

Supporting Materials

Winter population estimates and distribution changes of two common East Asian dabbling duck species: current status and long-term (1990–2020) trends

Table S1. Currently available global flyway population estimates for Wigeon and Pintail based on Wetlands International (2012).

Common name	Population name	Breeding range	Non-breeding range	Population estimates	Start year	End year	Trend
Wigeon	Western Siberia/SW Asia & NE Africa	C & W Siberia	SW & C Asia, NE Africa	250,000	1997	2007	DEC?
Wigeon	S Asia	C Siberia	S Asia	250,000	1977	1991	INC
Wigeon	Western Siberia & NE Europe/NW Europe	W Siberia & NW, NE Europe	NW Europe	1,500,000	1997	2007	STA
Wigeon	W Siberia & NE Europe/Black Sea & Mediterranean	W Siberia NE Europe	Black Sea, Mediterranean	300,000	1997	2007	STA
Wigeon	E Asia	E Siberia, Mongolia, NE China	E Asia	710,000	1977	1991	DEC
Pintail	N America	Alaska, Canada, N USA	SW Canada, USA, Mexico, Caribbean, C America	4,430,000	2002	2011	INC
Pintail	North-west Europe	N Europe, W Siberia	NW Europe	60,000	1997	2007	INC
Pintail	W Siberia, NE & E Europe/S Europe & West Africa	NE Europe, W Siberia	Black Sea, Mediterranean, W Africa	750,000	1995	2005	FLU
Pintail	S Asia	C Siberia, C Asia	S Asia	2,000,000	1977	1991	DEC
Pintail	E & SE Asia	E Siberia	E & SE Asia S to Thailand	240,000	1977	1991	DEC
Pintail	Western Siberia/SW Asia & Eastern Africa	W Siberia	SW Asia, E & NE Africa	700,000	0	0	UN

Table S2. The number of sites counted in the Asian Waterbird Census from 4 East Asian countries and 11 Southeast Asian countries in the three periods for which data are presented in this manuscript.

Area	Country	Area (km ²)	1997	1998	1999	2000	2001	2002	2003	2004	2008	2009	2010	2011	2012	2013	2014	2015	Total	Count
East Asia	South Korea	103,290	22	15	69	100	112	118	113	115	139	135	137	132	137	188	193	199	1,924	16
	Japan	378,000	37	41	37	109	112	101	107	95	131	145	142	144	152	150	160	157	1,820	16
	China (mainland)	960,000	12	18	17	11	7	18	43	72	8	11	11	11	11	10	6	12	278	16
	Hong Kong	1,114	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	41	16
	Taiwan	36,014	38	40	52	38	40	33	23	33	0	0	30	23	0	34	34	0	418	12
	North Korea	123,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Southeast Asia	Philippines	299,700	29	32	35	46	40	48	50	60	159	167	194	187	164	193	140	157	1,701	16
	Vietnam	329,556	0	1	8	2	2	16	4	4	0	0	2	1	3	3	2	0	48	12
	Laos	236,800	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1
	Thailand	513,000	3	1	0	7	3	9	27	21	122	44	53	69	81	87	18	0	545	14
	Myanmar	676,578	4	2	0	10	33	49	75	24	0	17	15	0	0	12	6	9	256	12
	Cambodia	180,000	0	0	12	13	11	5	1	6	4	10	8	13	13	11	6	7	120	14
	Brunei Darussalam	5,765	5	5	0	0	0	9	0	0	15	6	8	11	10	12	17	15	113	11
	Malaysia	330,000	0	0	20	25	24	25	43	42	23	41	16	14	6	1	5	18	303	14
	Singapore	733	10	6	11	10	10	1	9	9	9	8	9	9	8	7	8	8	132	16
	Indonesia	191,3579	0	0	47	12	10	40	34	14	37	11	30	11	9	5	16	7	283	14
	Timor-Leste	15,007	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1

Table S3. Number of survey sites in each count region within Eastern China contributing to the analyses presented in this analysis.

Count region	1990s	2000s	2020s
Yangtze River	13 ^a	46 ^c	85 ^c
Huaihe River	3 ^a	28 ^d	15 ^d
Yellow River and its north	6 ^a	3 ^c	0 ^h
Inland total	22	77	100
North of the Yellow River estuary	7 ^a	1 ^c	3 ⁱ
Yellow River estuary and its south	27 ^a	50 ^f	29 ⁱ
Hong Kong, China	1 ^b	1 ^b	1 ^b
Coastal total	35	52	33
Taiwan	1 ^g	1 ^g	1 ^j
Overall total	57	130	134

^a1990–1993 data published in Waterbird Group of the Chinese Ornithological Society (1994).

^bSurvey data from the Hong Kong Bird Watching Society, 1990–2021.

^cSynchronous survey of wintering waterbirds in the Yangtze River by the Cao group in 2004, 2005, 2019 and 2020 (December to February).

^dOverwintering waterbirds monitored by the Cao group in Huaihe River from 2006 to 2007 and 2016.

^eCao *et al.* (2008).

^fA simultaneous survey of coastal wintering waterbirds was conducted by the Cao Group in the winter of 2006 and 2007 (November to February).

^gLi & Mundkur (2004, 2007); Mundkur *et al.* (2017).

^h2016–2020 eBird online data.

ⁱThe co-authors provided coastal shared data for 2016–2021 and (Li *et al.* 2020b).

^jThe data from the 2016/17–2019/20 winter survey provided by the Taiwan New Year Bird Counting Carnival on GBIF (Lin 2021).

Table S4. Regional definition of data contributions and affiliation information relating to the 19 co-authors.

No.	Name	Province	Institute
1	Dingtuan Zheng	Fujian	Fujian Provincial Forest Inventory and Planning Institute, Fujian, China
2	Jin Yang	Fujian	Fujian Bird Watching Society, Fujian, China
3	Yongxiang Han	Jiangsu	Jiangsu Wild Bird Society, Jiangsu, China
4	Yang Liu	Guangdong	School of Ecology, Sun Yat-Sen University, Guangzhou, China
5	Shuyu Zhu	Shandong	Shandong Yellow River Delta National Nature Reserve Management Committee, Shandong, China
6	Jing Li	Jiangsu	Jiangsu Bird Watching Society, Jiangsu, China
7	Chihong Chen	Fujian	Xiamen Coastal Wetland and Bird Research Center, Fujian, China
8	Xiaoning Wang	Zhejiang	Wenzhou Medical University, Zhejiang, China
9	Zhidong Yang	Shanghai	Shanghai Wild Bird Society, Shanghai, China
10	Yong Zhang	Jiangsu	Nanjing Forestry University, Jiangsu, China
11	Changhu Lu	Jiangsu	Nanjing Forestry University, Jiangsu, China
12	Kai Shan	Shandong	Shandong Yellow River Delta National Nature Reserve Management Committee, Shandong, China
13	Chengwu Jiao	Zhejiang	Research Institute of Subtropical Forestry, Chinese Academy of Forestry, Zhejiang, China
14	Fengqin Wang	Tianjin	Tianjin Museum of Natural History, Tianjin China
15	Lin Xue	Shandong	Qingdao Bird Watching Society, Shandong, China
16	Dongsheng Zhang	Shanghai	Shanghai Ocean University, Shanghai, China
17	Qingquan Bai	Liaoning	Dandong Wildlife Protection and Management Station, Liaoning, China
18	Aiwu Jiang	Guangxi	College of forestry, Guangxi University, Guangxi, China
19	Ming Zhang	Liaoning	Panjin Wild Bird Society, Liaoning, China

Table S5. Estimated relative survey coverage of suitable wetlands in China reporting Wigeon and Pintail in the three periods reported in this analysis. Coverage for the 1990s was obtained by comparing Wigeon and Pintail’s estimate of 500,000 to the maximum raw counts obtained during the 1990s.

Content	1990s	2000s	2020s
No. of wetlands	58	130	135
Percentage coverage of total	7–9%	72%	78%

Table S6. Methods for conversion of raw count data into population estimates employed for the Chinese mainland areas in the 2000s and 2020s. Note that the conversion methods used in the 1990s (Lu 1995, 1996) are not fully documented.

Location	Wigeon abundance			Pintail abundance		
	1990s	2000s	2020s	1990s	2000s	2020s
Mainland total	44,177	24,141	41,988	32,974	21,704	24,368
Adjustment for within site coverage rate ^a	–	31,811	52,533	–	29,168	29,959
Adjustment for species detection probability ^b	–	39,763	65,666	–	36,460	37,449
Adjustment for proportional habitat coverage ^c	–	49,704	82,082	–	45,575	46,811
Mainland estimates	500,000	50,000	82,000	500,000	46,000	47,000

^aFirst, the survey coverage of each lake was calculated and the average degree of count coverage at all lakes was calculated (see Supplementary Table S3). For example, if the coverage of Caizi Lake in 2019 was considered to be 80%, and the coverage in 2020 was 90%, then the overall degree of count coverage at Poyang Lake in the 2020s was judged to be approximately 85%. Using this approach, the coverage rate in the 2000s and 2020s were considered to be 72% and 78% in the 2000s and 2020s, respectively.

^bAdjusted by the detection rate of different species, which is related to the body size of the surveyed species, where the detection rate of the Wigeon and Pintail is both 80% (Cao *et al.* 2008). For example, the adjusted number of Wigeon in the 2020s, after adjusting for coverage rate (52,533 individuals), should be calculated by dividing 52,533 by 0.8.

^cTaking into account that the total number of surveyed wetlands accounts for a percentage of the total suitable habitat for ducks in eastern China (Rappoldt *et al.* 1985), the obtained value is divided by 80% to obtain the area of the suitable habitat for ducks in eastern China. For example, after adjusting for the detection rate, the estimated number of Wigeon in the 2020s is 82,082, calculated by dividing 65,666 by 0.8. Therefore, the final estimate is approximately 82,000 individuals.

Table S7. Changes in 1% threshold levels for Wigeon and Pintail resulting from the six population estimates generated since WPE 1 in 1994.

Common name	Population name	Publication	One per cent	Minimum	Maximum
Wigeon	E Asia	WPE 1 (1994)	–	100,000	1,000,000
Wigeon	E Asia	WPE 2 (1997)	–	100,000	1,000,000
Wigeon	E Asia	WPE 3 (2002)	7,500	500,000	1,000,000
Wigeon	E Asia	WPE 4 (2006)	7,500	500,000	1,000,000
Wigeon	E Asia	WPE 5 (2012)	7,100	500,000	1,000,000
Wigeon	E Asia	EAAF CSR 1 (2022)	7,100	500,000	1,000,000
Pintail	E & SE Asia	WPE 1 (1994)	–	100,000	1,000,000
Pintail	E & SE Asia	WPE 2 (1997)	–	10,000	1,000,000
Pintail	E & SE Asia	WPE 3 (2002)	7,500	500,000	1,000,000
Pintail	E & SE Asia	WPE 4 (2006)	2,500	200,000	300,000
Pintail	E & SE Asia	WPE 5 (2012)	2,400	200,000	300,000
Pintail	E & SE Asia	EAAF CSR 1 (2022)	2,400	200,000	300,000

Table S8. Winter national count totals for Wigeon and Pintail from Southeast Asia in the 1990s, 2000s and 2020s. Note zero means counted but none present; – indicates not counted.

Species	Country	1997	1998	1999	AWC 1990s Population estimate ^a	eBird count data from 1990s ^b	2002	2003	2004	AWC 2000s Population estimate ^a	eBird count data from 2000s ^b	2015	AWC 2020s Population estimate ^a	eBird count data from 2020s ^b
Wigeon	Philippines	0	0	0	0	0	0	205	46	84	15	30	30	30
	Vietnam	–	940	128	534	34	1,400	300	3	568	335	0	0	0
	Laos	–	–	–	–	0	–	–	–	0 ^c	0	–	–	0
	Thailand	0	0	–	0	5	0	0	20	7	16	–	–	10
	Myanmar	1,000	0	–	500	0	215	65	157	146	0	44	44	0
	Cambodia	–	–	0	0	0	0	0	0	0	0	0	0	0
	Brunei	0	0	–	0	0	0	–	–	0	0	0	0	0
	Darussalam	–	–	–	–	–	–	–	–	–	–	–	–	–
	Malaysia	–	–	0	0	0	0	0	0	0	0	0	0	2
	Singapore	0	0	0	0	0	0	0	0	0	0	0	0	0
	Indonesia	–	–	0	0	0	0	0	0	0	0	0	0	0
	Timor-Leste	–	–	–	–	0	–	–	–	0 ^c	0	0	0	0
Total		1,000	940	128	1,034	38	1,615	570	226	805	367	74	74	42

Table S8 (continued).

Species	Country	1997	1998	1999	AWC 1990s Population estimate ^a	eBird count data from 1990s ^b	2002	2003	2004	AWC 2000s Population estimate ^a	eBird count data from 2000s ^b	2015	AWC 2020s Population estimate ^a	eBird count data from 2020s ^b
Pintail	Philippines	0	6	0	2	0	26	587	0	204	174	87	87	227
	Vietnam	–	65	300	183	267	761	20	0	260	266	0	0	0
	Laos	–	–	–	–	0	–	–	–	4 ^c	0	–	–	0
	Thailand	0	0	–	0	3	86	188	760	345	275	–	–	669
	Myanmar	1,500	850	–	1,175	0	283	2,783	6,665	3,244	0	374	374	1
	Cambodia	–	–	9	9	0	0	0	1	0	0	0	0	0
	Brunei	0	0	–	0	0	0	–	–	0	0	0	0	0
	Darussalam													
	Malaysia	–	–	0	0	0	0	0	0	0	0	0	0	21
	Singapore	0	0	0	0	0	0	0	0	0	0	0	0	0
	Indonesia	–	–	0	0	0	0	0	0	0	0	0	0	0
	Timor-Leste	–	–	–	–	0	–	–	–	0 ^c	0	–	–	0
Total		1,500	921	309	1,369	270	1,156	3,578	7,426	4,057	716	461	461	918

^aLi & Mundkur (2004, 2007); Mundkur *et al.* (2017).

