Levels, Inventory, and Risk Assessment of Heavy Metals in Wetland Ecosystem, Northeast China: Implications for Snow Cover Monitoring

Supplementary Information

Table S1. Classifications of heavy metal pollution degree.

WPI	***P_i***	**Pollution degree**
$WPI < 1$	$P_i < 1$	Clean
$1 \leq WPI < 2$	$1 \leq P_i < 2$	Low
$2 \leq WPI < 3$	$2 \leq P_i < 3$	Moderate
$WPI \geq 3$	$P_i \geq 3$	High

Table S2. The depth and density of snow cover in the Qixing River wetland

Sampling sites	**depth (m)**	**Density (kg·m^{-3})**
S1	0.14	188.75
S2	0.18	220.34
S3	0.07	153.38
S4	0.19	165.93
S5	0.15	164.19
S6	0.05	179.54
S7	0.10	216.79
S8	0.13	140.84
S9	0.07	161.50
S10	0.08	152.36
S11	0.06	174.11
S12	0.09	168.57
S13	0.06	166.62
S14	0.16	166.68
S15	0.20	221.16
S16	0.13	328.42
S17	0.16	221.59
S18	0.20	252.62
S19	0.15	182.80

Table S3. Selected toxicity parameters and calculated *TDIs* in the study (mg·kg^{-1}day^{-1})

	LOAEL	***NOAEL***	***TDI***
Cu	61.70	47.00	5.39
Ni	107.00	77.40	9.10
Cr	5.00	1.00	0.22
Cd	20.00	1.45	0.54
Pb	11.30	1.13	0.36
Zn	131.00	14.50	4.36

Table S4. Classifications of heavy metal exposure risk.

HQ	**Exposure risk**

$HQ < 1.00$	No
$1.00 \leq HQ < 2.00$	Low
$2.00 \leq HQ < 3.00$	Moderate
$HQ \geq 3.00$	High

Table S5. Pearson correlation matrix for heavy metals and particle contents in snow cover of the Qixing River wetland.

	Cu	Ni	Cr	Cd	Pb	Zn	Particle contents
Cu	1						
Ni	.235	1					
Cr	.791**	.310	1				
Cd	.107	.363	.057	1			
Pb	.865**	.191	.798**	-.049	1		
Zn	.463*	.047	.512*	.090	.516*	1	
Particle contents	.883**	-.039	.684**	-.042	.817**	.487*	1

** Correlation is significant at $p < 0.01$ level (two-tailed);

* Correlation is significant at $p < 0.05$ level (two-tailed).

Table S6. Pearson correlation matrix for heavy metals residues and snow cover depth in the Qixing River wetland.

	Cu	Ni	Cr	Cd	Pb	Zn	depth
Cu	1						
Ni	.648**	1					
Cr	.901**	.641**	1				
Cd	.790**	.622**	.723**	1			
Pb	.793**	.522*	.829**	.444	1		
Zn	.691**	.397	.746**	.704**	.666**	1	
depth	.743**	.338	.767**	.684**	.594**	.721**	1

** Correlation is significant at $p < 0.01$ level (two-tailed);

* Correlation is significant at $p < 0.05$ level (two-tailed).

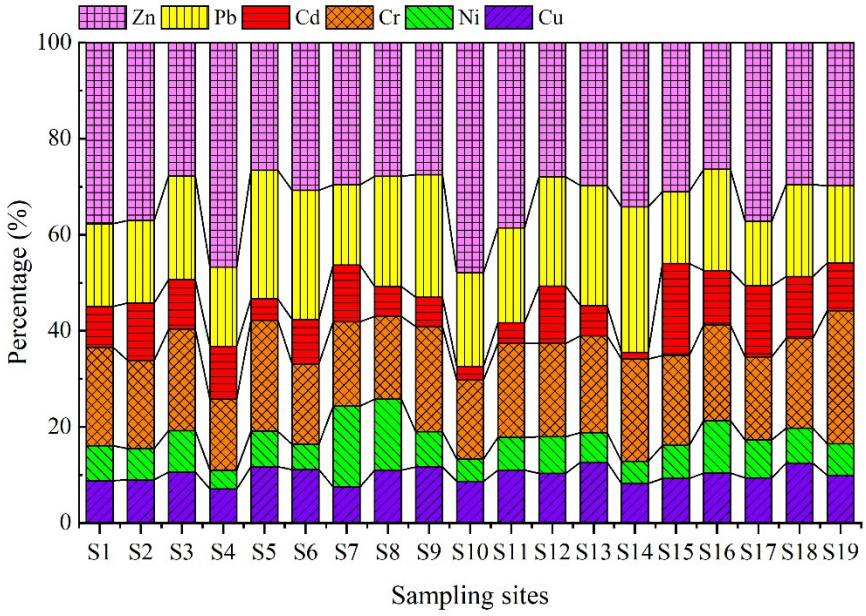


Figure S1. Contributions of the target heavy metals to the water quality index (*WPI*)

