

21 Oblique view of Tianjin Port after reclamation. Land leveling work is in progress. Tianjin Municipality, China, July 2025.

22 Satellite imagery of Bohai Bay in 2000, with its coastline marked by yellow lines. Red dots show where the photos were taken.

23 Satellite imagery of Bohai Bay in 2025, with yellow lines indicating the coastline as of 2000. Red dots show where the photos were taken.

24 Mid-shot of Pier 12 at Tianjin Port.

25 Surveillance cameras at Tianjin Port.

26 Bomesc Offshore Engineering. Unused reclaimed land in the distant background.

27 Highway entrance to Tianjin Port. Next to it is unused, empty reclaimed land.

28 Tianjin Port Yuanhang International Ore Terminal Co., Ltd.

29 Vertical view of grab bridge cranes in operation.

30 ***Laizhou Bay***

31 Oblique view of salt fields. Left is grassland yet to be transformed into salt fields. Weifang City, Shandong Province, China, July 2025.

32 Satellite imagery of Laizhou Bay in 2000, with its coastline marked by yellow lines. Red dots show where the photos were taken.

33 Satellite imagery of Laizhou Bay in 2025, with yellow lines indicating the coastline as of 2000. Red dots show where the photos were taken.

34 Vertical view of salt fields covered with anti-seepage geomembranes.

35 Aerial view of workers rolling up the anti-seepage geomembrane.

36 A group of workers are rolling up the anti-seepage geomembrane.

37 Close-up of precipitated salt crystals.

38 Houses for the salt fields' workers.

39 Female workers in the salt fields after work. They try to run away from the camera.

40 Interior of the house for the salt fields' workers.

41 An elderly worker is washing salt off his hair.

42 ***Haizhou Bay***

43 Oblique view of the reclaimed Lianyungang Port, with Lian Island Scenic Area on the left and Lianyun Ancient Town on the right. Lianyungang City, Jiangsu Province, China, July 2025.

44 Satellite imagery of Haizhou Bay in 2000, with its coastline marked by yellow lines. Red dots show where the photos were taken.

45 Satellite imagery of Haizhou Bay in 2025, with yellow lines indicating the coastline as of 2000. Red dots show where the photos were taken.

46 Vertical view of the beach at Haizhouwan National Ocean Park.

47 Tourists on the beach at Lian Island Scenic Area.

48 Boarding point for sailing tours to Lianyungang Port.

49 Tourists on the beach.

50 Sanitation workers of Lianyun Ancient Town.

51 Waitresses are setting the table.

52 Tourists in Lianyun Ancient Town.

53 Vertical view of Lianyun Ancient Town, with a local school in the left corner.

54 ***Hangzhou Bay***

55 Oblique view of the reclaimed Zhenhai Petrochemical Base and the Jintang Bridge leading to Zhoushan City. Ningbo City, Zhejiang Province, China, August 2025.

56 Satellite imagery of Hangzhou Bay in 2000, with its coastline marked by yellow lines. Red dots show where the photos were taken.

57 Satellite imagery of Hangzhou Bay in 2025, with yellow lines indicating the coastline as of 2000. Red dots show where the photos were taken.

58 Binhai Interchange of Yongzhou Expressway is located on a natural mudflat.

59 Vertical view of a natural mudflat.

60 Vertical view of Jintang Bridge over a natural mudflat.

61 Xihoumen Bridge, Zhoushan City, Zhejiang Province, China, August 2025.

62-63 Panorama of the bridge system: Taoyaomen Bridge is in the front left, with Fuchi Island as a connecting islet, Xiangjiaomen Bridge in the front right, and Fuchimen Bridge in the rear right which connects to Zhoudai Bridge in the rear left.

64 Yushan Bridge and the Zhoushan Green Petrochemical Base on Yushan Island.

65 Display reads: Welcome to Yushand Island. Vehicle registration number ‘Shanghai xxxxxx’ is prohibited from entering.

66 ***Xinghua Bay***

67 Oblique view of a coastal village and ongoing demolition works. In the background is the Guoneng (Fuzhou) Thermal Power Co., Ltd. Fuzhou City, Fujian Province, China, August 2025.

68 Satellite imagery of Xinghua Bay in 2000, with its coastline marked by yellow lines. Red dots show where the photos were taken.

