duration of 29 days.

waterfowl migrate north every year

and rely on the Yellow and Bohai seas'

wetlands to rest and build up their

of China's coastal wetlands have

■ Piersmai

2008 2009 2010

BIRDS INCREASE AS MUDFLATS DECREASE

ilable mudflat in north and northwest Bohai Bay in sq km

in Beipu village harvest shellfish from the wetland.

In 2011, the gross per capita income from selling

Edible shellfish generate 80% of their income.

shellfish was 20,000 yuan (\$3,140). Another

Photos: Jan Van De Kam, Adrian Boyle, Pavel Tomkovish

GRAPHIC BY GUILLERMO MUNRO, TIAN CHI

7,000 yuan came from selling clams as animal

Red knot numbers in study sites in Tangshan (x1000)

cies in the study areas of Bohai Bay

-sgadua to Presence of the two red knot subspe

The Luannan wetland

s host to more than

subspecies of red

60-100% of their

populations rest

knot (scientists gues

nere), and is also one

ites for the relict gu

a vulnerable migra-

tory bird.

of the major winterin

Survey route

Saltpans

TANGSHAN

MIGRATION DEVASTATION

Piersmai also have an average stopover

of the rogersi and piersmai subspe-

cies make the Luannan wetland

duration of 29 days, but

20% stay for 21 days or

Development of mudflats on the country's eastern coast threatens migratory birds, including rare species. Liu Xiangrui reports in Beijing.

le most scientists are proud of their breakthroughs, Dutch ornithologist Theunis Piersma, who discovered and named after himself a subspecies of the red knot (Calidris canutus), says he's ashamed to talk about the creature. "I feel very proud to have these birds named after me, but I fear that they may actually become extinct in my lifetime," the 54-year-old told a recent conference in the coastal city of Tangshan, Hebei province. The red knot subspecies piersmai is among many migratory shorebirds that make the inter-tidal mudflat in Luannan wetland a critical stop along their annual migrations from Australia to the Arctic.

villagers, too.

Bay's last — these birds are losing the able the 20-km-long, 3-km-wide mudwill likely face extinction.

Beijing Normal University orni- Beijing Normal University ornitholthologist Zhang Zhengwang says: ogy doctorate candidate Yang Hon-"While Bohai Bay is undergoing fast gyan says: "A very interesting pheeconomic development, it's losing its nomenon is that the shorebirds and

"gas station" for millions of migratory birds are OK when fishermen hand- and Tangshan reclaimed 649 sq km of birds, including many rare or endan- pick shellfish." gered species, Zhang says. The professor has researched shore-

the area for more than 20 years. "Mudflats in this area provide these In 2011, the gross per capita income along the Bohai Sea — Tianjin's Binhai birds with the necessary food and habi- from selling edible shellfish was 20,000 New Area and Tangshan's Caofeidian

Flyway stopped at the wetland.

tats," Zhang explains. "The rapid reclamations of mudflats have directly threatened their survival." mal feed. As mudflats along the bay rapidly But locals, such as 59-year-old Zhu nearby Cangzhou, Hebei province, will

higher density in the Luannan wetland. worry these days won't last. More than 200,000 birds from about "Nearly everyone in my village col- Luannan wetland is located between 60 migratory species, including many lected shellfish before," Zhu says. endangered species like relict gulls "But the mudflat is too small now. So new areas. and spoon-billed sandpipers, make we often sit at home and do nothing on To draw public attention to the need

the mudflat their stopover or wintering days we don't fish." site, Zhang says. His team discovered that, in 2010, 62 percent of the red knots' and 23 per-Yang says. cent of the curlew sandpipers' popula- Zhu and her husband could harvest the conference in May. Ornithologists,

tions along the East Asian-Australian about 300 yuan worth of shellfish on conservationists and Chinese scholars peak days, and the rich mudflats would attended The flyway stretches eastward from sustain the harvest from spring to WWF China's marine program offithe Taimyr Peninsula in Russia to autumn. But they've been claimed for cer Wang Songlin says the Luannan

lia and New Zealand. Between these relocated because the government is tional importance". The Ramsar Conextremes, the flyway covers much of planning a new development zone vention, adopted in 1971, is an intereastern Asia, including China, Japan, here," Zhu says. Korea, Southeast Asia and the western "We're worried because my family framework for national action and

and is a travel route for about 55 migra-living other than fishing." tory species, which equals about 5 mil- Reclamation, which often pipes their resources. sand from the mudflats into the levees, "We urge the local government to

