Shanghai Ecological and Environmental Bulletin

2022

Shanghai Municipal Bureau of Ecology and Environment

Recycle

According to the provision that “the authorities of environmental protection of the people’s government at provincial level or above should issue the environmental bulletin regularly”, which is stipulated in Article 54 of the Environmental Protection Law of the People’s Republic of China, and the provision that “the Municipal Environmental Protection Department should issue a local annual environmental bulletin every year”, which is provided for in Article 67 of the Shanghai Environmental Protection Regulations, 2022 Shanghai Environmental Bulletin is hereby issued.

YANABO

General Director

Shanghai Municipal Bureau of Ecology and Environment

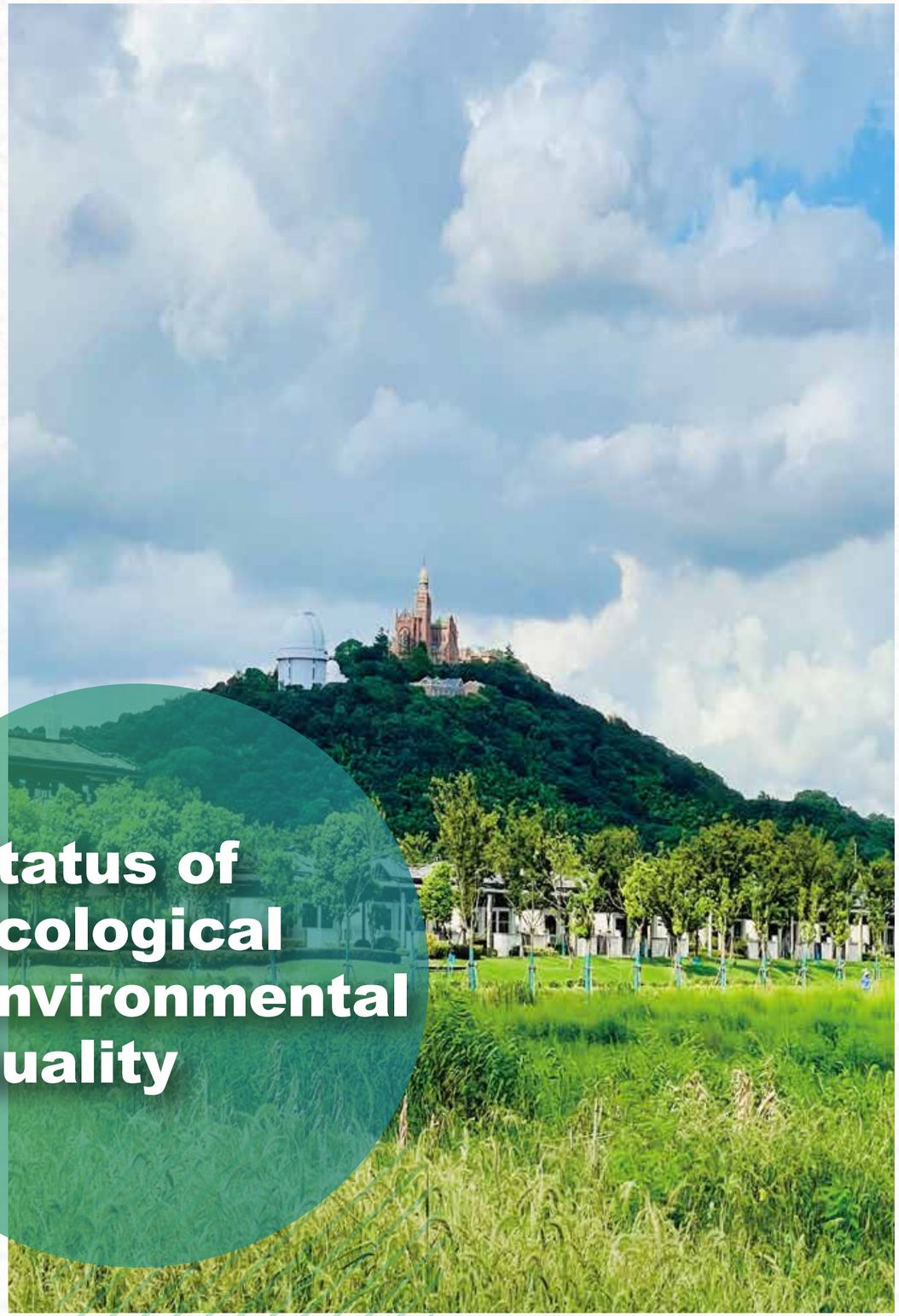
June 2023

Contents

Overview

In 2022, Shanghai adhered to the guidance of Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era, fully implemented the spirit of the 20th National Congress of the Communist Party of China and the spirit of the guiding principles of Xi's speech during his inspection visit to Shanghai, thoroughly implemented Xi Jinping Thought on Eco-civilization, and coordinated epidemic prevention and control, economic and social development and ecological environment protection. Shanghai actively explored the deep integration and practice of the important concepts of "lucid waters and lush mountains are invaluable assets" and people's cities, strengthened the construction of ecological civilization, accelerated the promotion of green and low-carbon development, laid a solid foundation for pollution prevention and control, paid close attention to the rectification of outstanding ecological environment problems, and upgraded the modernization level of ecological environment governance. Shanghai was rated by the CPC Central Committee as excellent in the assessment of pollution prevention and control outcomes in various provinces and cities.

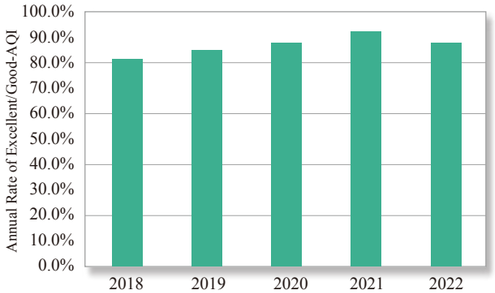
In 2022, the average annual concentration of fine particulate matter ($PM_{2.5}$) was 25 μg/m^3, a record low since the monitoring began; 95.6% of the water quality of the main rivers and lakes in the city fell into Category **III**, with no cross-sections monitors falling into or inferior to the Category **V** standard; the quality of all sources of centralized drinking water in use was all in full compliance with the national standards; the overall quality of the ground water in Shanghai remained stable; the overall quality of the marine environment remained stable with signs of improvement; the overall quality of the soil environment was stable; the quality of the acoustic environment improved; the ambient radiation was kept within normal range; the quality of the ecological environment was good.



Status of Ecological Environmental Quality

01 Quality of the Ambient Air

According to the Ambient Air Quality Standards (GB 3095-2012), in 2022[1], there were 318 days when the air quality index (AQI) varied in the range between excellent and good, 17 days less than 2021. The annual rate of excellent/good-AQI days was 87.1%, 4.7 percentage points lower than 2021. Throughout the year, there were 129 days when the AQI was excellent, 189 days when the AQI was good, 47 days when the AQI denoted light pollution, and 0 days when the AQI denoted moderate or heavy pollution. Among the 47 days when air was polluted, there were 41 days, 87.2% of the total 47 days, when ozone (O_3) was the primary pollutant; and 6 days, 12.8% of the total 47 days, when the primary pollutant was fine particulate matter ($PM_{2.5}$).

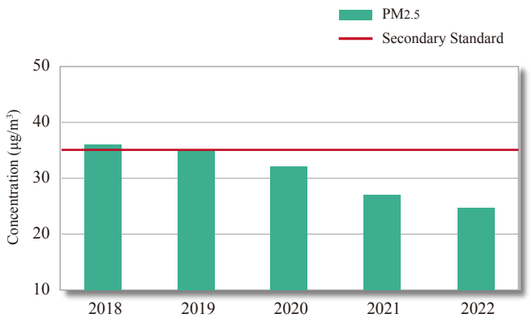


Variation of the annual rate of excellent/ good-AQI days in Shanghai from 2018 to 2022

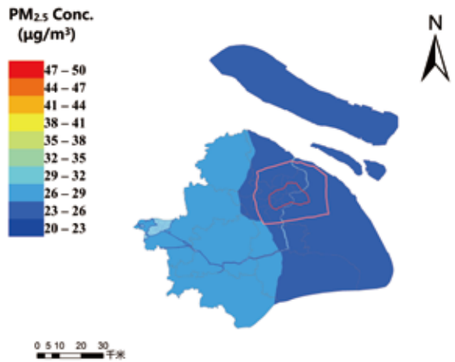
Primary Indicators Monitored

Fine Particulate Matter ($PM_{2.5}$)

The average annual concentration of $PM_{2.5}$ in Shanghai was 25 μg/m³, 7.4% lower than 2021, meeting the Category II standard of the National Ambient Air Quality Standards (NAAQS). The data monitored over the past five years show the average annual $PM_{2.5}$ concentration in Shanghai kept declining.



Variation of the average annual concentration of $PM_{2.5}$ in Shanghai from 2018 to 2022

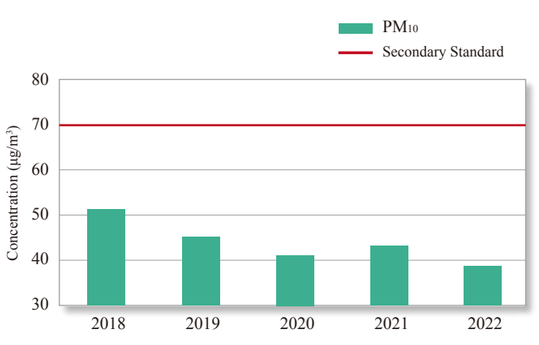


Spatial distribution of the concentration of $PM_{2.5}$ in different districts of Shanghai in 2022

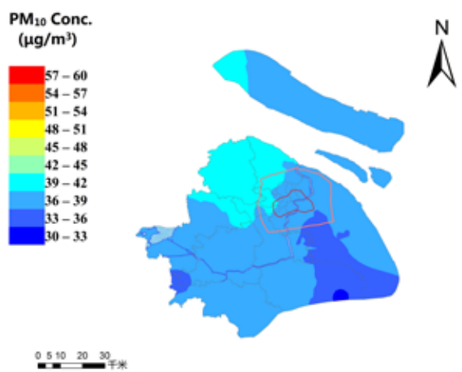
[1]Since 2021, the number of automatic state-controlled air quality monitoring sites of ambient air quality has been adjusted to 19, so the ambient air quality index (AQI) and statistics of the six primary indicators, including $PM_{2.5}$, PM_{10}, SO_2, NO_2, O_3, and CO of 2022 can be compared with that of 2021,but the published data in 2020 and previous years are only for reference of the overall trend, and no absolute comparison should be made.

Inhalable Particulate Matter (PM_{10})

The average annual concentration of PM_{10} in Shanghai was 39 μg/m³, 9.3% lower than 2021, meeting the Category II standard of the NAAQS. The data monitored in the past five years suggest that the annual averages of the concentration of PM_{10} in Shanghai show a downward trend on the whole.



