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Table S1 Chinese and standard species used for the ecotoxicity data

Species scientific name	Species group	Species scientific name	Species group	Species scientific name	Species group	Species scientific name	Species group
Acipenser baerii	Fish	*Alburnus alburnus*	Fish	*Amoeba proteus*	Invertebrates	*Amoeba sp.*	Invertebrates
Algae	Algae	*Anabaena sp.*	Algae	*Animalia*	Miscellaneous	*Anabaena torulosa*	Algae
Anabaena cylindrica	Algae	*Anabaena flosaquae*	Algae	*Anabaena oryzae*	Algae	*Asellus communis*	Crustaceans
Anabaena variabilis	Algae	*Anacystis nidulans*	Algae	*Ankistrodesmus falcatus*	Algae	*Brachionus calyciflorus*	Invertebrates
Bacillariophyta	Algae	*Bacopa caroliniana*	Plants	*Ceratophyllum demersum*	Plants	*Canthocamptus sp.*	Crustaceans
Carassius auratus	Fish	*Carassius gibelio*	Fish	*Catostomus commersoni*	Fish	*Ceriodaphnia dubia*	Crustaceans
Channa punctata	Fish	*Chironomidae*	Insects	*Ceriodaphnia reticulata*	Crustaceans	*Chamaesiphon polymorphus*	Algae
Chironomus plumosus	Insects	*Chironomus riparius*	Insects	*Chironomus sp.*	Insects	*Chironomus tentans*	Insects
Chlamydomonas sp.	Algae	*Chlorella sp.*	Algae	*Chironomus yoshimatsui*	Insects	*Chlamydomonas acidophila*	Algae
Chlorella vulgaris	Algae	*Chlorella rubescens*	Algae	*Chlamydomonas globosa*	Algae	*Chlamydomonas reinhardtii*	Algae
Coleoptera	Insects	*Cyprinidae*	Fish	*Chlamydomonas variabilis*	Algae	*Chlorella pyrenoidosa*	Algae
Cyprinus carpio	Fish	*Cypris subglobosa*	Crustaceans	*Chlorella saccharophila*	Algae	*Ctenopharyngodon idella*	Fish
Cypris subglobosa	Crustaceans	*Danio rerio*	Fish	*Cyprinus carpio ssp. jian*	Fish	*Cyprinus carpio ssp. communis*	Fish
Daphnia magna	Crustaceans	*Daphnia pulex*	Crustaceans	*Daphnia sp.*	Crustaceans	*Duttaphrynus melanostictus*	Amphibians
Esox lucius	Fish	*Euplotes sp.*	Invertebrates	*Fontinalis antipyretica*	Algae	*Fragilaria capucina*	Algae
Gammarus fasciatus	Crustaceans	*Gammarus lacustris*	Crustaceans	*Gammarus pulex*	Crustaceans	*Gasterosteus aculeatus*	Fish
Girella punctata	Fish	*Hyalella azteca*	Crustaceans	*Hydropsyche sp.*	Insects	*Hygrophila polysperma*	Plants
Ictalurus punctatus	Fish	*Invertebrates*	Invertebrates	*Hygrohypnum ochraceum*	Algae	*Hypophthalmichthys molitrix*	Fish
Isochrysis galbana	Algae	*Lemna gibba*	Plants	*Ischnochiton hakodadensis*	Molluscs	*Lemna aequinoctialis*	Plants
Lemna minor	Plants	*Lemna trisulca*	Plants	*Lemnaceae*	Plants	*Lecane hamata*	Invertebrates
Lecane luna	Invertebrates	*Lepomis macrochirus*	Fish	*Limnophila sp.*	Worms	*Ludwigia palustris*	Plants
Ludwigia sp.	Plants	*Melosira granulata*	Algae	*Microcystis aeruginosa*	Algae	*Zygoptera*	Insects
Monopterus albus	Fish	*Myriophyllum sp.*	Plants	*Myriophyllum spicatum*	Plants	*Najas graminea*	Plants
Najas sp.	Plants	*Navicula seminulum*	Algae	*Nitzschia palea*	Algae	*Noemacheilus barbatulus*	Fish
Nostoc commune	Algae	*Nostoc muscorum*	Algae	*Nymphoides peltatum*	Plants	*Oligochaeta*	Worms
Oncorhynchus clarkii	Fish	*Oncorhynchus kisutch*	Fish	*Oncorhynchus masou*	Fish	*Oncorhynchus tshawytscha*	Fish
Oncorhynchus mykiss	Fish	*Orconectes sp.*	Crustaceans	*Oryzias latipes*	Fish	*Oryza sativa*	Plants
Oscillatoria sp.	Algae	*Osteichthyes*	Fish	*Ostreoida*	Molluscs	*Phormidium foveolarum*	Algae
Phormidium sp.	Algae	*Physella sp.*	Molluscs	*Pimephales promelas*	Fish	*Pistia stratiotes*	Plants