^beBird. The period of data selection is the same as that extracted from AWC report. The average of 1997–1999 data was adopted in the 1990s. The mean value of data from 2000 to 2004 was adopted in the 2000s. The 2020s uses data from 2015.

^cData from the only surveys reported for Timor-Leste and Laos (in 2008/09 and 1999/2000, respectively) were applied to population estimates in the 2000s.

Table S9. Internationally important wintering sites identified in East Asia during the three periods for Wigeon and Pintail (based on 1% thresholds of 7,100 and 2,400 respectively).

Species	Year	Country	Sites	Wetlands	Count	Latitude	Longitude
Wigeon	1990s	China	Coastal	Sheyang Saltworks	41,850	33.70	120.46
Wigeon	1990s	China	Coastal	Dafeng Port–Jiang Port	32,500	33.03	120.85
Wigeon	2020s	China	Inland	Poyang Lake	9,429	29.19	116.01
Wigeon	2020s	China	Taiwan	Taiwan	12,237	23.35	120.16
Wigeon	2020s	China	Coastal	Funing Wan	8,860	26.85	120.04
Wigeon	1990s	Japan	Inland	Shiga	11,248	35.00	135.87
Wigeon	1990s	Japan	Coastal	Kumamoto	16,545	32.79	130.74
Wigeon	1990s	Japan	Coastal	Hyogo	10,224	34.69	135.18
Wigeon	1990s	Japan	Coastal	Miyazaki	8,610	31.91	131.42
Wigeon	1990s	Japan	Coastal	Tokushima	8,479	34.07	134.56
Wigeon	1990s	Japan	Coastal	Kagoshima	8,470	31.56	130.56
Wigeon	1990s	Japan	Coastal	Yamaguchi	7,897	34.19	131.47
Wigeon	1990s	Japan	Coastal	Oita	7,536	33.24	131.61
Wigeon	2000s	Japan	Inland	Shiga	22,201	35.00	135.87
Wigeon	2000s	Japan	Coastal	Saga	21,903	33.25	130.30
Wigeon	2000s	Japan	Coastal	Chiba	14,954	35.60	140.12
Wigeon	2000s	Japan	Coastal	Kumamoto	11,895	32.79	130.74
Wigeon	2000s	Japan	Coastal	Mie	11,416	34.73	136.51
Wigeon	2000s	Japan	Coastal	Tokushima	11,146	34.07	134.56
Wigeon	2000s	Japan	Coastal	Ibaraki	9,991	36.34	140.45
Wigeon	2000s	Japan	Coastal	Hyogo	9,959	34.69	135.18
Wigeon	2000s	Japan	Coastal	Ishikawa	8,840	36.59	136.63
Wigeon	2000s	Japan	Coastal	Kagoshima	8,726	31.56	130.56
Wigeon	2000s	Japan	Coastal	Osaka	8,434	34.69	135.52
Wigeon	2000s	Japan	Coastal	Yamaguchi	8,379	34.19	131.47
Wigeon	2000s	Japan	Coastal	Oita	8,349	33.24	131.61
Wigeon	2000s	Japan	Coastal	Fukuoka	7,499	33.61	130.42
Wigeon	2020s	Japan	Inland	Shiga	17,587	35.00	135.87
Wigeon	2020s	Japan	Coastal	Ibaraki	14,212	36.34	140.45
Wigeon	2020s	Japan	Coastal	Mie	13,541	34.73	136.51
Wigeon	2020s	Japan	Coastal	Saga	7,496	33.25	130.30
Wigeon	2020s	Japan	Coastal	Miyazaki	7,305	31.91	131.42
Wigeon	2020s	Japan	Coastal	Hyogo	7,166	34.69	135.18
Wigeon	1990s	South Korea	Inland	Lower Yeongsan River	11,283	34.82	126.55

Table S9 (*continued*).

Species	Year	Country	Sites	Wetlands	Count	Latitude	Longitude
Pintail	1990s	China	Inland	Poyang Lake	8,500	29.19	116.01
Pintail	1990s	China	Inland	East Dongting Lake	4,235	29.33	112.92
Pintail	1990s	China	Coastal	Baoshan Tideland	10,800	31.38	121.50
Pintail	1990s	China	Coastal	Sheyang Saltworks	9,300	33.70	120.46
Pintail	1990s	China	Coastal	Xinyang Port–Dafeng Port	8,153	33.43	120.66
Pintail	1990s	China	Coastal	Deep Bay	5,361	22.48	114.03
Pintail	1990s	China	Coastal	Dafeng Port–Jiang Port	4,320	33.03	120.85
Pintail	1990s	China	Coastal	Guandong Saltworks	4,010	34.43	119.96
Pintail	1990s	China	Taiwan	Taiwan	3,525	23.35	120.16
Pintail	2000s	China	Inland	Poyang Lake	9,429	29.19	116.01
Pintail	2000s	China	Inland	Shengjin Lake	4,760	30.40	117.08
Pintail	2000s	China	Coastal	Laizhou Wan	8,560	37.14	119.26
Pintail	2000s	China	Coastal	Deep Bay	4,381	22.48	114.03
Pintail	2020s	China	Inland	East Dongting Lake	4,415	29.33	112.92
Pintail	2020s	China	Inland	Baidang Lake	3,018	30.81	117.38
Pintail	2020s	China	Taiwan	Taiwan	6,446	23.35	120.16
Pintail	2020s	China	Coastal	Huang He NNR	6,700	37.92	118.92
Pintail	2020s	China	Coastal	Minjiang Kou	4,690	26.04	119.64
Pintail	2020s	China	Coastal	Deep Bay	3,747	22.48	114.03
Pintail	1990s	Japan	Inland	Saitama	22,726	35.86	139.65
Pintail	1990s	Japan	Inland	Tochigi	7,702	36.57	139.88
Pintail	1990s	Japan	Inland	Gunma	5,702	36.39	139.06
Pintail	1990s	Japan	Inland	Gifu	5,127	35.39	136.72
Pintail	1990s	Japan	Coastal	Niigata	22,694	37.90	139.02
Pintail	1990s	Japan	Coastal	Aichi	22,164	35.18	136.91
Pintail	1990s	Japan	Coastal	Fukushima	19,273	37.75	140.47
Pintail	1990s	Japan	Coastal	Miyagi	17,351	38.27	140.87
Pintail	1990s	Japan	Coastal	Yamagata	16,333	38.24	140.36
Pintail	1990s	Japan	Coastal	Akita	14,831	39.72	140.10
Pintail	1990s	Japan	Coastal	Tokyo	12,357	35.69	139.69
Pintail	1990s	Japan	Coastal	Chiba	8,201	35.60	140.12
Pintail	1990s	Japan	Coastal	Iwate	6,543	39.70	141.15
Pintail	1990s	Japan	Coastal	Nagasaki	5,593	32.74	129.87
Pintail	1990s	Japan	Coastal	Shizuoka	5,325	34.98	138.38
Pintail	1990s	Japan	Coastal	Saga	5,081	33.25	130.30

Table S9 (*continued*).

Species	Year	Country	Sites	Wetlands	Count	Latitude	Longitude
Pintail	1990s	Japan	Coastal	Okayama	4,736	34.66	133.94
Pintail	1990s	Japan	Coastal	Hyogo	4,656	34.69	135.18
Pintail	1990s	Japan	Coastal	Kanagawa	4,116	35.45	139.64
Pintail	1990s	Japan	Coastal	Yamaguchi	3,775	34.19	131.47
Pintail	1990s	Japan	Coastal	Ishikawa	3,073	36.59	136.63
Pintail	1990s	Japan	Coastal	Tottori	2,948	35.50	134.24
Pintail	1990s	Japan	Coastal	Osaka	2,845	34.69	135.52
Pintail	1990s	Japan	Coastal	Shimane	2,669	35.47	133.05
Pintail	2000s	Japan	Inland	Saitama	6,677	35.86	139.65
Pintail	2000s	Japan	Inland	Nagano	5,840	36.65	138.18
Pintail	2000s	Japan	Inland	Gunma	5,501	36.39	139.06
Pintail	2000s	Japan	Inland	Tochigi	2,928	36.57	139.88
Pintail	2000s	Japan	Coastal	Fukushima	33,616	37.75	140.47
Pintail	2000s	Japan	Coastal	Yamagata	33,179	38.24	140.36
Pintail	2000s	Japan	Coastal	Miyagi	17,979	38.27	140.87
Pintail	2000s	Japan	Coastal	Iwate	10,935	39.70	141.15
Pintail	2000s	Japan	Coastal	Aichi	10,816	35.18	136.91
Pintail	2000s	Japan	Coastal	Niigata	10,476	37.90	139.02
Pintail	2000s	Japan	Coastal	Akita	7,947	39.72	140.10
Pintail	2000s	Japan	Coastal	Chiba	7,187	35.60	140.12
Pintail	2000s	Japan	Coastal	Tokyo	6,237	35.69	139.69
Pintail	2000s	Japan	Coastal	Mie	6,227	34.73	136.51
Pintail	2000s	Japan	Coastal	Saga	6,136	33.25	130.30
Pintail	2000s	Japan	Coastal	Ibaraki	4,741	36.34	140.45
Pintail	2000s	Japan	Coastal	Aomori	4,224	40.82	140.74
Pintail	2000s	Japan	Coastal	Okayama	3,696	34.66	133.94
Pintail	2000s	Japan	Coastal	Ishikawa	3,652	36.59	136.63
Pintail	2000s	Japan	Coastal	Shizuoka	3,447	34.98	138.38
Pintail	2000s	Japan	Coastal	Oita	3,393	33.24	131.61
Pintail	2000s	Japan	Coastal	Fukuoka	3,055	33.61	130.42
Pintail	2000s	Japan	Coastal	Hyogo	3,044	34.69	135.18
Pintail	2020s	Japan	Inland	Tochigi	5,022	36.57	139.88
Pintail	2020s	Japan	Inland	Shiga	4,639	35.00	135.87
Pintail	2020s	Japan	Inland	Gunma	3,433	36.39	139.06
Pintail	2020s	Japan	Inland	Saitama	3,338	35.86	139.65

Table S9 (*continued*).

Species	Year	Country	Sites	Wetlands	Count	Latitude	Longitude
WPintail	2020s	Japan	Coastal	Ibaraki	41,345	36.34	140.45
Pintail	2020s	Japan	Coastal	Miyagi	37,255	38.27	140.87
Pintail	2020s	Japan	Coastal	Chiba	33,826	35.60	140.12
Pintail	2020s	Japan	Coastal	Yamagata	21,512	38.24	140.36
Pintail	2020s	Japan	Coastal	Niigata	15,914	37.90	139.02
Pintail	2020s	Japan	Coastal	Fukushima	15,368	37.75	140.47
Pintail	2020s	Japan	Coastal	Mie	10,881	34.73	136.51
Pintail	2020s	Japan	Coastal	Saga	9,854	33.25	130.30
Pintail	2020s	Japan	Coastal	Ishikawa	9,828	36.59	136.63
Pintail	2020s	Japan	Coastal	Aichi	6,709	35.18	136.91
Pintail	2020s	Japan	Coastal	Ehime	5,581	33.84	132.77
Pintail	2020s	Japan	Coastal	Okayama	3,956	34.66	133.94
Pintail	2020s	Japan	Coastal	Kochi	3,455	33.56	133.53
Pintail	2020s	Japan	Coastal	Iwate	3,219	39.70	141.15
Pintail	2020s	Japan	Coastal	Hyogo	2,456	34.69	135.18
Pintail	1990s	South Korea	Inland	Lower Yeongsan River	2,430	34.82	126.55
Pintail	1990s	South Korea	Coastal	Ganwol Reservoir	6,530	36.64	126.47
Pintail	2000s	South Korea	Inland	Lower Geum River	5,178	36.09	126.88
Pintail	2000s	South Korea	Coastal	Shihwa Reservoir	10,510	37.29	126.69
Pintail	2000s	South Korea	Coastal	Ganwol Reservoir	10,132	36.64	126.47
Pintail	2000s	South Korea	Coastal	Geum River Estuary	5,655	36.00	126.71
Pintail	2020s	South Korea	Coastal	Asan Bay	3,016	36.91	126.85

Table S10. Summary of raw area count totals data for Wigeon and Pintail in each area of Eastern China covered during the surveys of the 1990s, 2000s and 2020s.

Area		Number of Wigeon			Number of Pintail		
		1990s	2000s	2020s	1990s	2000s	2020s
Yangtze River ^{a,c,e}	Hunan	1,967	261	6,307	4,239	548	2,919
	Hubei	0	42	6,284	0	71	1,551
	Jiangxi	0	3,702	4,855	8,500	4,672	637
	<u>Anhui</u>	0	596	211	520	2544	1669
	<u>Jiangsu</u>	14	2	129	183	2	0
	<u>Shanghai</u>	—	3	0 ^a	—	53	0 ^a
	Total	1,981	4,606	17,786	13,442	7,890	6,774
Huaihe River ^{a,d}	<u>Anhui</u>	—	678	0	—	0	0
	<u>Jiangsu</u>	330	314	0	450	2	0
	Total	330	992	0	450	2	0
Yellow River and its north ^{a,e,h}	Inner Mongolia	—	—	0 ^a	—	—	0 ^a
	Heilongjiang	—	—	0 ^a	—	—	0 ^a
	Jilin	0	—	0 ^a	0	—	0 ^a
	Beijing	0	1,000	8 ^a	0	0	38 ^a
	Henan	14	0	40 ^a	0	0	82 ^a
	Shanxi	0	—	0 ^a	0	—	0 ^a
	Total	14	1,000	0	0	0	0
Inland Total		2,325	6,598	17,786	13,892	7,892	6,776
North of the Yellow River estuary ^{a,e,i}	Liaoning	0	—	0	0	—	0
	Tianjin	0	257	20	75	588	8
	Hebei	0	—	0 ^a	0	—	0 ^a
	Total	0	257	20	75	588	8
Yellow River and its south ^{a,f,g,i,j}	<u>Shandong</u>	0	2,679	1,270	100	9,054	6,905
	<u>Jiangsu</u>	40,411	3,995	165	8,091	291	126
	<u>Shanghai</u>	106	503	192	5,006	0	205
	Zhejiang	0	1,413	3,633	9	19	529
	Fujian	—	2,568	10,838	—	521	4,962
	Guangdong	0	2,850	1,232	440	200	10
	Hainan	0	270	101	0	421	1,100
	Macau	—	—	0	—	—	0 ^a
Hong Kong ^b	Total	40,517	14,278	17,431	13,646	10,506	13,837
	Total	1,335	3,278	6,751	5,361	3,139	3,747

Table S10 (continued).

