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2019

Beijing Ecology and Environment Statement

Beijing Municipal Ecology and Environment Bureau



Beijing Ecology and Environment Statement 2019

The *Beijing Ecology and Environment Statement 2019* is hereby announced in accordance with the *Environmental Protection Law of the People's Republic of China*.

Beijing Municipal Ecology and Environment Bureau
April, 2020

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OVERVIEW

In 2019, under the guidance of the Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era, Beijing acted on the Xi Jinping Thought on Ecological Civilization, and resolutely implemented the decisions and assignments by the CPC Central Committee and the State Council. Centering on the improvement of the capital's ecological and environmental quality and focusing on serving the celebrations of the PRC's 70th anniversary, Beijing further implemented the new version of Master Plan for city development, promoted the citywide development of ecological civilization, and advanced the modernization of the ecological and environmental governance systems and capacities. Full-throttled efforts were made in safeguarding blue sky, clean waters and clean soil. Major breakthroughs were achieved in the uphill battle over pollution. The annual average concentration of fine particles (PM_{2.5}) hit a record low. The quality of surface water witnessed constant improvement, and the number of rivers that fail the Grade V national standard further decreased. The environmental risks of soil have been effectively controlled, and the overall ecological and environmental status of the city keeps improving.



ECOLOGY AND ENVIRONMENT QUALITY



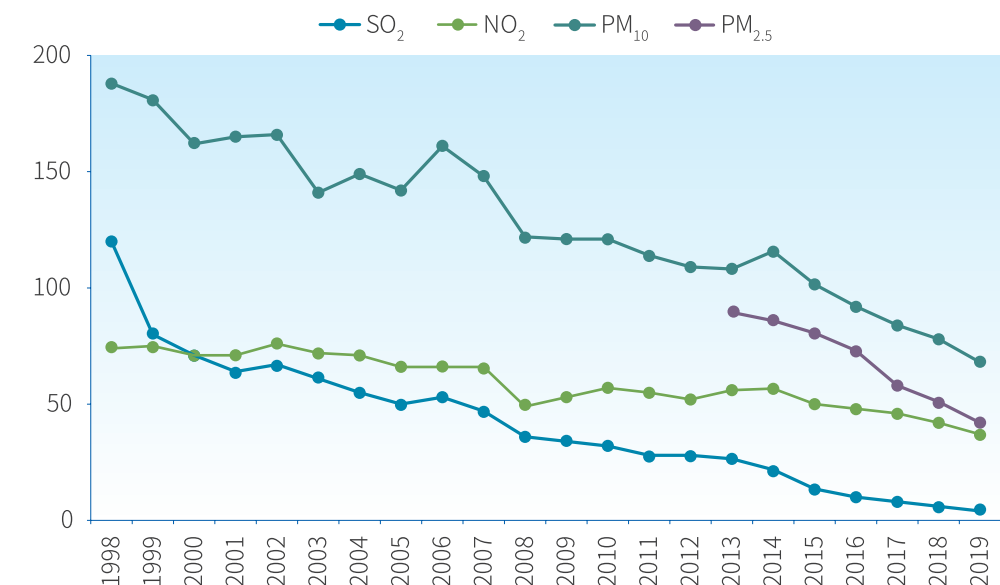
Air Quality

The air quality has witnessed continued improvement citywide, with the annual average concentrations of all the criteria air pollutants decreasing. The annual average concentration of $PM_{2.5}$ hit a record low, and the annual average concentrations of $PM_{2.5}$ in Miyun District and Huairou District took the lead in the city to meet the Grade II limit of National Ambient Air Quality Standard (NAAQS) of China.

Air Quality Status

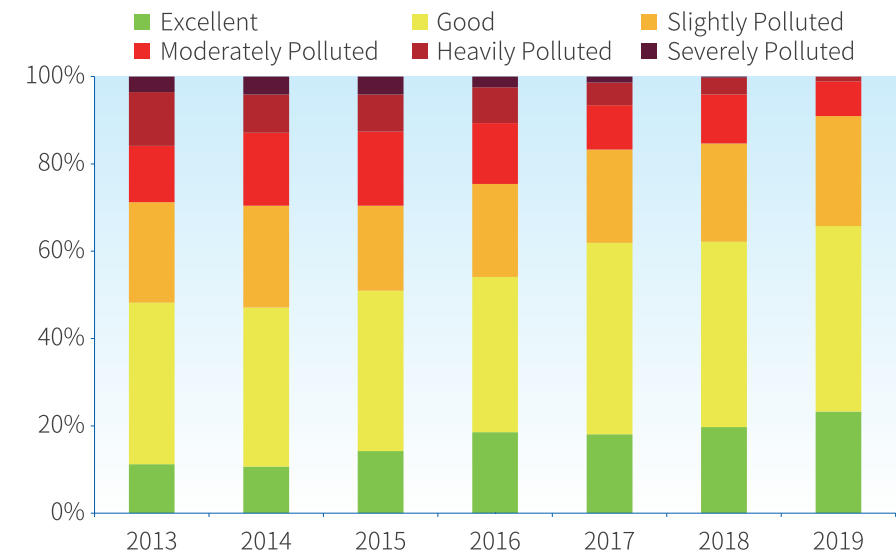
The annual average concentration of $PM_{2.5}$ throughout Beijing was $42\mu g/m^3$, exceeding the Grade II annual limit of NAAQS ($35\mu g/m^3$) by 20.0%. This has brought the three-year (2017-2019) average concentration of $PM_{2.5}$ down to $50\mu g/m^3$. The annual average concentration of sulfur dioxide (SO_2) was $4\mu g/m^3$, well below the Grade II limit of $60\mu g/m^3$ in NAAQS, and remained in the single digits for the third consecutive year. The annual average concentration of nitrogen dioxide (NO_2) was $37\mu g/m^3$, below the Grade II limit of $40\mu g/m^3$ set by NAAQS. The annual average concentration of inhalable particles (PM_{10}) was $68\mu g/m^3$, below the Grade II limit of $70\mu g/m^3$ set by NAAQS.

For carbon monoxide (CO), the annual 95th percentile value of the 24-hour average concentration was $1.4mg/m^3$, below the Grade II limit of $4\mu g/m^3$ set by NAAQS. For ozone (O_3), the annual 90th percentile daily maximum 8-hour average concentration was $191\mu g/m^3$, 19.4% higher than the Grade II limit of $160\mu g/m^3$ set by NAAQS. The O_3 exceedances were found during April to October, and were more likely to occur during the time periods of afternoon to evening in spring and summer.

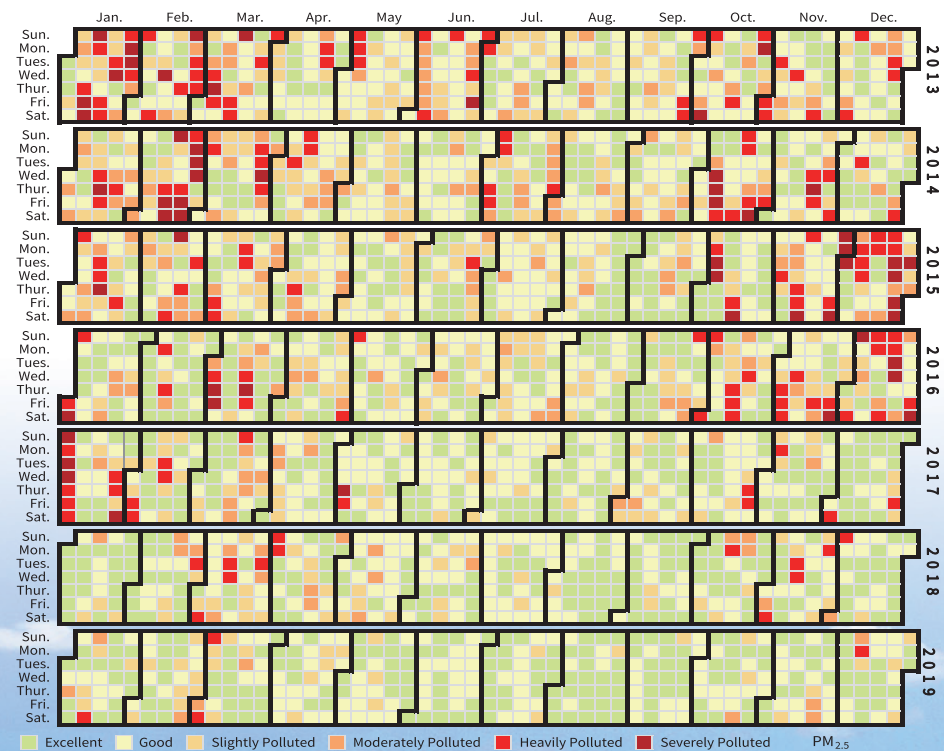


Trends of annual concentrations for criteria air pollutants in Beijing, 1998-2019

In 2019, Beijing's air quality met the national standard (levels of excellent and good) in 240 days, accounting for 65.8% of the year, and 64 days more than 2013. The number of days with heavy pollution episode (levels of heavily polluted and severely polluted) was 4 days, 54 days less than 2013. There was no severely polluted day for the first time in the whole year in 2019.



