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Left: An Oriental stork flies to its nest on a pole at the Yellow River Delta National Nature Reserve. YANG BIN / FOR CHINA DAILY



Center: Zhao Yajie (right) and her teammates conduct research on vegetation at the reserve. WANG LIDONG / FOR CHINA DAILY



Right: A mallard leads her ducklings on a walk through seagrass at the reserve. LIU YUELIANG / FOR CHINA DAILY

# Reserve: Protection work given priority

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Meanwhile, in Gansu province, Wang Jiayang, who works for a management and protection center station at Yellow River First Curve National Nature Reserve in Maqu county, Gannan Tibetan autonomous prefecture, said that in November last year some 30,000 birds stopped over at the reserve's wetlands. It was the first time that so many birds had been witnessed at the venue, which is located on the upper reaches of the waterway.

Gou Hongshui, director of the Yellow River Delta National Nature Reserve's management committee from 2019 to May this year, said: "Birds know whether an environment is good or not. Increasing numbers of migratory species are stopping over at the reserve. Some make it their home all year — good evidence that the delta's ecological system is constantly improving."

Rising in the Bayan Har Mountains in Qinghai province, the Yellow River, China's second-longest, flows through a plateau blanketed with fine, windblown soil. Millions of tons of soil are carried east by the river every year, with some of it reaching the estuary, where the waterway flows into the Bohai Bay in Dongying, forming a large expanse of wetlands.

In the 1980s and '90s, coastal erosion, seawater encroachment and droughts caused the wetlands to shrink.

The delta's rich wetland ecosystems are also seriously threatened by rapid urbanization, oil and industrial waste pollution, and unprecedented land reclamation, according to the reserve's management committee.

To protect the wetlands, the reserve was established in 1992. It covers about 153,000 hectares, with the wetlands comprising 70 percent of the total.

President Xi Jinping, who is also general secretary of the Communist Party of China Central Committee, inspected the Yellow River estuary, including the reserve, on Oct 20.

He checked the river's tributaries, the wetlands' environment and learned about ecological protection and high-quality development in the Yellow River Basin.

An outline for the Basin's protection and development through 2030,



The wetlands at the Yellow River Delta National Nature Reserve. HU YOUWEN / FOR CHINA DAILY

released in early October by the central government, calls for the protection and restoration of wetlands on the lower reaches of the delta.

Local governments have prioritized protection of the reserve, with such efforts strengthened in the past three years. This work followed a symposium on ecological conservation and high-quality development in the Yellow River Basin chaired by Xi in Henan province in 2019.

Gou said, "As water is crucial to maintaining the healthy ecological system in the wetlands, we have been replenishing the water there."

Water projects have made replenishment possible. For example, local governments use the Xiaolangdi Hydroelectric Power Plant on the middle reaches of the river in Henan to regulate the waterway's flow by storing floodwater to be released when needed.

Dikes have been built at the wetlands to conserve water, helping restore surface runoff and supplement groundwater supplies.

To date, 160 million cubic meters of water has been replenished in the delta this year, according to the Department of Natural Resources in Shandong.

Gou said the abundance of water in the wetlands has significantly contained destruction of the ecosystem caused by seawater encroachment, and has also slowed soil salinization.

In 2006, the reserve teamed up with the Chinese Academy of Sciences to tack-

le *Spartina alterniflora*, a smooth type of marsh cordgrass spreading widely on the estuary coastline and seriously threatening species' habitats.

This cordgrass can have serious ecological consequences by changing the terrain of the intertidal area, hindering the flow of tidal ditches and water channels, replacing indigenous plants, and reducing key habitats for water birds wintering and breeding.

Liu Jing, director of the environmental monitoring center at the nature reserve, said: "The soil where this cordgrass grows was turning black. It not only causes biodiversity changes and ecosystem imbalances, but also has an important impact on the natural wetland landscape."

A large expanse of *Spartina alterniflora* was eliminated last year, she added.

Such efforts have resulted in more than 18,800 hectares of the wetlands being restored since 2017, according to the nature reserve.

To advance ecological conservation and high-quality development at the mouth of the river, local governments are working on building a Yellow River estuary national park, which will cover 2,152 square kilometers of marine area and 1,371 sq km of land, according to the reserve.

The national park will be the first in the country to boast land and marine areas.

The outline for the Yellow River Basin's protection and development through

2030 calls for further efforts to be made to restore key wetlands on the upper reaches of the Basin, such as those in Gannan.

Wang, from the management and protection center station, said authorities have also taken steps to better protect the wetlands in Maqu, which play a crucial role in conserving water for the Yellow River.

Maqu, located in the eastern part of the Qinghai-Tibet Plateau at an average altitude of 3,600 meters, is where the Yellow River makes its first curve. The wetlands are dubbed the river's "water pool".

For the past five years, the central government and the authorities in Gansu have launched 70 projects to restore the wetlands and monitor their environment.

Wang said the increasing number of birds breeding at the Maqu wetlands shows that the ecological systems there are improving.

## Biodiversity enriched

Liu, from the monitoring center, said this good environment has enriched biodiversity, and according to the delta nature reserve, the wetlands are now home to 1,630 wild animal species and 685 plant species.

A line on the big screen at the monitoring center indicates changes in the number of birds living or stopping over in the delta. It also shows that the number of

avian species in the delta has risen from 187 in 1992 to 371.