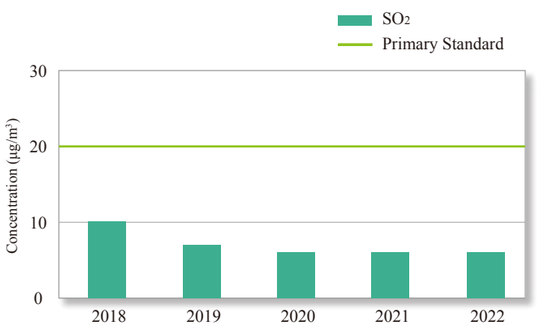
Variation of the average annual concentration of PM_{10} in Shanghai from 2018 to 2022



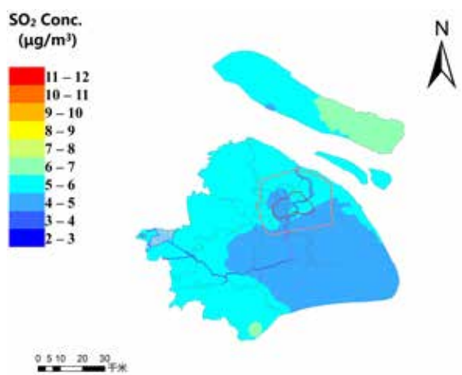
Spatial distribution of the concentration of PM_{10} in different districts of Shanghai in 2022

Sulfur Dioxide (SO_2)

The average annual concentration of SO_2 in Shanghai was 6 μg/m³, the same as 2021, meeting the Category I standard of the NAAQS. The data monitored over the past five years show that the annual averages of the concentration of SO_2 in Shanghai remained at a low level.



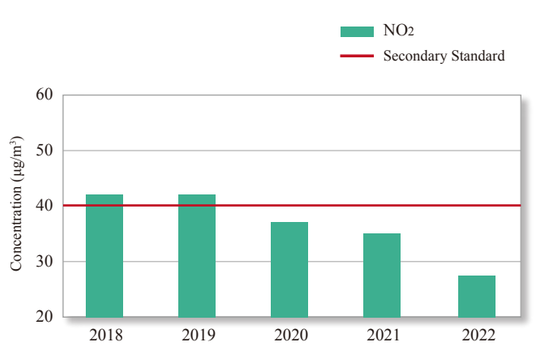
Variation of the average annual concentration of SO_2 in Shanghai from 2018 to 2022



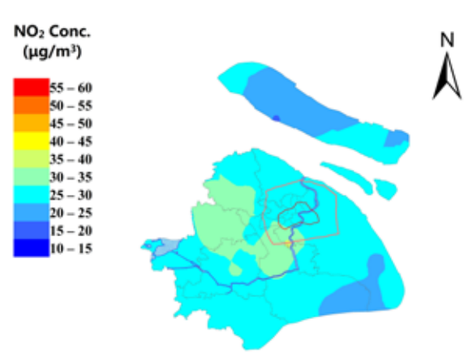
Spatial distribution of the concentration of SO_2 in different districts of Shanghai in 2022

Nitrogen Dioxide (NO_2)

The average annual concentration of NO_2 in Shanghai was 27 μg/m³, 22.9% lower than 2021, meeting the Category II standard of the NAAQS. The data monitored in the past five years show that the average annual NO_2 concentration in Shanghai kept declining.



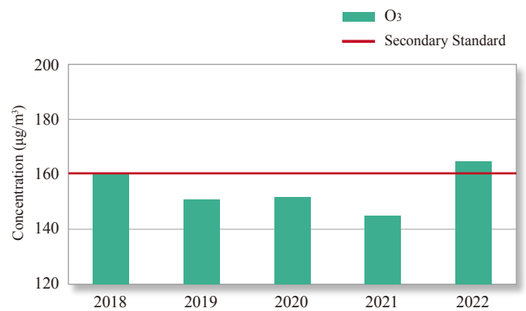
Variation of the average annual concentration of NO_2 in Shanghai from 2018 to 2022



Spatial distribution of the concentration of NO_2 in different districts of Shanghai in 2022

Ozone (O_3)

The 90th percentile[2] of the daily max 8-hour average measurements of O_3 in Shanghai was 164 μg/m³, 13.1% up compared to 2021, 4 μg/m³ higher than the Category II standard of the NAAQS. The data monitored in the past five years show that the overall trend of the 90th percentile of the daily max 8-hour average concentrations of O_3 in Shanghai fluctuated.

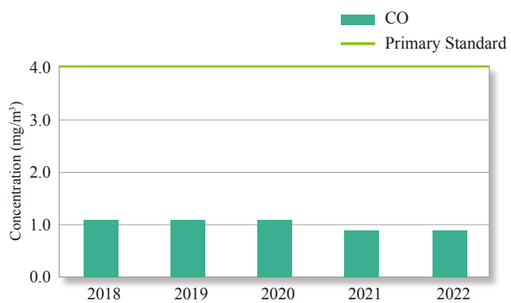


Variation of the concentration of O_3 in Shanghai from 2018 to 2022

[2]According to the *Technical Specification for Ambient Air Quality Assessment (Trial)* (HJ 663-2013), the annual assessment indicators for O_3 and carbon monoxide (CO) are the 90th percentile of the daily max 8-hour average measurements and the 95th percentile of the 24-hour average measurements, respectively.

Carbon Monoxide (CO)

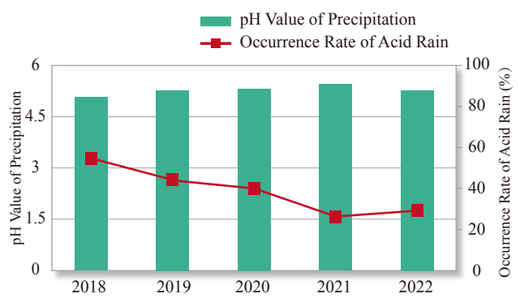
The 95th percentile of the 24-hour average measurements of CO in Shanghai was 0.9 mg/m^3, the same as 2021, meeting the Category I standard of the NAAQS. The data monitored in the past five years show that the 95th percentile of the 24-hour average concentrations of CO in Shanghai kept comparatively stable on the whole.



Variation of the average annual concentration of CO in Shanghai from 2018 to 2022

Acid Rain

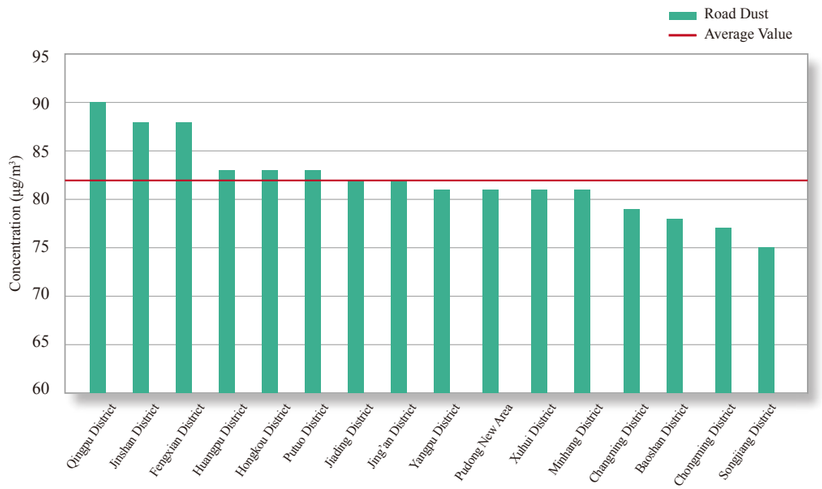
The average pH value of precipitation in 2022 was 5.42; the occurrence rate of acid rain was 27.2%, 0.8 percentage points higher than 2021. The data monitored in the past five years show that air pollution caused by acid rain in Shanghai was, by and large, decreasing.



Variation of the average pH value of precipitation and the occurrence rate of acid rain in Shanghai from 2018 to 2022

Road Dust

The average concentration of road dust recorded with mobile monitoring in all districts in Shanghai ranged from 75 to 90 μg/m^3, with an average value of 82 μg/m^3.



Concentration distribution of road dust in different districts of Shanghai in 2022

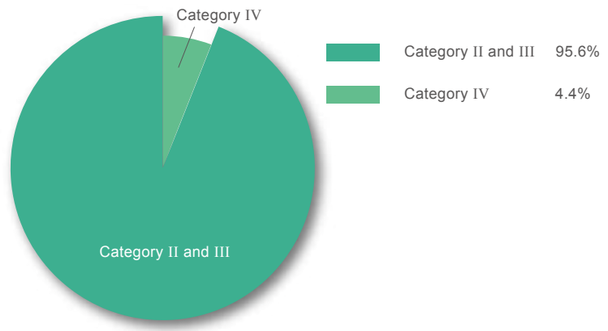
02 Quality of the Surface Water Environment

Water Quality of the Sources of Centralized Drinking Water

There are four sources of centralized drinking water in use in Shanghai, namely the Qingcaosha Reservoir, the Dongfengxisha Reservoir, and the Chenhang Reservoir in the Yangtze River, and the Jinze Reservoir in the Huangpu River. In 2022, the water quality of the four reservoirs were all in full compliance with the standards (at or above the Category-III standard).

Water Quality of Main Rivers and Lakes

Assessments of water quality were carried out on cross-sections[3] of all main rivers in Shanghai in accordance with the *Environmental Quality Standards for Surface Water* (GB 3838-2002). In 2022, the water quality of 95.6% of the monitored cross-sections fell into Category II and III, and 4.4% Category IV, with no water quality of cross-sections falling into or inferior to Category V. The average concentration of ammonia nitrogen was 0.42 mg/l, 16.0% lower than 2021; the average concentration of total phosphorus was 0.138 mg/l, 12.7% lower than 2021; the average value of the permanganate index was 3.8 mg/l, 7.3% lower than 2021.

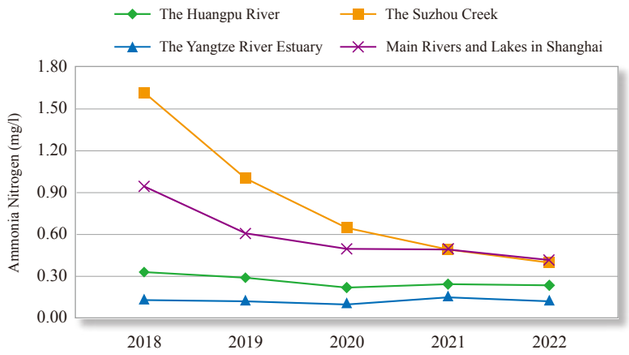


Percentage of the category of water quality at cross-sections of main rivers in Shanghai in 2022

[3]Since 2021, the total number of monitoring sections of major rivers and lakes in the city has been adjusted to 273. Therefore, the relevant data of permanganate index, ammonia nitrogen, total phosphorus and other major indicators

The Huangpu River

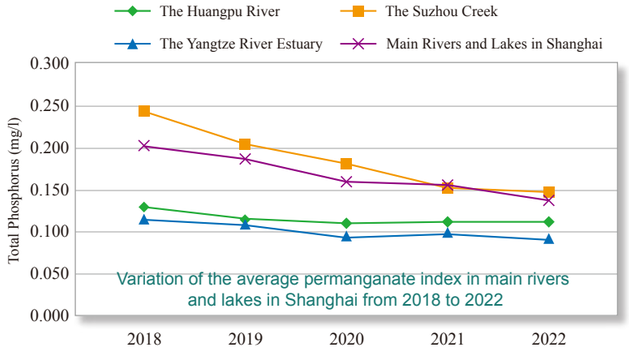
The water quality of four out of six cross-sections of the Huangpu River was up to the standard of Category II, and the other two met the standard of Category III. Among the major indicators, the average concentration of ammonia nitrogen was down 8.0%, and the average permanganate index and average concentration of total phosphorus remained basically unchanged.