Annual Proportion of Air Quality Levels, 2013-2019



Ambient PM_{2.5} Level Calendar, 2013-2019

Spatial Distribution

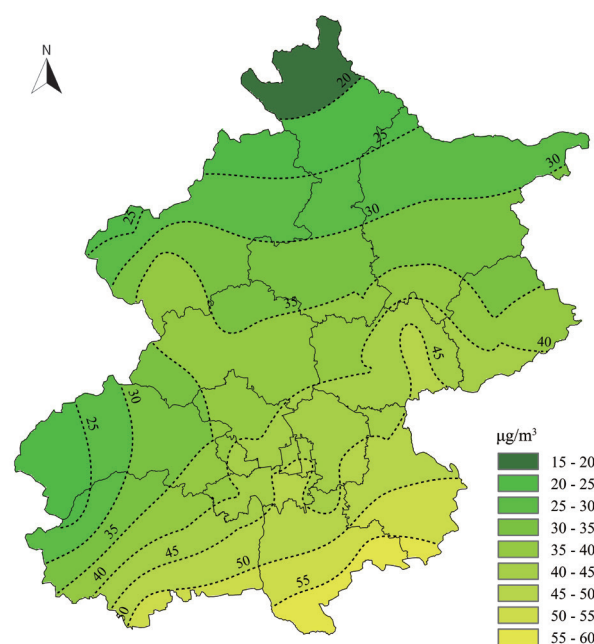
Throughout Beijing, the air quality showed difference between north and south. The air quality was better in the ecological conservation areas located in the northern and northwestern part of the city. The gap between the southern part and the rest of the city has been narrowing from year to year.

The PM_{2.5} annual average concentration of different districts varied from 34 to 46 $\mu\text{g}/\text{m}^3$, among which Miyun District and Huairou District took the lead to meet the Grade II limit in NAAQS. The SO₂ annual average concentration of different districts ranged within 3-5 $\mu\text{g}/\text{m}^3$, and all met the Grade II limit in NAAQS. The NO₂ annual average concentration of different districts ranged within 22-42 $\mu\text{g}/\text{m}^3$, with 15 districts in compliance with the Grade II limit in NAAQS. The PM₁₀ annual average concentration of different districts ranged within 53-79 $\mu\text{g}/\text{m}^3$, with 10 districts in compliance with the Grade II limit in NAAQS.

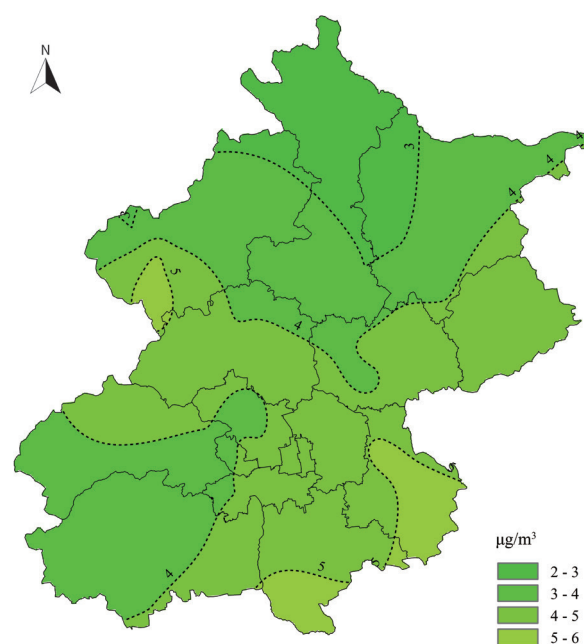
Annual Average Concentrations of Criteria Air Pollutants at District Level Unit: $\mu\text{g}/\text{m}^3$

	PM _{2.5}	NO ₂	PM ₁₀	SO ₂
Dongcheng	44	38	68	4
Xicheng	44	40	70	4
Chaoyang	43	41	71	5
Haidian	40	38	66	4
Fengtai	42	36	71	4
Shijingshan	43	39	71	4
Mentougou	36	30	65	4
Fangshan	42	32	73	4
Tongzhou	46	42	78	5
Shunyi	41	31	64	4
Daxing	44	40	79	4
Changping	37	29	63	4
Pinggu	40	24	60	3
Huairou	35	22	53	3
Miyun	34	22	55	3
Yanqing	37	29	63	5
Beijing Economic-Technological Development Area	44	40	74	5

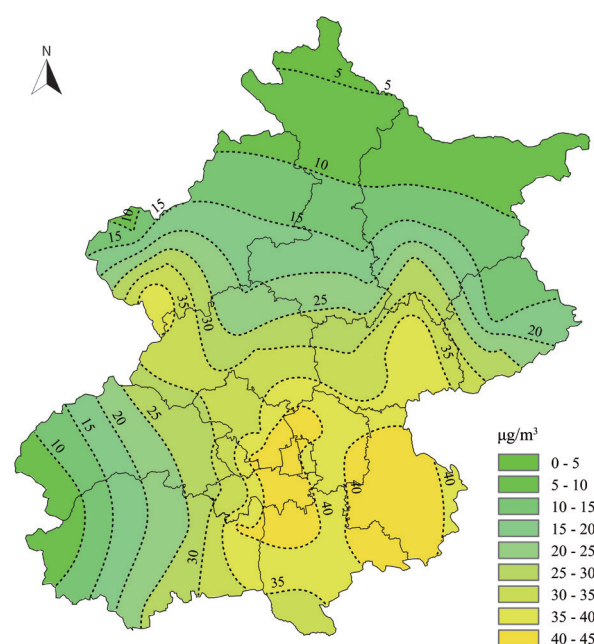
*Source: monitoring data from urban stations at district level



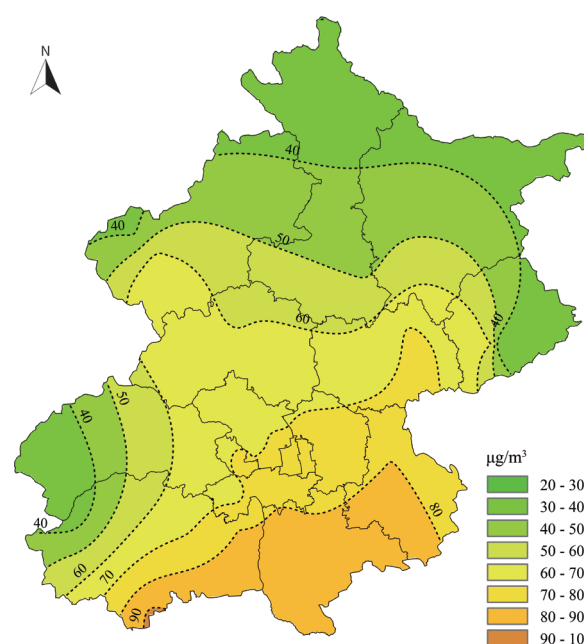
Spatial Distribution of PM_{2.5} Annual Average Concentration



Spatial Distribution of SO₂ Annual Average Concentration



Spatial Distribution of NO₂ Annual Average Concentration



Spatial Distribution of PM₁₀ Annual Average Concentration

Assessment by Monitoring Stations with Special Functions

Results from the inter-provincial pollution monitoring stations showed that, the average value of the PM_{2.5} annual concentrations monitored from the 3 stations located near the southwestern, southeastern and southern inter-provincial border of Beijing was 56µg/m³, 33.3% higher than the average level of the whole city; whilst the average value monitored from the 2 stations located near the northeastern and northwestern inter-provincial border was 34µg/m³, 19.0% lower than the average level of the whole city.

