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# 2024

# REPORT ON THE STATE OF THE ECOLOGY AND ENVIRONMENT IN BEIJING

Beijing Municipal Ecology and Environment Bureau

# 2024 Report on the State of the Ecology and Environment in Beijing

*The 2024 Report on the State of the Ecology and Environment* in Beijing is hereby released in accordance with the *Environmental Protection Law of the People's Republic of China*.

Beijing Municipal Ecology and Environment Bureau

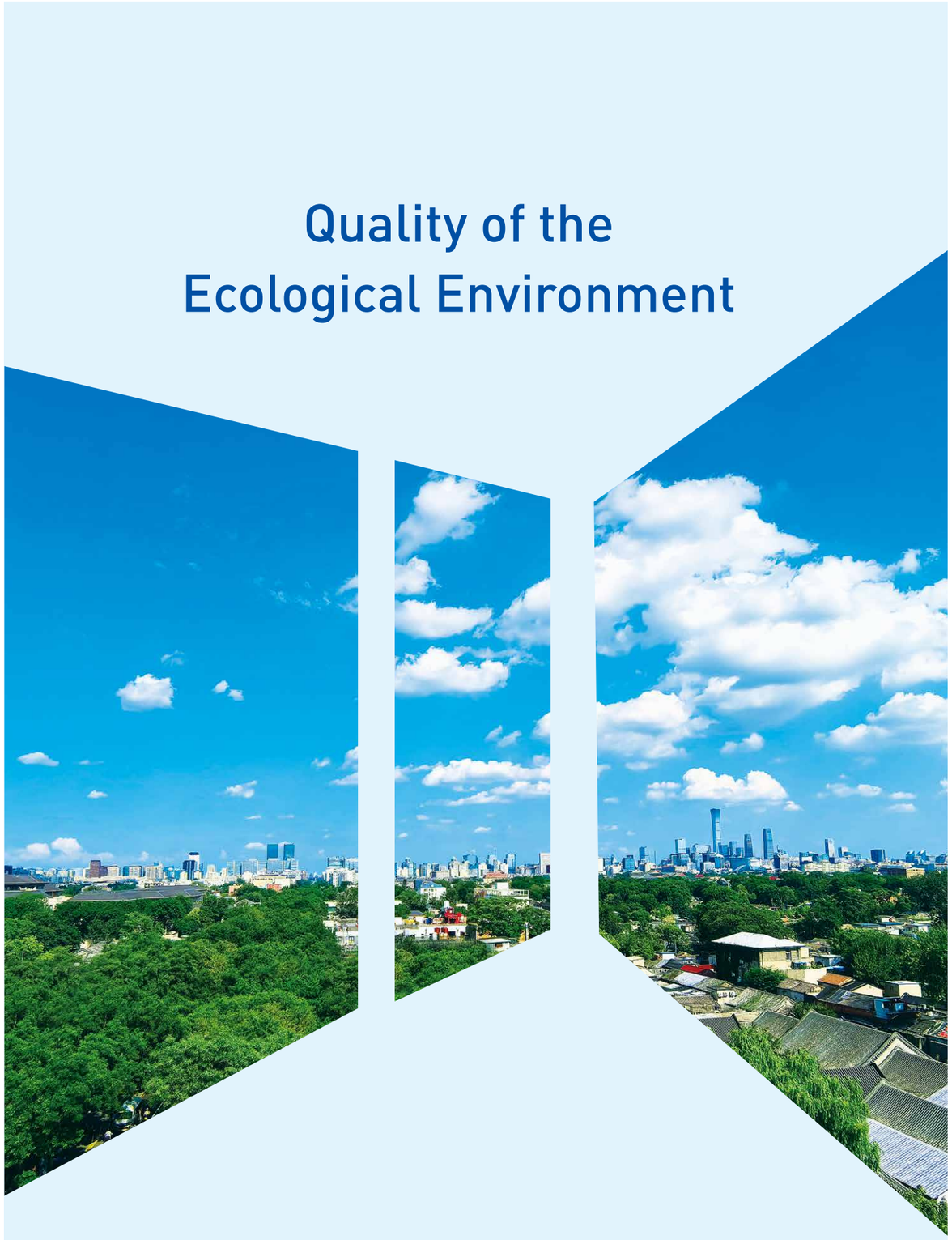
April 2025

# Contents

# OVERVIEW

In 2024, following the guidance of Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era, especially Xi Jinping Thought on Ecological Civilization, Beijing implemented the guiding principles from the 20th National Congress of the Communist Party of China (CPC) and the second and third plenary sessions of the 20th CPC Central Committee. Acting on the deployments of the National Conference on Ecological and Environmental Protection, we advanced the Green Beijing Strategy, promoted high-quality development in tandem with high-standard protection, and dedicated efforts to building a beautiful Beijing, steadily improving the environment. The annual average concentration of fine particulate matter ($PM_{2.5}$) was 30.5 μg/$m^3$, meeting the Grade II national air quality standard for the fourth consecutive year and setting a new record for the number of days with good or excellent air quality since the monitoring started. The water ecological environment quality continued to improve while the soil ecological environment quality remained good. The overall state of the ecology and environment in Beijing kept improving steadily, while the carbon dioxide emissions per 10,000 *yuan* of GRP (Gross Regional Product) remained the lowest among provincial-level jurisdictions in China. The "green quotient" of the capital city's ecological environment has been further increased.

# Quality of the Ecological Environment





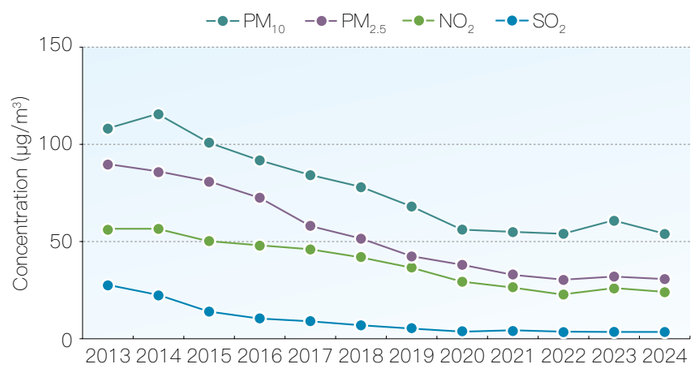
## Atmospheric Environment

Beijing's air quality kept improving. The annual average concentration of $PM_{2.5}$ met the Grade II national air quality standard for the fourth consecutive year, setting a new record for the number of days with good or excellent air quality since the monitoring started.

### Citywide Air Quality Status

The annual average concentration of $PM_{2.5}$ was 30.5 μg/m$^3$, down by 6.2% year-on-year. The annual average concentration of sulfur dioxide ($SO_2$) was 3 μg/m$^3$, which maintained in single-digit level for eight consecutive years. The annual average concentration of nitrogen dioxide ($NO_2$) was 24 μg/m$^3$, down by 7.7% year-on-year. The annual average concentration of inhalable particulate matter ($PM_{10}$) was 54 μg/m$^3$, down by 11.5% year-on-year. The 95$^{th}$ percentile value of the 24-hour average concentrations of carbon monoxide (CO) was 0.9 mg/m$^3$, remaining at low concentration levels. The 90$^{th}$ percentile value of the daily maximum 8-hour average concentrations of ozone ($O_3$) was 171 μg/m$^3$, down by 2.3% year-on-year.

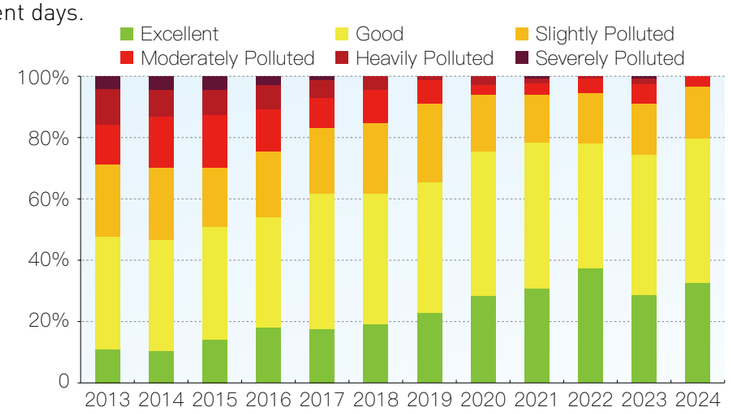
Compared with 2013, the annual average concentrations of $PM_{2.5}$, $SO_2$, $NO_2$ and $PM_{10}$ in the city decreased by 65.9%, 88.7%, 57.1% and 50.0%, respectively; while the 95$^{th}$ percentile value of the 24-hour average concentrations of CO and the 90$^{th}$ percentile value of the daily maximum 8-hour average concentrations of $O_3$ decreased by 73.4% and 6.8%, respectively.