Variation of the concentration of ammonia nitrogen in main rivers and lakes in Shanghai from 2018 to 2022

The Suzhou Creek

The water quality of all the seven cross-sections of the Suzhou Creek fell into Category III. Among the major indicators, the average concentration of ammonia nitrogen, total phosphorous, and permanganate index dropped by 21.6%, 3.9%, and 5.3% respectively.

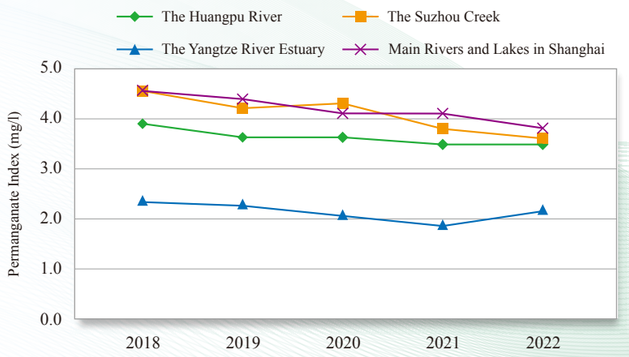


Variation of the average permanganate index in main rivers and lakes in Shanghai from 2018 to 2022

Variation of the concentration of total phosphorus in main rivers and lakes in Shanghai from 2018 to 2022

The Yangtze River Estuary

The water quality of five out of seven cross-sections of the Yangtze River Estuary fell into Category II, and the other two Category III. Among the major indicators, the average concentration of ammonia nitrogen and concentration of total phosphorous decreased by 13.3% and 8.0% respectively, and the average permanganate index increased by 15.8%.



Variation of the average permanganate index in main rivers and lakes in Shanghai from 2018 to 2022

03 Quality of the Groundwater Environment

According to the *Quality Standards for Groundwater* (GB/T 14848-2017), in 2022, the number of sites in Shanghai with groundwater quality meeting the standard of category III, IV and V were 5, 24 and 14 among the total 43 inspection sites, accouting for 11.6%, 55.8% and 32.6% respectively.

04 Quality of the Marine Environment

According to the *Quality Standards for Sea Water* (GB3097-1997), in 2022, among all the monitoring sites in Shanghai's marine areas[4], the water quality of 34.6% of them were compliant with the Category-I or II standard, 9.2 percentage points higher than 2021, 21.2% compliant with the Category-III or IV standard, 6.8 percentage points higher than 2021, and 44.2% inferior to the Category-IV standard, 16.0 percentage points lower than 2021. Among the major indicators, the average concentration of chemical oxygen demand was 1.61 mg/l, 5.9% higher than 2021, that of inorganic nitrogen was 0.505 mg/l, 26.8% lower than 2021, and that of reactive phosphate was 0.0237 mg/l, 14.7% lower than 2021, with inorganic nitrogen and reactive phosphate the primary pollutants.

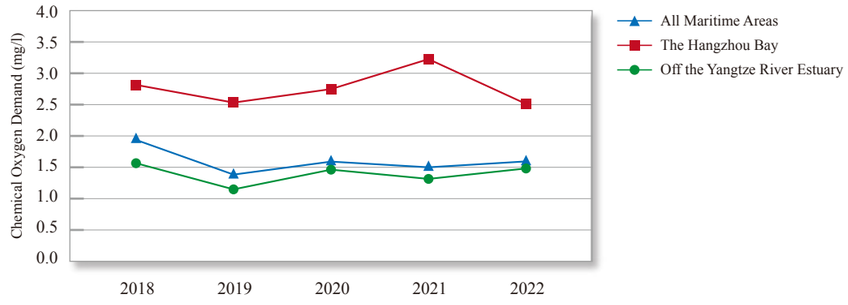
Quality of Sea Water in the Offshore Area of the Yangtze River Estuary

Among the major indicators, the average chemical oxygen demand concentration was 1.48 mg/l, 13.0% up compared to 2021; the average concentration of inorganic nitrogen and reactive phosphate were 0.467 mg/l and 0.0217 mg/l, 26.2% and 14.6% lower than 2021 respectively.

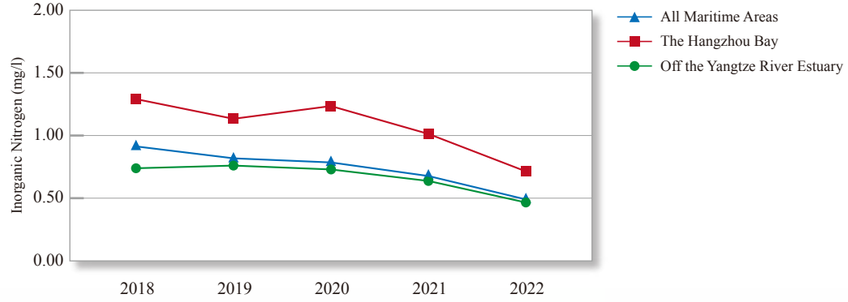
[4]Since 2021, the evaluation method of seawater quality has been adjusted, so the proportion of seawater quality categories in 2022 is comparable to that in 2021, and only the overall trend judgment is made with the published data in 2020 and over the years, but no absolute comparison is made.

Quality of Sea Water in the Hangzhou Bay

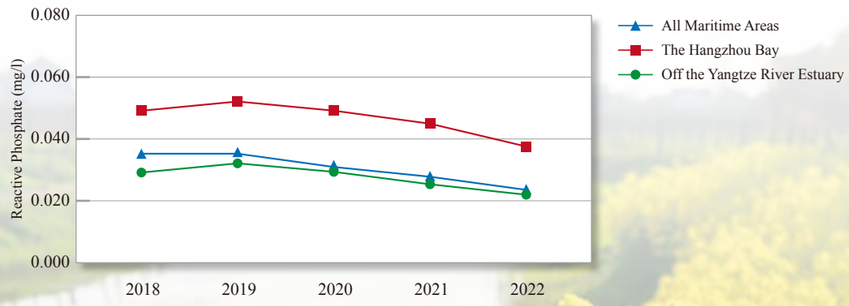
The concentration of major pollutants in the Hangzhou Bay has dropped. Among the major indicators, the average concentration of chemical oxygen demand and inorganic nitrogen and reactive phosphate were 2.51 mg/l, 0.721 mg/l and 0.0378 mg/l, 22.3%, 29.3% and 16.0% lower than 2021 respectively.



Variation of the average concentration of chemical oxygen demand in maritime areas in Shanghai from 2018 to 2022



Variation of the average concentration of inorganic nitrogen in maritime areas in Shanghai from 2018 to 2022



Variation of the average concentration of reactive phosphate in maritime areas in Shanghai from 2018 to 2022

05 Quality of the Soil Environment

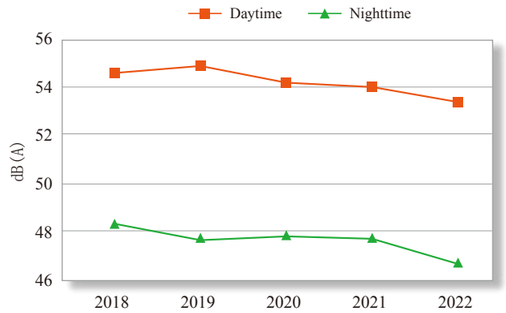
In 2022, according to the Standard for Management and Control of Soil Pollution Risk of Agricultural Land (GB 15618-2018), 84 basic soil quality points included in the national soil environmental monitoring network were monitored. The compliance rates were 98.8%, respectively, and the soil environmental quality was generally stable.

06 Quality of the Acoustic Environment

In 2022, both the sound level of regional ambient noise and the conditions of road traffic noise in Shanghai improved.

Regional Ambient Noise

The average equivalent sound level of regional ambient noise in Shanghai during the daytime was 53.4 dB(A), a year-on-year decline of 0.6 dB(A); and that at nighttime was 46.8 dB(A), 0.9 dB(A) down from 2021. The data monitored in the daytime at 96.0% of the monitoring sites were excellent, good, and fair, while at nighttime the data monitored at 82.3% of the monitoring sites were excellent, good, and fair. The data monitored in the past five years show a general downward trend in the average sound level of regional ambient noise during daytime and at nighttime.

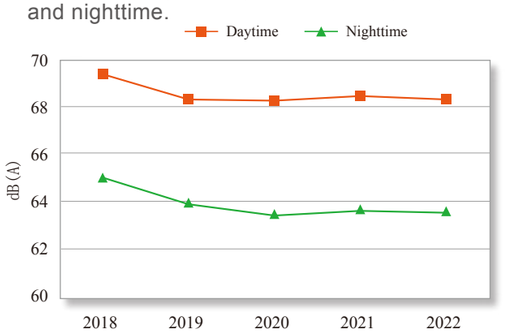


Variation of the sound level of regional ambient noise in Shanghai from 2018 to 2022

Road Traffic Noise

The average equivalent sound level of road traffic noise in the whole city during daytime is 68.3 dB (A), 0.1 dB (A) lower than that in 2021. The average equivalent sound level at night is 63.5 dB (A), 0.1 dB (A) lower than that in 2021. The data monitored in the daytime at 93.7% of the monitoring sites were excellent, good, and fair, while at nighttime the data monitored at 42.1% of the monitoring sites were excellent, good, and fair.

The data monitored in the past five years show that the sound level of road traffic noise in Shanghai is generally stable during daytime and nighttime.



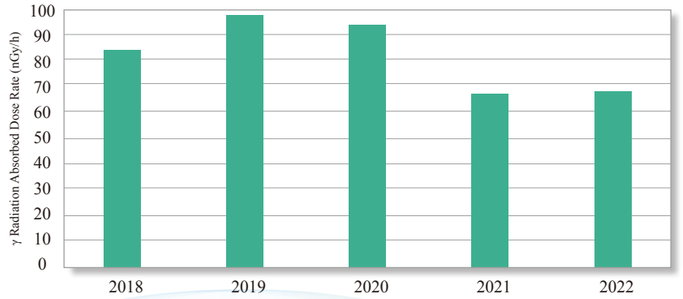
Variation of the sound level of road traffic noise in Shanghai from 2018 to 2022

07 Quality of the Radiation Environment

The quality of the radiation environment in Shanghai remained generally good in 2022.