— about 61 percent of the global populand, Yang says. lation — and 18,000 Eurasian curlews, It has turned the mudflat between wetland of international importance a nearly threatened species accord- Luannan's Zuidong and Nanpu vil- as agreed by the Ramsar Convention ing to the International Union for the lages, one of her research sites, into when the time is right," Wang says. Conservation of Nature and Natural an unsuitable habitat for shorebirds "It deserves the recognition. This is

> since 2011. her study sites in the Luannan wetland. the Bohai Sea."

"This makes it an extremely impor"But when their population exceeds tant wetland by international stan- the mudflat's capacity or if the area is Contact the writer at liuxiangrui@ claimed, the flyway populations will chinadaily.com.cn.

MUDFLATS Low marshes support grass.

Mudflats form when sediment, carried by rivers or the ocean, encounters a low-energy environment and settles to the bottom. Inlets or bays that are sheltered from waves are some examples. Over time, this sediment accumulates, making the area flatter and wider, which encourages more sediment deposition.

Resources, wintered there.

populations," Zhang says.

DREDGING

Enormous areas of inter-tidal mudflats have been converted to industrial land in this way. The China Marine **Environment Monitoring Center** estimates that; between 2006-10, 1,000 sq km of land were reclaimed each year in China. In addition to this pressure, the Bohai Sea is the most polluted sea in the world and absorbs nearly 5.7 billion tons of sewage and 2 million tons of solid waste each year. Also, 43 of the 52 rivers that flow into it are heavily polluted.

60 sq km

is the size of the Luannan wetland. The natural coastal wetland is of international importance.

34% the north and northwest of Bohai Bay have claimed by industrializa-

been industrialized.

649 sq km of the mudflats along is the area of mudflats in Tianjin and Tangshan

of the Yellow and Bohai seas' wetlands have been lost. It's the worst-affected

As booming industry continues to The concentration of birds also decline, and two of the six red knot devour the mudflat — one of Bohai demonstrates how rich and irreplace- subspecies will be endangered," Yang

key resting site of their migrations and flat is. The mudflat is a blessing for local Reclamations along the Bohai Bay have continued to increase because of pressure created by local population growth and economic development. Luannan wetland is a microcosm of the challenges the mudflats face.

local fishermen harmoniously share Satellite photos from the Chinese Bohai Bay has been an important the narrow but rich mudflat, and the Academy of Sciences show Tianjin mudflats, 34 percent of the total along Yang's research shows the shellfish northern and northwestern Bohai Bay, harvest accounts for 80 percent of the from 1994 to 2010.

birds and environmental changes in income of Beipu, a fishing village of Reclamation has accelerated, especially with two major seashore projects yuan (\$3,140), while another 7,000 New Area. yuan came from selling clams as ani- Other cities are eager to copy the

model. A new reclamation project in vanish, migratory birds concentrate in Yunuan from nearby Nanpu village, claim another 117 sq km of mudflats,

the expanding Binhai and Caofeidian

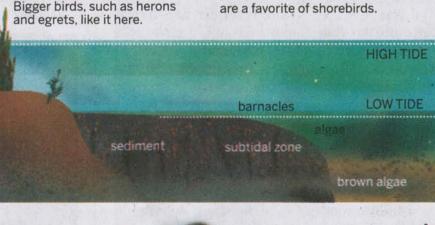
for more sustainable coastal develop-About 30 percent of the village's ment, Beijing Normal University and incomes comes from clam harvests, the China branch of the World Wide Fund for Nature (WWF) co-organized

Alaska in the United States, and its bridges, roads and manmade islands. wetland already meets international southern end encompasses Austra- "We've heard our village might be standards for "wetlands of internagovernmental treaty that provides the Pacific. It passes through 22 countries doesn't know any other way to make a international cooperation for the conservation and wise use of wetlands and

In 2009, more than 7,000 relict gulls seriously damages the remaining wet-set up a protected area in the Luannan mudflat and apply for the status as a

not just for these shorebirds but also for "About 20 of 40 species of shorebirds Yang predicts the number of shore- the welfare of us and our future genpassing through the narrow mudflat birds, especially red knots and curlew erations, if you consider this wetland's exceed 1 percent of their respective sandpipers, will continue increasing at ecological function as the 'kidney' of

Mudflats are rich in invertebrates and are a favorite of shorebirds.