Area	Number of Wigeon			Number of Pintail		
	1990s	2000s	2020s	1990s	2000s	2020s
Coastal Total	41,852	17,813	24,202	19,082	14,233	17,592
Continental China (total)	44,177	24,141	41,988	32,974	21,704	24,368
Taiwan ^{g,i,k} (total)	4,392	2,186	9,331	3,525	1,595	4,883
Total raw counts^l	48,569	26,327	51,319	36,499	23,299	29,268

Note: underlined provinces are those with wetlands situated in more than one river basis system. For the nine provinces with zero survey data in the 2020s, the maximum number of non-duplicate records entered on eBird at different locations during the 2016–2020 wintering seasons was used. These records came from between 3 and 220 survey sites, and provided < 100 survey counts. eBird data were only used for comparison of internationally important wintering sites to verify their distribution and were not used to contribute to the calculation of population estimates. The low count of five Wigeon and 20 Pintail in Guangxi Province, located west of 110°, once again support the hypothesis that both duck species are mainly concentrated in eastern China east of this meridian.

^aLiterature data from 1990 to 1993 published by the Water Bird Group of the Chinese Ornithological Society (1994).

^bHong Kong Bird Watching Society survey data from 1990 to 2021.

^cSurvey data of wintering waterbirds in the Yangtze River by Cao's group in 2004, 2005, 2019 and 2020.

^dSurvey data of wintering waterbirds in the Huaihe River from 2006 to 2007 and 2016 (December and February).

^eCao *et al.* (2008).

^fSurvey data of wintering waterbirds along the China coast in 2006 and 2007 (November to February).

^gLi & Mundkur (2004 and 2007).

^heBird online data from 2016 to 2020, maximum overwintering counts at different sites were counted from December to February each year (Comell Lab of Ornithology 2021).

ⁱCoastal shared data from 2016–2021 provided by the co-authors and Li *et al.* (2020b).

^jWintering survey data from 2016/17 to 2019/20 published on GBIF by Taiwan New Year Bird Counting Carnival (Lin 2021).

^kEstimation of population in the 1990s using the median of the maximum and minimum estimates.

^lChina total is the sum of the estimated numbers from mainland China and Taiwan.

Table S11. Winter counts of Wigeon and Pintail on Huaihe River from the 1990s to 2020s. Note zero means counted but none present; – indicates not counted.

Time period/winter (No. counts sites per winter)	Wigeon					Pintail				
	Max 1990–1993	2005/06	2006/07	2015/16	Max 1990–1993	2005/06	2006/07	2015/16		
	(3)	(12)	(11)	(16)		(12)	(11)	(16)		
Anfeng Tang	–	0	–	0	–	0	–	0		
Bali He	–	0	–	0	–	0	–	0		
Chengdong Lake	–	0	0	0	–	0	0	0		
Chengxi Lake	–	8	0	0	–	0	0	0		
Dou Lake	–	–	0	–	–	–	0	–		
Gaotang Lake	–	0	–	0	–	0	–	0		
Gaoyou Lake	850	–	314	0	400	–	0	0		
Anhui Reservoirs	–	0	0	0	–	0	0	0		
Hongze Lake	0	–	0	0	0	–	0	0		
Huayuan Lake	–	–	0	–	–	–	0	–		
Jiaogang Lake	–	0	–	0	–	0	–	0		
Nushan Lake	–	0	650	0	–	0	0	0		
Qili Lake	–	0	–	0	–	0	–	0		
Shaobo Lake	30	–	0	0	50	–	0	0		
Tiangang Lake	–	–	0	–	–	–	0	–		
Tuo Lake	–	20	–	0	–	0	–	0		
Wabu Lake	–	0	0	0	–	0	0	0		
Xiang Jian Lake	–	0	–	0	–	0	–	0		
Total	880	28	964	0	450	0	0	0		

Table S12. Maximum counts of Wigeon at Chinese inland and coastal survey sites from December to February in the winters of 1989/90–2020/21. Note: zero indicates counted but none present; – indicates not counted.

No.	Survey Sites	Province	Wetland	1990	1991	1992	1993	Maximum count in 1990s	2003	2004	2005	2006	2007	Maximum count in 2000s	2016	2017	2018	2019	2020	2021	Maximum count in 2020s
1	Inland	Beijing	Beijing Lakes	–	–	0	–	0	–	–	–	1,000	–	1,000	–	–	–	–	–	–	0
2	Inland	Shanxi	Shanxi Lakes	–	–	135	–	135	–	–	–	–	–	0	–	–	–	–	–	–	0
3	Inland	Henan	Pangzhai	58	–	0	0	58	–	–	–	–	–	0	–	–	–	–	–	–	0
4	Inland	Henan	Heigang Pork	–	14	16	0	16	–	–	–	–	–	0	–	–	–	–	–	–	0
5	Inland	Hunan	East Dongting Lake	42	1,967	0	–	1,967	–	1	350	–	–	350	–	–	–	2,712	1,240	–	2,712
6	Inland	Hunan	Helong Lake	37	0	0	–	37	0	70	0	–	–	70	–	–	–	3,150	4,892	–	4,892
7	Inland	Hunan	West Dongting Lake	–	–	–	–	0	–	0	97	–	–	97	–	–	–	4	304	–	304
8	Inland	Hunan	Beiming Lake	–	–	–	–	0	–	2	0	–	–	2	–	–	–	284	29	–	284
9	Inland	Hunan	Chong Lake	–	–	–	–	0	–	–	–	–	–	0	–	–	–	0	0	–	0
10	Inland	Hunan	Taxi Lake	–	–	–	–	0	–	–	–	–	–	0	–	–	–	0	0	–	0
11	Inland	Hubei	Chen Lake	–	–	–	–	0	–	55	0	–	–	55	–	–	–	3,200	200	–	3,200
12	Inland	Hubei	Fu He	–	–	–	–	0	–	–	–	–	–	0	–	–	–	5,300	252	–	5,300
13	Inland	Hubei	Tuandun Lake	–	–	–	–	0	–	–	–	–	–	0	–	–	–	60	2,000	–	2,000
14	Inland	Hubei	Wang Lake	–	–	–	–	0	–	0	4	–	–	4	–	–	–	27	923	–	923
15	Inland	Hubei	Liangzi Lake	–	–	–	–	0	–	0	0	–	–	0	–	–	–	0	600	–	600
16	Inland	Hubei	Hannan	0	–	30	–	30	–	–	–	–	–	0	–	–	–	–	–	–	0
17	Inland	Hubei	Longgan Lake (Anhui)	0	–	–	–	–	–	–	6	–	–	6	–	–	–	0	0	–	0
18	Inland	Hubei	Tabai Lake	–	–	–	–	0	–	–	9	–	–	9	–	–	–	0	0	–	0
19	Inland	Hubei	Tianezhou	–	–	–	–	0	–	0	–	–	–	0	–	–	–	0	0	–	0
20	Inland	Hubei	Zhangdu Lake	–	–	–	–	0	–	0	0	–	–	0	–	–	–	0	0	–	0
21	Inland	Hubei	Fu Tou Lake	–	–	–	–	0	–	–	2	–	–	2	–	–	–	0	7	–	7
22	Inland	Hubei	Yuni Lake	–	–	–	–	0	–	–	4	–	–	4	–	–	–	0	0	–	0
23	Inland	Hubei	Wu Lake	–	–	–	–	0	–	–	0	–	–	0	–	–	–	0	0	–	0
24	Inland	Hubei	Chang Lake	0	–	–	–	0	–	2	0	–	–	2	–	–	–	0	0	–	0
25	Inland	Hubei	Hong Lake	–	–	–	–	0	–	–	0	–	–	0	–	–	–	0	0	–	0
26	Inland	Jiangxi	Poyang Lake	0	0	–	–	0	1,100	2,654	3,998	–	–	3,998	–	–	–	251	9,429	–	9,429
27	Inland	Jiangxi	Chi Lake	–	–	–	–	0	–	–	2	–	–	2	–	–	–	0	30	–	30
28	Inland	Anhui	Sacheng Lake	–	–	–	–	0	–	0	0	–	–	0	–	–	–	0	0	–	0
29	Inland	Anhui	Shengjin Lake	480	0	–	–	480	–	1,091	0	–	–	1,091	–	–	–	0	0	–	0
30	Inland	Anhui	Baidang Lake	–	–	–	–	0	–	0	0	–	–	0	–	–	–	0	8	–	8
31	Inland	Anhui	Nushan Lake	–	–	–	–	0	–	–	–	–	650	650	–	–	–	–	–	–	0

Table S12 (continued).

No.	Survey Sites	Province	Wetland	1990	1991	1992	1993	Maximum count in 1990s	2003	2004	2005	2006	2007	Maximum count in 2000s	2016	2017	2018	2019	2020	2021	Maximum count in 2020s
32	Inland	Anhui	Wuchang Lake	-	-	-	-	0	0	0	0	-	-	0	-	-	-	0	370	-	370
33	Inland	Anhui	Caizi Lake	-	-	-	-	0	-	15	0	-	-	15	-	-	-	0	37	-	37
34	Inland	Anhui	Pogang Lake	-	-	-	-	0	-	18	0	-	-	18	-	-	-	0	4	-	4
35	Inland	Anhui	Daguan Lake	-	-	-	-	0	-	0	0	-	-	0	-	-	-	0	0	-	0
36	Inland	Anhui	Fengsha Lake	-	-	-	-	0	-	0	0	-	-	0	-	-	-	0	0	-	0
37	Inland	Anhui	Bo Lake	-	-	-	-	0	-	15	0	-	-	15	-	-	-	0	2	-	2
38	Inland	Anhui	Tuo Lake	-	-	-	-	0	-	-	-	20	-	20	-	-	-	-	-	-	0
39	Inland	Anhui	Dongpu Reservoir	-	-	-	-	0	-	-	-	-	0	0	-	-	-	-	-	-	0
40	Inland	Anhui	Chengsi Lake	-	-	-	-	0	-	-	-	8	-	8	-	-	-	-	-	-	0
41	Inland	Jiangsu	Gaoyou Lake	850	300	-	-	850	-	0	-	-	314	314	-	-	-	-	-	-	0
42	Inland	Jiangsu	Shiju Lake	0	14	0	-	14	-	-	0	-	-	0	0	-	-	0	0	-	0
43	Inland	Jiangsu	Tai Lake	-	-	-	-	0	-	-	0	-	-	0	-	-	-	255	0	-	255
44	Inland	Jiangsu	Dazong Lake	50	-	-	-	50	-	0	-	-	-	0	0	-	-	-	-	-	0
45	Inland	Jiangsu	Shaobo Lake	-	30	-	-	30	-	-	-	-	0	0	0	-	-	-	-	-	0
46	Inland	Jiangsu	Shang Lake	-	-	-	-	0	-	0	4	-	-	4	-	-	-	0	-	-	0
47	Inland	Jiangsu	Hongze Lake	0	-	-	-	0	-	0	0	-	-	0	-	-	-	-	-	-	0
48	Inland	Jiangsu	Chubertekou	-	-	-	-	0	-	0	0	-	-	0	-	-	-	-	-	-	0
49	Inland	Jiangsu	Gucheng Lake	-	-	-	-	0	-	-	0	-	-	0	-	-	-	2	0	-	2
50	Inland	Shanghai	Shanghai Tideland	-	-	-	-	0	-	0	3	290	207	290	-	-	-	-	-	-	0
51	Coastal	Liaoning	Chaoyang City	-	-	0	-	0	-	-	-	-	-	0	-	-	-	-	-	-	0
52	Coastal	Tianjin	Tianjin Area	0	0	-	0	0	-	-	0	257	257	257	-	-	-	-	20	-	20
53	Coastal	Shandong	Laizhou Wan	-	-	-	-	0	-	-	-	-	526	526	-	-	-	-	-	0	0
54	Coastal	Shandong	Huang He NNR	-	-	-	-	0	-	-	450	-	-	450	1,000	-	-	-	-	0	1,000
55	Coastal	Shandong	Jiaozhou Wan	30	0	350	10	350	-	-	-	-	12	12	-	-	-	-	270	-	270
56	Coastal	Shandong	Rongcheng Wan	-	-	-	-	0	-	-	-	-	643	643	-	-	-	-	-	-	0
57	Coastal	Shandong	Dingzi Wan	-	-	-	-	0	-	-	-	-	499	499	-	-	-	-	-	-	0
58	Coastal	Shandong	Linjialu Reservoir	-	-	-	-	0	-	-	-	-	340	340	-	-	-	-	-	-	0
59	Coastal	Shandong	Sangou Wan	-	-	-	-	0	-	-	-	-	125	125	-	-	-	-	-	-	0
60	Coastal	Shandong	Taoz Wan	-	-	-	-	0	-	-	-	-	70	70	-	-	-	-	-	-	0
61	Coastal	Shandong	Jinghai Wan	-	-	-	-	0	-	-	-	-	0	0	-	-	-	-	-	-	0
62	Coastal	Shandong	Haizhou City	-	-	-	-	0	-	-	-	-	0	0	-	-	-	-	-	-	0
63	Coastal	Shandong	Rushankou	-	-	-	-	0	-	-	-	-	0	0	-	-	-	-	-	-	0

Table S12 (continued).