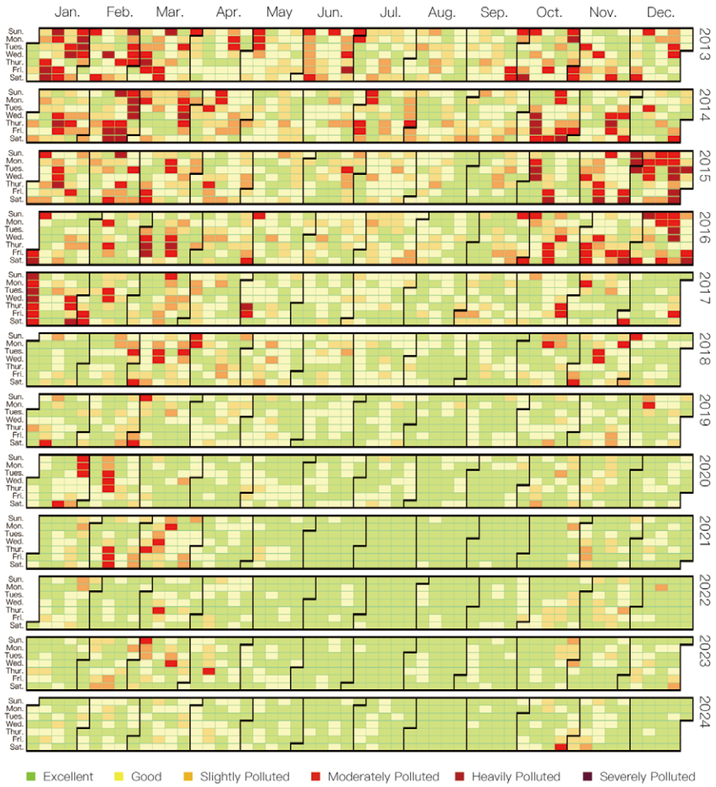

Trends of the Annual Average Concentrations of Major Air Pollutants in Beijing, 2013-2024

Note: The Grade II limits for the six major air pollutants in China's Ambient Air Quality Standard (GB3095-2012) are as below: $PM_{2.5}$: 35 μg/m$^3$; $SO_2$: 60 μg/m$^3$; $NO_2$: 40 μg/m$^3$; $PM_{10}$: 70 μg/m$^3$; CO: 4 mg/m$^3$ (24-hour average); $O_3$: 160 μg/m$^3$ (daily maximum 8-hour average).

In 2024, the number of days with good or excellent air quality was 290 in Beijing, accounting for 79.2% of the year, the highest since record-keeping began, which is 19 days more than the previous year, and 114 days more than 2013. The number of days with heavy air pollution was 2 (including 1 day of heavy pollution caused by inflow of sand-dust storms), the lowest annual record with an occurrence rate of 0.5%. Throughout the year, sand-dust storms accounted for 7 non-attainment days.




Interannual Variation in the Proportion of Days with Various Air Quality Grades in Beijing, 2013-2024




Ambient $PM_{2.5}$ Calendar in Beijing, 2013-2024





## Air Quality at District Level

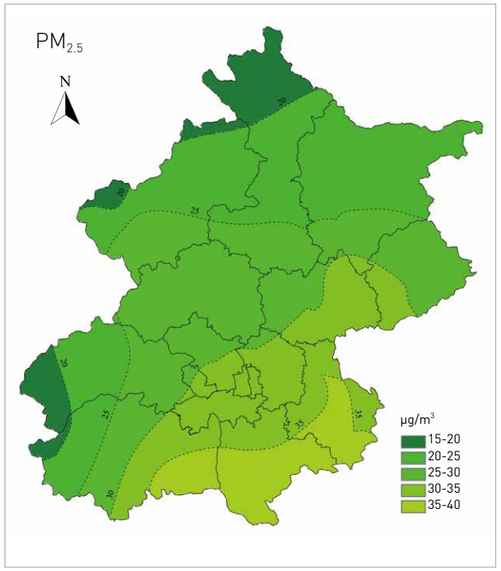
In terms of the different districts in Beijing, their annual average concentrations of $PM_{2.5}$ ranged from 25.6 to 33.9 μg/m$^3$, $SO_2$ from 2 to 3 μg/m$^3$, $NO_2$ from 15 to 32 μg/m$^3$, and $PM_{10}$ from 44 to 61 μg/m$^3$, all in compliance with the national Grade II standard.

Annual Average Concentrations of Major Air Pollutants at District Level in Beijing

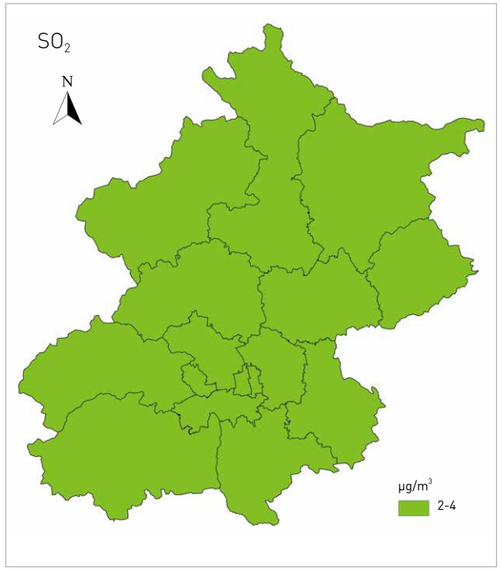
Unit: μg/m$^3$

| | $PM_{2.5}$ | $SO_2$ | $NO_2$ | $PM_{10}$ |
|---|---|---|---|---|
| Dongcheng | 33.9 | 3 | 28 | 57 |
| Xicheng | 33.6 | 3 | 30 | 59 |
| Chaoyang | 31.8 | 3 | 32 | 56 |
| Haidian | 30.6 | 3 | 28 | 54 |
| Fengtai | 32.3 | 3 | 29 | 60 |
| Shijingshan | 31.1 | 3 | 30 | 60 |
| Mentougou | 28.6 | 3 | 24 | 55 |
| Fangshan | 32.8 | 2 | 23 | 61 |
| Tongzhou | 33.9 | 3 | 30 | 60 |
| Shunyi | 28.7 | 3 | 23 | 52 |
| Changping | 27.1 | 3 | 20 | 51 |
| Daxing | 33.2 | 2 | 28 | 61 |
| Huairou | 26.6 | 3 | 15 | 44 |
| Pinggu | 29.4 | 3 | 16 | 51 |
| Miyun | 25.6 | 3 | 18 | 46 |
| Yanqing | 27.0 | 3 | 16 | 45 |
| Beijing Economic-Technological Development Area | 32.6 | 2 | 31 | 57 |

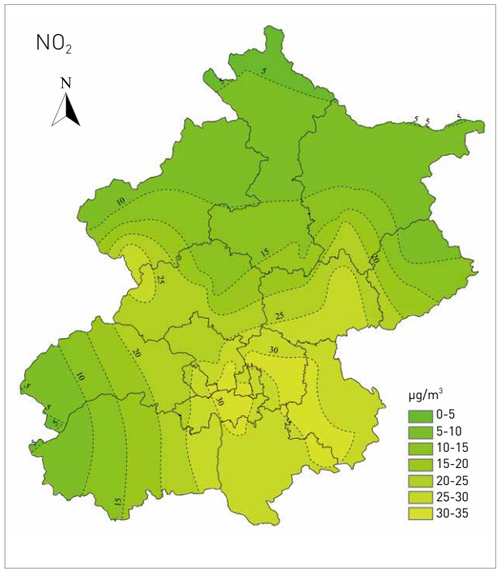
*Source: data from monitoring sites for urban environmental assessment at the district level



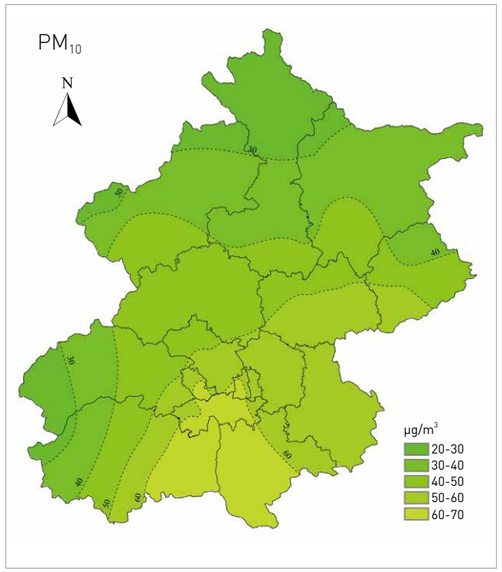

Spatial Distribution of Ambient $PM_{2.5}$ Concentration in Beijing




Spatial Distribution of Ambient $SO_2$ Concentration in Beijing




Spatial Distribution of Ambient $NO_2$ Concentration in Beijing




Spatial Distribution of Ambient $PM_{10}$ Concentration in Beijing

## Assessment by Monitoring Stations with Special Functions

Results from the inter-provincial pollution monitoring stations showed that the $PM_{2.5}$ annual average concentration monitored from the 3 stations located near the southwestern, southeastern and southern inter-provincial border of Beijing was 37.3 μg/m$^3$, 22.3% higher than the citywide average level; while the $PM_{2.5}$ annual average concentration monitored from the 2 stations located near the northeastern and northwestern inter-provincial border of Beijing was 25.4 μg/m$^3$, 16.7% lower than the citywide average.

Results from the traffic pollution monitoring stations showed that for roadside environment, the $PM_{2.5}$ annual average concentration was 35.1 μg/m$^3$, 15.1% higher than the citywide average; the $NO_2$ annual average concentration was 42 μg/m$^3$, 75.0% higher than the citywide average.

For the urban background monitoring station at Dingling of Changping District, the $PM_{2.5}$ annual average concentration was 26.6 μg/m$^3$, 12.8% lower than the citywide average.

Special Column

### The 100-Day Targeted Action for Dust Control

Fully-enclosed Construction in Foundation Pits with Air-supported Membrane Dome

Spring is both the peak season for dust pollution and a critical window for its control. In 2024, Beijing launched the 100-day targeted action for dust control. With strengthened scientific and technological support and leveraging big data methods such as remote sensing, ground patrols, video surveillance and mobile monitoring, we can efficiently identify prominent cases of dust pollution, promptly transfer them for rectification, conduct follow-up inspections and ensure closed-loop resolution.