Results from the traffic pollution monitoring stations showed that, for traffic-populated roadsides, the PM_{2.5} annual average concentration was 46µg/m³, 9.5% higher than the average level of the whole city; the NO₂ annual average concentration was 55µg/m³, 48.6% higher than the average level.

For the urban background monitoring station at Dingling, Changping District, the PM_{2.5} annual average concentration was 33µg/m³, 21.4% lower than the average level of the whole city.



The “One Microgram” Campaign

With years of undertakings and progress in air pollution prevention and control, it becomes more difficult to expect further improvement of air quality. Future progress shall be more and more dependent on the refined and targeted pollution control actions. For PM_{2.5} pollution control, every microgram matters. In 2019, with equal importance attached to emission reduction projects and management measures, Beijing implemented the “One Microgram” Campaign in depth, targeting on mobile sources, fugitive dust, industrial and domestic sources, and carried out scientific and precise pollution control.

The Municipal Commission for the Development of Ecological Civilization was established by the CPC Beijing Committee, under which a special team, the Working Group for Comprehensive Control of Air Pollution and Addressing Climate Change, was set up for stronger leadership and better coordination. 35 major tasks for defense of blue skies were identified and put to practice. With the combination of territorial administration and sectorial supervision, and relying on the citywide high-density sensor monitoring network, the performances of all townships (streets) were ranked, published and supervised, thus making sure that governments at all levels fulfill their duties. The China VI (B) emission standard for new vehicles was introduced ahead of time, new energy trucks were given priority pass, and the scope of the low emission zone for off-road mobile machinery got expanded. *Working Requirements on Fugitive Dust Control in Beijing* was issued, and a series of major policies for environmental improvement have been implemented. Special publicity activities have been organized for the “One Microgram” Campaign. Through the timely release of information, interpretation of policies and popularization of knowledge, citywide mobilization has been achieved for the whole society to join efforts in the actions.

In 2019, the “One Microgram” Campaign has successfully brought down the annual average concentration of PM_{2.5} by 9 micrograms, hitting a record low.



Water Quality

Beijing's surface water quality witnessed constant improvement, with the annual average concentrations of major pollutants and the number of rivers that fail the Grade V national standard further decreased, and the water quality of centralized surface drinking water sources keeps meeting national standard. Groundwater quality was generally stable.

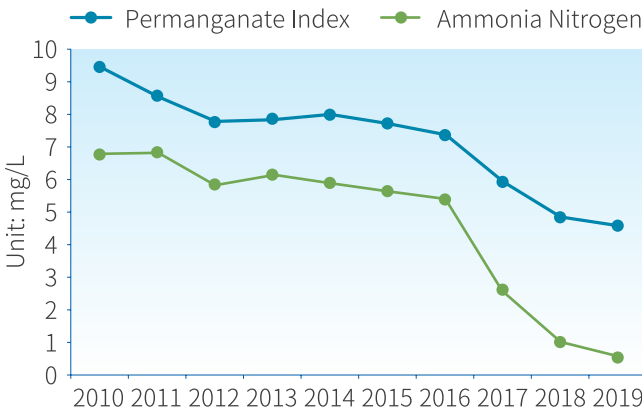
Surface Water Quality

The water quality showed a clear spatial difference. Generally, the water quality of upper-stream was better than down-stream



Water Quality Status Category in Beijing

Averaged from all surface water monitoring sections in Beijing, the annual permanganate index was 4.62mg/L, annual ammonia nitrogen concentration was 0.57mg/L, with a year-on-year decline of 5.9% and 41.8%, respectively. The water quality in reservoirs was preferable, followed by water quality in lakes. The water quality in rivers was relatively worse.

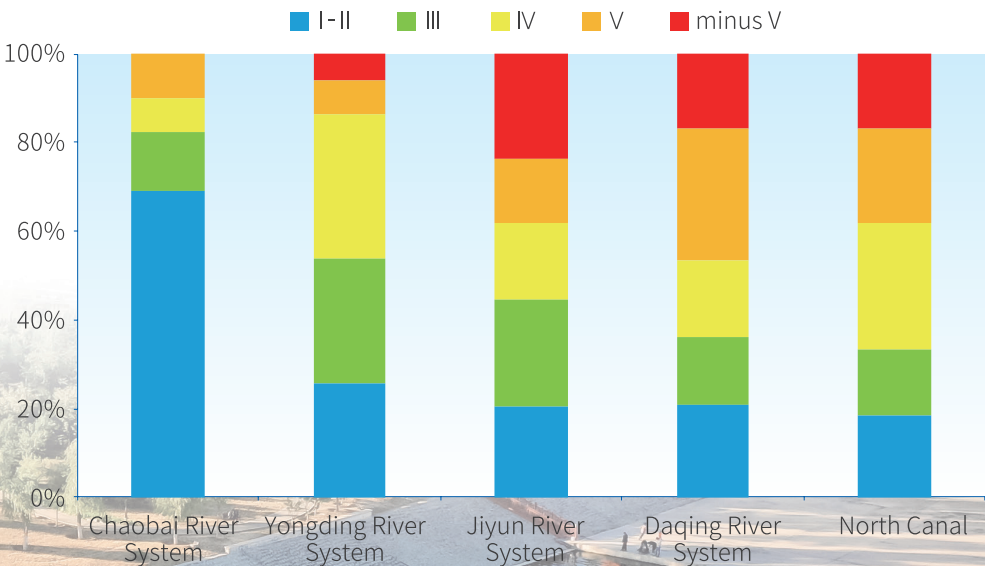


Trend of Annual Average Permanganate Index and Ammonia Nitrogen Concentration of Surface Water, 2010-2019

Rivers

In 2019, a total of 96 rivers from the five major river systems were monitored, covering a length of 2364.2km. Within the total length, 55.1% met the Grade I-III national standard for water quality, 35.4% had Grade IV or V water quality; and 9.5% failed to meet the Grade V national standard, a 11.5% decrease compared with last year. Major pollution indicators include COD, BOD and total phosphorus, and the type of pollution was organic pollution.

Among the five major river systems, Chaobai River system had the best water quality, followed by Yongding, Jiyun, Daqing River systems and the North Canal.



Proportion of Water Quality Grades in Five Major River Systems

Lakes

In 2019, a total of 22 lakes were monitored, covering a water surface area of 7.196 million m². Within the total monitored area, 61.2% met the Grade I-III limit of national standard for water quality, 36.1% were of Grade IV or V water quality, and 2.7% failed to meet the Grade V limit of national standard. Major pollution indicators include COD, total phosphorus and BOD.

10 lakes including Tuancheng Lake, Kunming Lake, Liuhai Lakes (consisting of 6 connected lakes), Tongzihe Lake, and Zhanlanguanhou Lake were mesotrophic lakes. Liuyin Park Lake was at high eutrophication level. The rest lakes were at light to medium eutrophication levels.

Reservoirs

In 2019, a total of 18 reservoirs were monitored, with an average total impoundage of 3.39 billion cubic meters. Within the total monitored impoundage, 85.2% came from reservoirs meeting Grade I-III national standard for water quality, the rest 14.8% were from reservoirs of Grade IV water quality. The major pollution indicators were total phosphorus, COD and fluoride.

The water in Miyun Reservoir and Huairou Reservoir met the national standard for drinking water sources. The water in Guanting Reservoir was at Grade IV, with major pollution indicators of COD, fluoride, total phosphorus, and permanganate index.

Groundwater Quality

The groundwater monitoring results showed that, the groundwater quality was generally stable. Due to the close relation with surface water and precipitation, the quality of shallow groundwater was susceptible to disturbances; while the quality of deep groundwater remained in a natural state, mainly affected by the hydro-geological and chemical factors such as iron, manganese and fluoride.