No.	Survey Sites	Province	Wetland	1990	1991	1992	1993	Maximum count in 1990s	2003	2004	2005	2006	2007	Maximum count in 2000s	2016	2017	2018	2019	2020	2021	Maximum count in 2020s
64	Coastal	Shandong	Shidao Wan	-	-	-	-	0	-	-	-	-	14	14	-	-	-	-	-	-	0
65	Coastal	Shandong	Wuleidao Wan	-	-	-	-	0	-	-	-	-	0	0	-	-	-	-	-	-	0
66	Coastal	Jiangsu	Sheyang Saltworks	2,780	7,911	41,850	-	41,850	-	1,623	-	-	3,780	3,780	-	-	-	-	-	0	0
67	Coastal	Jiangsu	Dafeng Port-Jiang Port	-	32,500	-	-	32,500	-	0	-	-	-	0	-	-	-	-	-	156	156
68	Coastal	Jiangsu	Xinyang Port-Dafeng Port	180	-	-	13	180	-	-	-	-	0	0	-	-	-	-	-	9	9
69	Coastal	Jiangsu	Guandong Saltworks	600	0	0	-	600	-	20	-	-	-	20	-	-	-	-	-	-	0
70	Coastal	Jiangsu	Xintai Saltworks	1,200	-	-	-	1,200	-	-	-	-	-	0	-	-	-	-	-	-	0
71	Coastal	Jiangsu	Haizhou Bay	-	-	0	-	0	-	-	-	-	0	0	-	-	-	0	-	-	0
72	Coastal	Jiangsu	Tainan Saltworks	-	-	-	-	0	-	-	-	-	182	182	-	-	-	-	-	-	0
73	Coastal	Jiangsu	Rudong Farm-Dayang Port	-	-	-	-	0	-	-	-	-	25	25	-	-	-	-	-	0	0
74	Coastal	Jiangsu	Jiang Port-Rudong Farm	-	-	-	-	0	-	0	-	-	8	8	-	-	-	-	-	-	0
75	Coastal	Shanghai	Booshan Tideland	0	0	-	-	0	-	-	-	-	-	0	-	-	-	-	-	-	0
76	Coastal	Shanghai	Chongming Dongtan	-	100	-	-	100	-	-	-	-	-	0	31	-	-	-	-	-	31
77	Coastal	Shanghai	Nanhui	0	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	161	161
78	Coastal	Shanghai	Wusi Farm	150	-	-	0	150	-	-	-	-	0	0	-	-	-	-	-	-	0
79	Coastal	Shanghai	Shanghai Coast	-	-	-	-	0	-	3	0	-	-	3	-	-	-	-	-	-	0
80	Coastal	Shanghai	Shanghai Zoo	0	6	-	-	6	-	-	-	-	-	0	-	-	-	-	-	-	0
81	Coastal	Shanghai	Jinshan Beach	0	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	-	0
82	Coastal	Zhejiang	Wenzhou Wan	0	-	-	-	0	-	-	-	-	109	109	-	-	-	-	3,303	-	3,303
83	Coastal	Zhejiang	Hangzhou Bay	-	-	-	-	0	-	-	-	-	203	203	-	-	-	-	-	330	330
84	Coastal	Zhejiang	Xiangshan Gang	-	-	-	-	0	-	-	-	-	490	490	-	-	-	-	-	-	0
85	Coastal	Zhejiang	Pubai Wan	-	-	-	-	0	-	-	-	-	400	400	-	-	-	-	-	-	0
86	Coastal	Zhejiang	Xihu Gang	-	-	-	-	0	-	-	-	-	160	160	-	-	-	-	-	-	0
87	Coastal	Zhejiang	Yueqing Wan	-	-	-	-	0	-	-	-	-	31	31	-	-	-	-	-	-	0
88	Coastal	Zhejiang	Sanmen Wan	10	-	-	-	10	-	-	-	-	10	10	-	-	-	-	-	-	0
89	Coastal	Zhejiang	Shijiao Reservoir	-	-	-	-	0	-	-	-	-	1	1	-	-	-	-	-	-	0
90	Coastal	Zhejiang	Taizhou Wan	-	-	-	-	0	-	-	-	-	9	9	-	-	-	-	-	-	0
91	Coastal	Zhejiang	Qingshan Reservoir	-	0	-	0	0	-	-	-	-	-	0	-	-	-	-	-	-	0

Table S12 (*continued*).

No.	Survey Sites	Province	Wetland	1990	1991	1992	1993	Maximum count in 1990s	2003	2004	2005	2006	2007	Maximum count in 2000s	2016	2017	2018	2019	2020	2021	Maximum count in 2020s
92	Coastal	Fujian	Funing Wan	-	-	-	-	0	-	-	-	0	-	0	-	-	-	-	-	8,860	8,860
93	Coastal	Fujian	Minjiang Kou	-	-	-	-	0	-	-	-	9	-	9	-	-	-	-	-	45	45
94	Coastal	Fujian	Meizhou Wan	-	-	-	-	0	-	-	-	213	-	213	-	-	-	-	-	927	927
95	Coastal	Fujian	Fuqing Wan	-	-	-	-	0	-	-	-	878	-	878	-	-	-	-	-	0	0
96	Coastal	Fujian	Dongshan Wan	-	-	-	-	0	-	-	-	200	-	200	-	-	-	-	-	300	300
97	Coastal	Fujian	Sandu Wan	-	-	-	-	0	-	-	-	505	-	505	-	-	-	-	-	63	63
98	Coastal	Fujian	Xinghua Wan	-	-	-	-	0	-	-	-	165	-	165	-	-	-	-	-	330	330
99	Coastal	Fujian	Xiamen Yanhai	-	-	-	-	0	-	435	-	0	-	435	-	-	-	-	0	-	0
100	Coastal	Fujian	Luoyuan Wan	-	-	-	-	0	-	-	-	234	-	234	-	-	-	-	-	167	167
101	Coastal	Fujian	Quanzhou Wan	-	-	-	-	0	-	-	-	146	-	146	-	-	-	-	-	146	146
102	Coastal	Fujian	Yacheng Wan	-	-	-	-	0	-	-	-	0	-	0	-	-	-	-	-	0	0
103	Coastal	Fujian	Shahcheng Gang	-	-	-	-	0	-	-	-	0	-	0	-	-	-	-	-	0	0
104	Coastal	Fujian	Pinghai Wan	-	-	-	-	0	-	-	-	0	-	0	-	-	-	-	-	0	0
105	Coastal	Guangdong	Xinken, Panyu	-	-	0	0	0	0	-	4,200	-	-	4,200	-	-	-	-	-	-	0
106	Coastal	Guangdong	Nansha Distric	-	-	-	-	0	-	-	-	-	-	0	-	1,232	-	-	-	-	1,232
107	Coastal	Guangdong	Futian Nature Reserve	19	0	-	0	19	-	-	-	-	-	-	-	-	-	-	-	-	0
108	Coastal	Guangdong	Lufeng Tideland	-	-	0	-	0	-	-	-	-	-	0	-	-	-	-	-	-	0
109	Coastal	Hong Kong	Deep Bay	-	0	1,335	-	1,335	-	-	-	-	3,278	3,278	-	-	0	-	-	6,751	6,751
110	Coastal	Hainan	Hainan Island	-	-	0	0	0	-	-	-	-	-	0	101	-	-	-	60	-	101
111	Taiwan	Taiwan	Taiwan	-	-	-	-	0	-	2,186	-	-	-	2,186	10,334	12,237	6,860	8,190	10,035	-	12,237

Table S13. Maximum counts of Pintail at Chinese inland and coastal survey sites in China from December to February in the winters of 1989/90–2020/21. Zero indicates counted but none present; – indicates not counted.

No.	Survey Sites	Province	Wetland	1990	1991	1992	1993	Maximum count in 1990s	2003	2004	2005	2006	2007	Maximum count in 2000s	2016	2017	2018	2019	2020	2021	Maximum count in 2020s
1	Inland	Beijing	Beijing Lakes	–	–	2	–	2	–	–	–	0	–	0	–	–	–	–	–	–	0
2	Inland	Shanxi	Shanxi Lakes	–	–	103	–	103	–	–	–	–	–	0	–	–	–	–	–	–	0
3	Inland	Henan	Pangzhai	0	–	–	0	0	–	–	–	–	–	0	–	–	–	–	–	–	0
4	Inland	Henan	Heigang Park	–	0	0	0	0	–	–	–	–	–	0	–	–	–	–	–	–	0
5	Inland	Hunan	East Dongting Lake	76	4,235	344	–	4,235	–	0	450	–	–	450	–	–	–	4,415	1,141	–	4,415
6	Inland	Hunan	Helong Lake	0	4	34	–	34	247	0	200	–	–	247	100	0	–	–	0	–	100
7	Inland	Hunan	West Dongting Lake	–	–	–	–	0	–	0	140	–	–	140	–	–	–	0	25	–	25
8	Inland	Hunan	Beiming Lake	–	–	–	–	0	–	1	0	–	–	1	–	–	–	0	0	–	0
9	Inland	Hunan	Chong Lake	–	–	–	–	0	–	–	–	–	–	0	–	–	–	0	154	–	154
10	Inland	Hunan	Taxi Lake	–	–	–	–	0	–	–	–	–	–	0	–	–	–	0	2	–	2
11	Inland	Hubei	Chen Lake	–	–	–	–	0	–	0	4	–	–	4	–	–	–	107	2,330	–	2,330
12	Inland	Hubei	Fu He	–	–	–	–	0	–	–	–	–	–	0	–	–	–	0	0	–	0
13	Inland	Hubei	Tuandun Lake	–	–	–	–	0	–	–	–	–	–	0	–	–	–	0	300	–	300
14	Inland	Hubei	Wang Lake	–	–	–	–	0	0	44	–	–	–	44	–	–	–	0	223	–	223
15	Inland	Hubei	Liangzi Lake	–	–	–	–	0	–	0	19	–	–	19	–	–	–	0	0	–	0
16	Inland	Hubei	Hannan	180	–	60	–	180	–	–	–	–	–	0	–	–	–	–	–	–	0
17	Inland	Hubei	Longgan Lake (Anhui)	0	–	–	–	–	–	–	14	–	–	14	–	–	–	20	48	–	48
18	Inland	Hubei	Tabai Lake	–	–	–	–	0	–	–	58	–	–	58	–	–	–	0	0	–	0
19	Inland	Hubei	Tianezhou	–	–	–	–	0	–	0	–	–	–	0	–	–	–	0	62	–	62
20	Inland	Hubei	Zhangdu Lake	–	–	–	–	0	–	0	0	–	–	0	–	–	–	0	12	–	12
21	Inland	Hubei	Fu Tou Lake	–	–	–	–	0	–	–	–	–	–	0	–	–	–	0	0	–	0
22	Inland	Hubei	Yuni Lake	–	–	–	–	0	–	–	0	–	–	0	–	–	–	0	1	–	1
23	Inland	Hubei	Wu Lake	–	–	–	–	0	–	–	2	–	–	2	–	–	–	0	0	–	0
24	Inland	Hubei	Chang Lake	0	–	–	–	0	–	0	0	–	–	0	–	–	–	0	0	–	0
25	Inland	Hubei	Hong Lake	–	–	–	–	0	–	0	1	–	–	1	–	–	–	0	0	–	0
26	Inland	Jiangxi	Poyang Lake	170	8,500	–	–	8,500	0	127	9,429	–	–	9,429	–	–	–	302	959	–	959
27	Inland	Jiangxi	Chi Lake	–	–	–	–	0	–	–	0	–	–	0	–	–	–	0	12	–	12
28	Inland	Jiangxi	Sacheng Lake	–	–	–	–	0	–	43	0	–	–	43	–	–	–	0	0	–	0
29	Inland	Anhui	Shengjin Lake	2,000	520	–	–	2,000	–	4,760	0	–	–	4,760	–	–	–	51	23	–	51
30	Inland	Anhui	Baidang Lake	–	–	–	–	0	–	0	0	–	–	0	–	–	–	3,018	5	–	3,018

Table S13 (continued).