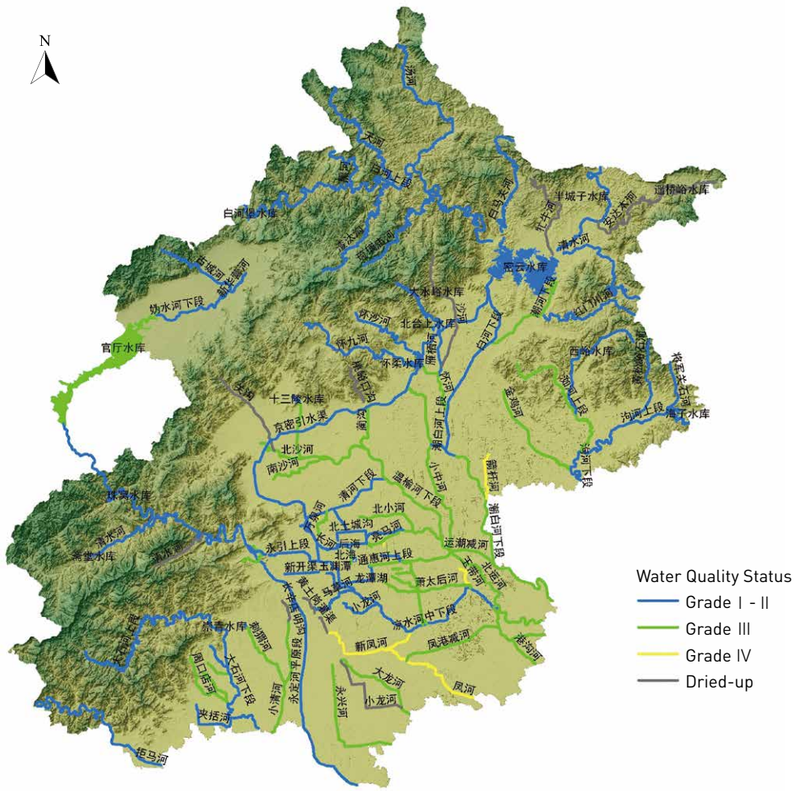
For road dust, starting from roads with "poor" dust load ratings, rectification and improvements were carried out with tailored solutions for each road, to further elevate the level of road cleaning and sanitation, and eradicate every case found. For dust emissions from construction sites, innovative technologies were applied. With the promotion of fully-enclosed construction in foundation pits with air-supported membrane dome, dust pollution during earth excavation were effectively reduced by over 90%. After the action, all key indicators of dust had significant improvement. To name a few, the citywide road dust load decreased by 21.4% year-on-year, the dust load at construction site exits dropped 34.1% year-on-year, and the citywide $PM_{10}$ concentration fell by 12.0% year-on-year.

# Water Ecological Environment

The citywide water ecological environment quality continued to improve. In 2024, the annual average concentrations of major pollutants in surface water further decreased, with water bodies inferior to the Grade V standard dynamically eliminated. The water quality of centralized surface drinking water sources met national standards. The groundwater quality remained stable. The ecological status of the water environment was good.

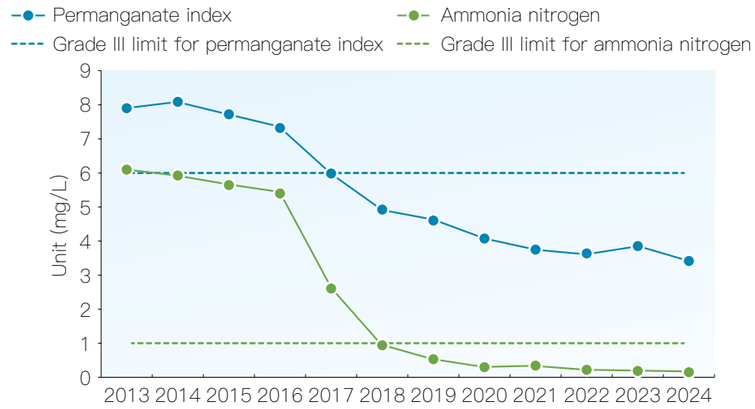
## Surface Water Quality

The surface water quality continued to improve. Generally, the upstream water quality was better than downstream.




Surface Water Quality Status in Beijing

Averaged from surface water monitoring sections in Beijing, the annual permanganate index was 3.40 mg/L, with a year-on-year decline of 11.2%, and the annual ammonia nitrogen concentration was 0.17 mg/L, with a year-on-year decline of 22.7%. Compared with 2013, the permanganate index and annual ammonia nitrogen concentration decreased by 56.9% and 97.2%, respectively. Among all types of surface water bodies in Beijing, the water quality of reservoirs was preferable, followed by rivers and lakes.

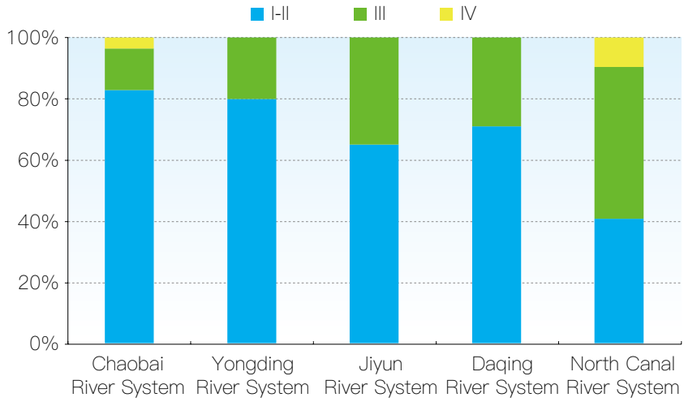



Trend of the Annual Average Concentrations of Major Pollution Indicators in Beijing's Surface Water, 2013-2024

## Rivers

In 2024, a total of 105 rivers from the five major river systems were monitored, covering a length of 2,551.6km. Within the total length, 87.2% met the Grade I-III national standard for water quality, which is 15.9 percentage points more than the previous year. No rivers inferior to the Grade V national standard were found, and all rivers achieved their planned water quality. Compared with 2013, the proportion of rivers with Grade I-III water quality increased by 37.4 percentage points, while the proportion of rivers inferior to Grade V standard decreased by 44.1 percentage points.

In terms of the proportion of water bodies with good or excellent grades, all the five major river systems maintained good water quality, among which the water quality of Jiyun River System had the most significant improvement.




Water Quality of the Five Major River Systems in Beijing

## Lakes

In 2024, a total of 22 lakes were monitored, covering a water surface area of 7.196 million square meters. Within the total monitored area, 63.5% met the Grade I-III national standard for water quality, an increase of 5.2 percentage points compared with last year; 36.5% were of Grade IV or V water quality, and no lakes inferior to Grade V standard were found. Compared with 2013, the proportion of lakes with Grade I-III water quality increased by 59.5 percentage points, and the proportion of lakes inferior to the Grade V standard decreased by 15.0 percentage points.

Tuancheng Lake, Kunming Lake, Bayi Lake, Yuyuantan Lake, Xihai Lake, Houhai Lake, Qianhai Lake, Beihai Lake, Tongzi River, Back-of-Exhibition-Hall Lake, and Qingnian Lake were under mesotrophic status. The rest of the lakes were all under slight eutrophication.

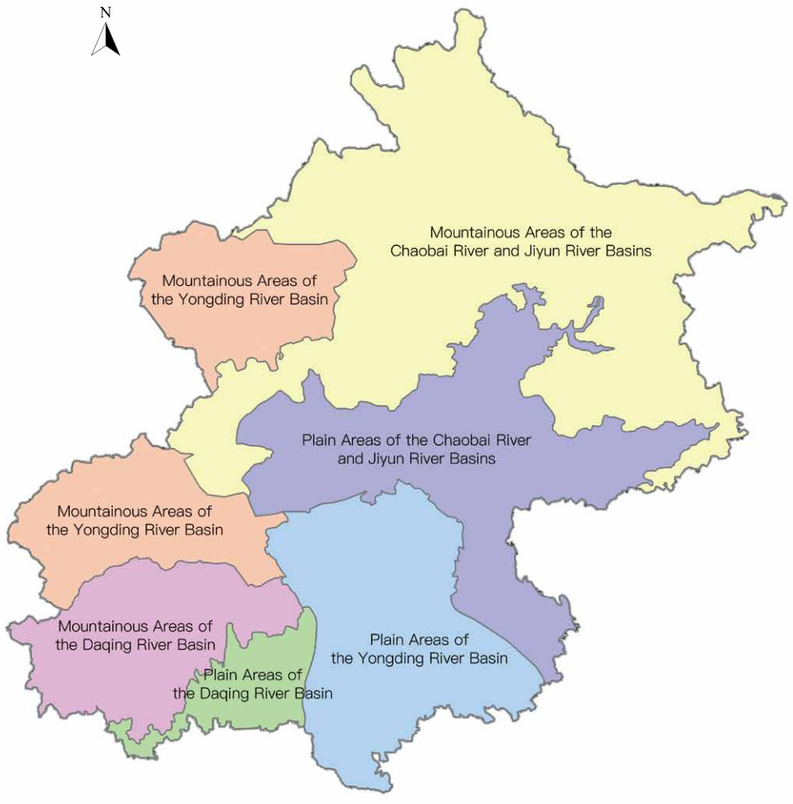
## Reservoirs

In 2024, a total of 14 medium and large-sized reservoirs were monitored, with an average total impoundage of 3.88 billion cubic meters. Grade I-III water quality accounted for 100% of the total impoundage, remaining stable year-on-year. Compared with 2013, the proportion of reservoirs with Grade I-III water quality increased by 12.3 percentage points.

The water quality in Miyun Reservoir and Huairou Reservoir remained stable at Grade II, meeting the national standard for drinking water sources. The water quality in Guanting Reservoir met the Grade III national standard and continued to improve.