Soil Quality

The ecological and environmental quality of soil in Beijing was in general favorable. With the classification system for agricultural land and the risk control for construction land, the environmental risks of soil have been effectively controlled



Development of Ecological Civilization and Institutional Reforms

The development of ecological civilization was greatly promoted. In January 2019, the Municipal Commission for the Development of Ecological Civilization under the CPC Beijing Committee, set up seven working groups dedicated to ecological and environmental supervision, the comprehensive control of air pollution and addressing climate change, etc. In this way, a comprehensive leadership system for the development of ecological civilization through different angles was established. Throughout 2019, the commission carried out a total of 47 major tasks, concentrating on nine fields including fighting the hallmark battles over pollution, optimizing the framework of territorial space development, development of ecological civilization, etc., which contributed to the formulation of 145 policies for advancing the green and high-quality development of the capital city.

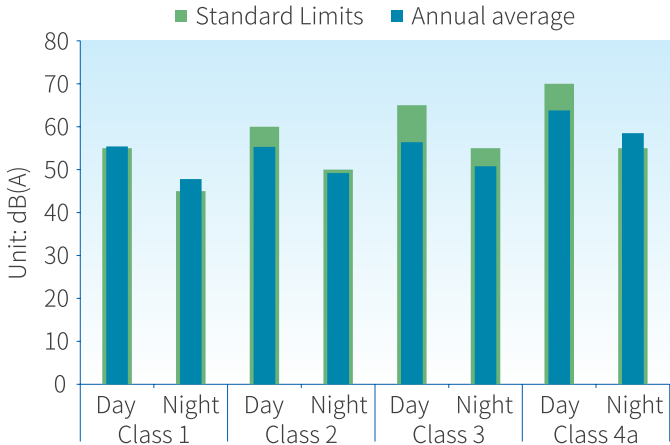
19 programs for speeding up the reform of the system for developing an ecological civilization were developed and implemented. Eight supporting systems, including that for the compensation of ecological and environmental damage, were put in place. The system for the synthesis of a natural resources balance sheet, along with a five-year plan for the auditing of officials on natural resources when leaving office, was developed and introduced. Policies on converting marginal croplands to forests were reinforced. A territorial space planning system oriented at promoting green development has been established, strategies and systems for main functional zones were improved, and the "Beijing-London Green Technology Investment Gateway" was created. By revising duties of the municipal agencies on ecological and environmental protection, basically completing the institutional reforms for establishing a vertical management framework for the monitoring, inspection, and enforcement branches of ecological and environmental departments, as well as promoting the reforms on the comprehensive administrative enforcement in the ecological and environmental sector in an orderly approach, the modernization of Beijing's ecological and environmental governance systems and capacities has been advanced.

Acoustic Environment

The acoustic environment throughout Beijing was generally stable.

Acoustic Environment of Functional Areas

The acoustic environment of urban functional areas remained stable comparing with last year. For day time, the annual average equivalent sound levels of Class 1 Areas exceeded the national standard, while those of Class 2, 3, and 4a Areas were in compliance. For night time, the annual average equivalent sound levels of Class 1 and 4a Areas exceeded the national standard, while those of Class 2 and 3 Areas were in compliance.



Noise Level of Functional Areas in Beijing

All the functional areas showed similar pattern of 24-hour noise variation. For Class 1 Areas, the noise level in six urban districts was roughly even with that of suburban areas. For Class 2, 3, and 4a Areas, the noise level in six urban districts was higher than suburban areas.

Regional Environmental Noise

The annual average noise level in the built-up area of Beijing was 53.7dB(A), equivalent to last year. The annual average noise level in the built-up area in different districts varied from 50.0 to 54.7dB(A), among which the annual average noise level in the built-up area of six urban districts was 53.0dB(A), and that of suburban districts was 53.0dB(A) as well.

Road Traffic Noise

The annual average noise level from road traffic in the built-up area of Beijing was 69.6dB(A), equivalent to last year. The annual average noise level from road traffic in the built-up area of different districts varied from 64.9 to 72.2db(A), among which the annual average noise level from road traffic in the built-up area of six urban districts was 70.3dB(A), and that of suburban districts was 68.3dB(A).

Radiation

The environmental radiation level throughout Beijing stays normal.

Ionizing Radiation

The environmental ionizing radiation level throughout Beijing was within the normal range of background fluctuations.

Real-time continuous air absorbed dose rate and accumulative dose were both within the range of natural background fluctuations. The activity concentration of natural radioactive nuclides in the air was at background level, and no abnormalities were observed on the activity concentration of artificial radioactive nuclides.

In water bodies including rivers, lakes, reservoirs and groundwater, the total α and total β activity concentrations were within the range of natural fluctuations, the activity concentration of natural radioactive nuclides was at background level, and no abnormalities were observed on the activity concentration of artificial radioactive nuclides.

In soil, the activity concentration of natural radioactive nuclides was at background level, and no abnormalities were observed on the activity concentration of artificial radioactive nuclides.

Electromagnetic Radiation

The environmental electromagnetic radiation level in Beijing was far below the limit value for human exposure set by the *Controlling Limits for Electromagnetic Environment (GB8702-2014)*.

Natural Ecology

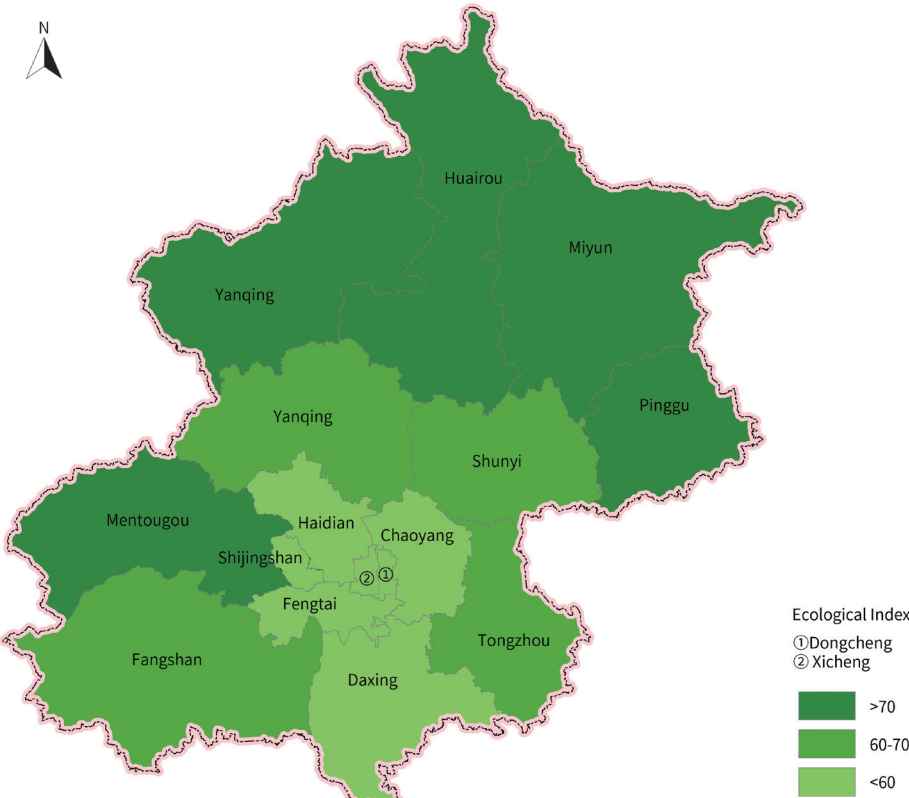
The overall ecological and environmental status of Beijing keeps good.

Ecological Status

According to the *Technical Criterion for Ecosystem Status Evaluation (HJ192-2015)*, the ecological status of Beijing keeps at the level of “Good”, with an Ecological Index (EI) of 69.7, which is 1.9% higher than last year and the fifth consecutive year with improvement. Comparing with last year, the EI of the core area of the capital was elevated by 13.3%, and the EI of the sub-center was elevated by 3.8%, which are 11.4% and 1.9% higher than the average increase rate of the whole city, respectively. The ecological protection areas of Beijing maintained stable and excellent ecological environment, among which the ecological status of Huairou District, Miyun District and Yanqing District was “excellent”.