TIDAL-FLAT ORGANISMS

st people think mudflats are devoid of life, but they are an important part of the food nain. Many of the animals are not predators but deposit feeders, filter feeders or cavengers. Because of a relatively small number of predator/prey relationships, the umbers of mud-dwelling organisms can increase dramatically. And that's the reason he birds rely on the mudflats before heading north.

lidal-flats host a diversity of life.

MICROBENTHOS include bacteria and diatoms.) MEIOBENTHOS are very small organisms that live in sediment.) HYPERBENTHOS are small organisms that live in the water just above the surface of,

4) MACROBENTHOS are slightly larger organisms (more than 1 mm) that move freely through soft sediments, such as polychaete worms, bivalves and amphipods.) EPIBENTHOS are large, active predatory and grazing species, such as crabs, nolluscs, fish, rays, wading birds and mammals.

Flight of the ornithologist

Migration route of piersmai

Migration route of rogersi

Migration route of other shorebirds

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shorebirds he studies.

Luannan wetland by Bohai Bay.

program funded by Birdlife Neth- especially the red knots — a flagship ornithologists and volunteers. Australia and New Zealand to the led reclamations, ocean traffic and oil

shortly before his return flight to Aus- satellite tracking.

It's common for birds to migrate recording re-sightings of the same percent of the red knot population landing."

north to the Arctic to breed and then individuals.

But it's not just fieldwork. He also birds' legs or wings to study various buck bays. must do a great deal of computer analaspects of the birds' lives, including A large proportion of the birds dent during such an extended flight," "Local governments and businesses ysis and record population counts, migration, mortality, population, ter- banded in Australia pass through Hassel says.

and tracking them afterward.

MONGOLIA

way (EAAF) is the most dynamic and says.

Wetlands in Bohai Bay and Aus- Flyway Network — a collaborative term futures rely on the remaining they can arrive in the Arctic in sum-Since 2007, he has spent two tralia's Roebuck Bay — the two most global organization of shorebird mudflat available. That's why it has mer successfully and find a mate to months a year by the wetland in the important sites along the EAAF—are researchers and birdwatchers— such immense conservation value." breed their next generation," he says. coastal city of Tangshan, Hebei prov- Hassel's main study locations. record re-sightings of the color- The red knots take an epic journey But this critical migration stopover ince, engaging a shorebird research His job includes banding the birds, banded birds with support from local of about 10,000 km annually from faces growing threats from industry-

Nature and Beijing Normal Univer- where they spend much of their lives, bers at other EAAF sites also photo- "They fly nonstop, without eat- lost in two or three years. "I love my job. It's really enjoyable There are many methods for study- of the banded birds, and update the the way across the Pacific, burning in China, but it's a global problem," to be close to the shorebirds and to ing wild birds' lives. Banding is a more information in a database that mem-only stored fat. Imagine that!" Hassel says.

nature," the bird researcher of 16 years common technique because it's much bers share. says, smiling, in a Beijing restaurant, cheaper than other methods, such as "In this way, we have an overall pic- Then, the birds land in the mudflat nature. But there has to be a point tralia after finishing this year's work in Ornithologists attach small, indi- But up to 95 percent of the EAAF them with open resting places and He believes a consensus is needed vidually coded metal or plastic tags to sightings are made in Bohai and Roe-rich food, such as abundant shellfish. to keep industrialization at a sensible

ritoriality and feeding behavior by Bohai Bay. Among them, about 60 "They know exactly where they are just move somewhere else," he says.

south for the winter. Studying migra- "Banding is simple and especially — piersmai and rogersi — have made feeders and need large areas of intertion routes is critical to ornithology, effective for the study of red knots, the narrow piece of mudflat in the tidal mudflats to feed. which have a relatively small size and Luannan their only stop, Hassel says. Their month-long stay allows them Australian ornithologist Chris Has- There are eight major flyways glob- normally appear in flocks, making "It's amazing for them to be so con- to recover the weight lost during their

AUSTRALIA

sel lives a life that's as migratory as the ally. The East Asian-Australian Fly-them difficult to recapture," Hassel centrated," Hassel explains. Every spring, the 50-year-old takes is taken by the largest number of birds In Luannan, Hassel, sometimes a serious problem, particularly for during their stays at the mudflat.

off from Australia and lands in China's and the greatest variety of species. with his EAAF partners of the Global these two subspecies, whose long-

erlands, the World Wide Fund for shorebird species — in Roebuck Bay, The Global Flyway Network mem-North Arctic.