## Groundwater Quality

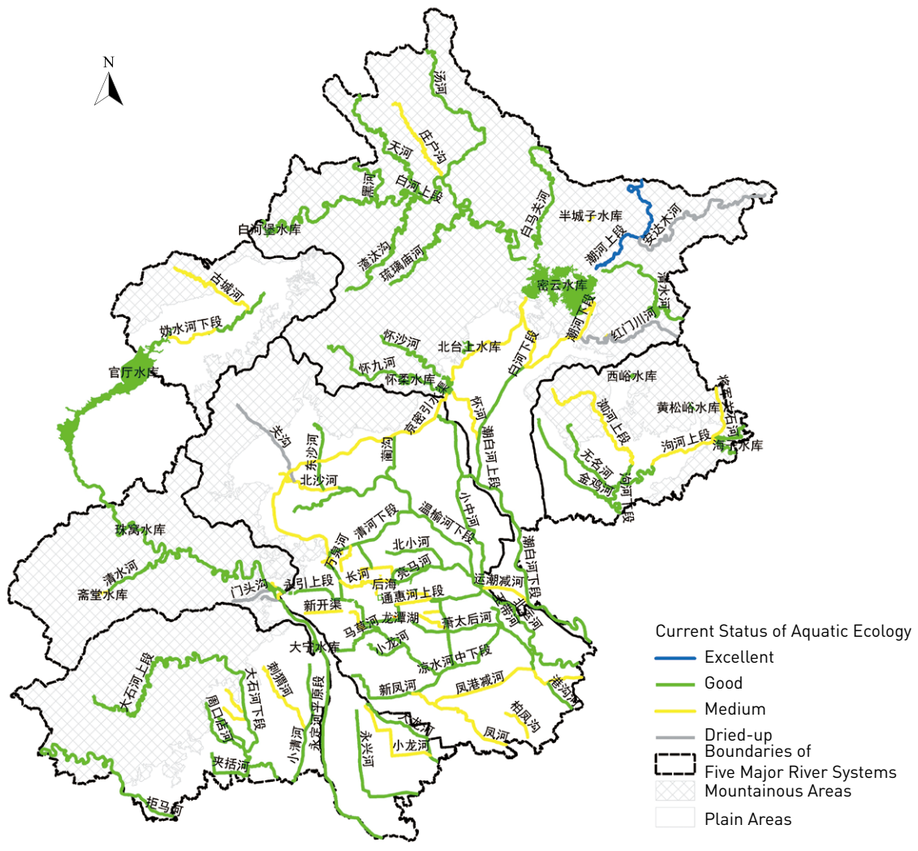
The overall quality of groundwater remained stable, with the water level slowly rising. From piedmont areas to plain areas, sediment particles in groundwater become finer and the aquifer structure gradually transitions from a single layer to multiple layers. In terms of horizontal distribution, the groundwater quality in piedmont areas such as Miyun, Huairou and Mentougou was generally better than that in central urban areas and downstream areas. In terms of vertical distribution, due to the close relation with surface water and precipitation, the quality of shallow groundwater remained in a natural state, mainly affected by the background factors such as iron, manganese and fluorides during hydro-geological and chemical processes.




Distribution of Groundwater Systems in Beijing

## Water Ecological Status

In 2024, the water ecology was sound in Beijing, with the water bodies in mountainous areas under generally better ecological conditions than those in plain areas. Comprehensive evaluation shows that the water ecological environment quality of rivers and reservoirs was "good", and that of lakes was "medium". The length of rivers with good ecological water quality accounted for 72.8% of the total length of rivers monitored, an increase of 17.5 percentage points compared with last year. In terms of spatial distribution, rivers in the mountainous areas mostly recorded "good" or "excellent" water ecological quality, and those in the plain areas mainly recorded "medium". In Beijing's five major river systems, the Chaobai River System registered the best water ecological quality. Reservoirs with good ecological water quality accounted for 61.1% of the total number of reservoirs monitored, including Huairou Reservoir and Miyun Reservoir.




Overview of Water Ecological Environment Quality in Beijing

## Aquatic Organisms

The monitoring of aquatic organisms went forward in the mainstreams and tributaries of Beijing's five major river systems, key lakes, as well as large and medium-sized reservoirs. From 2021 to 2024, a total of 617 species of phytoplankton, 283 species of zooplankton, 485 species of periphytic algae, 459 species of large benthic invertebrates, 78 species of fish and 66 species of aquatic macrophyte had been monitored. Among large benthic invertebrates, aquatic insects indicating clean water bodies, such as *Ephemeroptera*, *Plecoptera*, and *Trichoptera*, were frequently seen in mountainous rivers such as the upper reaches of the Chaohe River, the mountainous sections of the Yongding River, the Huaisha River and the Juma River, as well as in rivers of plain areas such as the Liangshui River and the Liangma River. Indigenous fish species such as *Pseudorasbora parva*, *Rhodeus sinensis* and *Carassius auratus* were the most common species. Fish species under second-class aquatic wildlife protection in Beijing, such as *Zacco platypus*, *Opsariichthys bidens*, and *Sarcocheilichthys nigripinnis*, were already widely distributed.

## Habitat

There was a gap in habitat conditions between the rivers in mountainous areas and those in plain areas. The rivers in mountainous areas were overall evaluated as "excellent" for habitat conditions, and those in plain areas were evaluated as as "medium". Among the five major river systems, the Chaobai River System had the best habitat conditions. Additionally, the lakes were overall evaluated as "medium" for habitat conditions, and the reservoirs were overall evaluated as "good" for habitat conditions.

Special Column

### Qinghe River, an Outstanding Case of the Third Batch of "Beautiful Rivers and Lakes"

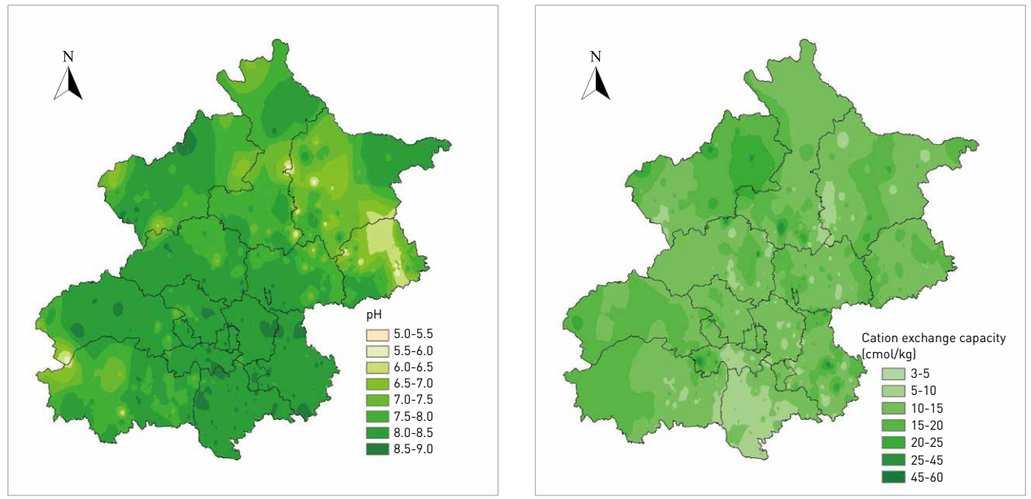
In December 2024, Qinghe River was selected into the third batch of outstanding cases of "beautiful rivers and lakes" released by the Ministry of Ecology and Environment. Originating from Beijing's Western Hills and running eastward across the districts of Haidian, Changping, Chaoyang and Shunyi, Qinghe River serves as a vital urban landscape river. Historically, excessive inflows of industrial and domestic sewage had greatly impaired Qinghe River's ecological environment, gradually transforming it into a black and odorous waterway.

In recent years, with the integrated governance of "Three Waters" (water resources, water environment, and water ecology), while bearing in mind the philosophy of "tackling pollution before rehabilitating rivers", Beijing has made systematic efforts across five key areas, including pollution source control, internal pollution treatment, ecological restoration, water replenishment for quality maintenance, and long-term management. As a result, the ecological environment quality of Qinghe River has significantly improved, with the water quality elevated from inferior to Grade V to Grade II. The river has been developed into an all-age-friendly urban waterfront integrating multiple functions of ecology, economy and culture, attracting nationally-protected bird species including the Oriental White Stork, Crested Honey Buzzard, and Pied Harrier. Lined with lush green paths and dappled shades, Qinghe River has become a river of happiness, where citizens can come to the riverside for photography, cycling, strolling, fishing and leisure.

# Soil Ecological Environment

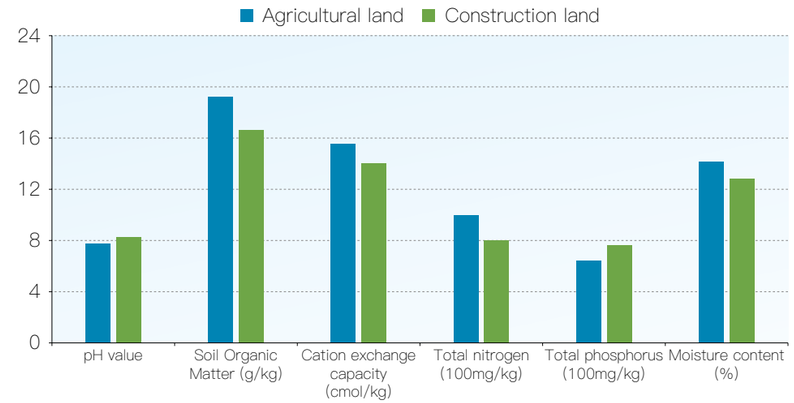
The quality of Beijing's soil ecological environment was good, and the environmental risks of soil were effectively controlled. Efforts were made to promote the category-based management of agricultural land, with strengthened protection of cultivated land, orchards and forests, as well as enhanced protection of soil environment in agricultural production areas. For the prevention and control of risks associated with construction land, emphasis was put on the source prevention at industrial enterprises and risk control of land parcels. The protection of unused land was also reinforced.

The content of major heavy metals in the soil across the city was stable compared to that during the 13th Five-Year Plan Period (2016-2020). The soils were generally neutral or weakly alkaline, with spatial distribution of pH values lower in the northeast and higher in the south. The soil nutrient retention and buffering capacity was generally above the medium level, with an average cation exchange capacity of 15.2 cmol (+) / kg, and was higher in the soil of mountainous forest areas.