Trend of Beijing's Ecological Index (EI)



Spatial Distribution of Ecological Index

Protected Natural Areas

By the end of 2019, a total of 79 protected natural areas at different levels and of various types had been established in Beijing. Of which, there were 21 nature reserves with 2 national nature reserves and 12 municipal nature reserves, the total area reached 133,800 hectares, accounting for 8.4% of the whole city's territory. The various and multi-functional protected natural areas have played an important role in protecting biodiversity, preserving natural heritage, improving the quality of ecological environment and maintaining the ecological security of the capital.



Biological Diversity

Beijing is located at the transition zone from Taihang Mountain and Yanshan Mountain to the North China Plain, with an altitude difference of more than 2000 meters. It naturally owned the characteristics of complex topography and landform, five major river systems and various habitat types distributed throughout the territory. Beijing is one of the metropolises with the richest biodiversity in the world.

Beijing owned different types of ecosystem including forest, shrub, grassland, meadow, wetland and others. While Beijing covers approximately 0.17% of China's whole territory, the number of its plant species accounted for around 8% of the nation's total. Up to now, 2917 species (including varieties, subspecies and forma) of 1115 genera in 198 families of higher plants have been recorded, including 4 species of national second-class protected plants; along with 4305 species of vertebrates and insects, of which 14 species are national first-class protected animals such as brown pheasants and white cranes, and 66 species are national second-class protected animals.

Located in the "East Asia-Australia" passage for bird migration, Beijing is one of the most abundant bird capitals in the world. At present, 497 species of birds have been recorded, accounting for 34.4% of the total number of bird species in China.



Cypripedium macranthos



Swartz Aquila chrysaetos



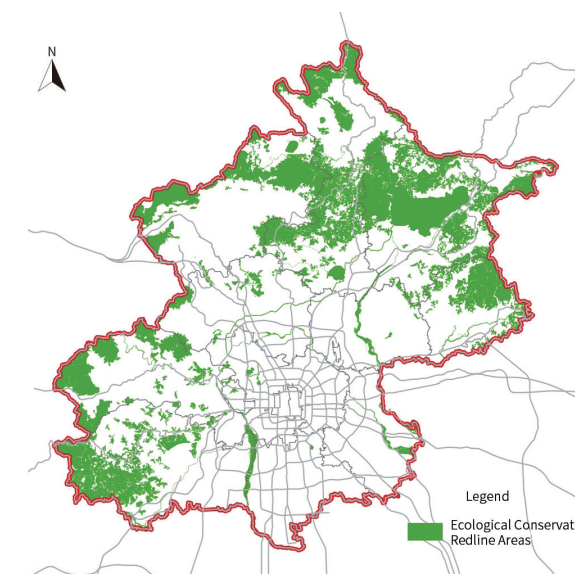
Prionailurus bengalensis

Ecological Construction

Beijing had engaged in expanding the city's ecological space and environmental capacity. To make the forest ecosystem more holistic and better connected, Beijing completed a new round of forestation of 258,000 *mu*, and achieved a forest coverage of 44%. With the principle of "keep the space for more green", 1,686 hectares of land has been vacated and reclaimed for greening. 24 new leisure parks, 60 new mini greens and "pocket parks", as well as 13 urban forests have been created. Per capita public green area reached 16.4 square meters.

Ecological Conservation Redlines

The Ecological Conservation Redline areas cover 4,290 km² in Beijing, 26.1% of the city's territory. They were mainly distributed in the "two screens and two belts", namely Yanshan Mountain to the north and Taihangshan Mountain to the west as two ecological screens; Yongding River Basin and Chaobai River Basin as two ecological protection belts. As the most important ecological space of Beijing, these areas have nurtured abundant and unique biodiversity, which laid the natural and material foundation for the city's historical origin, and serve as important ecological background and protective screen for the city.



In 2019, with the approval of the People's Government of Beijing Municipality, all district governments announced their own development plans, which clarified the spatial pattern, land area, natural quality and protection requirements for the Ecological Conservation Redlines.

Demonstration of Ecological Civilization

According to the requirements of the *Master Plan of Beijing (2016-2035)*, the city takes demonstration of ecological civilization as an important starting point to explore the local practice of promoting the "Five-in-One" general layout (promoting economic, political, cultural, social, and environmental progress in a coordinated way) and the transformation path of the philosophy "Lucid Waters and Lush Mountains are Invaluable Assets". After Yanqing District, in the year of 2019, Mentougou District was certified as the 3rd Batch of national innovation bases for practicing the philosophy of "Lucid Waters and Lush Mountains are Invaluable Assets", and Miyun District was awarded the title of the 3rd Batch of National Pilot City/County in Demonstration of Ecological Civilization.

By advocating the philosophy of "Lucid Waters and Lush Mountains are Invaluable Assets" and promoting green and high-end technological industries such as winter sports, Yanqing District has gained the "Midas touch" and managed to provide jobs for 30% of its rural labor force in the eco-environment related sector. With steady increase of water conservation capacity, Miyun Reservoir has become a frequent resting place for over 10,000 migrant birds, with the number of transiting birds more than doubled in 2019 compared with 2005. Mentougou District continued to safeguard its "lucid waters and lush mountains", putting a thorough end to the local coal mining history that had lasted a millennium, and the mountainous catchments of the Yongding River maintained water-filled whole year round for the first time in 40 years.

ACTIONS

Pollution Control Battle

Battle for Blue Sky

With "One Microgram" Campaign as the main task, in depth pollution control actions were focused on key areas such as diesel trucks, fugitive dust and volatile organic compounds(VOCs). The pollution from mobile sources had been strictly controlled, with 205,200 high-polluting vehicles put on the "blacklist" for closed-loop supervision, and 28,000 heavy-duty diesel vehicles being remotely monitored online. A thorough investigation was carried out to code and register off-road mobile machinery. China VI (B) emission standard was introduced for certain types of heavy-duty vehicles ahead of the schedule. In total, 42,700 diesel trucks were removed from road. The population of new energy vehicles reached 308,900. Beijing strengthened precision control over dust, set up a unified visual monitoring platform for punishment of illegal acts, and 43 construction companies were suspended the bidding qualification due to the violation of dust control requirements. The special operation of upgrading the city through function transfer and remediation has made new advances. 399 companies in general manufacturing were shut down, and 393 "small, unlicensed and polluting" companies were dynamically identified and closed. Individualized solutions on VOCs control have been provided to 52 businesses in the most relevant industries. More than 18,000 restaurants conducted cooking fume pollution control. On top of the fact that coal is basically no longer used in plain areas, clean energy further replaced coal in 41,000 households in rural mountainous area.



Multi-tiered Emergency Management for Heavy Air Pollution Episode

In accordance with the *Emergency Plan for Air Pollution Episode in Beijing*, the response action was carried out. Following the guidance of the Ministry of Ecology and Environment, combined with Beijing's local characteristic, and under the principle of "reduction on high efforts, on high standards, by different approach and for significant effect", Beijing formulated the "13+3" list of key industries and enterprises to implement emergency emission reduction, and added three key industries on the basis of national regulations. According to the different environmental performance levels, enterprises were divided into three tiers: A, B and C, which brought about more scientific and contingent reduction measures, to avoid the situation of "one size fits all".

Battle for Lucid Water

Beijing had integrated water resources, water environment and water ecology management, to focus on water environment governance and protection. The second three-year action plan for sewage treatment and utilization of recycled water was completed, and the sewage treatment rate throughout the city reached 94.5%. According to the management idea of "inspection, measurement, tracking, treatment and management", the whole-process management system covering water environment, sewage outlet, and pollution source was promoted. An integrated working pattern of joint protection and co-governance of upstream and downstream, in terms of monthly report of water environment quality, early warning, in-depth implementation of regional compensation for water quality, had been formed. 25 small watersheds' cleaning and ecological improvement projects were implemented to further improve water ecological environment. The comprehensive treatment and ecological restoration of the Yongding River had been accelerated, and 340 million cubic meters of freshwater was filled to the downstream of Guanting Reservoir. To secure safe drinking water for the capital, exclusive actions for protection of surface drinking water sources were implemented. The Miyun Reservoir, Huairou Reservoir and Jingmi Diversion Canal were under closed-off management. The maximum storage capacity of Miyun Reservoir exceeded 2.6 billion cubic meters, a new record in the past 21 years. The depth of groundwater in the plain area rose 0.32m compared with the same period of the previous year, a rising trend which had lasted for the past 4 years.