"Industrialization in the area is their body weights with fat deposits

graph and record their re-sightings ing or resting, for about six days all "This is a problem that happens

ture of their life cycles," Hassel says. in Luannan Wetland, which welcomes when it won't work anymore."

"They don't find the place by accilevel for the mudflat to survive.

"We are asking for too much from

installations. The rich wetland may be

intense flights. Red knots can double

have always argued that the birds can

"But these birds really don't have and 80 percent of its two subspecies The red knots are highly specialized many alternatives."

Economic boom in coastal areas harms vulnerable wetlands

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economies boom. While planning the marine func- percent of its coastal wetlands, and tions related to wetland protection. posal at the conference's annual ses- But Wang Songlin points out that

should reach 5 percent of its total ter- ecosystem including providing food Ministry of Environmental Protection descendants," Yuan, also an active Jiangsu, a developed province in the "But the current figure is smaller tats for wildlife and protection against more effectively by drawing a national His proposal calls for the drawing 6,670 sq km and about one fourth of than 1 percent," Wang Songlin, WWF floods, typhoons, tsunamis and tidal "ecological red line". It plans to accel- of a "conservation red line" for at least the nation's mudflats area. China's marine program officer, says. surges.

issued a document to strengthen we inherited from our ancestors, but mentation by some regional govern-

mation for urban, port and industrial pared with its land area is much lower advisors in the country.

than the world's average, at 6 percent. Yuan Xikun, the artist and a mem-

and clean water for humans, habi- again vowed to protect the ecosystem conservationist, emphasizes. eastern coast, for example, boasts over

nessed a new climax of coastal recla- fourth globally, but the ratio com- wide attention from some legislative such as pollution, a decline in fishing resources and reduced biodiversity.

that in recent decade, China has wit- China's natural wetland area ranks coastal reclamation have also drawn Bohai Bay has caused severe problems

China's coastal wetlands, especially constructions.

tion zones, experts of the National the ecological costs from the dam- That's an indication that wetland pro- sion this spring. Bureau of Oceanography point out age of the coastal wetlands are equal tection is on the country's agenda. "We should never forget that regulations for wetland protection, zones covering 11 percent of its off- marine GDP.

mudflats, continue to diminish at The report shows an average of 285 China joined the Ramsar Convenber of the Chinese People's Political the CCICED also warns that the astonishing speed as coastal-based square kilometers of land is reclaimed tion in 1992, and has since committed Consultative Conference National Bohai Sea could become a "dead sea" if every year, resulting in the loss of 57 to many other international conven- Committee, submitted a policy pro- effective measures are not taken soon.

that China should set up protection to 6 percent of the country's annual In 2004, the State Council also nature and its resources are not what the problem usually lies during impleshore areas, and the protected area Wetlands play a critical role in the wetland protection. And in May, the are also what we borrowed from our ments.

national Cooperation on Environ- WWF's deputy chief representative regions. ment and Development points out to China.

and the Yellow Sea.

erate the enactment of environmen- 10 percent of critical coastal wetlands But its coastal development plans A recent report by a marine research "Wetlands to the Earth is what tal laws and policies for important that serve as shorebird stopover sites between 2010 and 2020 would result group under China Council for Inter-kidneys are to humans," notes Li Lin, ecological zones, inland and marine and shellfish habitats in the Bohai Sea in the province claiming 1,817 sq km of mudflats — a detrimental move

The ecological costs of China's The lost of coastal wetlands in the which will harm the ecosystem.

tion from 1994-2010. Sources: Smithsonian Marine Station, WWF, NOOA, Astrocape.org.za, ARKIVE, Australian Wader Studies Group and the Commonwealth Scientific and Industrial Research Organisation (CSIRO)