Spatial Distribution of Soil pH Values and Cation Exchange Capacity in Beijing

No significant difference was found in soil pH values between agricultural land and construction land. Compared with construction land, agricultural land had higher values of organic matter content, cation exchange capacity, total nitrogen, moisture content and other indicators, featuring stronger soil fertility and water retention capacity.




Physical-Chemical Properties of Soil with Different Types of Land Use

Special Column

## Phased Remediation of Contaminated Soil on Construction Land

Beijing pioneered a phased remediation approach for contaminated soil of construction land, establishing a whole-process management mechanism featuring scientific commitment, joint assessment and strict supervision, with the *Regulation on Soil Pollution Prevention and Control in Beijing* as the institutional guarantee. On the premise of ensuring soil remediation meet standards, construction is permitted to proceed simultaneously on plots where contamination has been cleared. This approach not only ensures residents' safe housing, but also promotes efficient and safe utilization of land resources, achieving a win-win outcome for pollution control and urban development.

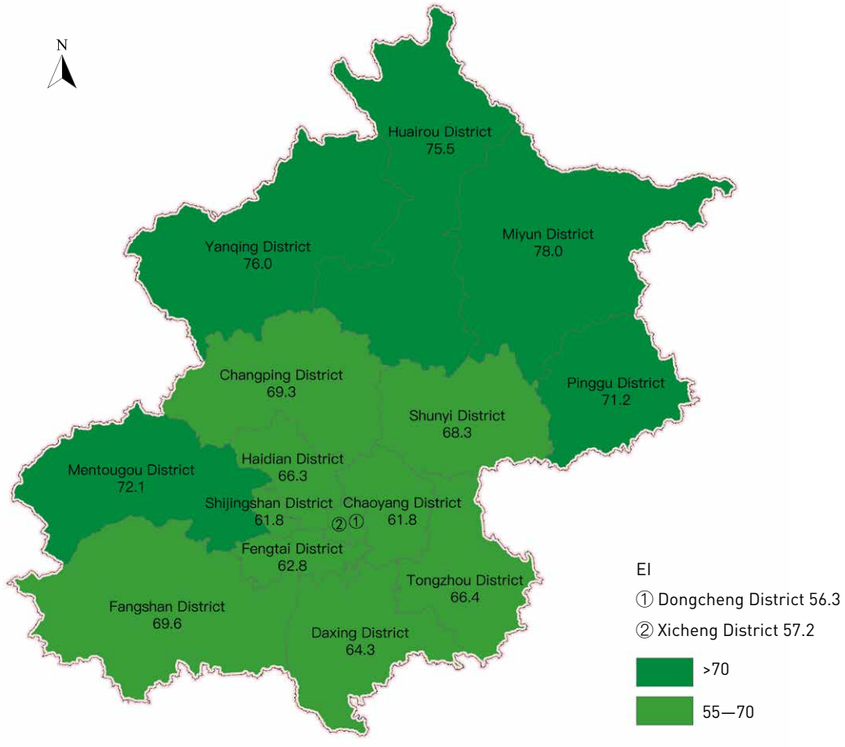
Timely remediation was ensured through scientific commitments. Holders of land-use rights were guided to determine and commit in writing to contaminated soil remediation timelines based on comprehensive evaluation of treatment capacity and other relevant factors. Remediation quality was ensured through joint assessment. A multi-department collaborative evaluation mechanism was established to organize industry experts to conduct technical reviews, full-process tracking and assessment of remediation effectiveness, to ensure compliance with treatment standards. Strict supervision was enforced to maintain strong deterrence. On-site inspections were strengthened and administrative penalties were imposed on the non-compliant entities that failed to complete contaminated soil remediation within stipulated deadlines in accordance with the *Regulation on Soil Pollution Prevention and Control in Beijing*.

# Natural and Ecological Environment

The overall ecological and environmental status of Beijing steadily improved and remained in good condition.

## Ecological and Environmental Status

Evaluated according to the *Technical Specification of Ecological and Environmental Quality Evaluation (DB11/T 1877-2021)*, the ecological and environmental quality index (EI) of the city was 71.4, with a year-on-year increase of 0.85%, and the quality of ecosystems steadily improved. The vegetation coverage index increased by 2.21% year-on-year, while the water coverage index rose by 1.59% year-on-year. The core area serving capital functions, central urban districts, and plain areas continued to maintain a good level of EI, with year-on-year EI increases of 0.91%, 0.56%, and 0.93%, respectively. The ecological conservation areas continued to maintain good to excellent ecological environment for many years, with a year-on-year EI growth of 0.84%.

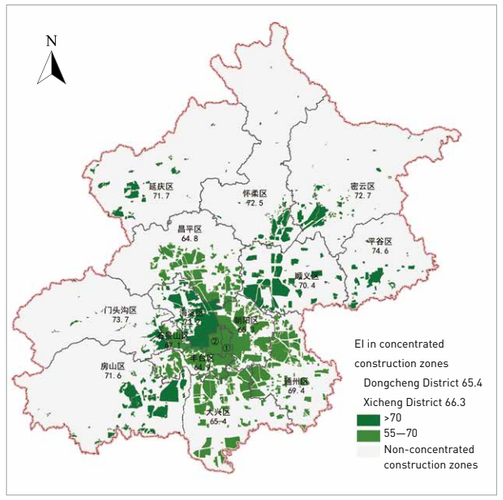



Spatial Distribution of EI by District in Beijing

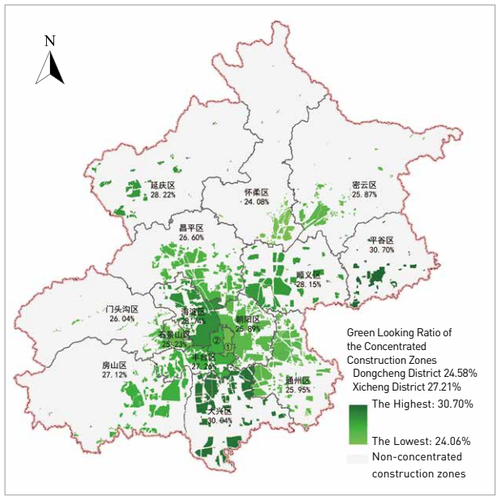
## Concentrated Construction Zones

The ecological status of concentrated construction zones was good. The concentrated construction zones in the core area serving capital functions had good environmental quality, with EI increasing by 0.55% year-on-year. The green space index continued to increase in the districts of Dongcheng and Xicheng. The EI in concentrated construction zones in central urban areas increased by 0.40% year-on-year. Among these, the concentrated construction zone in Haidian had the highest EI. The EI in concentrated construction zones in plain areas rose by 0.81% year-on-year. The EI in concentrated construction zones in ecological conservation areas achieved a 0.52% increase year-on-year.

The green looking ratio of the city's concentrated construction zones was 26.98%, with Pinggu, Daxing, and Haidian ranking among the top three districts in Beijing. Among them, Pinggu District had the highest green looking ratio, reaching 30.70%. Pinggu and Miyun ranked among the top districts in Beijing for the growth of the green looking ratio, registering increases of 0.69 and 0.63 percentage points respectively.




Spatial Distribution of EI in Concentrated Construction Zones of Beijing's Districts




Spatial Distribution of Green Looking Ratio in Concentrated Construction Zones of Beijing's Districts

## Key Nature Reserves

Key Nature Reserves had a good ecological environment. EI increased by 1.58% year-on-year, indicating steady improvement in ecosystem quality. Baihua Mountain National Nature Reserve, Wulingshan Mountain Municipal Nature Reserve, Wild Duck Lake Municipal Wetland Nature Reserve and other ecosystems maintained excellent quality.

## Ecological Conservation Redline

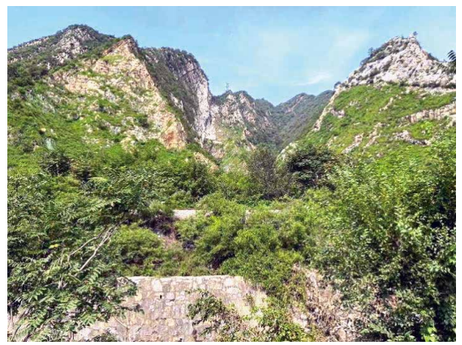
The ecological and environmental status of the ecological conservation redline was good, with EI increase of 2.38% year-on-year, demonstrating steady improvement in ecosystem quality. The area of ecological land, including forests, shrubs, meadows and wetlands, increased by 0.66% year-on-year, with the quality of forest ecosystems showing sustained improvement.

## Greenbelt Areas

The ecological environment quality of greenbelt areas continued to improve, with EI increasing by 3.83% year-on-year and ecological land area expanding by 2.36% year-on-year, demonstrating further optimization of the ecological structure. The EI of the first greenbelt area increased by 4.45% year-on-year, of which the area of meadow and shrub increased by 8.92%, the water coverage area increased by 5.24%, while the area of construction land decreased by 2.29% year-on-year. The EI of the second greenbelt area increased by 3.63% year-on-year, of which the area of ecological land increased by 2.62%, while the area of construction land decreased by 3.44% year-on-year.

Special Column

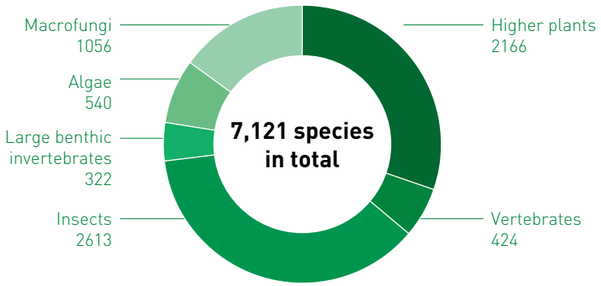
### Evaluation of Ecological Restoration



The three-phase (2016/2021/2024) ecological remediation of exposed bedrock in the abandoned limestone quarry at Dingjiatan Village, Miaofengshan Town, Mentougou District has yielded measurable environmental gains. The project site was in the stage of natural restoration and the ecological environment quality evaluation results of this area indicated that the bare land forest and grass coverage rate reached 88.36%, an increase of 32.69% compared with 2020, and the vegetation biomass also increased by 2.07 times. The restoration rate for degraded land reached 92.75%, with significant improvement in soil quality and the average organic matter content exceeded 10g/kg. While biodiversity has been gradually restored, the number of plant species has returned to a level similar to that of surrounding natural ecosystems.