Ionizing Radiation

In 2022[5], the activity concentration of environmental natural radionuclides in the atmosphere, water, soil and other media in Shanghai was at a normal level, and the absorbed dose rate of γ radiation in air at each monitoring point is equivalent to the monitoring results over the years. The annual cumulative radiation dose in the surrounding environment of the nuclear technology application site meets the limit requirements specified in the *Basic Standards for the Protection against Ionizing Radiation and for the Safety of Radiation Sources* (GB 18871-2002).



Variation of the annual absorbed dose rate of γ radiation from 2018 to 2022

Electromagnetic Radiation

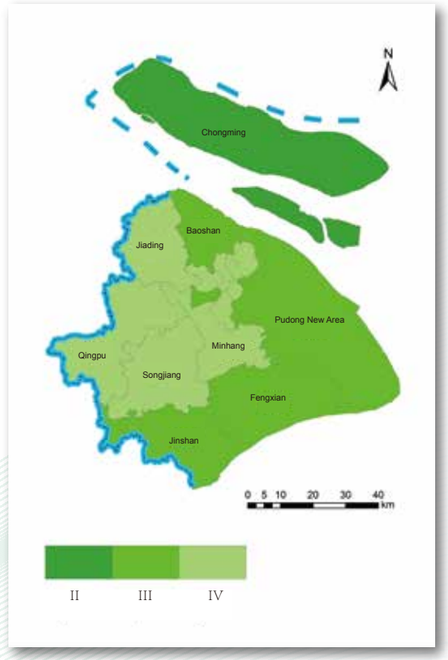
In terms of the electromagnetic radiation environment, the data monitored in ten sites show that the industrial-frequency electric field intensity varied from 0.140 to 0.790 V/m; the industrial-frequency magnetic induction intensity varied from 0.0105 to 0.0326 μt; and the composite electric field intensity was 0.27 to 1.36 V/m. The electromagnetic radiation level in the surrounding environment of electromagnetic facilities meets the requirements of public exposure control limits specified in *Controlling Limits for Electromagnetic Environment* (GB 8702-2014).

[5]Since 2021, the automatic monitoring points of ionizing radiation have been relocated, and no absolute comparison is made with the published data in 2020 and previous years.

08 Ecological Quality Index

As evaluated in accordance with the *Regional Ecological Quality Evaluation (Trial)* (HJ [2021] 99), in 2022[6] the ecological quality index (EQI) of Shanghai was 47.6, 0.1 lower than that of 2021, and the ecological quality fell into Category III according to evaluation, the same as that of 2021. The ecological quality of the city was basically stable, and the ecological pattern, ecological function, biodiversity and ecological stress remained stable.

In 2022, the EQI of each district met the standards of Category II to Category IV based on evaluation. The EQI of Chongming District fell into Category II, the EQI of Jinshan District, Fengxian District, Pudong New Area, Changning District and Baoshan District fell into Category III, and those of the other districts fell into Category IV. The EQI evaluation categories of each district were the same as those in 2021.



Schematic diagram of ecological quality index distribution in Shanghai in 2022

[6]Since 2021, ecological quality has been evaluated by ecological quality index (EQI).

Measures Taken

01 Pollution Prevention and Control

The Eighth Three-Year Action Plan on Environmental Protection

2022 was a key year in implementing Shanghai's eighth three-year action plan on environmental protection. Shanghai improved and leveraged the coordination and promotion platform established by the Municipal Government's leading team for environmental protection to advance the eighth round of the action plan in an orderly manner. The plan includes contents on 212 key projects in 11 special aspects, including water environment protection, atmospheric environmental protection, soil (groundwater) pollution prevention, solid waste pollution prevention, industrial pollution prevention and green transformation, agricultural and rural environmental protection, ecological construction and protection, climate change response and low-carbon development, estuary and marine ecological environment protection, circular economy and green life, and ecological civilization system reform and guarantee mechanism. In 2022, 207 projects were started/launched, with a start-up/launch rate of 98% (of which 62 projects were completed, with a completion rate of 29%).

Special Actions

Giving full play to the role of coordination mechanism and make overall plans to promote work in special areas

A number of sewage treatment plant expansion projects were completed, and the sewage treatment capacity increased by 395,000 cubic meters per day; A total of about 22 kilometers of sewage collection pipe network has been built, and the construction of 6 backbone rivers with about 25 kilometers has been completed. In residential areas (villages) of the city, the compliance rate of unit garbage classification was stable at over 95%, the recycling rate of domestic garbage reached 42%, the reduction rate at the source reached 3%, the incineration capacity of domestic garbage reached 28,000 tons/day, and the centralized disposal capacity of wet garbage reached over 7,000 tons/day. The recycling rate of pesticide packaging waste remained above 99%, and the comprehensive utilization rate of main crop straws exceeded 98%. 51,000 mu of forest area, 1,055 hectares of green space, 232 kilometers of greenway, 446,000 square meters of three-dimensional greening were added, and the forest coverage rate reached 18.51%. 138 new parks were built, including 39 urban parks, 69 pocket parks and 30 countryside parks.

Action Plan on Air Pollution

The task of ultra-low emission transformation of steel was completed in an all-round way (the cumulative crude steel production capacity was 18.34 million tons), and Baoshan Iron & Steel performed the monitoring and evaluation of ultra-low emission. The comprehensive management and organization of VOCs 2.0 was completed in more than 2,400 key industry enterprises in the city; VOCs emission reduction accounting verification and subsidy application review was organized. The fine pilot evaluation of simple VOCs treatment facilities was promoted and completed. According to the national requirements, the special investigation and rectification of outstanding problems in the key links of VOCs governance was promoted in industrial enterprises. The special rectification work of volatile organic liquid storage tanks was implemented in the city, and the compliance and treatment of oil storage tanks in airports, docks and other areas was accelerated. The closed treatment of VOCs in the storage and transportation industry in 7 enterprises was completed. Throughout the year, the environmental consistency inspection of new vehicles was carried out, inspecting 63models of 8 production enterprises in the city. 135 models of 34 other production, import and sales enterprises were selected for inspection. Over the year, more than 840,000 vehicles were organized for remote sensing monitoring, road inspection and household inspection, among which 109 did not comply with the standard and punished with a penalty of 21,800 yuan. A cumulative total of 102 thousand heavy-duty diesel vehicles were equipped with remote online monitoring equipment and networked, exploring the establishment of working mechanisms such as remote online monitoring data of diesel vehicles for law enforcement inspection of non-social gas stations and exemption of diesel vehicles from inspection. A total of more than 90,000 off-road mobile machinery were declared and registered. A new round of examination and approval of the application for scrapping subsidies for National Class III diesel vehicles was started, and completed the scrapping registration of more than 1,600 vehicles. The third-party intensive treatment of catering enterprises was continued, and the treatment of catering oil fume in nearly 400 restaurants was completed. The prevention and control of dust pollution was furthered, completing the treatment of 9 dust-prone storage yards.

Special Actions

Optimizing the management of heavy-duty diesel vehicles with the help of remote monitoring technology

Shanghai Municipal Bureau of Ecology and Environment, together with Shanghai Municipal Public Security Bureau, issued the *Notice on Implementing Remote Online Monitoring of Pollutant Emissions and Exempting Heavy-duty Diesel Vehicles from Emission Inspection*, and announced the first batch of exemption lists after the official implementation in January 2023, covering more than 5,000 vehicles. More than 30,000 heavy-duty diesel vehicles can be exempted from on-line emission inspection. Related logistics and transportation enterprises saved 6 million yuan only for inspection and were thus encouraged to standardize vehicle maintenance and reduce pollutant emissions, which generated remarkable economic and social benefits.

Action Plan on Water Pollution

Overall plans were made to promote the coordinated management of water resources, water environment and water ecology. The environmental supervision of water sources was strengthened, and the ecological compensation assessment of water sources in 2022 was completed. Shanghai cooperated with Zhejiang Province to complete the optimization and adjustment of water source protection areas in the upper reaches of the Huangpu River, signed a memorandum with the ecology and environment departments of Jiangsu and Zhejiang provinces and the Executive Committee of the Demonstration Zone of Green and Integrated Ecological Development of the Yangtze River Delta Region on the protection of cross-provincial-border water sources, and established a joint decision-making, joint protection and integrated management and control mechanism. The water environment management was continuously promoted. Shanghai basically completed the expansion project of 4 sewage treatment plants in the suburbs, completed the transformation of rain and sewage mixed connection in enterprises and institutions in the whole city, and optimized the external closure facilities of residential quarters and closure facilities along rivers; it completed the rectification of more than 90% of the sewage outlets into the Yangtze River, and comprehensively started the investigation and traceability of the sewage outlets into the river and into the sea in the city; it comprehensively investigated the shortcomings of sewage treatment facilities in medical institutions and strengthened the supervision of medical sewage and urban sewage during the epidemic. The water ecological foundation was reinforced, with the establishment of 15 ecological clean small watershed demonstration sites completed, forming a water ecological monitoring network covering the Yangtze River Estuary, the Huangpu River, the Suzhou Creek, the Dianshan Lake and some backbone rivers.

Special Actions

Comprehensively starting the investigation and traceability of sewage outlets entering rivers and seas and continuing to improve the environmental quality of rivers, lakes and bays

The investigation and traceability of sewage outlets entering rivers and seas in the whole city started in an all-round way. Shanghai Municipal Bureau of Ecology and Environment issued the *Work Manual for on-site Investigation and Traceability of Sewage Outlets Entering Rivers (Sea) in Shanghai (Trial)*, and all districts promoted the work steadily and orderly. By the end of 2022, the investigation and traceability of sewage outlets entering rivers, lakes and bays of nearly 10,000 kilometers had been completed in the whole city, accounting for about 30% accounting for about 30% of the total length of rivers, lakes and bays in the city, laying a solid foundation for the follow-up improvement and continuous improvement of the environmental quality of rivers, lakes and bays.

Action Plan on Land Pollution

Strengthening prevention and control, and continuously ensuring the safety of soil environment. Minister Huang Runqiu of the Ministry of Ecology and Environment took the remediation of soil pollution in Taopu Town, Putuo District, Shanghai as an example, and summarized the prevention and control of soil pollution in the past ten years at a series of press conferences on the theme of China's Decade held by the Publicity Department of the CPC. Twelve departments of the city jointly issued the *14th Five-Year Plan for Prevention and Control of Soil and Groundwater Pollution in Shanghai*, formulated and issued documents such as *Administrative Measures for Comprehensive Supervision Platform for Prevention and Control of Soil Pollution in Shanghai, Implementation Measures for Identification of Responsible Persons for Soil Pollution in Construction Land in Shanghai, Investigation and Treatment Measures for Fraud in Activities Related to Soil Pollution Risk Control and Restoration of Construction Land in Shanghai, and updated four batches of List of Soil Pollution Risk Control and Restoration of Construction Land in Shanghai*. Shanghai checked the safe use of key construction land in the year and promoted the joint supervision of soil pollution prevention and control in redevelopment and utilization of contaminated land. The construction of pioneer areas for soil pollution prevention and control was carried out, and the Shanghai Comprehensive Supervision Platform for Soil Pollution Prevention and Control was put into trial operation. The construction of two major projects of soil pollution source control was promoted, hidden danger investigation of key supervision units was carried out, and a new model of "environmental restoration + development and construction" was explored. The annual investigation and assessment of groundwater pollution in hazardous waste landfills and domestic waste landfills was completed according to the requirements of the state. A new round of detailed land survey for enterprises in typical industries was launched.