Discharge Standard of Water Pollutants for Rural Sewage Treatment Facilities

Special
Column

In January 2019, Beijing issued the *Discharge Standard of Water Pollutants for Rural Sewage Treatment Facilities (DB11/1612-2019)*, which centers on the improvement of water quality and takes an ecological approach towards environmental problems. For rural sewage, the guiding principle is to apply tailor-made, recycle-friendly and ecological treatment, with combined punishment and clemency.

According to the different handling capacity (4 tiers including above 500t/d, 500-50t/d, 50-5t/d and below 5t/d), effluent destination and type of recipient water body, the standard has put forward correspondent control indicators and limit values. With key areas strictly controlled, the treatment of rural sewage should take a tailor-made approach, give priority to the use of ecological treatment process, and encourage water recycle and reuse.

Battle for Clean Soil

Beijing took the agricultural land and construction land as the priority, and carried out in-depth prevention and control of soil pollution. By promoting the detailed investigation of soil and the classified management of agricultural land, Beijing completed the detailed investigation on soil conditions of agricultural land, and preliminarily classified the categories of soil environmental quality of cultivated land. According to local conditions, measures such as returning farmland to forest, fallow and increasing organic fertilizer were taken to realize the safe utilization of contaminated land. The investigation of soil pollution in key industries and enterprises was promoted. A monitoring network for the ecological and environmental quality of soil covering all kinds of land had been established, with special monitoring networks set up for agricultural producing area, geological environment, landscape land, etc. In order to prevent soil pollution, 34 key entities under supervision for soil pollution carried out self-monitoring and hidden danger investigation. A total of 149 non-formal waste dump sites had been renovated. Risk management and control of construction land were strengthened, and a dynamic soil pollution assessment mechanism is built for shut-down enterprises. Soil pollution risk management and remediation directory system was implemented for construction land, and the approach of "reasonable planning, control first, ecological remediation" was explored for the safe utilization of construction land. 2.33 million square meters of contaminated land had been treated and repaired for safe utilization.

Fugitive Dust Control

Special
Column

To tighten the fugitive dust control and make the city cleaner, Beijing issued the *Working Requirements on Fugitive Dust Control*. The working mechanism of "shared platform, responsible departments, standardized enforcement and inspection, and information disclosure" was put into effect to strengthen work coordination and foster joint force among municipal departments and various districts. Innovative means of supervision were applied. A TSP monitoring network covering all townships (streets) and a dust video surveillance platform covering construction sites above the designated scale of various types were built. More than 1,700 roads in 252 townships (streets) in the plain area have been placed under real-time, mobile dust load surveillance and monthly satellite remote sensing monitoring was carried out for bare lands. Notifications and reminders were given on a regular basis to townships (streets), construction sites, and roads in the lower rankings. Supervision and law enforcement were enhanced, and joint disciplinary actions were taken. A cumulative number of 32,000 cases were filed for construction dust violations throughout the year, an increase of 35.2% compared with last year. In 2019, the citywide average dust precipitation has dropped to 5.8 tons/square kilometer per month, a decrease of 22.7% compared with last year.

Addressing Climate Change

The 2019 *Work Plan of Priorities to Combat Climate Change* was published and implemented. Integrated emissions reduction of greenhouse gases and air pollutants was advanced in a coordinated manner for key areas such as energy, industry, construction, transportation, and agriculture. The working system at municipal and district levels for addressing climate change has been established after the institutional mission transfer. Publicity activities such as Low Carbon Day were organized to mobilize the whole society to practice the concept of low-carbon production and life. Carbon emissions reporting, verification, review, and spot checks were completed for 903 key carbon emitters. With carbon emission quotas verified and allocated, key carbon emitters 100% fulfilled the emission obligations, which brought up both the volume and price of transactions in the carbon market. The market mechanism has motivated companies to control greenhouse gas emissions by enhancing energy efficiency and technological innovation.

In 2019, carbon dioxide (CO₂) emission per 10,000 yuan of gross domestic product (GDP) in Beijing shrank to less than 0.5 tons, a decline of 4.5% compared with last year, far surpassing the annual goal of 2.6%, and a drop by 18% compared with the year of 2015.

Publication of A Review of 20 Years' Air Pollution Control in Beijing



In March 2019, an assessment report titled *A Review of 20 Years' Air Pollution Control in Beijing*, compiled by a UN Environment-led team of international and Chinese experts over two years, was officially released at the headquarter of UN Environment in Nairobi, Kenya.

The report stated that over the 20 years from 1998 to 2017, to control air pollution in the backdrop of rapid economic and social development, Beijing had launched comprehensive air pollution control programs in stages. With constant efforts, the emission intensity of air pollutants has decreased year by year, and Beijing's air quality improved significantly. Between 1998 and 2017, the annual average concentrations of SO₂, NO₂ and PM₁₀ in Beijing were reduced by 93%, 38% and 55%, respectively. In just five years from 2013 to 2017, the annual average PM_{2.5} concentration in Beijing fell by 35.2%, from 89.5µg/m³ to 58µg/m³, while the level of annual PM_{2.5} in the Beijing-Tianjin-Hebei Region dropped by 25%. Beijing's efforts to improve air quality provide experience for cities around the world, especially those in developing countries.

"No other city or region on the planet has achieved such a feat," said Joyce Msuya, UN Environment acting executive director.

Ecological and Environmental Management

Regulations and standards

Local system of regulations and standards on ecology and environment has been improved. The draft of *Ordinance of Beijing Municipality on Control of Emissions from Motor Vehicles and Off-road Mobile Machinery* based on sufficient study was submitted, which was reviewed and approved by the Third Session of the 15th Beijing Municipal People's Congress. Study and drafting of the proposed *Ordinance on Ecological Conservation Redlines* was under process. Five local environmental standards, including the *Discharge Standard of Water Pollutants for Rural Sewage Treatment Facilities* were issued.

Local Environmental Standards Issued in 2019

No.	Code	Name	Date of issuance
1	DB 11/ 1612-2019	Discharge Standard of Water Pollutants for Rural Sewage Treatment Facilities	January 7, 2019
2	DB 11/T 838-2019	Code for Metro Noise and Vibration Control	March 27, 2019
3	DB 11/ 208-2019	Emissions Control and Limits of Gasoline Vapor from Gasoline Filling Stations	June 13, 2019
4	DB 11/ 1631-2019	Emission Standard of Air Pollutants for Electronic Industry	June 13, 2019
5	DB 11/T 656-2019	Site Investigation and Risk Assessment Guideline of Development Land	September 26, 2019

Environmental Access

The business environment was optimized to bring benefits to enterprises and convenience to people. Beijing continued to deepen the reform of "streamlining administration, delegating power, improving regulation, and optimizing service". 32 types of projects with small environmental impacts and controllable risks, such as storage and logistics, were exempted from environmental impact assessment (EIA) procedures. The documentation and time needed for EIA procedures were curtailed by 62% and 55% respectively. The pending time for EIA approval was reduced to half of the statutory level, contributing to a substantial increase in the World Bank's Ease of Doing Business Ranking for "getting a building permit". To fully clean up intermediary service items, Beijing further promoted Internet Plus government services, and advanced the reform of providing online, offline and in-person access to one-stop government services, which made the online management of government service items and administrative approvals 100% achievable.

Beijing implemented the permit system for pollutant discharge, and issued pollutant discharge permits in an orderly manner. Pollutant discharge permits were issued to 6,364 enterprises in industries such as car manufacturing, electronic device manufacturing, and heat production and supply. The pilot work to review and rectify the permits for stationary pollution sources was completed, which included the investigation and classified treatment of 23 industrial sectors with permits issued in 2017 and 2018, such as thermal power and paper-making. Post-permit supervision was strengthened by carrying out special law enforcement for pollutant discharge permits.