Liu said: "We observed flamingos in March, white pelicans last December and spoon-billed sandpipers this year. More than 10,000 Saunders's Gulls bred at the reserve this year."

In addition, many Oriental storks live at the nature reserve throughout the year.

Zhao, the monitoring worker, said: "Oriental storks, an endangered species, gave birth at the nature reserve for the first time in 2005. Last year, they gave birth to 324 nestlings, and 2,278 of these storks have been born at the reserve."

The 34-year-old can identify more than 170 species of birds, and she has a wealth of experience in caring for her charges, such as building homes for the birds and creating a friendly and suitable environment on land and water for different species.

"Oriental storks like building nests in tall arbor trees, but because we have few of these trees, we have built nests for the birds on poles standing 15 meters to 17 meters high," Zhao said.

To date, 115 nests have been built for Oriental storks, she added.

"The nests, which are shaped like bowls, are 1.2 meters in diameter at the base, 2.2 meters in diameter at the top, and 35 centimeters deep. Birds place branches and leaves inside the nests, making warm homes for themselves in these artificially built structures," she said.

Zhao is among 20 people working at the reserve who monitor the birds' conditions every day.

Coastal waters near the Yellow River Delta are also important for marine life in the Yellow Sea and Bohai Bay to spawn, winter, feed and migrate, according to the nature reserve.

More than 2,000 swans, 40 red-crowned cranes and thousands of wild geese, gray cranes and wild ducks are now arriving daily in the delta, according to the nature reserve.

Zhao said: "When we walk around this vast reserve, we are not alone, as the birds are everywhere — on lakes, in woods and across the sky. It will be a beautiful winter."

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Black-necked cranes gather at Yellow River First Curve National Nature Reserve in Maqu county, Gannan Tibetan autonomous prefecture, Gansu province. PROVIDED TO CHINA DAILY

## Conscientious team assists birds in their search for food

By ZHAO RUIXUE  
in Dongying, Shandong

Millions of migratory birds start arriving at the Yellow River Delta National Nature Reserve in Dongying, Shandong province, in mid-October.

They rest in the wetlands, feeding on a rich variety of food such as fish, shrimps and grain to build their strength. Some birds even make the wetlands their home all year.

Zhao Yajie, 34, is a member of a team patrolling the wetlands every day to ensure a safe environment for the birds.

After being awarded a doctorate in ecology by the China Academy of Sciences' Institute of Applied Ecology, Zhao started work at the reserve in 2014. Her main jobs are conducting scientific research on ecological restoration and protection, and monitoring the birds' conditions, such as their numbers and the different types of species at the reserve, along with the birds' environment.

In October and November, Zhao and her colleagues collect samples from the birds, such as fresh droppings.

"We analyze the droppings at our laboratories to see whether the birds are carrying flu," Zhao said.

The team carries out a comprehensive survey of birds at the reserve in winter. This work also includes checking the number of species, the population of a particular species, and the birds' habits.

"Species such as the red-crowned crane like looking for food in the tidal-flat areas, and crabs are their favorite. To avoid being disturbed, these birds prefer to stay on land surrounded by water or in an area packed with reeds," Zhao added.

Information gathered on the birds' habits helps Zhao and her colleagues create a better environment for them. To ensure that arrivals have sufficient food, the team has created what it terms "small dining tables" for the birds.

In the marshes, an area of water 10 centimeters to 25 cm deep has been created for Oriental storks and egrets to look for food. Next to this shallow area, an expanse of water 30 cm to 100 cm deep has been set up for swans and gray geese to eat water grass.

When spring and summer arrive, Zhao and her colleagues conduct a survey on the birds' breeding habits. They count the number of nests, eggs and nestlings. Zhao likes this work best, as she loves to welcome new life to the wetlands.

"I'm amazed by some Saunders's Gull chicks who stay in my shadow to avoid the sun and potential enemy birds flying in the sky. The chicks are weak, but so cute, so I feel a strong need to protect them," Zhao said.

Every time a chick stands in her shadow, Zhao is reluctant to leave until its mother appears. The moment Zhao departs, the mother swoops down and covers the young bird with her wings.

"As a mother myself, I can sense their love,"



Zhao Yajie observes Oriental storks at the Yellow River Delta National Nature Reserve. CHI WEI / FOR CHINA DAILY

said Zhao, who has a 4-year-old daughter.

Working on such a large wetland area is not always easy.

"When we walk on the mud flats, every step is so hard, because we need to pull our feet out each time," Zhao said.

From 2015 to 2018, the reserve teamed up with Qingdao Agricultural University in Shandong to survey insects at the reserve.

Zhao and her teammates carried a posi-

tioning system to find their way back to their work station.

"This system is very helpful, especially when we walk among reeds growing more than 2 meters high in the wetlands," Zhao said.

The team also has to contend with mosquitoes in summer that are larger than those seen typically in China.

Over the past seven years, Zhao has visited all the reserve's main areas. This year, a center using digital technology, including a remote monitoring system, was put into use, making her job easier.

"Every year, I welcome migratory birds at the reserve and see them depart. I have seen some species several times, but on each occasion, I am just as excited as the first time," she said.

In her spare time, Zhao gives speeches to students conducting field studies at the reserve.

"The students are very interested in the birds, plants and landscape at the reserve. They will learn a lot, such as why Oriental storks communicate by clattering their bills and why some grass tastes salty. Students can also try their hand at making nests," she said.