Strengthening supervision and management and safeguarding the bottom line of solid waste environment safety. Shanghai established a medical waste management system ensuring both readiness in peacetime and proper response in epidemics, realizing efficient and safe treatment of medical waste in the super-limit state during Shanghai's defense against COVID-19. Shanghai focused on the construction of "zero-waste city" and new pollutant treatment actions, promoted the construction of an overall, coordinated, efficient and safe solid waste treatment system, and compiled the *Work Plan for the Construction of "Zero-Waste City" in Shanghai and the Work Plan for the Treatment of New Pollutants in Shanghai*. Continuously improving the supervision, utilization and disposal capacity of hazardous wastes, and the General Office of Shanghai Municipal People's Government *issued the Implementation Plan for Strengthening the Reform of Supervision, Utilization and Disposal Capacity of Hazardous Wastes in Shanghai*. The annual assessment of standardized assessment of hazardous wastes was carried out, the joint remediation of abandoned hazardous chemicals was strengthened, and the rectification of problems found in the three-year action of special remediation of hazardous wastes was comprehensively completed.

Special Actions

Giving full play to the leading role of demonstration and promoting the construction of a "zero-waste city" with high standards

The *Work Plan for the Construction of Zero-Waste Cities in Shanghai* was formulated. Jing'an District, Changning District, Baoshan District, Jiading District, Songjiang District, Qingpu District, Fengxian District, Chongming District and Lingang New Area were selected to be included in the List of Zero-Waste Cities during the 14th Five-Year Plan period issued by the Ministry of Ecology and Environment at the end of April, with the number of the selected ranking first in the country. The construction demonstration of "zero-waste enterprises (industrial parks)" such as Shanghai Chemical Industrial Zone, Baowu Group, Shanghai Petrochemical and China City Investment Group was led by innovation.

Marine Ecological Environmental Protection

The comprehensive management of key sea areas was fully started. *The Implementation Plan for the Comprehensive Management of Sea Areas in Shanghai Changjiang Estuary-Hangzhou Bay* was issued. A regular scheduling mechanism for key tasks was established. And tracking and evaluation of key tasks were carried out in a regular manner; The investigation of pollutants discharge into the sea was carried out, and the control of land-based pollution was strengthened; The control of total nitrogen in river sections entering the sea was strengthened and the monitoring of marine plastic waste was carried out. Jiangsu, Zhejiang, and Shanghai jointly signed the *Cooperation Agreement on Ecological Environment Protection in the Coastal Waters of the Yangtze River Estuary-Hangzhou Bay* to jointly improve the regional marine ecological environment governance capacity; The construction of coastal marine ecological restoration project was started near the port and the construction of beautiful bay in Hangzhou Bay-Jinshan section was promoted to improve the quality of marine ecological environment; The "Six Insurance and Six Guarantees" was actively served, and the examination and approval of marine engineering EIA was speeded up based on laws and regulations. The EIA examination and approval of major projects including the coastal marine ecological protection and restoration project near the port, the expansion project of Shanghai LNG Station Line, and the regulation project of Dalu Line East Extension Waterway were completed.

Environmental Protection of Agriculture and Rural Areas

In conjunction with the Municipal Agriculture and Rural Committee, the Municipal Bureau of Ecology and Environment,the Municipal Greening and City Appearance Bureau, and the Municipal Water Affairs Bureau, the *Implementation Plan of Pollution Control in Shanghai's Agriculture and Rural Areas (2021-2025)* was issued to systematically promote the treatment of rural domestic sewage and garbage, the comprehensive improvement of rural water environment, and the prevention and control of agricultural side source pollution. By the end of 2022, the treatment rate of rural domestic sewage in the city has reached 93.3%, and the objectives and tasks of the 14th Five-Year Plan have been completed ahead of schedule.

Natural Environment Restoration

Deepening and refining the goal of a resilient ecological city put forward in *Shanghai Master Plan (2017-2035)*, Shanghai Municipal Bureau of Planning and Resources organized and compiled the *Special Plan for Ecological Restoration of Land and Space in Shanghai (2021-2035)* as the top-level design and action plan for coordinating the ecological restoration work of the whole city.

Shanghai Municipal Development and Reform Commission, Shanghai Municipal Finance Bureau, Shanghai Municipal Bureau of Planning and Natural Resources and Shanghai Lanscaping and City Appearance Administrative Bureau jointly formulated Several Policies and Measures for Promoting *the Healthy Development of Forestry and Promoting the Construction of Ecological Civilization in Shanghai from 2022 to 2024,* and supported batch of protection and restoration projects of important wildlife habitats, wetlands and nature reserves.

Shanghai Lanscaping and City Appearance Administrative Bureau organized a survey of smooth cordgrass, and knew well the area (about 15,000 hectares) and main distribution range of smooth cordgrass in the whole city, which laid a foundation for the next step of smooth cordgrass control in the whole city. To explore the treatment technology of smooth cordgrass suitable for Jiuduansha area, a pilot project of smooth cordgrass treatment (with a total area of about 49.6 hectares) was carried out in Shanghai Jiuduansha Wetland National Nature Reserve with the central forest and grass reform funds, providing technical support for future large-scale treatment.

Shanghai steadily implemented marine ecological protection and restoration. Shanghai adhered to the priority of protection and natural restoration and continued the compensation for ecological conservation and environmental protection projects of Hengsha Dongtan Rectification (Phase VIII) Project and Nanhui Dongtan Silt Restoration and Rectification Project. Shanghai Municipal Oceanic Bureau started construction of Shanghai Lingang Coastal Marine Ecological Protection and Restoration Project and completed the establishment of Fengxian Coastal Marine Ecological Restoration Project. Shanghai Municipal Commission of Agriculture and Rural Affairs continued to carry out the proliferation and release of fishery resources.

02 Green and low-carbon development

Green and Low-carbon Development in Key Areas

In the industrial field, Shanghai implemented 500 municipal industrial structure adjustment projects and promoted the creation of 66 municipal green factories and 11 municipal green supply chains. Energy-intensive and high-emission projects were strictly controlled, and the transformation and upgrading of key areas such as Jinshan No.2 Work Area and Xinghuo Development Zone was promoted in an orderly manner. **In the energy field,** Shanghai carried out science-based adjustment of energy structure, promoted the green transformation of energy, comprehensively started the construction of the million-kilowatt offshore wind power project, and accelerated the “photovoltaic +” special project. **In the transportation field,** all the newly added or updated buses and taxis were new-energy vehicles, and more than 6,800 LNG trucks were put into use, nearly 700,000 charging piles were built, and the use of about 1 million new-energy vehicles was promoted. Rail-sea intermodal transport of about 50,000 TEUs of container was completed, an increase of about 40.15% year-on-year. **In the construction field,** the scale of green buildings reached 320 million square meters, and the prefabricated buildings was about 193 million square meters. 18 green ecological cities were successfully created and 100 high-quality “beautiful blocks” were completed.

Carbon Peaking and Neutrality

Shanghai did a good job in the management of the national carbon market, ensured the smooth operation of the carbon trading system, and successfully guided the holding of the first China International Carbon Trading Conference; continued to do a good job in local carbon market management and created a record of 100% performance for nine consecutive years; studied and formulated the *Implementation Plan for Synergy of Pollution Reduction and Carbon Reduction in Shanghai* to promote the coordinated management of pollution reduction and carbon reduction; issued the *Shanghai Greenhouse Gas Inventory Compilation Work Plan for Districts* to further consolidate the data base of carbon emission management and improve the level of refined management; continued to do a good job in low-carbon demonstration pilots and formed a list of low-carbon development practice areas and low-carbon communities in 2023; innovated and established a carbon inclusive mechanism, issued the *Shanghai Carbon Inclusive System Construction Work Plan*, and promoted the whole society to accelerate the formation of a green production lifestyle; Pudong New Area was selected as the first batch of national climate investment and financing pilots; organized the National Low-Carbon Day, published the *Handbook of Low Carbon Wisdom of Shanghai Citizens*, which brought together low-carbon coups from citizens.

Special Actions

Promoting high-quality development by releasing documents on top-level design for carbon peaking and neutrality

To peak carbon emissions and achieve carbon neutrality is intrinsically required for the application of a new development philosophy, facilitation of a new pattern of development, and promotion of high-quality development. It is a major strategic decision made by the Central Committee of the CPC to take into consideration both the domestic and the international situation. In 2022, Shanghai Municipal Party Committee and Shanghai Municipal People's Government clarified the top-level design and general arrangements for carbon peaking and neutrality by issuing Opinions on Full, Accurate and Comprehensive Implementation of the New Development Philosophy to Do a Good Job in Carbon Peaking and Carbon Neutrality in Shanghai and Implementation Plan to Peak Carbon Emissions in Shanghai and introducing the "1 + 1 + 8 + 13" policies for carbon peaking and neutrality, all in accordance with the national general work arrangements for carbon peaking and neutrality.

03 Deepening Reform and Innovation

Construction of Modern Environmental Governance

According to the requirements of the *Notice of General Office of Shanghai Municipal Committee of the CPC and the General Office of Shanghai Municipal People's Government on Accelerating the Construction of Modern Environmental Governance System*, Shanghai continued to promote the construction of eight systems, including leadership responsibility, corporate responsibility, national action, supervision, market, credit, regional cooperation and laws, regulations, and policies. The pilot demonstration work of modern environmental governance system in the city was vigorously carried out, with 12 units listed in the first batch of modern environmental governance system demonstration units and 15 units listed in the first batch of modern environmental governance system pilot units, constituting a batch of park samples with low-carbon transformation driven by urban renewal, enterprise samples with green cutting-edge manufacturing and excellent social responsibility, towns and community samples with intelligent means empowering grassroots governance and innovating pluralistic co-governance mode, and building samples with green management and service in the whole process and in multiple directions.

The third-party environmental governance model in Fengxian, Pudong and Lingang Districts was deepened, vigorously promoting the pilot of environmental butler services and third-party services for grassroots environmental governance in communities and towns (industrial parks), and the first batch of 10 third-party environmental protection service demonstration projects in the city was released. The management measures of the third-party service organization of Environmental Protection Housekeeper in Fengxian District were guided and promoted. Pudong New Area and Lingang New Area were guided to introduce supporting policies for environmental protection housekeeping and comprehensive management custody services, standardizing the third-party environmental service market. The *Implementation Plan for the Construction of a Third-party Governance and Service Platform for the Ecology and Environment in the Demonstration Zone of Green and Integrated Ecological Development of the Yangtze River Delta Region* was issued, and the Third-party Governance and Service Platform for Ecological Environment in the Demonstration Zone of Green and Integrated Ecological Development of the Yangtze River Delta Region was officially launched.