Scientific and Technological support

The scientific and technology innovation system was given full play. Beijing launched a number of major scientific research projects such as the Study of Real-time Accurate Traceability Technology of Air Pollution based on High-Density Monitoring Network and Big Data, which provided technological support for formulating and implementing pollution control action plans and improving environmental supervision. Beijing also participated in scientific research programs launched at national level on pollution control, and carried out studies in the framework of heavy air pollution control program in 2+26 cities in the Beijing-Tianjin-Hebei Region. Scientific research project fruits offered technical support for the continuous improvement of environmental quality in Beijing.

Eco-environmental Monitoring

The eco-environmental monitoring networks at municipal, district and township levels were refined. A high-density monitoring network for atmospheric particulate matters (PM_{2.5} and TSP) covering all townships (streets) and a surface water quality monitoring and evaluation system were put into place. To serve for high-quality development, the monitoring of environmental quality, ecological status and pollution sources were carried out, including air, water, soil, sound and radiation, which supplied scientific and accurate data for evaluation of environmental status and decision-making. The *Implementation Plan for Deepening Environmental Monitoring Reform and Improving Environmental Quality Monitoring Data in Beijing* was put into effect to strengthen the quality control for environmental monitoring, and the inspection on various environmental monitoring agencies was conducted to enhance monitoring data quality.

Environmental Monitoring Contest



In order to implement the national strategy of making China a talent-strong country and build an eco-environmental protection iron army, Beijing Municipal Ecology and Environment Bureau organized, in conjunction with five other departments, the Second Beijing Environmental Monitoring Professionals Contest. More than 40 environmental monitoring agencies participated in the contest, including municipal and district level environmental institutions, and environmental business companies. The contest has boosted the professional level of environmental monitoring in the whole city, and propelled the progress towards science-based and standardized environmental monitoring, which had laid a solid foundation for building an eco-environmental protection iron army.

In the national contest of environmental monitoring professionals, 9 contestants from the Beijing delegation won two second prizes as a group and six awards as individuals.

International Exchanges and Cooperation

Beijing has always been open to international exchanges and cooperation to learn advanced international experiences and share its own lessons and experience in environmental protection. The *A Review of 20 Years' Air Pollution Control in Beijing*, which evaluates Beijing's efforts and progress on air pollution control, was published by UN Environment to share Beijing's story with cities in developing countries. Beijing successfully hosted the 2019 Beijing International Forum for Metropolitan Clean Air and Climate Actions, and attended such major international events as the C40 World Mayors Summit and the United Nations Climate Change Conference, to share the challenges and progress made in green development on multiple platforms. Beijing also actively launched environmental cooperation programs with government departments and international agencies in a wider scope, including the Italian Ministry for the Environment, Land and Sea, the San Francisco Bay Area of California, U.S.A., and the Energy Foundation.

Environmental Safety Supervision

As an important aspect of environmental safety, hazardous waste management and supervision was tightened. Special action for defusing hidden safety risks of hazardous waste was taken, under which 165 key waste-producing companies and 16 companies engaged in hazardous waste operations were inspected and assessed. The online application platform for hazardous waste transfer across provinces was put into use. Pilot projects for centralized collection and transfer of waste lead-acid batteries were implemented to improve the collection and transportation system. Meanwhile, companies engaged in hazardous waste operations were increased to expand the disposal capacity. Emergency risk control and emergency precaution were bolstered, so as to enhance emergency response capabilities and properly handle environmental emergency events. Radiation safety supervision was intensified by tightening access to radiation activities. 80 institutions with renewed radiation safety license were brought under standardized management. Nearly 100 times of on-site inspections were performed over radioactive material transportation, radioactive source transfer, and radiographic inspection to enhance the supervision on high-risk sources. Special inspections on medical waste management were carried out over 40 medical institutions. 205 disused radioactive sources and 7,350L radioactive waste from 36 institutions were collected and stored in a safe manner.

Ecological and Environmental Protection Inspection

Eco-environmental inspections were carried out to make sure that party committees and governments at all levels and related departments effectively fulfill their duties, so as to promote solutions to prominent environmental problems. Beijing rigorously urged the rectification required in the first round of environmental protection inspection by the central government of China, and steadily advanced the rectification of problems identified in the first round of municipal-level environmental protection inspection. A cumulative number of 104 accountability clues were transferred, and 35 agencies and 369 persons were held accountable. Focusing on supervision on government agencies, Beijing launched special inspection on air pollution prevention and control that highlights prominent problems, and brought agencies and people that failed to perform their duties accountable.

Ecological and Environmental Law Enforcement

In terms of stationary sources, Beijing strengthened environmental law enforcement inspection featuring the random selection of both inspectors and inspection targets and the prompt publication of results. Adhering to a problem-oriented approach, 12 rounds of pinpoint and basin-wide enforcement actions and more than 20 special enforcement tasks on air, water and soil pollution were carried out, supported by technological means such as hotspot grid and online monitoring. A total of more than 10,000 environmental problems were found during inspection throughout the year. As many as 6,446 cases were filed as violations, an increase of 30.78% over last year, and more than 200 million yuan of penalties were imposed. Meanwhile, 888 major environmental violation cases were investigated and handled; other environmental violation cases were transferred to localities in line with the six-step procedure, which included examination, transfer, rectification, feedback, review and inspection. The “respond to whistle” mechanism (streets and villages whistle and law enforcement departments handle) was introduced to address environmental problems, which improves refined management and environmental quality of areas within their respective jurisdiction.

For mobile sources, Beijing continued to focus efforts on heavy-duty diesel vehicles and off-road mobile machinery. Precise law enforcement was adopted for single vehicles that repeatedly exceed emission limits and enterprises with many non-compliant vehicles. Totally 3.118 million heavy-duty diesel vehicles (times) were inspected throughout the year, an increase of 43.8% compared with last year, of which 242,000 violation cases were recorded and punished. The non-compliance rate of heavy-duty diesel vehicles checked fell from 15% in 2018 down to 8% in 2019. At the same time, 18,701 off-road mobile machinery (times) were inspected, with 1,680 violations recorded and punished. Source control played the due role as spot checks of new cars were carried out for 1,085 vehicles (times) of 822 models. Inspection and testing agencies were also regulated. On-site examination was conducted over 7,854 vehicle inspection stations (times) throughout the year, covering 738,300 vehicle (times). Oil and gas quality supervision and law enforcement were tightened. The centralized special inspections covered 15,919 gasoline stations (times) and 313 oil tanks (times), of which 132 illegal oil storage, sales, and transportation companies were investigated and punished.

