Title: **Protection of wetlands as a strategy for reducing the spread of avian influenza from migratory waterfowl**

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Table S1: Land cover classifications use in the raster map for spatial analyses.

Primary classification	Subsidiary classification
1 Agricultural	11 Rice paddy
	12 Dry farmland
2 Forest	21 Woodland
	22 Shrubland
	23 Sparsely forested woodland
	24 Other forest
3 Grassland	31 High coverage grassland
	32 Middle coverage grassland
	33 Low coverage grassland
4 Water	41 Rivers and canals
	42 Lake
	43 Reservoir and other artificial
	44 Glacier
	45 Tidal marsh
	46 Shoal and reeds
5 Built-up land	51 Cities and towns
	52 Rural settlements
	53 Industry and transport
6 Other	61 Sandy land
	62 Gobi desert
	63 Saline/alkaline land
	64 Swampland
	65 Bare land
	66 Rock and gravel
	67 Other unused land

Table S2: Results for models of risk factors of H5N1 poultry outbreaks in China, from January 1, 2004 to September 20, 2017. Odds ratios and p-levels are reported (latter in parentheses). All are significant at the 1 per cent level. Controls were generated at a ratio of 5 for each 1 case, distributed randomly over the map without reference to administrative boundaries. Results from columns (a), (b) and (c)

differed because of different values for rice paddy area radius. The variables
"Proximity to nearest unprotected large water body" and "Proximity to nearest
Ramsar wetland" were unit-less because they were normalized (see Methods
section).

Variables	Units	H5N1 Poultry Outbreaks		
		(a)	(b)	(c)
Proximity to nearest unprotected large water body	-	1.0051 (0.000)	1.0455 (0.000)	1.0418 (0.000)
Proximity to nearest Ramsar wetland	-	0.98326 (0.001)	0.97906 (0.000)	0.97633 (0.000)
Rice paddy area				
within 10-km radius zone	km^2	1.0163 (0.000)		
within 20-km radius zone	km^2		1.0052 (0.000)	
within 50-km radius zone	km^2			1.0010 (0.000)
Per-capita GDP	¥	0.99999 (0.000)	0.99999 (0.000)	0.99998 (0.000)
Observations		1206	1206	1206
Pseudo R^2		0.1940	0.2205	0.2293

**Table S3: Results for models of risk factors of H5N1 poultry outbreaks in China,
from January 1, 2004 to September 20, 2017. Odds ratios and p-levels are reported
(latter in parentheses). All are significant at the 1 per cent level. Controls were
generated at a ratio of 5 for each prefecture, regardless of the size of prefecture, to
account for geographically uneven distribution of populations. Results from**

columns (a), (b) and (c) differed because of different values for rice paddy area radius. The variables "Proximity to nearest unprotected large water body" and "Proximity to nearest Ramsar wetland" were unit-less because they were normalized (see Methods section).

Variables	Units	H5N1 Poultry Outbreaks		
		(a)	(b)	(c)
Proximity to nearest unprotected large water body	-	1.0777 (0.000)	1.0735 (0.000)	1.0715 (0.000)
Proximity to nearest Ramsar wetland	-	0.97168 (0.000)	0.96936 (0.000)	0.96834 (0.000)
Rice paddy area				
within 10-km radius zone	km^2	1.0065 (0.000)		
within 20-km radius zone	km^2		1.0022 (0.000)	
within 50-km radius zone	km^2			1.0004 (0.000)
Per-capita GDP	¥	0.99998 (0.000)	0.99998 (0.000)	0.99998 (0.000)
Observations		1356	1356	1356
Pseudo R^2		0.1476	0.1571	0.1571

Table S4: Results for models of risk factors of H5N1 poultry outbreaks in China, from January 1, 2004 to September 20, 2017. Odds ratios and p-levels are reported (latter in parentheses). All are significant at the 1 per cent level. Controls were generated at a ratio of 5 for each case within a given province; controls were then randomly distributed within the boundaries of the province. There were five mainland provinces without reported cases during the study period: Hainan,

Sichuan, Heilongjiang, Beijing, and Shandong. Results from columns (a), (b) and (c) differed because of different values for rice paddy area radius. The variables "Proximity to nearest unprotected large water body" and "Proximity to nearest Ramsar wetland" were unit-less because they were normalized (see Methods section).

Variables	Units	H5N1 Poultry Outbreaks		
		(a)	(b)	(c)
Proximity to nearest unprotected large water body	-	1.0563 (0.000)	1.0546 (0.000)	1.0551 (0.000)
Proximity to nearest Ramsar wetland	-	0.98474 (0.002)	0.98333 (0.001)	0.98370 (0.002)
Rice paddy area				
within 10-km radius zone	km^2	1.0041 (0.003)		
within 20-km radius zone	km^2		1.0013 (0.001)	
within 50-km radius zone	km^2			1.0002 (0.004)
Per-capita GDP	¥	0.99999 (0.000)	0.99999 (0.000)	0.99999 (0.000)
Observations		1206	1206	1206
Pseudo R^2		0.0861	0.0883	0.0856