

4 **Supplementary Table S4** The physicochemical properties of channel sediments, rhizosphere soils, and bulk
5 soils (mean $\pm$ SE). Means $\pm$ SE followed by different lowercase letters indicate a significant difference ($p <$
6 0.05) among soil types

	Channel sediments (0–20 cm)	Rhizosphere soils (0–20 cm)	Bulk soils (0–20 cm)	Bulk soils (60–80 cm)	Bulk soils (160–180 cm)
Moisture (%)	20.4 $\pm$ 1.3a	22.3 $\pm$ 1.5a	16.1 $\pm$ 1.0b	20.0 $\pm$ 1.1a	20.2 $\pm$ 1.2a
SpH	7.8 $\pm$ 0.1	7.8 $\pm$ 0.1	7.9 $\pm$ 0.1	7.7 $\pm$ 0.2	7.9 $\pm$ 0.2
STN (mg kg ⁻¹)	1179.3 $\pm$ 225.1a	729.2 $\pm$ 62.8b	791.9 $\pm$ 52.9b	473.2 $\pm$ 43.8c	338.6 $\pm$ 54.3c
SNO ₃ ⁻ -N (mg kg ⁻¹)	2.0 $\pm$ 1.0	0.5 $\pm$ 0.1	0.8 $\pm$ 0.1	0.9 $\pm$ 0.1	0.5 $\pm$ 0.1
SNH ₄ ⁺ -N (mg kg ⁻¹)	8.8 $\pm$ 1.4	12.1 $\pm$ 2.9	7.6 $\pm$ 1.2	8.3 $\pm$ 2.3	6.1 $\pm$ 2.5
STC (mg g ⁻¹)	16.3 $\pm$ 4.4a	12.9 $\pm$ 1.4b	10.3 $\pm$ 0.9b	11.8 $\pm$ 1.2b	11.4 $\pm$ 2.0b
SOC (mg g ⁻¹)	9.3 $\pm$ 3.6a	6.7 $\pm$ 1.2b	3.78 $\pm$ 0.4c	3.1 $\pm$ 0.5c	2.5 $\pm$ 0.7c
Fe ²⁺ (mg kg ⁻¹)	158.0 $\pm$ 36.1a	85.5 $\pm$ 10.7b	79.7 $\pm$ 11.2b	156.1 $\pm$ 28.1a	136.6 $\pm$ 24.3a
AF _e (mg kg ⁻¹)	19.7 $\pm$ 2.6a	18.0 $\pm$ 2.6a	13.1 $\pm$ 2.01b	13.9 $\pm$ 2.8b	14.0 $\pm$ 3.8b
Clay (%)	11.4 $\pm$ 1.2	10.6 $\pm$ 0.8	8.8 $\pm$ 1.3	13.0 $\pm$ 2.2	12.4 $\pm$ 2.4
Silt (%)	43.7 $\pm$ 4.0	49.5 $\pm$ 3.0	38.0 $\pm$ 4.6	44.3 $\pm$ 5.2	47.3 $\pm$ 4.6
Sand (%)	44.9 $\pm$ 4.9	39.9 $\pm$ 3.5	53.2 $\pm$ 5.8	42.7 $\pm$ 7.0	40.3 $\pm$ 6.4