Special Actions

Improving the working mechanism of cooperation between the MEE and Shanghai to build a modern environmental governance system

Shanghai continued to build a modern environmental governance system, fully implemented the contents of the *MEE's Strategic Cooperation Framework Agreement of the Shanghai Municipal People's Government to Jointly Promote the Ecological Environment Governance of a People's City* to improve the working mechanism of cooperation between MEE and the city. Shanghai summarized and popularized the experience of ecological environment governance in "People's City", and compiled and published the book *Beautiful Shanghai with Harmonious Coexistence between Man and Nature-Exploration and Practice of Ecological Environment Governance in Socialist Modern International Metropolis (Summary + Cases).*

Reform on EIA Mechanism

Shanghai continued to launch the reform measures of environmental impact assessment and pollutant discharge permit to help high-quality development. Shanghai issued the *Notice on Optimizing the Management of Environmental Impact Assessment and Pollutant Discharge Permit to Support Enterprises to Resume Work and Resume Production during the Epidemic Period* and implemented 13 reform measures of environmental impact assessment and pollutant discharge permit, such as "exemption of procedures, notification of commitments, integration of two certificates, postponement of handling, simplification and classification", so as to greatly improve the efficiency of examination and approval, reduce the burden on enterprises and help the city's economy to revive. The *Technical Requirements for Compilation of Carbon Emission Assessment of Construction Project EIA and Industrial Park Planning EIA in Shanghai (Trial)* was issued, piloting the carbon emission assessment of construction project EIA and industrial park planning EIA, and actively building an EIA system suitable for carbon peaking. *Several Opinions on Supporting New Town Construction to Deepen the Reform of Environmental Impact Assessment and Pollutant Discharge Permit (Trial)* was issued, carrying out pilot optimization and adjustment of EIA management and control requirements for industrial park planning, implementing "bundled" examination and approval of EIA, reducing and exempting the total sources of small pollutants, exploring and implementing streamlined management of EIA report forms linked with pollutant discharge permit, etc., and concentrating on serving new town construction.

Actively exploring the application of ecological environment zoning management and control results. Initial results have been achieved in related work in local legislation, policy formulation, mechanism exploration and data application. A comprehensive index system covering the relevant requirements of ecological environment zoning control and planning environmental impact assessment was established, and full coverage tracking evaluation on the implementation of planning environmental impact assessment of key control units (industrial parks) was carried out in the city in 2022. According to the follow-up evaluation results, the industrial park rectification was promoted, and 12 parks including Jinqiao Economic and Technological Development Zone and Jiading International Automobile City were newly included in the linkage list, increasing the number of parks with "linkage between planned EIA and project EIA" to 52. Shanghai continued to promote data sharing and launched the public version application module of ecological environment zoning control with the Suishenban APP to provide tools for the access and site selection of new reconstruction and expansion projects of enterprises and institutions; completed the upgrading and transformation of the EIA integrated management system, and opened up the application chain of ecological environment zoning control-industrial park planning EIA-construction project approval data.

Special Actions

Coordinating and promoting planned EIA and project EIA and fully guaranteeing the major planning and project settling in the city

EIA of major special plans in the city, such as Shenjiawan operation area adjustment plan, No.5 ditch operation area adjustment plan, Luojing operation area adjustment plan and Xiaoyangshan north operation area, have passed the examination of the MEE to ensure the smooth start of follow-up projects. The *Notice on Optimizing the Environmental Impact Assessment of Major Projects in Shanghai* was issued, further strengthening the EIA guarantee, implementing customized and accurate services, unblocking the "green channel" for EIA approval, promoting the linkage between planned EIA and project environmental impact assessment as a whole, and implementing support policies such as the city-wide balance of major pollutant indicators of major projects, so as to promote the settling of major projects during the 14th Five-Year Plan. Shanghai made every effort to promote and dispatch the EIA approval of 15 policy-oriented development financial instruments (funds) projects, such as Shanghai Demonstration Zone Line of Municipal Railway and Shanghai Bioenergy Reuse Project Phase **III**, tracked and dispatched 171 EIA approval progress of major projects, and coordinated and promoted the EIA approval guarantee of a number of major foreign-funded projects. In 2022, the city approved 2,187 EIA reports, including 115 environmental impact reports, 1,337 environmental impact report forms, 735 notification commitment systems and 15,561 environmental impact registration forms.

Reform of the Compensation System for Environmental Damage

Shanghai continued to promote the compensation for ecological environmental damage, and effectively linked the reform of compensation system for ecological environmental damage with environmental law enforcement, environmental credit evaluation and environmental justice. The case practice was further promoted, the first batch of *Typical Cases of Compensation for Ecological Environment Damage in Shanghai* was published, and three cases in the municipality were selected as *Typical Cases of Compensation for Ecological Environment Damage in Yangtze River Delta Region*. To strengthen the guiding role of environmental restoration, Pudong New Area and Qingpu District successively established ecological environmental damage restoration bases to enhance social perception with actual restoration projects.

Reform of the Identification System for Hazardous Waste

According to the requirements of the *Notice on Strengthening the Identification of Hazardous Wastes* issued by the MEE, our bureau timely formulated the *Notice on Strengthening the Identification of Hazardous Wastes in Shanghai*, and organized the recommendation, selection and establishment of the first Shanghai Hazardous Wastes Identification Expert Committee. Shanghai Solid Waste and Chemical Management Technology Center formulated internal standard systems such as registration management of identification units, assessment and evaluation of identification quality, established a technical support system for hazardous waste identification, and successfully realized the market-oriented transformation of identification work.

Special Actions

Going all out to defend Shanghai against COVID-19 and continuously improving the supervision and service level of medical wastes

Shanghai faced a severe test in the safe treatment and disposal of medical waste faced a severe test during its defense against COVID-19. A special class for medical waste treatment was set up at the first time, with the city leaders serving as the leaders of the special working group. All districts set up special classes for emergency collection and transportation of medical waste in time, facilitating communication channels and strengthening overall coordination. Under the guidance of the Ministry of Ecology and Environment, the emergency collection, transportation and disposal plan of medical waste was optimized and adjusted, and the exemption measures for emergency collection, transportation and disposal of medical waste were implemented according to law. From March to May, the city collected, transported and disposed of 76,600 tons of epidemic-related garbage and medical waste, of which the highest peak in a single day reached 1,419 tons (6 times as usual). In 2022, a total of 193,000 tons of epidemic-related garbage and medical waste were collected and transported (an increase 127% year-on-year). In 2022, Shanghai treated medical waste efficiently and safely under the extreme state, ensured the urban ecological environment and kept the bottom line of public safety.

04 Ecological Environmental Legal System

Ecological Environmental Legislation

Shanghai completed the revision of *Regulations of Shanghai Municipality of Environmental Protection*, improved the system and mechanism of ecological civilization construction, increased the work requirements related to carbon peaking and carbon neutrality, optimized and strengthened environmental governance measures such as “light pollution” prevention and control, plastic treatment, epidemic prevention and control and environmental emergency, and further consolidated the legal guarantee of ecological environmental protection in the city. The revision of 13 administrative normative documents was completed; the *Catalogue of Major Administrative Decision-making Matters of Shanghai Bureau of Ecology and Environment in 2022* was issued, and major administrative decisions in strict accordance with legal procedures were carried out.

Ecological Environmental Law Enforcement

Shanghai has successively issued *Shanghai Ecological Environmental Protection Regional Cross Law Enforcement Inspection System (Trial)*, *Shanghai Ecological Environmental Protection Project Investigation System (Trial), Shanghai Ecological Environmental Protection Joint Law Enforcement Regulations, Shanghai Ecological Environmental Law Enforcement and Popularization Work System* and *Shanghai Ecological Environmental Protection Comprehensive Administrative Law Enforcement Agency Standardization Construction Work Party Cases (2022-2025)* and other comprehensive environmental law enforcement documents, and constantly improved the strict, standardized, fair and civilized ecological environment law enforcement system.

Shanghai strengthened law enforcement cooperation among departments, shared industry supervision data, actively used big data analysis and other means to carry out clue investigation and information judgment, and jointly cracked down on ecological and environmental crimes. A total of 987 cases were investigated and punished in the city, with a penalty of 111 million yuan. The whole city imposed a daily penalty of 1 case, seized and detained illegal objects in 19 cases, restricted production/stopped production and rectified 2 cases, transferred 6 cases to public security administrative detention, and transferred 13 cases to public security for criminal responsibility.

Ecological Environmental Law Popularization

Shanghai issued the *Implementation Plan for Deepening Administration According to Law in the Field of Ecological Environment and Continuously Strengthening Pollution Control According to Law*, and incorporated the task of abiding by the law into the integrated deployment of the construction plan of the government under the rule of law; prepared and revised the list of legal responsibilities and the catalogue of responsibilities for different legal objects; set up a special report on the rule of law in the city's "Leading Cadres' Special Seminar on Pollution Prevention and Control" and this year's Ecological Environment Learning Forum; organized new law training such as the revised *Noise Pollution Prevention and Control Law and Regulations of Shanghai Municipality of Environmental Protection*, and published a series of typical cases of case interpretation; organized 12 "cloud" trainings on ecological environment law enforcement, further promoted the integration of law enforcement into the whole process of environmental management and law enforcement, and actively implemented the system of responding to lawsuits in court by the person in charge of administrative organs, with an annual rate of responding to lawsuits in court of 100%.

05 Ecological Environmental Supervision And Management

Supervision and Administration of Natural Ecology

In September 2022, General Office of CPC Shanghai Municipal Committee and the General Office of the Shanghai Municipal People's Government issued the *Implementation Opinions on Further Strengthening Biodiversity Conservation (hereinafter referred to as the Implementation Opinions)*, which will serve as the program and guide for the city's biodiversity conservation in the future. According to the *Implementation Opinions*, it is necessary to effectively cope with the challenges faced by biodiversity in megacities and comprehensively improve the level of biodiversity protection, so as to ensure the comprehensive protection of important ecosystems, biological species and biological genetic resources.

Shanghai has always placed biodiversity conservation in a prominent position, incorporated biodiversity into its urban planning, implemented it in all aspects of urban development, construction and renewal, and striven to improve the area, quality, connectivity and accessibility of urban blue-green spaces, improved the diversity of urban native species and the ecological connectivity between the city and its surrounding areas, and enhanced urban resilience and ecosystem service functions.

The assessed and adjusted ecological protection red line has been approved by the state and officially put into use. Shanghai strictly abided by the ecological protection red line of 2,527 square kilometers, so that 90% of terrestrial ecosystem types and 75% of national key protected wildlife species in the city can be effectively protected. The Yangtze finless porpoise, a national first-class protected animal, reappeared in the Yangtze River estuary. By the end of 2022, there are 519 registered bird species in the whole city. The per capita green area reached 9 square meters. The level of urban biodiversity was significantly improved, with raccoon dogs, civet cats and other species successively returning to Shanghai.