No.	Survey Sites	Province	Wetland	1990	1991	1992	1993	Maximum count in 1990s	2003	2004	2005	2006	2007	Maximum count in 2000s	2016	2017	2018	2019	2020	2021	Maximum count in 2020s
31	Inland	Anhui	Nushan Lake	-	-	-	-	0	-	-	-	-	0	0	-	-	-	-	-	-	0
32	Inland	Anhui	Wuchang Lake	-	-	-	-	0	1	0	0	-	-	-	-	-	-	0	125	-	125
33	Inland	Anhui	Caizi Lake	-	-	-	-	0	-	0	74	-	-	-	74	-	-	0	32	-	32
34	Inland	Anhui	Pogang Lake	-	-	-	-	0	-	19	-	-	-	-	19	-	-	0	80	-	80
35	Inland	Anhui	Daguan Lake	-	-	-	-	0	-	40	0	-	-	-	40	-	-	0	0	-	0
36	Inland	Anhui	Fengsha Lake	-	-	-	-	0	-	0	26	-	-	-	26	-	-	0	0	-	0
37	Inland	Anhui	Bo Lake	-	-	-	-	0	-	0	0	-	-	-	-	-	-	0	5	-	5
38	Inland	Anhui	Tuo Lake	-	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	0
39	Inland	Anhui	Dongpu Reservoir	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	-	-	0
40	Inland	Anhui	Chengxi Lake	-	-	-	-	0	-	-	-	0	-	-	-	-	-	-	-	-	0
41	Inland	Jiangsu	Gaoyou Lake	0	400	-	-	400	-	0	-	-	0	-	0	-	-	-	-	-	0
42	Inland	Jiangsu	Shijiu Lake	83	183	530	-	530	-	-	0	-	-	-	-	-	-	0	0	-	0
43	Inland	Jiangsu	Tai Lake	-	-	-	-	0	-	-	0	-	-	-	0	-	-	0	0	-	0
44	Inland	Jiangsu	Dazong Lake	100	-	-	-	100	-	0	-	-	-	-	0	-	-	-	-	-	0
45	Inland	Jiangsu	Shaobo Lake	-	50	-	-	50	-	-	-	-	0	-	-	-	-	-	-	-	0
46	Inland	Jiangsu	Shang Lake	-	-	-	-	0	-	0	0	-	-	-	0	-	-	0	-	-	0
47	Inland	Jiangsu	Hongze Lake	0	-	-	-	0	-	4	0	-	-	-	4	-	-	-	-	-	0
48	Inland	Jiangsu	Chuhehekou	-	-	-	-	0	-	0	3	-	-	-	3	-	-	-	-	-	0
49	Inland	Jiangsu	Gucheng Lake	-	-	-	-	0	-	-	0	-	-	-	-	-	-	0	0	-	0
50	Inland	Shanghai	Shanghai Tideland	-	-	-	-	0	-	0	2	97	0	97	-	-	-	-	-	-	0
51	Coastal	Liaoning	Liaoyang City	-	-	1	-	1	-	-	-	-	-	-	0	-	-	-	-	-	0
52	Coastal	Tianjin	Tianjin Area	50	75	-	0	75	-	-	130	-	588	588	-	-	-	-	-	8	8
53	Coastal	Shandong	Laizhou Wan	-	-	-	-	0	-	-	-	-	8,560	8,560	-	-	-	-	-	105	105
54	Coastal	Shandong	Huang He NNR	-	-	-	-	0	-	-	0	-	-	0	6,700	-	-	-	-	100	6,700
55	Coastal	Shandong	Jiaozhou Wan	120	100	500	40	500	-	-	-	-	113	113	-	-	-	-	0	-	0
56	Coastal	Shandong	Rongcheng Wan	-	-	-	-	0	-	-	-	-	-	40	40	-	-	-	-	-	0
57	Coastal	Shandong	Dingzi Wan	-	-	-	-	0	-	-	-	-	154	154	-	-	-	-	-	-	0
58	Coastal	Shandong	Linjialiu Reservoir	-	-	-	-	0	-	-	-	-	60	60	-	-	-	-	-	-	0
59	Coastal	Shandong	Sanggou Wan	-	-	-	-	0	-	-	-	-	5	5	-	-	-	-	-	-	0
60	Coastal	Shandong	Taozi Wan	-	-	-	-	0	-	-	-	-	2	2	-	-	-	-	-	-	0
61	Coastal	Shandong	Jinghai Wan	-	-	-	-	0	-	-	-	-	52	52	-	-	-	-	-	-	0

Table S13 (continued).

No.	Survey Sites	Province	Wetland	1990	1991	1992	1993	Maximum count in 1990s	2003	2004	2005	2006	2007	Maximum count in 2000s	2016	2017	2018	2019	2020	2021	Maximum count in 2020s
62	Coastal	Shandong	Haiyang City	-	-	-	-	0	-	-	-	-	50	50	-	-	-	-	-	-	0
63	Coastal	Shandong	Rushankou	-	-	-	-	0	-	-	-	-	17	17	-	-	-	-	-	-	0
64	Coastal	Shandong	Shidao Wan	-	-	-	-	0	-	-	-	-	0	0	-	-	-	-	-	-	0
65	Coastal	Shandong	Wuleidao Wan	-	-	-	-	0	-	-	-	-	1	1	-	-	-	-	-	-	0
66	Coastal	Jiangsu	Sheyang Saltworks	1,500	3,568	9,300	-	9,300	-	0	-	-	0	0	-	-	-	-	-	4	4
67	Coastal	Jiangsu	Dafeng Port-Jiang Port	-	4,320	-	-	4,320	-	2	-	-	-	2	-	-	-	-	-	82	82
68	Coastal	Jiangsu	Xinyang Port-Dafeng Port	8,153	-	-	12	8,153	-	-	-	-	200	200	-	-	-	-	-	4	4
69	Coastal	Jiangsu	Guandong Saltworks	650	203	4,010	-	4,010	-	0	-	-	-	0	-	-	-	-	-	-	0
70	Coastal	Jiangsu	Xintai Saltworks	0	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	-	0
71	Coastal	Jiangsu	Haizhou Bay	-	-	746	-	746	-	-	-	-	6	6	-	-	-	0	-	-	0
72	Coastal	Jiangsu	Tainan Saltworks	-	-	-	-	0	-	-	-	-	0	0	-	-	-	-	-	-	0
73	Coastal	Jiangsu	Rudong Farm-Dayang Port	-	-	-	-	0	-	-	-	-	85	85	-	-	-	-	-	36	36
74	Coastal	Jiangsu	Jiang Port-Rudong Farm	-	-	-	-	0	-	58	-	-	0	58	-	-	-	-	-	-	0
75	Coastal	Shanghai	Baoshan Tideland	10,800	4,000	-	-	10,800	-	-	-	-	-	0	-	-	-	-	-	-	0
76	Coastal	Shanghai	Chongming Dongan	-	1,000	-	-	1,000	-	-	-	-	-	0	0	-	-	-	-	-	0
77	Coastal	Shanghai	Nanhui	4	-	-	-	4	-	-	-	-	-	0	-	-	-	-	205	205	205
78	Coastal	Shanghai	Wusi Farm	0	-	-	0	0	-	-	-	-	-	0	-	-	-	-	-	-	0
79	Coastal	Shanghai	Shanghai Coast	-	-	-	-	0	-	0	103	-	-	103	-	-	-	-	-	-	0
80	Coastal	Shanghai	Shanghai Zoo	12	6	-	-	12	-	-	-	-	-	0	-	-	-	-	-	-	0
81	Coastal	Shanghai	Jinshan Beach	8	-	-	-	8	-	-	-	-	-	0	-	-	-	-	-	-	0
82	Coastal	Zhejiang	Wenzhou Wan	0	-	-	-	0	-	-	-	1	1	1	-	-	-	-	359	-	359
83	Coastal	Zhejiang	Hangzhou Bay	-	-	-	-	0	-	-	-	-	0	0	-	-	-	-	-	170	170
84	Coastal	Zhejiang	Xiangshan Gang	-	-	-	-	0	-	-	-	-	0	0	-	-	-	-	-	-	0
85	Coastal	Zhejiang	Pubai Wan	-	-	-	-	0	-	-	-	-	1	1	-	-	-	-	-	-	0
86	Coastal	Zhejiang	Xihu Gang	-	-	-	-	0	-	-	-	-	0	0	-	-	-	-	-	-	0
87	Coastal	Zhejiang	Yueqing Wan	-	-	-	-	0	-	-	-	-	5	5	-	-	-	-	-	-	0

Table S13 (continued).

No.	Survey Sites	Province	Wetland	1990	1991	1992	1993	Maximum count in 1990s	2003	2004	2005	2006	2007	Maximum count in 2000s	2016	2017	2018	2019	2020	2021	Maximum count in 2020s
88	Coastal	Zhejiang	Sammen Wan	0	-	-	-	0	-	-	-	-	0	0	-	-	-	-	-	-	0
89	Coastal	Zhejiang	Shijiao Reservoir	-	-	-	-	0	-	-	-	-	12	12	-	-	-	-	-	-	0
90	Coastal	Zhejiang	Taizhou Wan	-	-	-	-	0	-	-	-	-	0	0	-	-	-	-	-	-	0
91	Coastal	Zhejiang	Qingshan Reservoir	-	9	-	0	9	-	-	-	-	-	0	-	-	-	-	-	-	0
92	Coastal	Fujian	Funing Wan	-	-	-	-	0	-	-	-	0	-	0	-	-	-	-	-	-	140
93	Coastal	Fujian	Minjiang Kou	-	-	-	-	0	-	-	-	66	-	66	-	-	-	-	-	-	4,690
94	Coastal	Fujian	Meizhou Wan	-	-	-	-	0	-	-	-	10	-	10	-	-	-	-	-	-	40
95	Coastal	Fujian	Fuqing Wan	-	-	-	-	0	-	-	-	20	-	20	-	-	-	-	-	-	40
96	Coastal	Fujian	Dongshan Wan	-	-	-	-	0	-	-	-	160	-	160	-	-	-	-	-	-	50
97	Coastal	Fujian	Sandu Wan	-	-	-	-	0	-	-	-	72	-	72	-	-	-	-	-	-	0
98	Coastal	Fujian	Xinghua Wan	-	-	-	-	0	-	-	-	74	-	74	-	-	-	-	-	-	0
99	Coastal	Fujian	Xiamen Yanhai	-	-	-	-	0	-	0	-	110	-	110	-	-	-	-	0	-	0
100	Coastal	Fujian	Luoyuan Wan	-	-	-	-	0	-	-	-	0	-	0	-	-	-	-	-	-	0
101	Coastal	Fujian	Quanzhou Wan	-	-	-	-	0	-	-	-	4	-	4	-	-	-	-	-	-	0
102	Coastal	Fujian	Yacheng Wan	-	-	-	-	0	-	-	-	3	-	3	-	-	-	-	-	-	0
103	Coastal	Fujian	Shahcheng Gang	-	-	-	-	0	-	-	-	0	-	0	-	-	-	-	-	-	2
104	Coastal	Fujian	Pinghai Wan	-	-	-	-	0	-	-	-	2	-	2	-	-	-	-	-	-	0
105	Coastal	Guangdong	Xinken, Panyu	-	-	0	0	0	200	-	0	-	-	200	-	-	-	-	-	-	0
106	Coastal	Guangdong	Nansha District	-	-	-	-	0	-	-	-	-	-	-	-	10	-	-	-	-	10
107	Coastal	Guangdong	Futian Nature Reserve	192	440	-	0	440	-	-	-	-	-	0	-	-	-	-	-	-	0
108	Coastal	Guangdong	Lufeng Tiddland	-	-	40	-	40	-	-	-	-	-	0	-	-	-	-	-	-	0
109	Coastal	Hong Kong	Deep Bay	-	5,361	0	-	5,361	-	-	-	-	3,139	3,139	-	-	3,747	-	-	-	3,747
110	Coastal	Hainan	Hainan Island	-	-	0	0	0	-	-	-	-	-	0	71	-	-	-	1,100	-	1,100
111	Taiwan	Taiwan	Taiwan	-	-	-	-	0	-	1,595	-	-	-	1,595	2,600	6,446	3,760	5,759	3,566	-	6,446

Table S14. Summary of population estimates for Wigeon and Pintail in each area of Eastern China based on raw data from the 1990s, 2000s and 2020s. For data resource, see Table S10.

Area		Number of Wigeon			Number of Pintail		
		1990s	2000s	2020s	1990s	2000s	2020s
Yangtze River	Hunan	22,250	554	13,298	64,293	1,292	6,205
	Hubei	0	89	13,249	0	167	3,297
	Jiangxi	0	7,855	10,236	128,920	11,011	1,354
	Anhui	0	1,265	445	7,887	5,996	3,544
	Jiangsu	158	4	272	2,776	5	0
	Shanghai	—	6	—	—	125	0
	Total	22,409	9,773	37,500	203,875	18,595	14,400
Huaihe River	Anhui	—	1,439	0	—	0	0
	Jiangsu	3,733	666	0	6,825	5	0
	Total	3,733	2,105	0	6,825	5	0
Yellow River and north	Inner Mongolia	—	—	—	—	—	0
	Heilongjiang	—	—	—	—	—	0
	Jilin	0	0	—	0	0	0
	Beijing	0	2,122	—	0	0	—
	Henan	158	0	—	0	0	—
	Shanxi	0	—	—	0	—	—
	Total	158	2,122	0	0	0	0
Inland total		26,300	14,000	37,500	210,700	18,600	14,400
North of the Yellow River estuary ^{a,c,i}	Liaoning	0	—	0	0	—	0
	Tianjin	0	519	37	1,137	1,132	15
	Hebei	0	—	—	0	—	—
	Total	0	519	37	1,137	1,132	15
Yellow River and south ^{a,b,g,i,j}	Shandong	0	5,414	2,335	1,516	17,430	12,796
	Jiangsu	457,390	8,074	303	122,667	560	233
	Shanghai	1,200	1,017	353	75,895	0	380
	Zhejiang	0	2,856	6,680	136	37	980
	Fujian	—	5,190	19,928	—	1,003	9,195
	Guangdong	0	5,760	2,265	6,671	385	19
	Hainan	0	546	186	0	810	2,038
	Macau	—	—	0	—	—	—
	Total	458,590	28,856	32,050	206,885	20,225	25,642
Hong Kong	Total	15,110	6,625	12,413	81,278	6,043	6,944
Coastal total		473,700	36,000	44,500	289,300	27,400	32,600

Table S14 (*continued*).

Area		Number of Wigeon			Number of Pintail		
		1990s	2000s	2020s	1990s	2000s	2020s
Continental China	Total	500,000	50,000	82,000	500,000	46,000	47,000
Taiwan		4,400	2,200	9,300	3,500	1,600	4,900
Total population estimate		504,400	52,200	91,000	503,500	47,600	52,000

Note: underlined provinces are those with wetlands situated in more than one river basin system. For the nine provinces with zero survey data in the 2020s, the maximum number of non-duplicate records entered on eBird at different locations during the 2016–2020 wintering seasons was used. These records came from between 3 and 220 survey sites, and provided < 100 survey counts. eBird data were only used for comparison of internationally important wintering sites to verify their distribution and were not used to contribute to the calculation of population estimates. The low count of five Wigeon and 20 Pintail in Guangxi Province, located west of 110°, once again support the hypothesis that both duck species are mainly concentrated in eastern China east of this meridian.

^aLiterature data from 1990 to 1993 published by the Water Bird Group of the Chinese Ornithological Society (1994).

^bHong Kong Bird Watching Society survey data from 1990 to 2021.

^cSurvey data of wintering waterbirds in the Yangtze River by Cao's group in 2004, 2005, 2019 and 2020.

^dSurvey data of wintering waterbirds in the Huaihe River from 2006 to 2007 and 2016 (December and February).

^eCao *et al.* (2008).

^fSurvey data of wintering waterbirds along the China coast in 2006 and 2007 (November to February).

^gLi & Mundkur (2004 and 2007).

