Table. S1 Specific Information of Sampling

Site	abbreviation	region	longitude	latitude
Mahushan	MH	Shenyang	123.1892°E	42.1386°N
Shuguangqiao	SG	Panjin	121.9042°E	41.1197°N
Xing'an	XA	Panjin	122.2155°E	41.2099°N
Hongmiaozi	HM	Anshan	122.6538°E	41.4460°N
Dongdaqiao	DDQ	Tieling	123.9267°E	42.2789°N
Fudedian	FD	Tieling	123.5425°E	42.9771°N
Huanghezi	HH	Tieling	123.6378°E	42.6284°N
Qingliao	QL	Tieling	123.8663°E	42.4355°N
Sanhetun	SH	Tieling	123.6555°E	42.6136°N
Tongjiangkou	TJ	Tieling	123,6730°E	42.6311°N
Zhuershan	ZE	Tieling	123.5476°E	42.2064°N

Table. S2 Species classification and distribution table in different sites

Order	Family	Genera	Species	DDQ	FD	HH	HM	MH	QL	SG	SH	TJ	XA	ZE
Synbranchiformes	Mastacembelidae	*Sinobdella*	*Sinobdella sinensis* (Bleeker, 1870)	+	+		+						+	+
Siluriformes	Bagridae	*Tachysurus*	*Tachysurus fulvidraco* (Richardson, 1846)		+	+	+	+	+		+	+	+	+
		Pelteobagrus	*Tachysurus nudiceps* (Sauvage, 1883)		+	+	+	+	+		+	+	+	+
	Siluridae	*Silurus*	*Silurus soldatovi* Nikolskii & Soin, 1948	+	+	+	+		+		+	+	+	
		Silurus	*Silurus asotus* Linnaeus, 1758	+	+	+	+		+		+	+	+	
Perciformes	Centrarchidae	*Lepomis*	*Lepomis cyanellus* Rafinesque, 1819	+			+	+	+				+	
	Gobiidae	*Acanthogobius*	*Acanthogobius hasta* (Temminck & Schlegel, 1845)	+		+				+		+	+	
		Rhinogobius	*Rhinogobius cliffordpopei* (Nichols, 1925)	+					+					
		Rhinogobius	*Rhinogobius similis* Gill, 1859	+	+	+	+	+	+	+	+	+	+	+
		Tridentiger	*Tridentiger barbatus* (Günther, 1861)			+			+	+	+		+	+
		Tridentiger	*Tridentiger bifasciatus* Steindachner, 1881		+	+	+		+				+	
		Tridentiger	*Tridentiger trigonocephalus* (Gill, 1859)		+	+	+		+				+	
	Odontobutidae	*Micropercops*	*Micropercops swinhonis* (Günther, 1873)			+		+	+	+	+	+	+	+
		Odontobutis	*Odontobutis yaluensis* Wu, Wu & Xie, 1993		+		+							
Mugiliformes	Mugilidae	*Planiliza*	*Planiliza haematocheilus* (Temminck & Schlegel, 1845)	+	+	+	+		+	+	+	+	+	+
Cypriniformes	Acheilognathidae	*Acheilognathus*	*Acheilognathus barbatus* Nichols, 1926	+	+	+	+	+	+	+	+	+	+	+
		Acheilognathus	*Acheilognathus macropterus* (Bleeker, 1871)	+	+	+	+	+	+	+	+	+	+	+

Table. S2 Species classification and distribution table in different sites. (Continue1)