There are 11 nature reserves in the city with a total area of over 1,146 square kilometers, including 4 nature reserves and 7 natural parks. Special actions of strengthening supervision of Green Shield 2022 nature reserve were carried out, severely cracking down on illegal activities and building a strong ecological security barrier in the whole city. The construction of Chongming World-class Ecological Island was further promoted, strengthening wetland protection, biodiversity protection and ecological value commercialization. Shanghai further strengthened the environmental safety management of microbial agents for environmental protection use, supervised and guided relevant units to use microbial agents legally and in compliance, and carried out law enforcement inspections on key application units of microbial agents for environmental protection use.

Special Actions

The Shanghai Theme Day Exhibition was held on the Conference of the Parties to the Convention on Biological Diversity

During the second phase of the United Nations' negotiations on the world's new biodiversity conservation goals through 2030, known as COP15, Shanghai delegation, as the only delegation of a municipality directly under the Central Government, held a side event and thematic exhibition on the theme of The Integration of City and Nature, the Intersection of Estuary and Ocean in the China Pavilion of the event, which received great attention from the COP15 organizers and the Chinese delegation. Huang Runqiu, Chairman of COP15 and Minister of Ecology and Environment, paid a visit and fully affirmed Shanghai's achievements in ecological civilization construction, green development transition and biodiversity conservation. Zhao Yingmin, head of the Chinese delegation and Vice Minister of Ecology and Environment, expressed his hope that Shanghai would make greater contributions to global and Chinese biodiversity conservation from a new starting point. The event showcased the image of Shanghai city with vivid cases and international language, which was welcomed and affirmed by domestic and foreign experts and scholars, participants, audience and media.

Pollutant Discharge Permit Management

The pollutant discharge permit system was fully implemented and the dynamic and overall coverage of pollutant discharge permit was promoted. In 2022, a total of 2,750 approvals for pollutant discharge permits were handled throughout the year. By the end of 2022, there were about 43,000 pollutant discharge units included in the management of pollutant discharge permits in the city, including 4,845 licensed units and about 38,000 registered units.

Pollutant discharge permit was promoted to improve the quality and efficiency. The *Implementation Plan for Improving Quality and Efficiency of Shanghai Pollutant Discharge Permit (2022-2024)* was formulated, the "Double Hundred" task of national permit quality and implementation report inspection was completed, and on-site inspection of pollutant discharge permit quality and implementation was carried out.The construction of a fixed pollution source supervision system with the pollutant discharge permit system as the core was promoted. The *Detailed Rules for the Implementation of Shanghai Pollutant Discharge Permit Management* was revise and the requirements for the issuance, supervision, and management of pollutant discharge permits were improved; The *Notice on Regulating the Technical Assessment of Pollutant Discharge Permits for Fixed Pollution Sources in Shanghai* was issued, and the technical assessment procedures and technical requirements for the issuance of pollutant discharge permits were standardized.The comprehensive supervision information system of fixed pollution sources was built and put into trial operation, and the fixed pollution source information database was dynamically updated.

Radiation Safety Management

In 2022, Shanghai handled 1,653 radiation safety permits, 345 radioisotope transfers, 175 EIA documents for radiation construction projects, 35 exemptions for radioisotopes and radiation devices, 2,539 law enforcement inspections, 72 administrative punishment cases, and collected and stored 41 radioactive waste sources and 251 kilograms of radioactive waste.

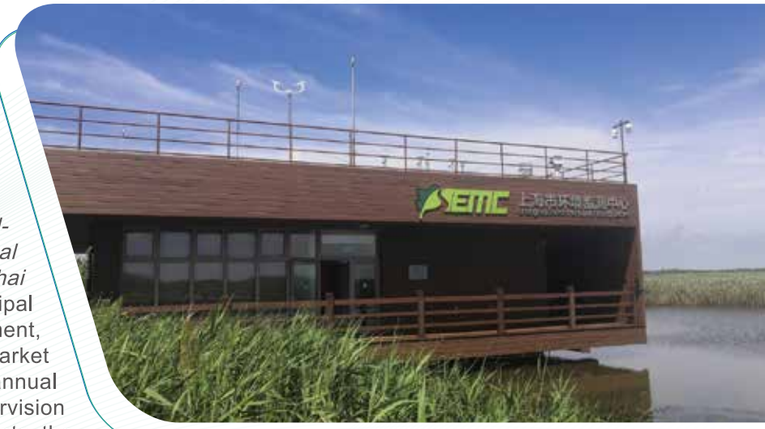
Shanghai built a strong defense line to ensure radiation safety, Shanghai Municipal Bureau of Ecology and Environment, Shanghai Municipal Transportation Commission, Shanghai Municipal Health Commission, Shanghai Municipal Emergency Bureau, Shanghai Municipal Civil Defense Office and Shanghai Customs District jointly issued the *Shanghai Nuclear Safety Coordination Mechanism (Trial)* , organized the revision of the *Shanghai Emergency Plan for Handling Nuclear and Radiation Accidents*, completed the investigation of radiation safety hazards of nuclear technology utilization units in this city, self-assessment of radiation monitoring and emergency work of ecological environment departments, verification of electromagnetic radiation environmental monitoring of communication base stations and other special work, properly handled the identification of two suspected radioactive substances and handled emergencies, and promoted the deepening operation of the "online monitoring platform of high-risk mobile sources". Shanghai implemented targeted law popularization to regulatory units, published typical radiation safety law enforcement cases in the city, issued radiation safety management notices in medical and flaw detection industries, and prepared test questions for Class III radiation devices; publicized the public on the Nuclear Safety Law and the prevention and control of electromagnetic radiation pollution during National Security Education Day on April 15 and World Environment Day on June 5.

06 Technical Support

Ecological Environmental Monitoring

The integration of the Yangtze River Delta was promoted with high standards. *The Implementation Plan for Ecological Monitoring in the Demonstration Zone of Green and Integrated Ecological Development of the Yangtze River Delta Region* was jointly issued by the ecological environment departments of the two provinces and one city in the Yangtze River Delta and the Executive Committee of the Demonstration Zone, the annual ecological environment quality report of the demonstration zone was released for the first time, and the air quality forecast for the next seven days in the cross-provincial Yangtze River Delta region in China was realized leading by Shanghai. The pilot work of carbon monitoring and evaluation in the city was further promoted, the preparation of the *Pilot Work Plan of Carbon Monitoring and Evaluation in Shanghai* was completed, and an atmospheric environmental greenhouse gas monitoring system based on "fixed site + drone monitoring + satellite remote sensing" was initially established. The application of water quality automatic monitoring data was strengthened, the management of groundwater environmental monitoring wells was standardized, the monitoring and evaluation of agricultural side source pollution was promoted, and the completion of the distribution of agricultural side source pollution monitoring constituencies were coordinated in Chongming, Jinshan, Qingpu and Fengxian districts.

The supervision and management of pollutant discharge units was continually strengthened in the city, and the self-monitoring, self-assistance, self-guidance, and the special inspection of automatic monitoring of pollutant discharge units were organized; The *Guidelines for Supervision and Inspection of Socialized Service Institutions for Ecological Environment Monitoring in Shanghai (Trial)* was issued, Shanghai Municipal Bureau of Ecology and Environment, together with Shanghai Municipal Market Supervision Bureau, carried out the annual "two randomly and one public" supervision and spot check work to jointly promote the quality management of social monitoring institutions.



Special Actions

Continuously improving the efficiency of supervision and the guidance of credit evaluation

Shanghai Municipal Bureau of Ecology and Environment issued the *Guidelines for Supervision and Inspection of Socialized Service Institutions for Ecological Environment Monitoring in Shanghai (Trial)*, improved the supervision mechanism combining daily inspection with special supervision and inspection, continuously improved the ability to identify problems and prevent and resolve risks to forced social monitoring institutions to strengthen internal quality management; released the annual credit evaluation results of social monitoring institutions for the third time, strengthening the collection and sharing of credit information and guiding various enterprises and institutions to select social monitoring institutions with lower credit risks. In 2022, the proportion of A-level and B-level social monitoring institutions undertaking environmental monitoring business in Shanghai was 62%, up 13 percentage points over the same period of 2021.

Ecological Environmental Science and Technology

Focusing on the major strategies and key tasks of environmental protection, more than 43 scientific research projects were organized. Focusing on the key and difficult issues of grass-roots environmental governance, fields including environmental monitoring, supervision and law enforcement were strengthened, and 20 youth scientific research projects were carried out. Complete the acceptance of Dianshan Lake Scientific Observation Station of Complex Air Pollution in Yangtze River Delta supported by the Ministry of Ecology and Environment; Complete the acceptance of the Municipal Environmental Science and Technology Innovation Platform of the Key Laboratory of Environmental Big Data and Intelligent Decision-making of Jiaotong University; Carry out the monitoring, evaluation, and improvement of environmental and health literacy, and continue to promote the construction of the National Key Laboratory for Environmental Health Impact Assessment of New Pollutants in Environmental Protection.

To accelerate the high-quality development of green and low-carbon industries, the Municipal Bureau of Ecology and Environment, Baoshan District People's Government and Shenergy Group jointly guided the establishment of Shanghai Green and Low-carbon Service Base, launched the city's green and low-carbon innovation competition, and explored new mechanisms to guide innovation and promote the transformation of achievements. The green and low-carbon CTO community of science and technology innovation version was launched by Shanghai Municipal Bureau of Ecology and Environment cooperating with the Municipal Science and Technology Commission, Shanghai Science and Technology Innovation Center, and Shanghai Technology Exchange.

Ecological Environmental Standards

The public consultation on local standards for semiconductors and aquaculture tail water was organized and completed, and the revision of water pollutant discharge standards in local pharmaceutical industry was coordinated and promoted; The post-evaluation of five local standards was started; A seminar on the integration of ecological environment standards in the Yangtze River Delta was organized to jointly plan the specific work of the integration of ecological environment standards; Together with the ecological departments of the three provinces and one city, the publicity and training of air standards in the integrated pharmaceutical industry in the Yangtze River Delta was held, further assisting enterprises to implement and improve the technical level of air pollution prevention and control in the industry; Together with the Municipal Environmental Protection Industry Association, the preparatory work for the establishment of the Shanghai Ecological Environmental Protection Standardization Technical Committee was completed.

Digital Transformation

In 2022, focused on the digital transformation projects such as Government Online-Offline Shanghai and One Network Unified Management, Shanghai Municipal Bureau of Ecology and Environment continuously improved the ability of "doing things online" in the ecological environment, connecting a total of 63 items to the Government Online-Offline Shanghai platform and completing more than 15,000 pieces throughout the year. Shanghai implemented "two certificates in one" for the examination and approval of environmental impact assessment documents of construction projects to streamline administration, expanded the related public services of "spatial analysis of ecological environment zoning management and control", and realized one set of materials, one-off acceptance, simultaneous examination and approval and one-stop conclusion of environmental impact assessment and pollutant discharge permit of construction projects. The ability of One Network Unified Management for coordinated management of ecological environment was strengthened, constantly improving and integrating the ecological environment perception network, including more than 6,000 automatic monitoring stations and online monitoring points of pollution sources, expanding the application scenarios of soil pollution prevention and control, and enhancing the ability of targeted control of ecological environment conditions. Shanghai promoted the integration of application systems, strengthened data governance, improved the construction of "one file for one source" for more than 47,000 fixed pollution sources, strengthened the comprehensive supervision system for fixed pollution sources, and promoted the integration of the ecological environment mobile law enforcement system into the unified law enforcement platform of the whole city. The network security supervision and inspection was enhanced, and there were no network security incidents throughout the year.