^heBird online data from 2016 to 2020, maximum overwintering counts at different sites were counted from December to February each year (Cornell Lab of Ornithology 2021).

ⁱCoastal shared data from 2016–2021 provided by the co-authors and Li *et al.* (2020b).

^jWintering survey data from 2016/17 to 2019/20 published on GBIF by Taiwan New Year Bird Counting Carnival (Lin 2021).

^kEstimation of population in the 1990s using the median of the maximum and minimum estimates.

^lChina total is the sum of the estimated numbers from mainland China and Taiwan.

Table S15. List of counted wetlands in different areas in eastern China contributing to the population estimates for Wigeon and Pintail in the 1990s, 2000s and 2020s.

No.	Year	Survey position	Province	Wetland	Latitude	Longitude
1	1990s	Yangtze River	Hunan	East Dongting Lake	29.33	112.92
2	1990s	Yangtze River	Hunan	Helong Lake	28.83	112.84
3	1990s	Yangtze River	Hubei	Chang Lake	30.42	112.42
4	1990s	Yangtze River	Hubei	Hannan	30.34	113.90
5	1990s	Yangtze River	Hubei	Longgan Lake (Anhui)	29.93	116.05
6	1990s	Yangtze River	Jiangxi	Aoxi Reservoir	27.33	115.67
7	1990s	Yangtze River	Jiangxi	Poyang Lake	29.19	116.01
8	1990s	Yangtze River	Jiangxi	Wuyuan Reservoir	29.33	117.84
9	1990s	Yangtze River	Anhui	Flower Pavilion Reservoir	30.50	116.20
10	1990s	Yangtze River	Anhui	Shengjin Lake	30.40	117.08
11	1990s	Yangtze River	Anhui	Yushan Lake	31.69	118.50
12	1990s	Yangtze River	Jiangsu	Dazong Lake	33.15	119.81
13	1990s	Yangtze River	Jiangsu	Shijiu Lake	31.47	118.87
14	1990s	Huaihe River	Jiangsu	Gaoyou Lake	32.86	119.33
15	1990s	Huaihe River	Jiangsu	Hongze Lake	33.31	118.68
16	1990s	Huaihe River	Jiangsu	Shaobo Lake	32.63	119.44
17	1990s	Yellow River and its north	Jilin	Songhua Jiang	45.00	126.00
18	1990s	Yellow River and its north	Beijing	Beijing Lakes	40.40	115.80
19	1990s	Yellow River and its north	Henan	Heigang Pork	34.17	114.67
20	1990s	Yellow River and its north	Henan	Nanwan Reservoir	32.12	114.00
21	1990s	Yellow River and its north	Henan	Pangzhai	35.42	114.28

Table S15 (continued).

No.	Year	Survey position	Province	Wetland	Latitude	Longitude
22	1990s	Yellow River and its north	Shanxi	Shanxi Lakes	37.77	112.50
23	1990s	North of the Yellow River estuary	Liaoning	Chaoyang City	42.00	120.67
24	1990s	North of the Yellow River estuary	Liaoning	Dalian	38.74	121.15
25	1990s	North of the Yellow River estuary	Liaoning	Qinghe Reservoir	42.52	124.37
26	1990s	North of the Yellow River estuary	Liaoning	Yalu Jiang Area	39.82	123.91
27	1990s	North of the Yellow River estuary	Tianjin	Tianjin Area	39.20	117.92
28	1990s	North of the Yellow River estuary	Hebei	Hebei coast	39.16	118.16
29	1990s	North of the Yellow River estuary	Hebei	Hebei Lake	38.89	116.01
30	1990s	Yellow River estuary and its south	Shandong	Changshan Islands	38.01	120.32
31	1990s	Yellow River estuary and its south	Shandong	Dongyu River	34.99	115.66
32	1990s	Yellow River estuary and its south	Shandong	Jiaozhou Wan	36.15	119.72
33	1990s	Yellow River estuary and its south	Shandong	Rizhao Beach	35.62	119.62
34	1990s	Yellow River estuary and its south	Jiangsu	Dafeng Port–Qiong Port	33.03	120.85
35	1990s	Yellow River estuary and its south	Jiangsu	Guandong Saltworks	34.43	119.96
36	1990s	Yellow River estuary and its south	Jiangsu	Haizhou Bay	34.76	119.22
37	1990s	Yellow River estuary and its south	Jiangsu	Sheyang Saltworks	33.70	120.46
38	1990s	Yellow River estuary and its south	Jiangsu	Xintai Saltworks	34.30	120.28
39	1990s	Yellow River estuary and its south	Jiangsu	Xinyang Port–Dafeng Port	33.43	120.66
40	1990s	Yellow River estuary and its south	Shanghai	Baoshan Tideland	31.38	121.50
41	1990s	Yellow River estuary and its south	Shanghai	Chongming Dongtan	31.05	121.67
42	1990s	Yellow River estuary and its south	Shanghai	Jinshan Beach	30.70	121.35
43	1990s	Yellow River estuary and its south	Shanghai	Nanhui	30.90	121.98
44	1990s	Yellow River estuary and its south	Shanghai	Shanghai Zoo	31.02	121.50

Table S15 (continued).

No.	Year	Survey position	Province	Wetland	Latitude	Longitude
45	1990s	Yellow River estuary and its south	Shanghai	Wusi Farm	30.82	121.56
46	1990s	Yellow River estuary and its south	Zhejiang	Qiandao Lake	29.73	118.77
47	1990s	Yellow River estuary and its south	Zhejiang	Qingshan Reservoir	30.24	119.78
48	1990s	Yellow River estuary and its south	Zhejiang	Sanmen Wan	29.14	121.65
49	1990s	Yellow River estuary and its south	Zhejiang	Wenzhou Wan	27.74	120.75
50	1990s	Yellow River estuary and its south	Zhejiang	West Lake (Zhejiang)	30.25	120.15
51	1990s	Yellow River estuary and its south	Zhejiang	Zhoushan Islands	30.00	122.17
52	1990s	Yellow River estuary and its south	Guangdong	Futian Nature Reserve	22.53	114.01
53	1990s	Yellow River estuary and its south	Guangdong	Lufeng Tideland	22.84	115.94
54	1990s	Yellow River estuary and its south	Guangdong	Xinken, Panyu	23.00	113.30
55	1990s	Yellow River estuary and its south	Guangdong	Zhaoqingxing Lake	23.08	112.49
56	1990s	Yellow River estuary and its south	Hainan	Hainan Island	20.00	110.80
57	1990s	Hong Kong	Hong Kong	Deep Bay	22.48	114.03
58	1990s	Taiwan	Taiwan	Taiwan	23.35	120.16
59	2000s	Yangtze River	Hunan	Beiming Lake	29.72	111.90
60	2000s	Yangtze River	Hunan	Changjiang Riverbank	29.42	113.13
61	2000s	Yangtze River	Hunan	Datong Lake	29.21	112.51
62	2000s	Yangtze River	Hunan	Dong Lake	29.34	112.66
63	2000s	Yangtze River	Hunan	East Dongting Lake	29.33	112.92
64	2000s	Yangtze River	Hunan	Helong Lake	28.83	112.84
65	2000s	Yangtze River	Hunan	Huanggai Lake	29.71	113.54
66	2000s	Yangtze River	Hunan	Miaoli Lake	29.41	111.95
67	2000s	Yangtze River	Hunan	West Dongting Lake	29.02	112.08

Table S15 (continued).

No.	Year	Survey position	Province	Wetland	Latitude	Longitude
68	2000s	Yangtze River	Hunan	Xiangyang Lake	28.81	112.12
69	2000s	Yangtze River	Hunan	Yangxi Lake	29.63	113.35
70	2000s	Yangtze River	Hubei	Chang Lake	30.42	112.42
71	2000s	Yangtze River	Hubei	Chen Lake	30.25	113.77
72	2000s	Yangtze River	Hubei	Diaocha Lake	30.69	113.72
73	2000s	Yangtze River	Hubei	Fu Tou Lake	30.02	114.21
74	2000s	Yangtze River	Hubei	Hong Lake	29.87	113.36
75	2000s	Yangtze River	Hubei	Houguan Lake	30.52	114.01
76	2000s	Yangtze River	Hubei	Liangzi Lake	30.29	114.58
77	2000s	Yangtze River	Hubei	Longgan Lake (Anhui)	29.93	116.05
78	2000s	Yangtze River	Hubei	Tabai Lake	29.96	115.81
79	2000s	Yangtze River	Hubei	Tianezhou	29.81	112.56
80	2000s	Yangtze River	Hubei	Wang Lake	29.87	115.38
81	2000s	Yangtze River	Hubei	Wu Lake	30.79	114.47
82	2000s	Yangtze River	Hubei	Xiliang Lake	29.96	114.08
83	2000s	Yangtze River	Hubei	Yuni Lake	29.80	113.10
84	2000s	Yangtze River	Hubei	Zhangdu Lake	30.66	114.69
85	2000s	Yangtze River	Jiangxi	Poyang Lake	29.19	116.01
86	2000s	Yangtze River	Jiangxi	Saicheng Lake	29.69	115.87
87	2000s	Yangtze River	Jiangxi	Taibo Lake	30.01	116.70
88	2000s	Yangtze River	Anhui	Baidang Lake	30.81	117.38
89	2000s	Yangtze River	Anhui	Bo Lake	30.15	116.47
90	2000s	Yangtze River	Anhui	Caizi Lake	30.83	117.08

Table S15 (continued).

No.	Year	Survey position	Province	Wetland	Latitude	Longitude
91	2000s	Yangtze River	Anhui	Daguan Lake	30.02	116.34
92	2000s	Yangtze River	Anhui	Fengsha Lake	30.94	117.64
93	2000s	Yangtze River	Anhui	Huang Lake	29.99	116.47
94	2000s	Yangtze River	Anhui	Pogang Lake	30.65	117.16
95	2000s	Yangtze River	Anhui	Qili Lake	32.92	118.21
96	2000s	Yangtze River	Anhui	Shengjin Lake	30.40	117.08
97	2000s	Yangtze River	Anhui	Wuchang Lake	30.26	116.76
98	2000s	Yangtze River	Jiangxi	Chi Lake	29.75	115.68
99	2000s	Yangtze River	Jiangsu	Chuheruhekou	32.23	119.04
100	2000s	Yangtze River	Jiangsu	Dazong Lake	33.15	119.81
101	2000s	Yangtze River	Jiangsu	Shang Lake	31.64	120.68
102	2000s	Yangtze River	Jiangsu	Xinglongsha	31.75	121.51
103	2000s	Yangtze River	Shanghai	Hengshadao	31.34	121.88
104	2000s	Yangtze River	Shanghai	Shanghai Tideland	31.20	121.98
105	2000s	Huaihe River	Anhui	Anfeng Tang	32.30	116.68
106	2000s	Huaihe River	Anhui	Bali He	32.57	116.27
107	2000s	Huaihe River	Anhui	Chengdong Lake	32.34	116.39
108	2000s	Huaihe River	Anhui	Chengxi Lake	32.35	116.21
109	2000s	Huaihe River	Anhui	Dongpu Reservoir	31.89	117.18
110	2000s	Huaihe River	Anhui	Gaotang Lake	32.65	117.17
111	2000s	Huaihe River	Anhui	Huayuan Lake	32.99	117.83
112	2000s	Huaihe River	Anhui	Jiaogang Lake	32.59	116.60
113	2000s	Huaihe River	Anhui	Lindong Reservoir	32.67	118.14

Table S15 (continued).

No.	Year	Survey position	Province	Wetland	Latitude	Longitude
114	2000s	Huaihe River	Anhui	Nushan Lake	32.96	118.07
115	2000s	Huaihe River	Anhui	Qiaozijian Reservoir	33.11	117.92
116	2000s	Huaihe River	Anhui	Shiba Reservoir	32.75	118.10
117	2000s	Huaihe River	Anhui	Tuncang Reservoir	32.60	118.45
118	2000s	Huaihe River	Anhui	Tuo Lake	33.18	117.82
119	2000s	Huaihe River	Anhui	Wabu Lake	32.41	116.89
120	2000s	Huaihe River	Anhui	Xiang Jian Lake	33.15	117.62
121	2000s	Huaihe River	Jiangsu	Gaoyou Lake	32.86	119.33
122	2000s	Huaihe River	Jiangsu	Guwu Reservoir	32.87	118.47
123	2000s	Huaihe River	Jiangsu	Hongqi Reservoir	32.85	118.70
124	2000s	Huaihe River	Jiangsu	Hongze Lake	33.31	118.68
125	2000s	Huaihe River	Jiangsu	Hualong Reservoir	32.78	118.50
126	2000s	Huaihe River	Jiangsu	Liangtian Reservoir	32.79	118.65
127	2000s	Huaihe River	Jiangsu	Longwangshan Reservoir	32.92	118.56
128	2000s	Huaihe River	Jiangsu	Shaobo Lake	32.63	119.44
129	2000s	Huaihe River	Jiangsu	Shaozhuang Reservoir	33.25	118.01
130	2000s	Huaihe River	Jiangsu	Tiangang Lake	33.26	117.94
131	2000s	Huaihe River	Jiangsu	Xiangyang Reservoir	33.34	118.01
132	2000s	Huaihe River	Jiangsu	Xinglong Reservoir	33.07	118.36
133	2000s	Yellow River and its north	Jilin	Songhua Jiang	45.00	126.00
134	2000s	Yellow River and its north	Beijing	Beijing Lakes	40.40	115.80
135	2000s	Yellow River and its north	Henan	Mengjin Area	34.82	112.84
136	2000s	North of the Yellow River estuary	Liaoning	Yalu Jiang Area	39.82	123.91

Table S15 (continued).