69 Satellite imagery of Xinghua Bay in 2025, with yellow lines indicating the coastline as of 2000. Red dots show where the photos were taken.

70 Demolition work is in progress.

71 Land reclamation is in progress.

72 A coastal village on the left and the reclaimed Hanjiang Coastal New Town on the right corner. A road is currently under construction over a natural mudflat. Putian City, Fujian Province, China, August 2025.

73 A coastal village in the mountains.

74 Close-up of a five-storey, three-bay house with a private courtyard.

75 Local residents are burning daily garbage.

76 Huihetang Traditional Chinese Medicine Rehabilitation and Physiotherapy.

77 Nightlife of local residents on the commercial street.

78 ***Daya Bay***

79 Oblique view of the reclaimed Huizhou Daya Bay Petrochemical Zone. Huizhou City, Guangdong Province, China, August 2025.

80 Satellite imagery of Daya Bay in 2000, with its coastline marked by yellow lines. Red dots show where the photos were taken.

81 Satellite imagery of Daya Bay in 2025, with yellow lines indicating the coastline as of 2000. Red dots show where the photos were taken.

82 Country Garden Ten-Mile Silver Beach real estate development project.

83 Daya Bay Golden Coast Tourist Area, with red tide algae blooms under the sea surface.

84 46-storey unfinished commercial housing in Daya Bay Golden Coast Tourist Area.

85 Tourists on the beach where sand mingles with algae.

86 Huizhou Tinghaizhijia Sea-view Holiday Apartment in Haiyue Long Beach Garden.

87 Vertical view of Haiyue Long Beach Garden from the window.

88 ***Lingdingyang Bay***

89 Oblique view of the reclaimed Pearl River Estuary and the Shenzhen–Zhongshan Link. Zhongshan City, Guangdong Province, China, August 2025.

90 Satellite imagery of Lingdingyang Bay in 2000, with its coastline marked by yellow lines. Red dots show where the photos were taken.

91 Satellite imagery of Lingdingyang Bay in 2025, with yellow lines indicating the coastline as of 2000. Red dots show where the photos were taken.

92 Guangdong-Hong Kong-Macao Greater Bay Area Cultural and Sports Centre. Guangzhou City, Guangdong Province, China, August 2025.

93 Guangzhou Port Nansha Container Terminal Phase III, with unused land on the right.

94 Vertical view of Guangzhou Port Nansha Container Terminal Phase III.

95 The third phase of the Nansha Container Terminal at Guangzhou Port is currently under construction.

96 Oblique view of the reclaimed Zhuhai Highway Port of the Hong Kong-Zhuhai-Macao Bridge. Zhuhai City, Guangdong Province, China, August 2025.

97 Hong Kong-Zhuhai-Macao Bridge. When we see the bridge, the structure underneath it goes as deep into the sea as the reflection of the bridge.

98 Sightseeing tour called 'Viewing the Hong Kong-Zhuhai-Macao Bridge from the Sea'.

99 Model of the main project traffic engineering system of the Hong Kong-Zhuhai-Macao Bridge.

100 ***Beibu Bay***

101 Oblique view of the reclaimed Qinzhou Petrochemical Industrial Park and the Longmen Bridge leading to Fangchenggang City. Qinzhou City, Guangxi Zhuang Autonomous Region, China, August 2025.

102 Satellite imagery of Beibu Bay in 2000, with its coastline marked by yellow lines. Red dots show where the photos were taken.

103 Satellite imagery of Beibu Bay in 2025, with yellow lines indicating the coastline as of 2000. Red dots show where the photos were taken.

104 Vertical view of mangroves intertwined with marine debris, such as white foam and the remains of abandoned rafts.

105 Sparse mangroves.

106 Local residents take tourists into the mangroves, where they use shovels to dig for mudskippers and fiddler crabs. In the upper right corner, locals are picking mangrove fruits. Beihai City, Guangxi Zhuang Autonomous Region, China, August 2025.

107 Local residents return from collecting conchs (Silver-mouthed monodont) from mangroves and mudflats.

108 Local fishmongers are buying the catch from a sea angler. Qinzhou City, Guangxi Zhuang Autonomous Region, China, August 2025.