## Biodiversity

In 2024, a total of 59 natural and semi-natural ecosystems, including forests, shrubs, meadows, swamps and aquatic vegetations, were observed in Beijing through field biodiversity surveys with a total of 151 natural and semi-natural ecosystems recorded from 2020 to 2024. In 2024, 2,234 species were observed in staged field surveys with a total of 7,121 species recorded from 2020 to 2024.




Number of Species Recorded in Beijing, 2020-2024

Special Column

### For the Building of a Beautiful Beijing

In July 2024, the CPC Beijing Municipal Committee and the People's Government of Beijing Municipality issued the *Implementation Guidelines on Comprehensively Promoting the Building of a Beautiful Beijing and Accelerating the Advancement of Modernization Featuring Harmony between Humanity and Nature*. Focusing on deep-going efforts during the 14th Five-Year Period, consolidation and development during the 15th Five-Year Period, and overall improvement during the 16th Five-Year Period, the document outlined a beautiful vision of Beijing - the modernized capital of a great nation featuring harmony between humanity and nature.

The document also put forward the objectives for building a beautiful Beijing. By 2027, the ecological environment will continue to improve steadily, green development will enjoy extensive public support, and positive progress will be made in the building of a beautiful Beijing. By 2035, there will be a fundamental improvement in the environment, the carbon emissions will be significantly reduced, green and low-carbon production and living will be widely accepted by the public, and the goal of building of a beautiful Beijing will be basically attained among the first in China. Looking forward to the middle of this century, a beautiful Beijing will serve as a model for sustainable development among super-large cities.

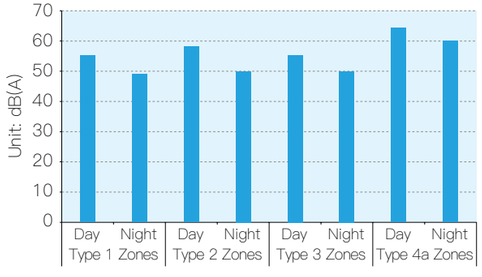
The document clarified the tasks and measures for building a beautiful Beijing. We will expedite the transition to green development, endeavor to cultivate new quality productive forces, make active yet prudent advancement in achieving the carbon peaking and carbon neutrality goals, and promote green and low-carbon development in key areas. We will further the critical battle against pollution with top priority on the battle for blue skies, advance beautiful rivers and lakes, and promote environmental progress from quantitative to qualitative changes. We will persist with a holistic and systematic approach to conserving and improving mountain, water, forest, farmland, grassland and desert ecosystems, strengthen biodiversity conservation, develop Beijing into a garden city, and work to realize the value of ecosystem goods and services. We will pursue a holistic approach to national security, and rigorously prevent and control environmental risks to hold the security bottom line. We will take the lead to pilot in the building of a livable home city, and support various localities in developing distinctive exemplary models. We will actively promote public participation to foster a positive social atmosphere that values ecological civilization. Additionally, we will also establish a comprehensive support system, and strike a combination of the rule of law, the market, science and technology, and policies.

# Acoustic Environment

The acoustic environment in Beijing was generally stable.

## Acoustic Environment of Functional Zones

The acoustic environment of urban functional zones remained stable. For daytime, the annual average equivalent sound levels of Type 1, Type 2, Type 3, and Type 4a Zones met the national standard. For nighttime, the annual average equivalent sound level of Type 2 and Type 3 Zones met the national standard, while the annual average equivalent sound level of Type 1 and Type 4a Zones exceeded the national standard.




**Current Status of Acoustic Environment of Functional Zones in Beijing**

From the distribution of noise levels in various functional zones, the noise levels in central urban districts of Type 1 and 4a Zones were higher than that of other districts; those of Type 2 Zones were basically equal to that of other districts; for Type 3 Zones, the noise levels in central urban districts were higher during the day but lower at night compared to other districts.

## Regional Acoustic Environment

The annual average noise level in the built-up area of Beijing was 52.3dB(A), down by 1.2dB(A) compared with last year. The annual average noise level in the built-up area of different districts ranged from 50.9 dB(A) to 55.2(A) dB, with an annual average level of 52.6 dB(A) for central urban districts and 52.7 dB(A) for other districts.

## Acoustic Environment of Traffic Noise

The annual average noise level of road traffic in the built-up area of Beijing was 68.5 dB(A), showing no change compared with the previous year. The annual average noise levels of road traffic in the built-up area of different districts ranged from 64.6 dB(A) to 70.5 dB(A), which came to 69.2 dB(A) for central urban districts, and 66.5 dB(A) for other districts.





# Radiation Environment

The environmental radiation level in Beijing stayed normal.

## Ionizing Radiation

The environmental ionizing radiation level in Beijing remained within the fluctuations range of natural background level.

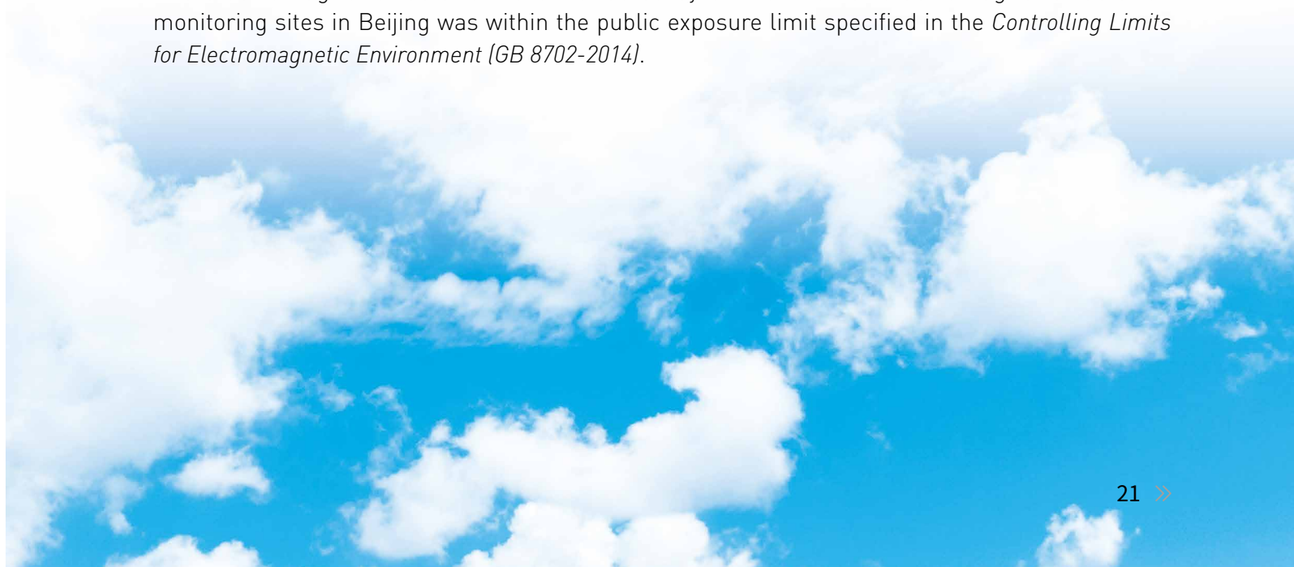
Real-time continuous air absorbed dose rate and accumulative dose were both within the fluctuation range of natural baseline value. The activity concentration of natural radionuclides in the air remained at the baseline level, while no abnormalities were observed in the activity concentrations of artificial radionuclides.

In water bodies, including rivers, lakes, reservoirs and groundwater, the activity concentration of gross α and gross ß was within the fluctuation range of natural baseline value, and the activity concentration of natural radionuclides remained at the baseline level, and no abnormalities were observed on the activity concentration of artificial radionuclides.

In soil, the activity concentration of natural radionuclides remained at the baseline level, and no abnormalities were observed in the activity concentration of artificial radionuclides.

## Electromagnetic Radiation

The electromagnetic radiation level reflected by environmental electromagnetic radiation monitoring sites in Beijing was within the public exposure limit specified in the *Controlling Limits for Electromagnetic Environment (GB 8702-2014)*.



# Measures and Actions

## Advancing Ecological Civilization and Institutional Reforms

In 2024, the advancement of ecological progress in Beijing was comprehensively strengthened. Functioning as the General Office of the CPC Beijing Municipal Committee's Commission for Advancing Ecological Civilization, we coordinated, organized, and supervised various districts and municipal departments to implement the Green Beijing Strategy, and to cut carbon emissions, reduce pollution, expand green development, and pursue economic growth in a coordinated way. The 60 key annual tasks for ecological conservation in Beijing were fully implemented, delivering 136 policy outcomes including the *Implementation Guidelines on Comprehensively Promoting the Building of a Beautiful Beijing and Accelerating the Advancement of Modernization Featuring Harmony between Humanity and Nature*. These outcomes have effectively supported the capital's high-quality development with a high-quality ecological environment, and contributed to the residents' quality life.

The reform to promote ecological progress was deepened. Relying on the platform of the General Office of the Special Group on Institutional Reforms for Promoting Ecological Progress under the CPC Beijing Municipal Committee's Commission for Further Reform, and in coordination with Beijing's districts and relevant municipal departments, joint efforts were made to tackle tough reform issues focusing on key fields. We strengthened top-level design and coordinated with relevant municipal departments to roll out 15 reform plans, including the initiative to transform Beijing into a global pacesetter in the green economy. We respect grassroots innovations and identified 21 exemplary cases of "micro-reforms and micro-innovations", among which Daxing District's establishment of a green credit system and Yanqing District's actions for translating into practice the General Secretary's instructions on the importance of ecological conservation to economic development in Heihanling Village were recognized as typical cases of Beijing in 2024. We carried out reform inspections to strengthen the zoning control of ecological environment, and promoted a thorough and effective mechanism for the implementation of the "dual carbon" goals.