No.	Year	Survey position	Province	Wetland	Latitude	Longitude
137	2000s	North of the Yellow River estuary	Tianjin	Tianjin Area	39.20	117.92
138	2000s	Yellow River estuary and its south	Shandong	Aoshan Wan	36.63	121.04
139	2000s	Yellow River estuary and its south	Shandong	Dingzi Wan	36.61	120.89
140	2000s	Yellow River estuary and its south	Shandong	Haiyang City	36.68	121.18
141	2000s	Yellow River estuary and its south	Shandong	Huang He NNR	37.92	118.92
142	2000s	Yellow River estuary and its south	Shandong	Jiaozhou Wan	36.15	119.72
143	2000s	Yellow River estuary and its south	Shandong	Jinghai Wan	36.97	122.17
144	2000s	Yellow River estuary and its south	Shandong	Laizhou Wan	37.14	119.26
145	2000s	Yellow River estuary and its south	Shandong	Linjialiu Reservoir	37.01	122.53
146	2000s	Yellow River estuary and its south	Shandong	Rongcheng Wan	37.31	122.60
147	2000s	Yellow River estuary and its south	Shandong	Rushankou	36.79	121.49
148	2000s	Yellow River estuary and its south	Shandong	Sanggou Wan	37.09	122.50
149	2000s	Yellow River estuary and its south	Shandong	Shankou Reservoir	36.80	121.35
150	2000s	Yellow River estuary and its south	Shandong	Shidao Wan	36.90	122.45
151	2000s	Yellow River estuary and its south	Shandong	Taozi Wan	37.62	121.23
152	2000s	Yellow River estuary and its south	Shandong	Wuleidao Wan	36.98	122.00
153	2000s	Yellow River estuary and its south	Jiangsu	Dafeng Port–Qiong Port	33.03	120.85
154	2000s	Yellow River estuary and its south	Jiangsu	Guandong Saltworks	34.43	119.96
155	2000s	Yellow River estuary and its south	Jiangsu	Haizhou Bay	34.76	119.22
156	2000s	Yellow River estuary and its south	Jiangsu	Jiang Port–Rudong Farm	32.52	121.07
157	2000s	Yellow River estuary and its south	Jiangsu	Rudong Farm–Dayang Port	32.12	121.44
158	2000s	Yellow River estuary and its south	Jiangsu	Sheyang Saltworks	33.70	120.46
159	2000s	Yellow River estuary and its south	Jiangsu	Tainan Saltworks	34.60	119.55

Table S15 (continued).

No.	Year	Survey position	Province	Wetland	Latitude	Longitude
160	2000s	Yellow River estuary and its south	Jiangsu	Xinyang Port–Dafeng Port	33.43	120.66
161	2000s	Yellow River estuary and its south	Shanghai	Shanghai Coast	30.86	121.88
162	2000s	Yellow River estuary and its south	Zhejiang	Hangzhou Bay	30.29	121.10
163	2000s	Yellow River estuary and its south	Zhejiang	Pubai Wan	28.91	121.59
164	2000s	Yellow River estuary and its south	Zhejiang	Sanmen Wan	29.14	121.65
165	2000s	Yellow River estuary and its south	Zhejiang	Shijiao Reservoir	28.98	121.58
166	2000s	Yellow River estuary and its south	Zhejiang	Taizhou Wan	28.68	121.52
167	2000s	Yellow River estuary and its south	Zhejiang	Wenzhou Wan	27.74	120.75
168	2000s	Yellow River estuary and its south	Zhejiang	Xiangshan Gang	29.66	121.86
169	2000s	Yellow River estuary and its south	Zhejiang	Xihu Gang	29.51	121.79
170	2000s	Yellow River estuary and its south	Zhejiang	Yueqing Wan	28.15	121.06
171	2000s	Yellow River estuary and its south	Fujian	Dongshan Wan	23.91	117.50
172	2000s	Yellow River estuary and its south	Fujian	Funing Wan	26.85	120.04
173	2000s	Yellow River estuary and its south	Fujian	Fuqing Wan	25.65	119.51
174	2000s	Yellow River estuary and its south	Fujian	Jiulong Jiang Kou	24.44	117.92
175	2000s	Yellow River estuary and its south	Fujian	Luoyuan Wan	26.41	119.71
176	2000s	Yellow River estuary and its south	Fujian	Meizhou Wan	25.15	118.99
177	2000s	Yellow River estuary and its south	Fujian	Minjiang Kou	26.04	119.64
178	2000s	Yellow River estuary and its south	Fujian	Pinghai Wan	25.22	119.13
179	2000s	Yellow River estuary and its south	Fujian	Quanzhou Wan	24.84	118.67
180	2000s	Yellow River estuary and its south	Fujian	Sandu Wan	26.69	119.71
181	2000s	Yellow River estuary and its south	Fujian	Shahcheng Gang	27.26	120.25
182	2000s	Yellow River estuary and its south	Fujian	Wen Wusha Shuiku	25.87	119.59

Table S15 (continued).

No.	Year	Survey position	Province	Wetland	Latitude	Longitude
183	2000s	Yellow River estuary and its south	Fujian	Xiamen Yanhai	24.58	118.16
184	2000s	Yellow River estuary and its south	Fujian	Xinghua Wan	25.40	119.24
185	2000s	Yellow River estuary and its south	Fujian	Yacheng Wan	26.97	120.19
186	2000s	Yellow River estuary and its south	Guangdong	Xinken, Panyu	23.00	113.30
187	2000s	Hong Kong	Hong Kong	Deep Bay	22.48	114.03
188	2000s	Taiwan	Taiwan	Taiwan	23.35	120.16
189	2020s	Yangtze River	Hunan	Along the Yangtze River (Hunan)	29.42	113.13
190	2020s	Yangtze River	Hunan	Bajiao Lake	29.42	113.18
191	2020s	Yangtze River	Hunan	Beiming Lake	29.72	111.90
192	2020s	Yangtze River	Hunan	Chong Lake	29.92	112.27
193	2020s	Yangtze River	Hunan	Datong Lake	29.21	112.51
194	2020s	Yangtze River	Hunan	East Dongting Lake	29.33	112.92
195	2020s	Yangtze River	Hunan	East Lake (Hunan)	29.34	112.66
196	2020s	Yangtze River	Hunan	Helong Lake	28.83	112.84
197	2020s	Yangtze River	Hunan	Huanggai Lake	29.71	113.54
198	2020s	Yangtze River	Hunan	Juantian Lake	29.71	113.45
199	2020s	Yangtze River	Hunan	Lishui Coast	29.50	111.95
200	2020s	Yangtze River	Hunan	Miaoli Lake	29.41	111.95
201	2020s	Yangtze River	Hunan	QixingLake	29.41	112.74
202	2020s	Yangtze River	Hunan	Shanbo Lake	29.42	112.02
203	2020s	Yangtze River	Hunan	Songyang Lake	29.50	113.21
204	2020s	Yangtze River	Hunan	Taxi Lake	29.60	112.48
205	2020s	Yangtze River	Hunan	West Dongting Lake	29.02	112.08

Table S15 (continued).

No.	Year	Survey position	Province	Wetland	Latitude	Longitude
206	2020s	Yangtze River	Hunan	Yangxi Lake	29.63	113.35
207	2020s	Yangtze River	Hubei	Along the Yangtze River (Hubei)	29.55	112.93
208	2020s	Yangtze River	Hubei	Bailian Lake	29.67	112.46
209	2020s	Yangtze River	Hubei	Baishui Lake	30.84	114.17
210	2020s	Yangtze River	Hubei	Baoan Lake	30.29	114.70
211	2020s	Yangtze River	Hubei	Chang Lake	30.42	112.42
212	2020s	Yangtze River	Hubei	Chen Lake	30.25	113.77
213	2020s	Yangtze River	Hubei	Dongxichahu	30.84	113.68
214	2020s	Yangtze River	Hubei	Fu He	30.76	114.14
215	2020s	Yangtze River	Hubei	Fu Tou Lake	30.02	114.21
216	2020s	Yangtze River	Hubei	Haikou Lake	30.04	115.23
217	2020s	Yangtze River	Hubei	Hong Lake	29.87	113.36
218	2020s	Yangtze River	Hubei	Hougong Lake	30.52	114.01
219	2020s	Yangtze River	Hubei	Huama Lake	30.26	114.98
220	2020s	Yangtze River	Hubei	Liangzi Lake	30.29	114.58
221	2020s	Yangtze River	Hubei	Longgan Lake (Anhui)	29.93	116.05
222	2020s	Yangtze River	Hubei	Lu Lake	30.31	114.23
223	2020s	Yangtze River	Hubei	Qi Lake	30.61	114.65
224	2020s	Yangtze River	Hubei	Sanshan Lake	30.32	114.76
225	2020s	Yangtze River	Hubei	Shangjin Lake	29.65	112.49
226	2020s	Yangtze River	Hubei	Tabai Lake	29.96	115.81
227	2020s	Yangtze River	Hubei	Taojia Lake	30.65	114.60
228	2020s	Yangtze River	Hubei	Tianezhou	29.81	112.56

Table S15 (continued).

No.	Year	Survey position	Province	Wetland	Latitude	Longitude
229	2020s	Yangtze River	Hubei	Tuandun Lake	30.11	114.21
230	2020s	Yangtze River	Hubei	Wang Lake	29.87	115.38
231	2020s	Yangtze River	Hubei	Wu Lake	30.79	114.47
232	2020s	Yangtze River	Hubei	Wusi Lake	30.45	114.71
233	2020s	Yangtze River	Hubei	Xiliang Lake	29.96	114.08
234	2020s	Yangtze River	Hubei	Yangzhuang Lake	30.38	114.65
235	2020s	Yangtze River	Hubei	Yu Pond	29.97	115.79
236	2020s	Yangtze River	Hubei	Yuni lake	29.84	112.14
237	2020s	Yangtze River	Hubei	Yuni Lake	29.80	113.10
238	2020s	Yangtze River	Hubei	Zhangdu Lake	30.66	114.69
239	2020s	Yangtze River	Hubei	Zhangjia Lake	30.75	113.25
240	2020s	Yangtze River	Hubei	Zhu Lake	30.82	113.94
241	2020s	Yangtze River	Jiangxi	Bali Lake	29.67	115.93
242	2020s	Yangtze River	Jiangxi	Chi Lake	29.75	115.68
243	2020s	Yangtze River	Jiangxi	East Lake (Jiangxi)	29.71	115.74
244	2020s	Yangtze River	Jiangxi	Poyang Lake	29.19	116.01
245	2020s	Yangtze River	Jiangxi	Saicheng Lake	29.69	115.87
246	2020s	Yangtze River	Jiangxi	Taibo Lake	30.01	116.70
247	2020s	Yangtze River	Jiangxi	Yao Lake	28.66	116.05
248	2020s	Yangtze River	Anhui	Baidang Lake	30.81	117.38
249	2020s	Yangtze River	Anhui	Bo Lake	30.15	116.47
250	2020s	Yangtze River	Anhui	Caizi Lake	30.83	117.08
251	2020s	Yangtze River	Anhui	Chenyao Lake	30.88	117.65

Table S15 (continued).

No.	Year	Survey position	Province	Wetland	Latitude	Longitude
252	2020s	Yangtze River	Anhui	Fengsha Lake	30.94	117.64
253	2020s	Yangtze River	Anhui	Huangda Lake	30.05	116.30
254	2020s	Yangtze River	Anhui	Huangpi Lake	31.20	117.34
255	2020s	Yangtze River	Anhui	Nan Lake	31.13	118.84
256	2020s	Yangtze River	Anhui	Pogang Lake	30.65	117.16
257	2020s	Yangtze River	Anhui	Qili Lake	32.92	118.21
258	2020s	Yangtze River	Anhui	Qilihe	30.51	116.97
259	2020s	Yangtze River	Anhui	Shengjin Lake	30.40	117.08
260	2020s	Yangtze River	Anhui	Wuchang Lake	30.26	116.76
261	2020s	Yangtze River	Jiangsu	Along the Yangtze River (Jiangsu)	32.00	118.64
262	2020s	Yangtze River	Jiangsu	Changdang Lake	31.67	119.58
263	2020s	Yangtze River	Jiangsu	Chishan Lake	31.84	119.09
264	2020s	Yangtze River	Jiangsu	Ge Lake	31.68	119.84
265	2020s	Yangtze River	Jiangsu	Gucheng Lake	31.26	118.93
266	2020s	Yangtze River	Jiangsu	Jinniu Lake	32.47	118.97
267	2020s	Yangtze River	Jiangsu	Kuncheng Lake	31.61	120.75
268	2020s	Yangtze River	Jiangsu	Longpao robe	32.19	118.95
269	2020s	Yangtze River	Jiangsu	Lvshui Way	32.00	118.64
270	2020s	Yangtze River	Jiangsu	Shang Lake	31.64	120.68
271	2020s	Yangtze River	Jiangsu	Shijiu Lake	31.47	118.87
272	2020s	Yangtze River	Jiangsu	Tai Lake	31.41	120.13
273	2020s	Yangtze River	Jiangsu	Yangcheng Lake	31.49	120.75
274	2020s	Huaihe River	Anhui	Anfeng Tang	32.30	116.68
275	2020s	Huaihe River	Anhui	Bali Lake	29.67	115.93

Table S15 (continued).