Order	Family	Genera	Species	DDQ	FD	HH	HM	MH	QL	SG	SH	TJ	XA	ZE
		Acheilognathus	*Acheilognathus chankaensis* (Dybowski, 1872)	+	+	+	+	+	+	+	+	+	+	
		Rhodeus	*Rhodeus sinensis* Günther, 1868		+		+		+				+	
	Botiidae	*Parabotia*	*Parabotia fasciatus* Dabry de Thiersant, 1872				+		+					
	Cobitidae	*Misgurnus*	*Misgurnus anguillicaudatus* (Cantor, 1842)	+	+		+		+	+	+	+	+	+
		Misgurnus	*Misgurnus bipartitus* (Dybowski, 1869)	+					+		+	+	+	
		Carassius	*Carassius auratus* (Linnaeus, 1758)	+	+	+	+	+	+	+	+	+	+	+
	Cyprinidae	*Chanodichthys*	*Chanodichthys dabryi* (Bleeker, 1871)	+	+	+	+	+	+	+	+	+	+	+
		Chanodichthys	*Chanodichthys erythropterus* (Basilewsky, 1855)		+	+	+	+		+		+	+	
		Chanodichthys	*Chanodichthys mongolicus* (Basilewsky, 1855)		+		+							
		Chanodichthys	*Ctenopharyngodon idella* (Valenciennes, 1844)							+	+	+	+	
		Ancherythroculter	*Ancherythroculter nigrocauda Yih & Wu, 1964*		+	+								
		Culter	*Culter alburnus* Basilewsky, 1855	+	+	+	+	+	+	+	+	+	+	+
		Cultrichthys	*Chanodichthys erythropterus* (Basilewsky, 1855)							+			+	
		Cyprinus	*Cyprinus carpio* Linnaeus, 1758	+	+	+	+	+	+	+	+	+	+	+
		Elopichthys	*Elopichthys bambusa* (Richardson, 1845)	+										
		Hemiculter	*Hemiculter bleekeri* Warpachowski, 1888			+	+		+		+	+	+	
		Hemiculter	*Hemiculter leucisculus* (Basilewsky, 1855)	+	+	+	+	+	+	+	+	+	+	+
		Hypophthalmichthys	*Hypophthalmichthys molitrix* (Valenciennes, 1844)	+	+	+	+	+	+	+	+	+	+	+
		Hypophthalmichthys	*Hypophthalmichthys nobilis* (Richardson, 1845)	+	+	+	+	+	+	+	+	+	+	+
		Megalobrama	*Megalobrama terminalis* (Richardson, 1846)	+	+		+		+				+	
		Parabramis	*Parabramis pekinensis* (Basilewsky, 1855)	+	+	+	+		+		+	+	+	+
		Phoxinus	*Phoxinus oxycephalus* (Sauvage & Dabry de Thiersant, 1874)	+										

Table. S2 Species classification and distribution table in different sites. (Continue2)

Order	Family	Genera	Species	DDQ	FD	HH	HM	MH	QL	SG	SH	TJ	XA	ZE
		Plagiognathops	*Plagiognathops microlepis* (Bleeker, 1871)	+	+	+	+	+	+	+	+	+	+	+
		Pseudobrama	*Pseudobrama simoni* (Bleeker, 1864)	+	+	+	+		+		+	+	+	
		Rhodeus	*Rhodeus uyekii* (Mori, 1935)		+		+		+		+	+	+	
		Squaliobarbus	*Squaliobarbus curriculus* (Richardson, 1846)	+	+	+	+	+	+	+	+	+	+	+
		Xenocypris	*Xenocypris davidi* Bleeker, 1871	+	+	+	+			+	+		+	+
		Zacco	*Zacco platypus* (Temminck & Schlegel, 1846)	+					+					
	Gobionidae	*Microphysogobio*	*Mesogobio lachneri* Bănărescu & Nalbant, 1973					+						
		Microphysogobio	*Microphysogobio liaohensis* (Qin, 1987)	+										
		Mesogobio	*Microphysogobio yaluensis* (Mori, 1928)	+										
		Pseudorasbora	*Pseudorasbora parva* (Temminck & Schlegel, 1846)			+	+							
		Sarcocheilichthys	*Sarcocheilichthys lacustris* (Dybowski, 1872)		+		+			+				
		Saurogobio	*Saurogobio dabryi* Bleeker, 1871					+						
	Nemacheilidae	*Barbatula*	*Barbatula toni* (Dybowski, 1869)	+					+					
		Barbatula	*Barbatula nuda* (Bleeker, 1864)	+					+					
Clupeiformes	Engraulidae	*Coilia*	*Coilia nasus* Kreyenberg & Pappenheim, 1908	+	+	+	+		+	+		+	+	

Table. S3 α diversity index in different sites.

site	α diversity index			
	chao1	ace	shannon	simpson
DDQ	6.25	8.23	1.29	0.64
FD	6.94	9.41	1.54	0.76
HH	12.83	22.68	1.67	0.77
MH	5.25	6.46	1.41	0.72
ZE	6.67	9.19	1.23	0.59
QL	8.17	11.35	1.59	0.77
SH	6.58	9.38	1.53	0.75
TJ	10.61	18.42	1.63	0.77
XA	5.03	6.31	1.41	0.72
HM	7.89	10.27	1.63	0.78
SG	8.44	14.21	1.29	0.62