109 A sea angler's catch of the day.

110 The owner of a raft.

111 A raft made of timber, foam and plastic barrels. It has a wooden hut on top and several ponds for raising sea fish. It also provides mooring space for sea anglers' boats.

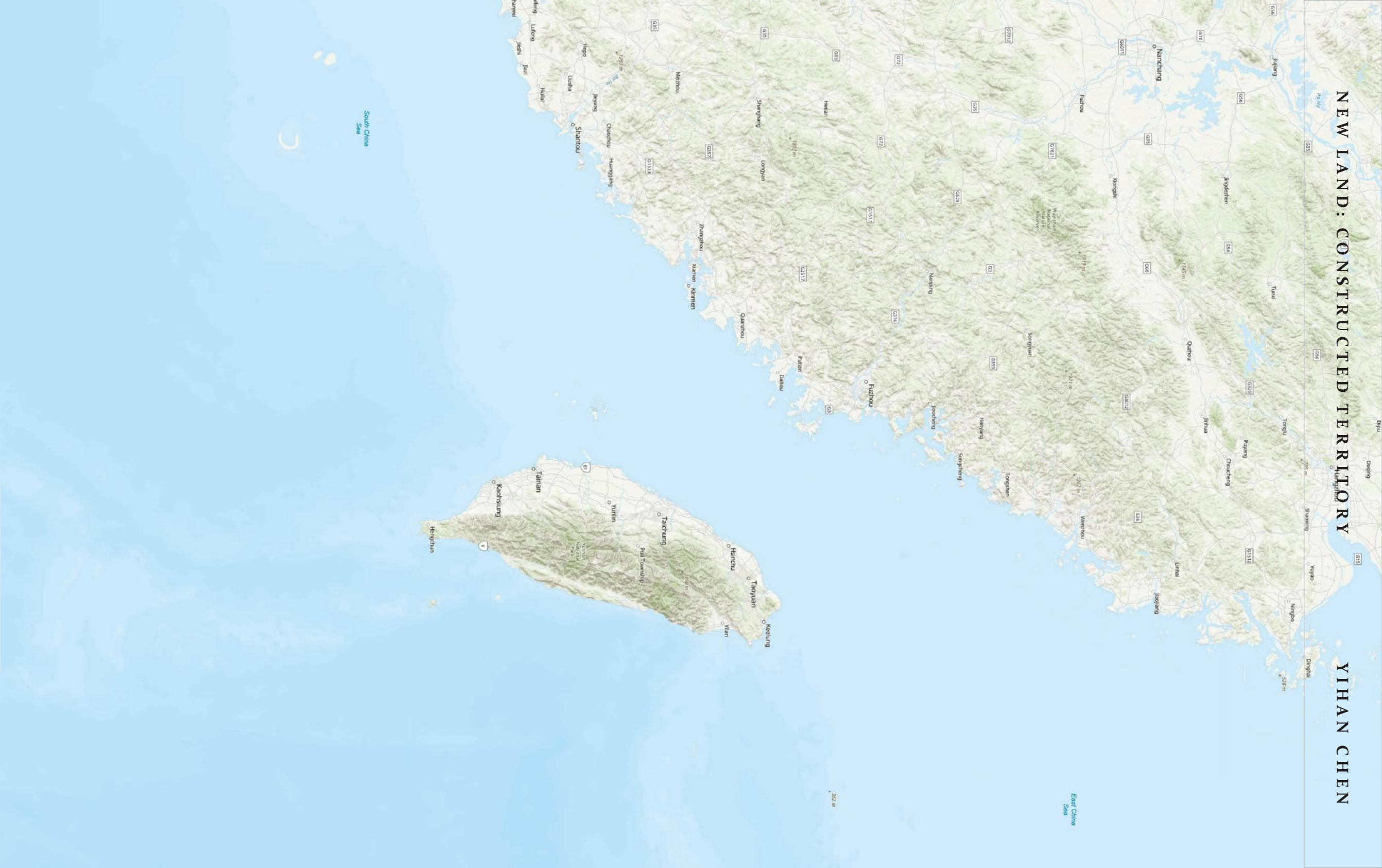
112 Waste materials generated during raft construction are dumped on the coast and may end up in mangroves, as shown on page 104.

113 Aerial view of hundreds of wooden rafts alongside a reclaimed road.

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South China Sea

East China Sea