No.	Year	Survey position	Province	Wetland	Latitude	Longitude
276	2020s	Huaihe River	Anhui	Chengdong Lake	32.34	116.39
277	2020s	Huaihe River	Anhui	Chengxi Lake	32.35	116.21
278	2020s	Huaihe River	Anhui	Gaotang Lake	32.65	117.17
279	2020s	Huaihe River	Anhui	Jiaogang Lake	32.59	116.60
280	2020s	Huaihe River	Anhui	Nushan Lake	32.96	118.07
281	2020s	Huaihe River	Anhui	Qili Lake	32.92	118.21
282	2020s	Huaihe River	Anhui	Shiba Reservoir	32.75	118.10
283	2020s	Huaihe River	Anhui	Tuncang Reservoir	32.60	118.45
284	2020s	Huaihe River	Anhui	Tuo Lake	33.18	117.82
285	2020s	Huaihe River	Anhui	Wabu Lake	32.41	116.89
286	2020s	Huaihe River	Anhui	Xiang Jian Lake	33.15	117.62
287	2020s	Huaihe River	Jiangsu	Gaoyou Lake	32.86	119.33
288	2020s	Huaihe River	Jiangsu	Hongze Lake	33.31	118.68
289	2020s	Huaihe River	Jiangsu	Shaobo Lake	32.63	119.44
290	2020s	North of the Yellow River estuary	Liaoning	Panjin	40.91	121.83
291	2020s	North of the Yellow River estuary	Liaoning	Yalu Jiang Area	39.82	123.91
292	2020s	North of the Yellow River estuary	Tianjin	Tianjin Area	39.20	117.92
293	2020s	Yellow River estuary and its south	Shandong	Huang He NNR	37.92	118.92
294	2020s	Yellow River estuary and its south	Shandong	Jiaozhou Wan	36.15	119.72
295	2020s	Yellow River estuary and its south	Shandong	Laizhou Wan	37.14	119.26
296	2020s	Yellow River estuary and its south	Jiangsu	Dafeng Port-Qiong Port	33.03	120.85
297	2020s	Yellow River estuary and its south	Jiangsu	Haizhou Bay	34.76	119.22
298	2020s	Yellow River estuary and its south	Jiangsu	Rudong Farm-Dayang Port	32.12	121.44
299	2020s	Yellow River estuary and its south	Jiangsu	Sheyang Saltworks	33.70	120.46

Table S15 (continued).

No.	Year	Survey position	Province	Wetland	Latitude	Longitude
300	2020s	Yellow River estuary and its south	Jiangsu	Shuangyang Port	34.00	120.38
301	2020s	Yellow River estuary and its south	Jiangsu	Xinyang Port–Dafeng Port	33.43	120.66
302	2020s	Yellow River estuary and its south	Shanghai	Chongming Dongtan	31.05	121.67
303	2020s	Yellow River estuary and its south	Shanghai	Nanhui	30.90	121.98
304	2020s	Yellow River estuary and its south	Zhejiang	Hangzhou Bay	30.29	121.10
305	2020s	Yellow River estuary and its south	Zhejiang	Wenzhou Wan	27.74	120.75
306	2020s	Yellow River estuary and its south	Fujian	Dongshan Wan	23.91	117.50
307	2020s	Yellow River estuary and its south	Fujian	Funing Wan	26.85	120.04
308	2020s	Yellow River estuary and its south	Fujian	Fuqing Wan	25.65	119.51
309	2020s	Yellow River estuary and its south	Fujian	Luoyuan Wan	26.41	119.71
310	2020s	Yellow River estuary and its south	Fujian	Meizhou Wan	25.15	118.99
311	2020s	Yellow River estuary and its south	Fujian	Minjiang Kou	26.04	119.64
312	2020s	Yellow River estuary and its south	Fujian	Quanzhou Wan	24.84	118.67
313	2020s	Yellow River estuary and its south	Fujian	Sandu Wan	26.69	119.71
314	2020s	Yellow River estuary and its south	Fujian	Shahcheng Gang	27.26	120.25
315	2020s	Yellow River estuary and its south	Fujian	Weitou Wan	24.62	118.49
316	2020s	Yellow River estuary and its south	Fujian	Wen Wusha Shuiku	25.87	119.59
317	2020s	Yellow River estuary and its south	Fujian	Xiamen Yanhai	24.58	118.16
318	2020s	Yellow River estuary and its south	Fujian	Xinghua Wan	25.40	119.24
319	2020s	Yellow River estuary and its south	Fujian	Zhao'an Bay	23.73	117.34
320	2020s	Yellow River estuary and its south	Guangdong	Nansha District	22.75	113.60
321	2020s	Yellow River estuary and its south	Hainan	Hainan Island	20.00	110.80
322	2020s	Hong Kong	Hong Kong	Deep Bay	22.48	114.03
323	2020s	Taiwan	Taiwan	Taiwan	23.35	120.16

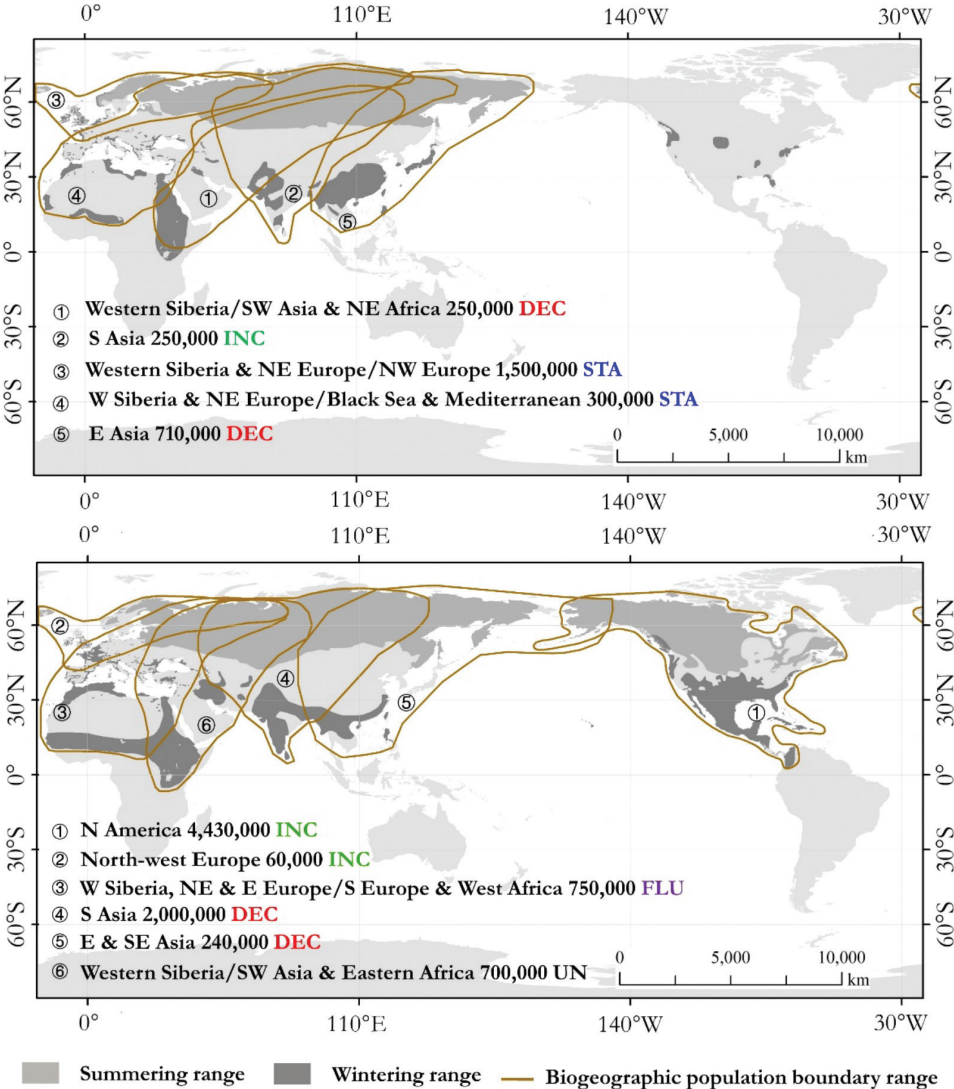


Figure S1. Defined global biogeographic subpopulation boundary maps for Wigeon and Pintail (Wetlands International 2023b). Note that the Wigeon is a relatively rare but regular vagrant to North America; some spots showing winter presence.

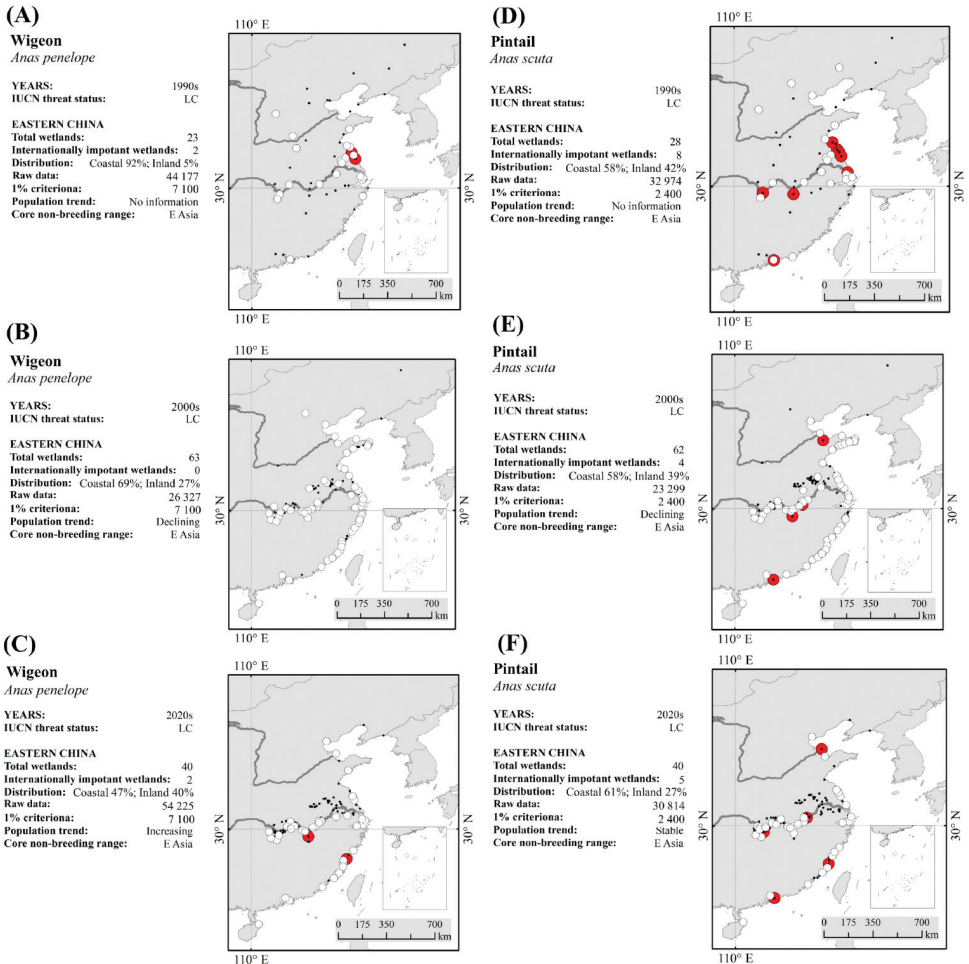


Figure S2. Changes in the numbers and distribution of Wigeon and Pintail at internationally important wintering sites in eastern China ($\geq 1\%$ of the total East Asian population). (A) = internationally important wintering sites of Wigeon in eastern China in the 1990s, (B) 2000s and (C) 2020s. (D) = internationally important wintering sites of Pintail in eastern China in the 1990s, (E) 2000s and (F) 2020s. Black dots = sites that were investigated but where no ducks were present; white dots = sites where the number of ducks was > 0 but $< 1\%$ of the population estimate; large red circles = sites where the number of ducks was greater than the 1% criteria (Wigeon = 7,100, Pintail = 2,400).

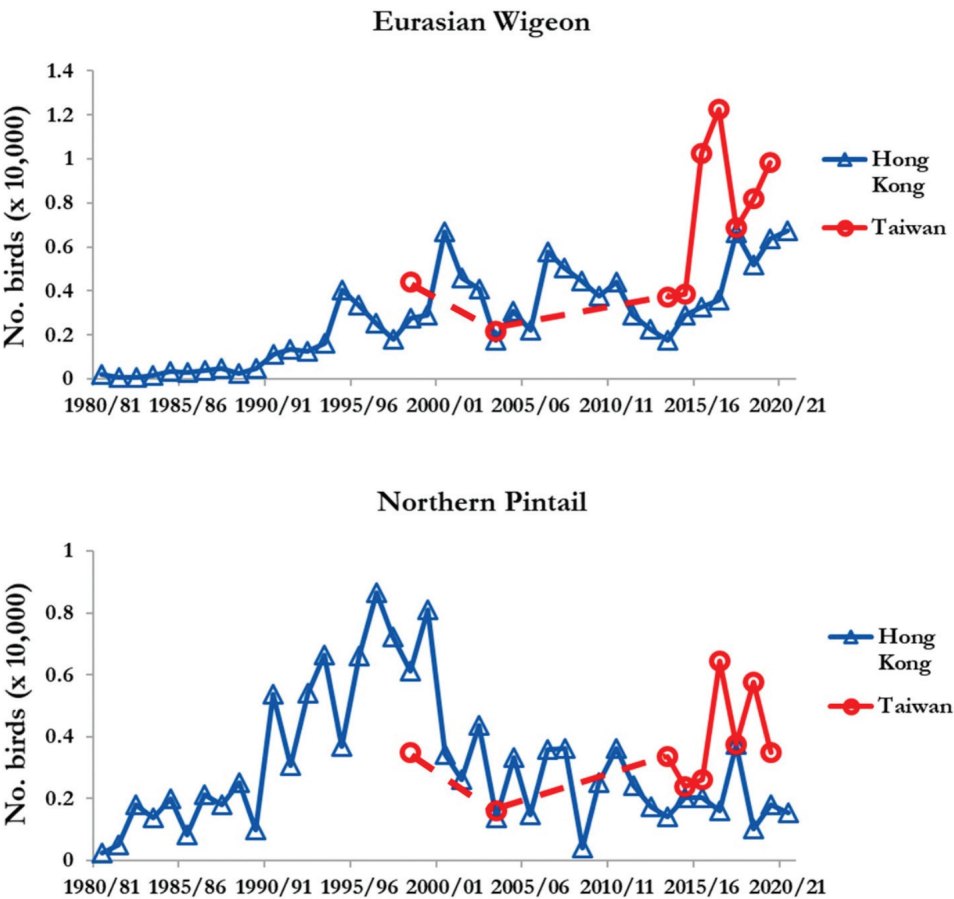


Figure S3. Changes in annual wintering abundance of Wigeon and Pintail in Chinese Hong Kong and Taiwan 1980/81–2020/21.