in snow cover from the Qixing River wetland

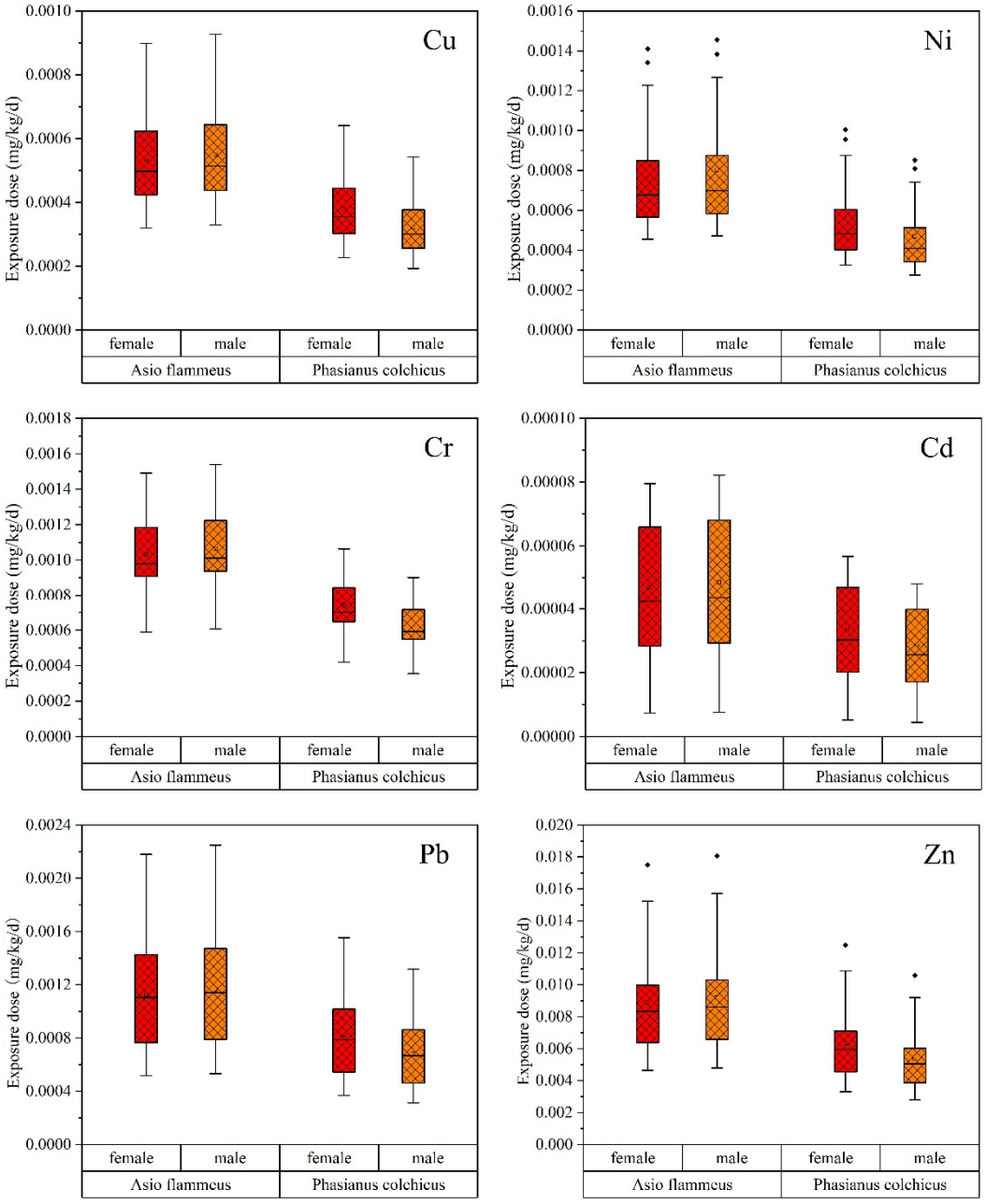


Figure S2. Exposure doses of heavy metals to Eurasian Spoonbills in the Qixing River wetland.