Plankton sp.	Miscellaneous	*Plantae*	Plants	*Planaria sp.*	Worms	*Platyhypnidium riparoides*	Algae
Poecilia reticulata	Fish	*Protozoa*	Invertebrates	*Rana catesbeiana*	Amphibians	*Pseudokirchneriella subcapitata*	Algae
Rotala sp.	Plants	*Salmo salar*	Fish	*Salmo trutta*	Fish	*Salvelinus fontinalis*	Fish
Salvelinus namaycush	Fish	*Scenedesmus acutus*	Algae	*Scenedesmus acuminatus*	Algae	*Scardinius erythrophthalmus*	Fish
Scenedesmus dimorphus	Algae	*Scenedesmus incrassatulus*	Algae	*Scenedesmus quadricauda*	Algae	*Scenedesmus acutus var. acutus*	Algae
Spirodela polyrhiza	Plants	*Spirulina platensis*	Algae	*Scenedesmus subspicatus*	Algae	*Synechococcus sp.*	Algae
Trichoptera	Insects	*Triturus cristatus*	Amphibians	*Tetrahymena pyriformis*	Invertebrates	*Tubifex tubifex*	Worms
Vallisneria americana	Plants	*Zizania sp.*	Plants				

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Table S2 Summary of information about ecotoxicity and environmental observed data of chemicals in the Bohai Region

Chemical	Information about ecotoxicity data				Information about environmental observed data				Risk ratio	Rank
	n	Min	Max	Median	n	Min	Max	Median		
Cu	71	0.15	8,000	130	838	0.0007	2,755	4.73	0.036	1
Fe	11	200	500,000	9,600	121	0.45	87,390	295.8	0.031	2
Zn	46	0.65	397,280	1,215	861	0.035	25,370	30	0.025	3
Mn	12	388	1,000,000	36,025	121	0.03	1,411	134.2	0.0037	4
Cr	29	24	700,000	2,900	118	0.66	6226	6	0.0021	5
Ni	18	36.58	850,000	4,540	118	0.8	571	9.28	0.0020	6
As	14	25	61,000	2,150	837	0.01	347.7	3.54	0.0016	7
Cd	42	0.15	100,000	85	882	0.0007	10.7	0.09	0.0011	8
Pb	18	1	363,000	1,430	879	0.0007	43.43	1.01	0.0007	9
Hg	27	2.1	20,000	240	842	3.53E-05	0.99	0.035	0.00015	10
norfloxacin	15	14	1,000,000	630	188	0.00025	4.46	0.05	0.00009	11
Gamma-HCH	78	1	70,000	110	64	1.37E-05	2.75	0.0089	0.00008	12

Table S3 The limit values of metals for each grade in basic surface water environmental quality standard item

Unit: μg/L

ID	Metals	Grade I	Grade II	Grade III*	Grade IV	Grade V
1	Cu (≤)	10	1000	1000	1000	1000
2	Zn (≤)	50	1000	1000	2000	2000
3	As (≤)	50	50	50	100	100
4	Hg (≤)	0.05	0.05	0.1	1	1
5	Cd (≤)	1	5	5	5	10
6	Cr (≤)	10	50	50	50	100
7	Pb (≤)	10	10	50	50	100

*Grade III applicable to secondary protection areas of central drinking water surface sources, overwintering grounds and migration routes of fish and shrimp, swimming area, and fishing waters like aquiculture areas