Table. S4 The NMDS1 and NMDS2 coordinates at different sampling sites

Site	NMDS1	NMDS2	Group
XA	-0.08045	0.261453	Downstream
SG	-0.77438	0.507803	Downstream
MH	0.813377	0.017116	Downstream
HM	0.424992	-0.07585	Downstream
DDQ	-0.21654	0.389424	Upstream
FD	0.037121	-0.15527	Upstream
HH	-0.04831	0.17586	Upstream
TJ	-0.11918	-0.17595	Upstream
QL	-0.1872	-0.1071	Upstream
SH	0.021457	-0.35646	Upstream
ZE	-0.24528	-0.48102	Upstream

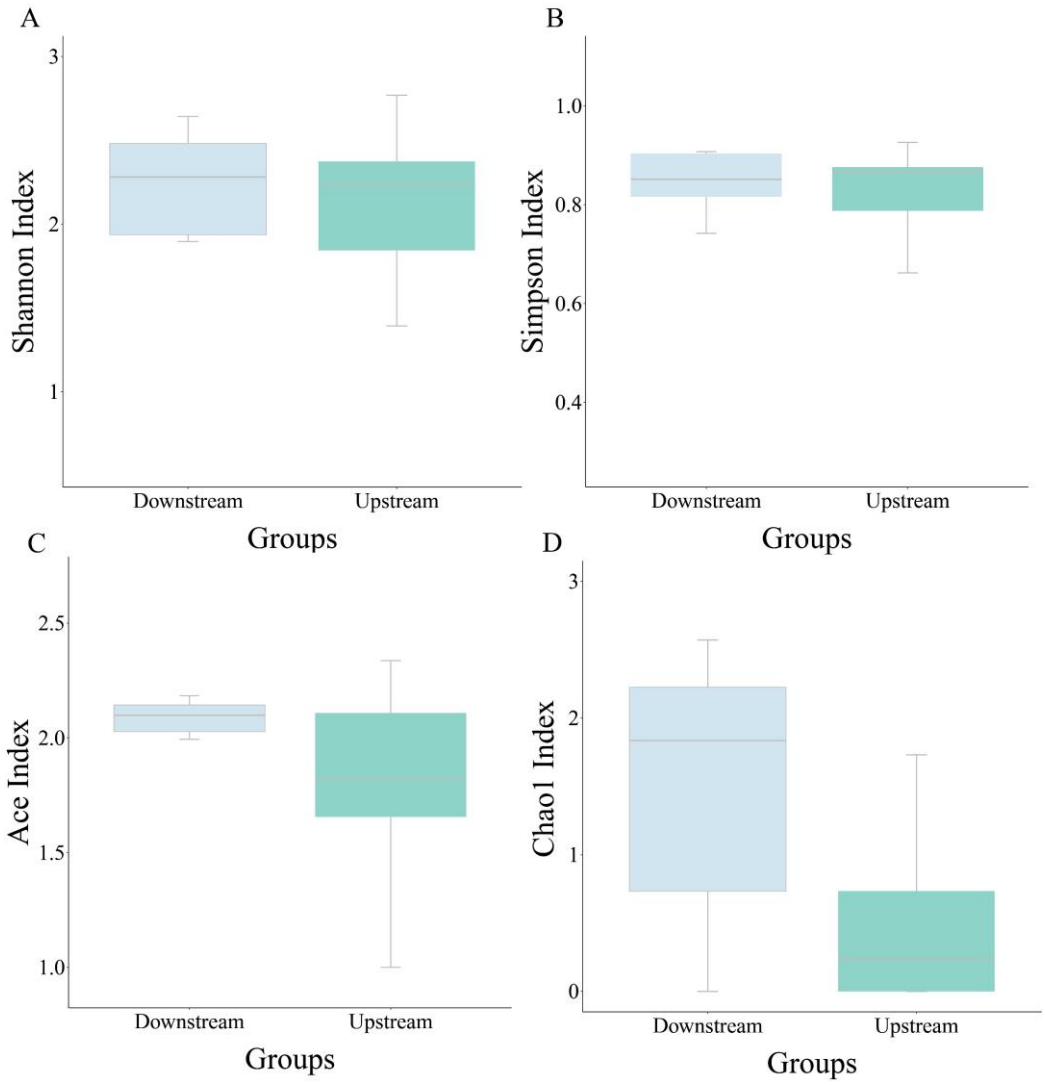

Fig. S1. Box diagram of α index distribution of upstream and downstream samples.