Special Column

### Ecological and Environmental Protection Inspection and Law Enforcement

Ecological and environmental protection inspections were carried out to address prominent environmental problems. Following the requirements of the Central Ecological and Environmental Protection Inspection Team, we rectified problems reflected in the feedback from its second round of inspection, and completed annual rectification tasks. We also conducted ecological and environmental protection inspections at the municipal level. With the approval of the CPC Beijing Municipal Committee and the People's Government of Beijing Municipality, we conducted the second round of routine eco-environmental inspections at the municipal-level, targeting the Party committees and governments of Yanqing District and Miyun District, as well as two state-owned enterprises under municipal jurisdiction (Beijing Xianglong Assets Management Co., Ltd. and Beijing Capital Agribusiness & Foods Group), formulated and implemented the work specifications for inspecting state-owned enterprises under municipal jurisdiction. Special inspections were also carried out in key subdistricts and townships to make sure that they fulfill their duties for ecological and environmental protection.

We strengthened off-site law enforcement, and made efforts to improve the level of smart supervision and management. We updated the positive list for supervision and law enforcement in a timely manner, put in place an innovative mechanism of acupoint-style law enforcement for air pollution, watershed management and noise control, while increasing the proportion of off-site supervision. We implemented the "1,000 restaurant initiative" for cooking fume control, effectively addressing the public's environmental concerns. Throughout the year, we filed and handled 12,000 cases of ecological and environment violations, imposing fines totaling 82.208 million yuan, which effectively deters ecological and environmental violations.

# Battle Against Pollution

## Battle for Blue Skies

The "every microgram counts" initiative was conducted, striving for and valuing every 0.1-microgram reduction. We pioneered a "green quotient" indicator system to steer all industries and sectors toward green transition and excellence, upgrading the quality of our development by increasing the "green quotient" of our ecological environment. To promote green structural transformation, we introduced subsidies for vehicle replacement, as well as the scrappage and renewal of old trucks and medium/large passenger vehicles, implemented priority access policies for new energy logistics delivery vehicles, and the number of new energy vehicles in use in Beijing surpassed 1 million. To advance green engineering, we formulated the green performance evaluation guidelines for enterprises to conduct clean production audits, in-depth treatment with individualized solutions and upgrade heavy pollution performance ratings. 191 enterprises in Beijing were newly evaluated as "green", 127 enterprises upgraded their heavy pollution performance ratings to Grade A or Grade B, and 37 enterprises exited Grade D, marking the most intensive green transition efforts in recent years. Targeting volatile organic compounds (VOCs), we launched a summer campaign which brought down the ambient VOCs concentrations by 12% year-on-year. To advance green management, we launched the 100-day targeted action for dust control, covering construction dust, road dust, bareland dust, and external sand-dust, and promoted the pilot applications of fully-enclosed construction with air-supported membrane dome in 11 foundation pits, thereby contributing to a 12.5% annual decrease in road dust load. The dust fall of the city was 3.5 tons/km$^2$ per month, down by 2.8% year-on-year.

## Battle for Lucid Waters

With integrated approach for the "Three Waters" (water resources, water environment, and water ecology), the protection and construction of beautiful rivers and lakes was promoted . Regarding the protection of water resources, we standardized the protection and management of drinking water source, with the water quality of Miyun Reservoir consistently at Grade II and water volume reaching an all-time high, and the groundwater table has been rising for nine consecutive years. Regarding the improvement of water environment, we implemented a three-year action plan for securing the decisive victory in water environment improvement in urban and rural areas, featuring 220 km of new or upgraded sewage collection pipelines and 100 km of reclaimed water pipelines, with a municipal sewage treatment rate of 97.5%. The drainage facilities were cleaned up before flood season, effectively reducing sediment inflow to rivers. Regarding the restoration of water ecology, we issued and implemented the *Chaobai River Ecological and Spatial Management Plan* to advance the sustained ecological recovery of rivers and lakes. All five major rivers now see water flowing all year round and have been able to reach the sea for four consecutive years. Qinghe River was selected into the third batch of outstanding cases of "Beautiful Rivers and Lakes" in China.

## Battle for Clean Soil

Focusing on the comprehensive management of agricultural land, construction land and unused land, we continued working to keep our lands pollution-free. To prevent risks associated with construction land, we organized key regulated entities to complete a follow-up review of hidden hazards. We carried out soil pollution risk control and remediation according to the law, and accelerated the treatment and transfer of contaminated soil. We safeguarded the environmental quality of agricultural land, implemented the accountability system for cultivated land protection and food security, and strengthened the coordinated monitoring of soil quality and agricultural products. We completed the construction of high-standard farmland, implemented productivity assessment and verification of new cultivated lands, and upgraded low-yield orchards. We strengthened the protection of unused land and conducted inspection patrols on a regular basis.

Special Column

### Environmental Monitoring Competition

To carry forward the spirit of model workers, hard work and craftsmanship, and to build a pioneering team in ecological and environmental protection, Beijing Municipal Ecology and Environment Bureau, together with six departments including Beijing Municipal Human Resources and Social Security Bureau, Beijing Municipal Federation of Trade Union, Beijing Municipal Committee of the Communist Youth League, Beijing Women's Federation and Beijing Municipal Administration for Market Regulation, jointly organized the 3rd Beijing Ecological and Environmental Monitoring Professional Skills Competition. A total of 186 monitoring technicians from environment, water affairs, geology, health, disease control, nuclear industry and other sectors entered the finals through preliminary selection. The competition has fostered a strong atmosphere of "comparison, learning, catching up, surpassing, and mutual assistance" in Beijing's ecological and environmental monitoring system. It further enhanced the professional skills and comprehensive competencies of the city's monitoring teams, and cultivated a group of highly skilled and technically proficient professionals in this field. These achievements have laid a solid foundation for achieving excellent results in the National Ecological and Environmental Monitoring Competition, securing the second prize in the comprehensive group and ranking first among municipalities directly under the central government.

# Protection of Natural Ecosystems

We strengthened supervision of ecological protection and restoration to enhance the diversity, stability, and sustainability of ecosystems. We enhanced the working coordination for biodiversity conservation and facilitated the implementation of biodiversity protection plans. At the Summit for Subnational Governments and Cities of the 16th Conference of the Parties (COP16) of the UN Convention on Biological Diversity, Beijing was recognized as one of the global Biodiversity Charming Cities.

We strived to maintain the stability of ecological spatial patterns. Remote sensing monitoring of human activities was conducted in key ecological spaces including nature reserves and ecological conservation redlines, with the conservation effectiveness of Songshan Mountain and Baihua Mountain National Nature Reserves reaching excellent level.

We continued to facilitate the realization of the value of ecosystem goods and services, including the calculation of the Gross Ecosystem Product-Regulating Services (GEP-R) at both municipal and district levels, and promoting the application of GEP-R accounting results in ecological compensation. We expanded the pathways for value realization, with Yanqing District being selected as one of the first batch of national pilot areas under the mechanism to realize the value of ecosystem goods and services.

Special Column

## Business Competitiveness in terms of Ecological and Environmental Protection

In April 2024, the *2024 China Urban Eco-Environment and Business Competitiveness Index Report* was released, with Beijing ranking first in the comprehensive score for urban eco-environment and business competitiveness, topping multiple sub-indicators. Beijing has garnered full recognition in terms of its market environment, foundational eco-business conditions, as well as ecological conservation and low-carbon development progress. Meanwhile, Beijing ecological and environmental system's "Two-Permits-in-One" reform integrating environmental impact assessments with pollution discharge permits was awarded as one of the Best Practice Cases of Business Environment Reform and Innovation in Beijing for 2024.

The Eco-Environmental Business Competitiveness Index System evaluates 36 major Chinese cities through a framework comprising of five first-tier indicators (including market environment, government services, ecological conservation and low-carbon development progress) and 58 second-tier indicators. This groundbreaking system integrates the working mechanisms, contents and performance of municipal environmental departments with the competitiveness of the city's business environment, establishing an evaluation system that holistically assesses both ecological and business environments.



# Addressing Climate Change

We actively responded to climate change, steadily yet prudently advanced carbon peaking and carbon neutrality, and improved the dual-control mechanism for carbon emissions. In 2024, Beijing's carbon dioxide emissions per 10,000 *yuan* of GRP remained the lowest among provincial-level jurisdictions in China. We improved the policy framework, and issued the *Action Plan for Adaptation to Climate Change in Beijing*, as well as the *Measures for the Administration of Carbon Emissions Trading in Beijing*. We improved the market mechanisms, promoted the trading of China Certified Emission Reduction (CCER), and innovated in conducting auctions for carbon allowances to promote the consumption of green electricity. We promoted low-carbon innovation, with Tongzhou District and Miyun District piloting climate investment and financing, and the districts of Mentougou, Tongzhou and Yanqing included in the national pilot for building climate-adaptive cities. Additionally, we selected 13 outstanding pilot projects with advanced low-carbon technologies, 3 front-runner low-carbon enterprises, and 6 climate-friendly regions. We enhanced publicity and exchanges by hosting the Beijing Side Event at the China Pavilion during the 29th Conference of the Parties of the United Nations Framework Convention on Climate Change (COP29), sharing Beijing's actions and progress in actively addressing climate change and promoting green, low-carbon lifestyles. We also organized the Beijing International Forum for Metropolitan Clean Air and Climate Actions, and the main event of National Low-Carbon Day in Beijing, further advancing green and low-carbon production and living.