Agricultural and Rural Pollution Control

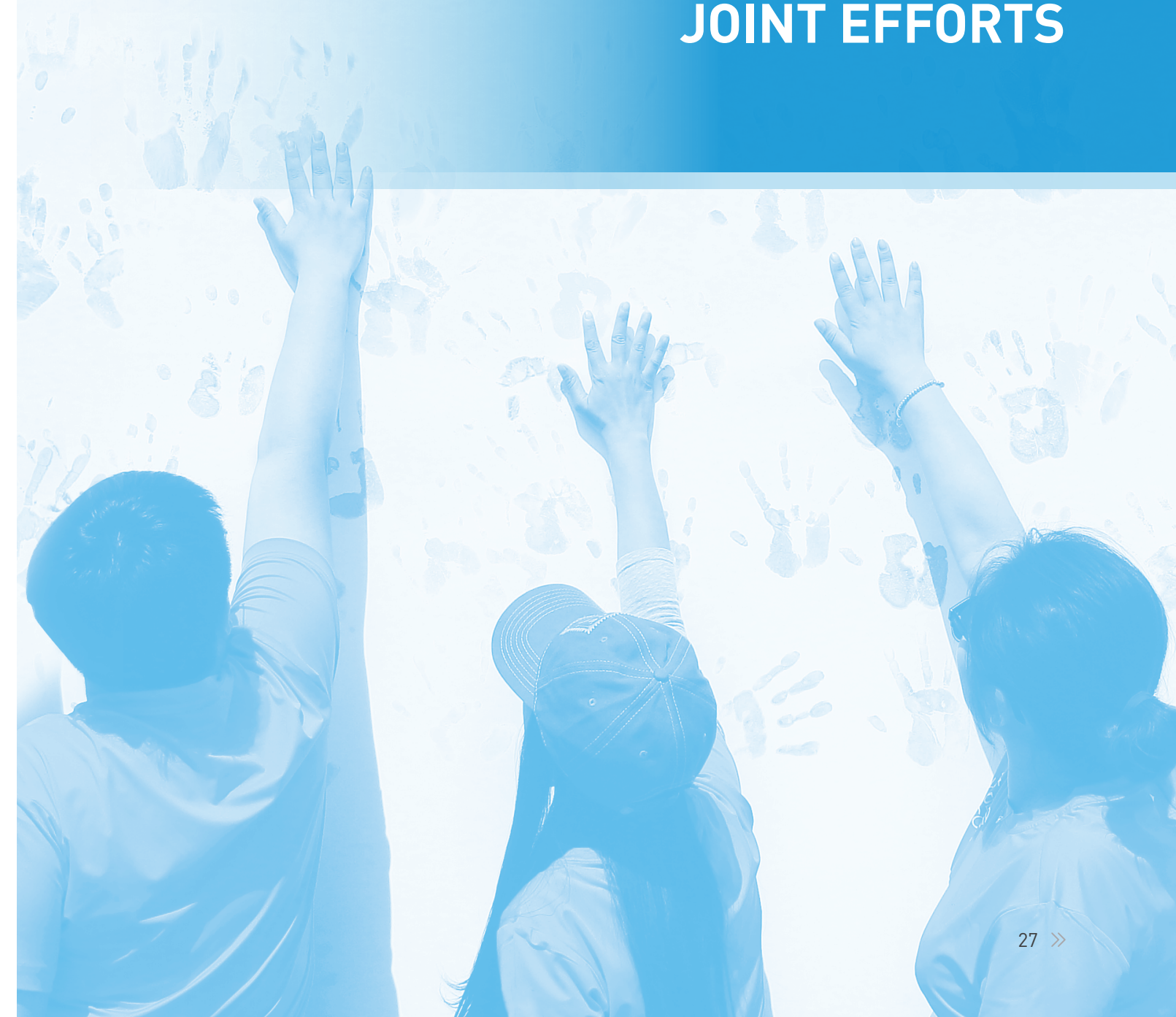


Beijing published the *Implementation Plan for the Action Plan for Uphill Battle Against Agricultural and Rural Pollution*. Rural drinking water sources were protected by establishing a drinking water sanitation monitoring network covering all townships in the city. The comprehensive environmental cleaning and improvement in rural area was strengthened, with environmental cleaning actions completed in 140 villages and sewage treatment facility built in 300 villages. Progress was made in reduced application and efficiency improvement of fertilizers and pesticides, as well as agricultural film recycling. The ecological prevention coverage rate for crop pest, the penetration rate of soil testing and fertilization technology, and the recovery rate of agricultural film reached 64%, 98% and 82% respectively. Areas prohibited from livestock production were delineated in a more standardized manner. Livestock and poultry farms above the designated scale in the city have been 100% equipped with waste treatment facilities, which raised the comprehensive utilization rate of livestock and poultry excrement to over 87.5%.

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JOINT EFFORTS



Regional Coordination

Coordinated prevention and control of air pollution was carried out on a regional scale. Under the leadership of the Steering Group for the Control of Air Pollution in the Beijing-Tianjin-Hebei Region and Surrounding Areas, Beijing plays a positive role in the regional air pollution control. With a problem-oriented view and focusing on key time periods, special action plans were rolled out for air pollution control in autumn and winter, and continued improvement of air quality was achieved in the two seasons. Emergency response to air pollution episodes, as well as the mechanism for joint consultation in air quality forecast and coordinated emergency response actions with surrounding areas got strengthened. An emergency emission reduction list was developed according to the environmental performance of emitters, and the differentiated emergency measures managed to cap the peak value and slow the growth of ambient pollutant concentration. Coordinated law enforcement was also carried out with surrounding areas to solve inter-provincial air pollution issues. Beijing, Tianjin and Hebei Province worked together for the legislation on control of emissions from motor vehicles and off-road mobile machinery, realizing the goal of synchronized legislation, review/approval, and implementation.

Coordinated protection and governance of water environment in river basins was strengthened. For protection of Miyun Reservoir, Beijing worked together with Hebei Province to develop the comprehensive plan for ecological and environmental protection in the Chao River Basin, and implemented the ecological compensation agreement with the upper reaches of Miyun Reservoir in an orderly approach. Beijing and Hebei jointly issued the *Working Mechanism for the Prevention and Control of Water Pollution in Inter-Provincial Rivers of the Baiyangdian Basin*, enhancing joint consultation, sharing of information, coordinated law enforcement and emergency response, and also jointly supported the building of Xiongan New Area. Beijing, Tianjin and Hebei Province jointly issued the *Emergency Plan for Addressing Water Pollution Accidents in Major River Basins of the Beijing-Tianjin-Hebei Region (Chaobai River-New Chaobai River Basin)*, which has further elevated the handling capacities for water pollution accidents in major river basins. Neighboring areas such as Miyun District and Huairou District of Beijing, and Chengde city of Hebei province, Fangshan District of Beijing and Baoding City of Hebei Province, Tongzhou District of Beijing, Wuqing District of Tianjin and Hebei Province's Langfang City, also strengthened ties and promoted regional coordination in localities.

Citywide Mobilization

By cultivating the ecological and environmental concept, Beijing has embraced a situation of joint efforts towards better environment. The government rules, the industry self-discipline and the public participate, each playing an important role. Headed by government bodies at different levels, the development of ecological civilization was further promoted. The mission of government agencies on ecological and environmental protection were performed by means of undertaking and assigning tasks in the uphill battle over pollution, thorough supervision and governance, active report of work progress and timely response to social concerns. For enterprises and public institutions, active measures were taken to cut the emissions of pollutants and greenhouse gases. Self-monitoring was carried out by key pollutant-discharging entities, and the monitoring data was actively published and subjected to public scrutiny. 41 enterprises and public institutions, including Beijing Drainage Group and Beijing Chaoyang Circular Economy Industrial Park, opened gates to the public and received visits from all walks of life to their environmental facilities and pollutant treatment units. More than 2 million people (times) have visited the ecological and environmental education bases, as well as open facilities, to get a field experience of Beijing's ecological and environmental protection progress. For the citizens of Beijing, as active promoters of ecological civilization with ever-growing sense of ecological awareness, more people chose to practice a green lifestyle. Green commuting took up 74.1% of all travels in the central urban area. A total of more than 10 million people (times) have participated in environmental protection events including Beijing Environmental Cultural Week, Beijing Children's Environmental Art Festival, "I Love Mother Earth" Primary and Secondary School Students Speech Competition, etc. Close to 7,000 teachers and students from 50 universities participated in the 15th Environmental Cultural Season for Capital Universities, and over 15,000 teachers and students from 69 middle and primary schools in 11 districts learned about ecological and environmental knowledge through the ecological and environmental protection courses.

The public is mobilized for ecological and environmental protection supervision, and citizens continued to offer their views and advice for the building a beautiful Beijing. Themed campaigns were carried out through TV, newspapers, websites, WeChat, etc. The public reported 984 cases of environmental violation activities, among which 288 reporters (times) of proved cases were awarded.



OUTLOOK

The year 2020 marks a grand finale for achieving the goal of building a moderately prosperous society in all aspects and completing the 13th Five-Year Plan (2016-2020). It will also be a critical year for Beijing to secure a decisive victory in the uphill battle over pollution. Beijing will follow the guidance of Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era, act on the Xi Jinping Thought on Ecological Civilization and instructions of the General-Secretary Xi Jinping in his important speeches on Beijing, and resolutely implement the decisions and assignments by the CPC Central Committee. Committed to building a moderately prosperous society in all aspects, to the goals and tasks of the 13th Five-Year Plan, and to the new development philosophy, Beijing will center on the improvement of the ecological and environmental quality, win the tough battle of pollution control, and keep advancing the modernization of the ecological and environmental governance systems and capacities. Meanwhile, holistic plans will be made for the 14th Five-Year Period (2021-2025). In a word, Beijing will further promote the development of ecological civilization, accomplish relevant tasks for ecological and environmental protection, and work with greater diligence to promote new development of the capital.