International Cooperation

During the 2022 World City Day home event and the Global Conference on Urban Sustainable Development, the Shanghai Municipal Bureau of Ecology and Environment, the United Nations Development Programme, and the World Resources Institute jointly hosted the "Urban Green Transformation and Development Theme Forum" in Shanghai; Attended the second phase of COP15 Conference of the Parties to Biodiversity in Canada, participated in the "Shanghai Day" exhibition, and host the theme side event of "Integration of City and Nature, Intersection of Estuary and Ocean" in Shanghai; Participated the "2022 Macao International Environmental Protection Cooperation and Development Forum and Exhibition" as a delegation invited by Macao Environmental Protection Bureau.

07 Creation of Eco-Civilization Demonstration

Demonstration Area of Ecological Civilization Construction

In 2022, Jinshan District was listed in the sixth batch of national ecological civilization construction demonstration zones. Jinshan District firmly implemented the strategic requirements of North-South Transformation, made every effort to create a new image of vibrant, beautiful and happy bay area, realized ecological innovation from production and living process to system and then to concept level, and realized the leap from traditional industrial civilization to new ecological civilization. The system of ecological civilization became increasingly perfected, with the district ecological environmental protection working committee dually headed by the CPC Jinshan District Committee Secretary and the District Head established, extending governance to the village level and significantly improving the environmental governance system and governance capacity. The concept of ecological civilization is deeply rooted in the hearts of the people. 23 environmental education bases and 20 practice points of ecological civilization self-cultivation were built in the district, and a number of publicity brands such as “Xiao Jiang talking about environmental protection” were created. The public service advertisements and cultural products launched won the Excellence Award and the Best Public Service Advertisement Award in the National Short Video Public Welfare Competition of the Ministry of Water Resources respectively.

“Two Mountains” Practice Innovation Base

In 2022, Maqiao Town was listed in the sixth batch of national practice and innovation bases of the concept “lucid waters and lush mountains are invaluable assets”. Maqiao Town, Minhang District made great efforts to create the style of Maqiao with “blue sky, green land and clear water”, implemented a number of ecological projects to benefit the people, improved the “15-minute community living circle”, and accelerated the construction of a park city where parks are at a stone’s throw. The per capita park green area was 11.7 square meters, and the green coverage rate was over 30%, ranking first in the whole district. Maqiao Town focused on the activation and utilization of ecological and cultural resources, actively integrated into the development of cultural and sports tourism industry and ecological agriculture industry, made efforts in multiple formats and promoted diversification, transformed “natural resources” into “ecological capital”, and actively created a new model of Shanghai agriculture and rural areas with the characteristics of Jiangnan water town. Focusing on the development goal of artificial intelligence innovation and development highland and Shanghai’s role As the bridgehead of the Land Silk Road, Maqiao vigorously developed intelligent manufacturing industry and comprehensively promoted industrial green transformation. Maqiao AI Innovation Experimental Zone has been included in 26 characteristic industrial parks in Shanghai.

Eco-friendly Demonstration Industrial Park

9 National Eco-industry Demonstration Park in Shanghai actively practiced the concept of green and low carbon, compiled and completed the work plan and implementation path of carbon peaking and carbon neutrality, and leaded the promotion of regional green transformation and development. Shanghai International Automobile City Parts Supporting Industrial Park, Shanghai Lingang Songjiang Science and Technology City, and Shanghai Caohejing Development Zone Pujiang High-tech Park have been approved as the Shanghai Eco-industry Parks after accepted by experts.

08 Collaboration in the Yangtze River Delta Region

Regional Green and Low-carbon Development

Shanghai completed the refinement of the “three lines and one list” ecological environment zoning control; promoted the elimination of backward production capacity, implemented clean energy substitution, and improved the shore power coverage and utilization rate of inland port ships; Zhejiang Provincial Department of Ecology and Environment, Shanghai Municipal Bureau of Ecology and Environment, Jiangsu Provincial Department of Ecology and Environment, Yangtze River Delta Eco-Green Integrated Development Demonstration Zone Executive Committee jointly issued the Notice on Printing and *Distributing the List of Ecological Environment Access in the Demonstration Zone of Green and Integrated Ecological Development of the Yangtze River Delta Region.*

Co-protection and Treatment of Ecological Environment

Shanghai jointly convened the 4th Green Yangtze River Delta Forum with the theme of Lake and Reservoir Eutrophication Control and Watershed System Governance; Strengthened the prevention and control of air pollution in the “2 + 12” areas around Hangzhou Bay and Jiangsu and Anhui provinces; studied and deployed joint prevention and control of key sea areas in the Yangtze River Estuary-Hangzhou Bay; established a cross-regional joint prevention and control and law enforcement mechanism for solid waste and hazardous waste, and accelerated the comprehensive utilization of solid waste in key industries; promoted the construction of greenways in metropolitan areas, and orderly implemented the ecological compensation mechanism for inter-provincial basins such as Xin’an River and Chuhe River.

Coordinated Guarantee of Regional Policies

Shanghai implemented mutual recognition of regional non-road mobile machinery identification marks; promoted the coordinated control of the total amount of major pollutants in the region; established a regional ecological environment education alliance; promoted the reform of environmental assessment system in demonstration areas and completed the adjustment of drinking water source protection zoning in demonstration areas under the cooperation with Shanghai and Zhejiang; prepared and published the *Ecological Environment Quality Report of the Demonstration Zone of Green and Integrated Ecological Development of the Yangtze River Delta Region (2021)*.

Public Participation and Supervision

01 Environmental Publicity

In 2022, focused on the theme of “Embarking on a New Journey, Contributing to the New Era”, the ecological environment system in Shanghai deeply publicizes Xi Jinping Thought on Eco-civilization and constantly innovated publicity methods.

Strengthening news media publicity. News reports on various topics, special topics and during important periods were organized, and 88,000 articles of Shanghai environment-related news were published and quoted on the Internet with focus on key tasks such as promoting the development of low-carbon life, laying a solid foundation for pollution prevention and control, and ecological environment cooperation in the Yangtze River Delta region. Columns such as the Voice of the Iron Army Fighting Epidemic, the Iron Army Fighting Epidemic, and the Illustration of the Defense against Epidemic were published to present the progress of epidemic prevention and control in the ecological environment system, typical deeds and the high-spirited spirit of the Eco-environmental Iron Army, and help win the defense battle against COVID-19.

Telling the story of Shanghai’s environmental protection well. Shanghai produced Shanghai Promotional Film on COP15 (2022) and won the Silver Dove Award, the highest overseas publicity award in Shanghai. Shanghai summarized Shanghai’s experience and practice in promoting ecological civilization construction and protection and published Beautiful Shanghai with Harmonious Coexistence between Man and Nature. High-quality promotional videos, such as Seeing *Beautiful China from Here-Shanghai, Green and Beautiful Yangtze River Delta, Biodiversity-Endless Life in Shanghai*, were released. Throughout 2022, 1,684 WeChat articles and 6,236 Weibo posts regarding Shanghai’s environmental protection were published.

Enhancing social popularization of science. To promote “Beautiful China, I’m a Contributor”, Shanghai carried out theme publicity activities at important occasions such as the World Environment Day, International Day for Biological Diversity and National Low Carbon Day.Shanghai Municipal Bureau of Ecology and Environment, Shanghai Municipal Education Commission, Shanghai Energy Conservation Center, Cailian Press, Shanghai Lanscaping and City Appearance Administrative Bureau and other departments and units jointly carried out popular science propaganda activities, such as the selection activities of Top Ten Environmental Protection Spokespersons, Green and Low Carbon Life Golden Ideas, The Most Beautiful Ecological Environment Volunteers and National Top Ten Environmental Protection Facilities Open Units, organized the Green Future 2022 theme forum activities, Insect Secret Service Parade, and guided the construction of multi-level, multi-form and multi-channel ecological environment protection by all the people.

02 Environmental Education

Shanghai actively promoted the opening of environmental protection facilities to the public. Besides a total of 90 units in the open list, new units in new fields such as electricity and petrochemicals were opened to the public. The re-evaluation of the fourth batch of Shanghai Environmental Education Bases was completed, promoting the newly identified 39 bases to consolidate the basic work of environmental education. Shanghai continued to do a good job in the establishment of international ecological schools, and held the preliminary competition of Shanghai Division of the 20th National Water Science and Technology Invention Competition for Middle School Students and Huanding Youth Environmental Protection Creative Competition 2022-2023. Shanghai organized small-scale funded projects of Shanghai environmental protection social organizations and jointly hosted the Building a Community of Life on Earth-Community Ecological Environment Education Seminar.

03 Handling of Complaints

In 2022, the city’s ecological environment system accepted 13,389 work orders from the citizen service hotline 12345, down 35.6% year-on-year. Among them, there were 8,271 air pollution claims, accounting for 61.8% of the total, mainly concentrated in industrial waste gas; 1,705 claims for noise pollution, accounting for 12.7% of the total, focusing on social life noise and industrial noise; 1,789 policy consultations related to motor vehicles, accounting for 13.4% of the total; 468 water pollution claims, accounting for 3.5% of the total; 456 complaints about construction projects, accounting for 3.4% of the total; other complaints and consultations, including solid waste, electromagnetic radiation and air quality, accounting for 5.2% of the total.

In 2022, Shanghai’s ecological environment system received 3,458 letters and visits, down 17.6% year-on-year. Among them, there were 3,246 environmental pollution complaints, down 16.4% year-on-year. There were 1,714 cases on air pollution, a year-on-year decrease of 2.7%; 234 cases on wastewater pollution, a year-on-year decrease of 22.5%; 748 cases on noise pollution, a year-on-year decrease of 28.3%; 241 cases on oil fume pollution, a year-on-year decrease of 42.6%.

04 Suggestion and Proposal Handling

In 2022, Shanghai Municipal Bureau of Ecology and Environment received 117 suggestions from NPC deputies and CPPCC proposals. Among them, there were 44 suggestions from NPC deputies (12 solely- and co-organized and 32 jointly-organized) and 73 proposals from CPPCC (19 soely- and co-organized and 54 jointly-organized). Concentrating on the environmental issues that the deputies of the Municipal People's Congress and CPPCC members focus on, highlighting carbon peaking and carbon neutrality, promoting the integration of ecological and environmental protection in the Yangtze River Delta and further optimizing the business environment, Shanghai Municipal Bureau of Ecology and Environment arranged special studies by relevant departments, and all the handling results of the solely or co-organized projects were solved or adopted.