Special Column

## Low-Carbon Pilot

Beijing pioneered low-carbon pilot initiatives, spearheading trials in critical areas, to harness the driving and leading role of innovation in low-carbon development. By 2024, the program had selected 26 exemplary low-carbon technology pilot projects, 5 front-runner low-carbon enterprises, and 6 climate-friendly regions, delivering carbon emission reductions of over 500,000 tons annually.

The demonstration projects have received both policy and publicity support. 13 key low-carbon technologies, including "Green Production Technology for Biodegradable PHA Materials", have been recommended to the Ministry of Ecology and Environment. Beijing's three excellent cases of low-carbon pilots were presented at the 29th Conference of Parties of the UNFCCC (COP29). Beijing's low-carbon pilot initiatives have created scalable and replicable paradigms for promoting low-carbon production and lifestyles across the society.

# Joint Prevention and Control

## Regional Coordination

We improved the long-term mechanism for coordinated ecological conservation, formulated and implemented the 2024 priority tasks for joint protection, pollution control and governance of the ecology and environment in Beijing-Tianjin-Hebei Coordinated Development as well as the third batch of task list for deeper and solid progress. We jointly established collaboration mechanisms for environmental news dissemination and standardization cooperation, further expanding the fields of coordination.

We strengthened the joint prevention and control of air pollution. The *Guidelines on Joint Prevention and Control of Air Pollution in the Beijing-Tianjin-Hebei Region* was issued, coordinating efforts to advance structural optimization, address vehicle emissions and respond to heavy pollution episodes. Joint law enforcement operations were also conducted to consolidate regional air quality improvements. We enhanced joint protection and treatment of water environments. Following the comprehensive plan for ecological and environmental protection in the Chaohe River Basin, continued efforts have been made to implement horizontal ecological compensation for water conservation in the Chaobai River Basin upstream of the Miyun Reservoir and the Yongding River Basin upstream of the Guanting Reservoir. Additionally, we have promoted the comprehensive governance of inter-provincial rivers such as the Chaobai River and the Yongding River. A mechanism for joint prevention and control of water pollution emergencies was implemented in the upstream and downstream of inter-provincial basins. Beijing-Tianjin-Hebei joint water environment emergency drills were carried out in 2024. We promoted the green and low-carbon transition through coordinated efforts, including the release of the nation's first regional low-carbon travel standard - *Technical Specifications for Greenhouse Gas Emission Reduction Accounting of Carbon Inclusive Projects: Low-Carbon Travel*, providing a standard basis for the public's voluntary participation in carbon emission reduction. Focusing on the development of the "Two New Wings", the building of Beijing Municipal Administrative Center into a national green development demonstration zone was greatly advanced, with the national CCER market settled and launched in the area. The city stepped up efforts to advance the implementation of the action plan for high-standard and high-quality development of the Xiong'an New Area. The People's Government of Beijing Municipality signed a memorandum with the Xiong'an Administrative Committee to collaborate on services for CCER tradings.

## Citywide Mobilization

As the society becomes more conscious of ecological conservation, the citywide action for building, protecting, and sharing a beautiful Beijing is rapidly taken shape. The 10-year achievements of ecological and environmental cooperation in the Beijing-Tianjin-Hebei Region and Beijing's ecological progress have been widely reported by news media, with a focus on the blue sky records, affirming Beijing's air pollution control approach. The voluntary environmental protection services were actively promoted by communities, and local low-carbon pilot cases were showcased at the China Pavilion of the UN Climate Change Conference. Enterprises proactively fulfilled their environmental responsibilities by improving their green and low-carbon production levels. A total of 63 environmental protection facilities across the city have opened their gates to the public, receiving nearly 30,000 visitors cumulatively.

Citizens engaged in a variety of environmental protection activities, making their own part of contribution to improving the quality of the ecological environment. The public actively participated in environmental public welfare activities such as the Beijing Environmental Cultural Week and the "V-Blue Beijing" campaign through both online and offline channels, and conscientiously adopted eco-friendly practices including green travels, the "Clean Your Plate" campaign and green office operations, while contributing suggestions and exercising public environmental supervision. Beijing's youth voiced their green aspirations through eco-themed speeches, with over 70,000 colleague students joining the 20th Capital University Environmental Culture Festival. These diverse ecological conservation practices have injected youthful vitality into the building of a beautiful Beijing. Citizens actively posted photos of blue skies and vibrant sunsets on social media, while photography enthusiasts captured star trails and iconic buildings of Beijing and Tianjin in one frame, documenting environmental improvements and expressing their happiness and satisfaction brought by the better environment.

# 10 Years of Beijing-Tianjin-Hebei Coordinated Development

2024 marked the 10th anniversary of the Beijing-Tianjin-Hebei (BTH) coordinated development, a major national strategy. Over the past decade, BTH has earnestly implemented the requirement of making eco-environmental protection a priority breakthrough in the coordinated development of the region. Through progressively establishing and improving coordination mechanisms, expanding areas of cooperation, and deepening collaborative efforts, major breakthroughs have been achieved in improving the region's ecological environment. The region, once challenged by smog-blurred skies, starless nights and dried-up rivers, now enjoys regular blue skies, starry nights and crystal-clear waters. Blue skies and clear waters have transitioned from being "luxury items" to "common commodities", significantly enhancing the public's sense of gain and happiness in ecological environment.

## Together for a Common Vision

Beijing, Tianjin, and Hebei have successively signed and implemented two rounds of framework agreements, and set up special working groups for the BTH ecological coordination. We actively explored collaboration in areas such as information sharing, environmental impact assessment consultation, joint law enforcement, heavy pollution emergency response, as well as media and communications, promoted the building of Beijing Municipal Administrative Center into a national demonstration zone for green development, and supported the ecological and environmental conservation of Xiong'an New Area.

## Substantial improvement of Air Quality

The region strengthened joint efforts on air pollution prevention and control, and promoted structural optimization of energy, industry, transportation and other sectors. The region has made concerted efforts to tackle air pollution during autumn and winter seasons for eight consecutive years to jointly address heavy air pollution episodes, yielding dramatic reductions in the concentrations of major air pollutants. In 2024, the annual average $PM_{2.5}$ concentrations in Beijing, Tianjin, and Hebei dropped to 30.5, 38.1, and 37.7 μg/m³, respectively, representing reductions of over 60% compared with 2013 levels. The number of days with good or excellent air quality has seen a significant increase, while heavy pollution days have been substantially reduced. From APEC to our daily life, blue skies and white clouds have become a tangible benefit that brings the greatest sense of gain to residents of the Beijing-Tianjin-Hebei region.

## Significantly Better Water Environment Quality

We enhanced joint protection and treatment of water environments, collaboratively protected key river basins, refined the horizontal eco-compensation mechanism for inter-provincial rivers, established a "community of water conservation", and conducted eight consecutive years of joint emergency drills for sudden water environmental incidents. In 2024, a thorough elimination of sections with water quality inferior to Grade V was achieved in the Beijing-Tianjin-Hebei Region. Meanwhile, the proportions of surface water sections with good or excellent water quality under the national monitoring program all dynamically met the targets set in the national 14th Five-Year Plan. Eleven rivers (lakes, reservoirs and bays), including Beijing's Miyun Reservoir, Tianjin's Zhouhe River, and Hebei's Beidai River section, have been selected as excellent cases of beautiful rivers and lakes, and beautiful bays. The picturesque scenery of crystal-clear rivers and lakes and azure bays has become an integral part of the citizens' lives.

Miyun Reservoir

Guanting Reservoir

## A Beautiful Ecological Environment Shared and Enjoyed by All

We jointly reinforced the ecological security of the Beijing-Tianjin-Hebei Region, accelerating the construction of the Yanshan-Saihanba National Park and the Chaobai River National Forest Park. The protection of critical ecological spaces, vital ecosystems, and habitats has been rigorously enforced, driving high-quality ecological conservation and green development in ecological conservation zones. As a result, the diversity, stability, and sustainability of ecosystems have been steadily enhanced. The City of Beijing, and Tianjin's Ninghe District were both recognized as a global Biodiversity Charming City, while the Nandagang Migratory Bird Habitat in Hebei Province was inscribed on the World Natural Heritage List.

## Green and Low-Carbon Social Development

Beijing, Tianjin and Hebei resolutely implemented the new development philosophy, and pursued high-quality economic growth with high standard ecological and environmental protection. In 2024, Beijing ranked first in the national evaluation of low-carbon pilot city construction, and its carbon dioxide emissions per 10,000 *yuan* of GRP had remained the lowest among provincial-level jurisdictions in China for many years. The Tianjin Port has constructed "zero-carbon" terminals, which was selected as a national exemplary case of green and low-carbon transition. The "Carbon-Negative Building Material Production via In-Situ $CO_2$ Sequestration in Steel Slag" Project of Hebei Province was shortlisted for the World Steel Association's 2024 Sustainability Excellence Award. Beijing and Hebei jointly supported key enterprises in piloting "Zero Waste Group", marking a pioneering innovation at a provincial level across the country.

# OUTLOOK

The year 2025 marks the final year of the 14th Five-Year Plan and is critical for laying solid foundations for the upcoming 15th Five-Year Plan period. In 2025, Beijing will continue to follow the guidance of Xi Jinping Thought on Ecological Civilization, study and implement the important speech delivered by General Secretary Xi Jinping at the National Conference on Ecological and Environmental Protection, uphold the general principle of pursuing progress while ensuring stability, fully and faithfully implement the principle to fight pollution with targeted measures, science-based approaches and in accordance with the law, and focus on the building of a beautiful Beijing. To cut carbon emissions, reduce pollution, expand green development, and pursue economic growth in a coordinated way, Beijing will better coordinate high-quality development with high-standard environmental protection, and accelerate the construction of a pilot zone for a Beautiful China, oriented toward achieving the modernization featuring harmony between humanity and nature.