Supplemental Materials

Table S1. The reported screening and sorting methods of priority pollutants.

Country	Screening Purposes	Evaluation Indicators	Evaluation Methodology	References
United States	Screening of priority pollutants in water environment	Production，detection rate，acute toxicity，chronic toxicity，environmental and biological effects of toxicity	Expert assessment	US EPA,1986 [34]; SWANSON M B.,1997 [35]
	Comprehensive Environmental Response, Compensation and Liability Act，CERCLA	Occurrence frequency in national priority list, toxicity, potential exposure hazards	Hierarchical assignment, weighting and sum comprehensive calculation	
European Union	Combined monitoring-based and modeling-based priority setting scheme，COMMPS	Concentration, exposed quantity, effect evaluation.	COMMPS evaluation tool	Sousa, J.C., 2018 [36]; Shang bo Zhou, 2019 [19]
Canada	Screening of environmental pollutants	Pollutant emission characteristics, exposed quantity, effect evaluation, risk assessment	Expert assessment	Dunn A M.2009 [37]
Netherlands	Priority screening of organic pollutants	Pollutant emission, physicochemical property, bioaccumulation, Pollutant destination, toxicity	Uniform system for the evaluation of substances，USES 1.0	GUINEE J B, et al., 1996 [38]
Australia	National pollutant inventory，NPI	Human health, environmental effect, exposure quantity	Hierarchical assignment, weighting and sum comprehensive calculation	National Pollutant Inventory Review Report 2021 [39]
Japan	Environmental priority monitoring substances	Human health, exposed quantity in working place, exposed factors in working place, general population exposure factors.	Hases graphic method	Wang Y Z. 2018 [33]

Germany	Chemical priority pollutant	Exposed quantity, toxicity，ecotoxicity	Classification score	
England, UK	UK Chemicals Stakeholder Forum， UKCSF; Royal Commission on Environmental Pollution，RCEP	Persistence, bioenrichment, toxicity； List, sort, evaluate, act	The persistence, bioenrichment and toxicity (PBT)assessment; Expert assessment	David Spurgeon，2022 [40]
Norway	Environmental chemistry priority pollutant	Toxicity，bioenrichment	Refer to the European Union	Wang Y Z. 2018 [33]
Sweden	Environmental chemistry priority pollutant	Refer to the European Union		
South Korea	Priority substances list，PSL	Emission sources, the amount of emissions, transfer volume, chemical characteristics, discharge value		Naree Park, et al., 2018 [41]

Table S2. Tested category.

Category	Number of Tests	Tests (Index)
In situ indicators	8	Temp, pH, ORP, Spcond, Salinity, Turb, DO, TDS
Regular test	46	Na^+, K^+, Ca^{2+}, Mg^{2+}, Al^{3+}, Fe，HCO_3^-, CO_3^{2-}, Cl-, SO_4^{2-}, F^-, NO_3^-, TDS, Mo, Be, Zn, Se, Cu, As, Hg, Cd, Ba, Cr, Pb, Mn, Ni, Co, I^-, Ag^+, TI, Sb, S^{2-}, Volatile phenols, Cyanide, NH_4^+, NO_2^-, COD_{Mn}, free carbon dioxide, Chroma, Turbidity, pH, Total hardness, Total alkalinity, Total acidity, Smell and taste
Perfluorochemical	15	PFBA, PFPA, PFBuS, PFHxA, PFHpA, PFHxS, PFOA, PFNA, PFOS, PFDA, PFUnA, PFDS, PFDoDA, PFTrA, PFTeA
Pesticide	12	Trichlorophenol, 2,4-Dichlorophenoxyacetic acid, PCP, Parathion, atrazine, Carbaryl, DDVP, Dimethoate, Systox, Darathion-methyl, Malathion, Dursban
Polycyclic aromatic hydrocarbon(PAHs)	16	Naphthalene, acenaphthylene, Acenaphthene, fluorine, phenanthrene, anthracene, Fluoranthene， Pyrene，Benzo[a]anthracene，Chrysene，Benzo[b]fluoranthene，Benzo[k]fluoranthene, Benzo[a]pyrene, Indeno(1,2,3-cd)pyrene, Dibenzo[a,h]anthracene, Benzo[g,h,i]perylene
Organo-chlorine pesticide (OCPs)	15	P,P'-DDD, P,P'-DDE, O,P'-DDT, P,P'-DDT, Dieidrin, Endosulfan Ⅰ, Alpha-endosulfan, Endosulfan Ⅱ, Endrin, Heptachlor, Heptachlor epoxide, Hexachlorobenzene, α-BHC, β_BHC, δ_BHC, Methoxychlor

Volatile organic chemicals (VOCs)	44	1, 1-dichloroethane, Bromochloromethane, 1,1, 1-trichloroethane, 1, 2-dichloropropane, Dibromomethane, Bromodichloromethane, Cis-1, 3-dichloropropene, Trans -1, 3-dichloropropene, 1,1, 2-trichloroethane, 1, 3-dichloropropane, Chlorodibromomethane, 1, 2-dibromoethane, 1,1,1, 2-tetrachloroethane, Bromobenzene, 1,2, 3-trichloropropane, Propylbenzene, bromobenzene，2 - chloro toluene， 4-chlorine toluene， 1,3, 5-trimethylbenzene， 1,2, 4-trimethylbenzene， Sec-butyl benzene， 1,3-dichlorobenzene，N-butylbenzene，1, 2-dibromo-3-chloropropane, 1,2,4-trichlorobenzene, 1, 1-dichloroethylene, Dichloromethane, Tra-1, 2-dichloroethylene, Cis-1, 2-dichloroethylene, Chloroform, Carbon tetrachloride, Benzene, 1, 2-dichloroethane, Trichloro ethylene, Methylbenzene, Tetrachloroethylene, Chlorobenzol, Ethylbenzene, Styrene, 1, 4-dichlorobenzene, 1, 2-dichlorobenzene

Table S3. Classification of pollutants used for evaluation.

Type	Pollutants	Number
Natural	Na^+, Al, Fe, Cl^-, SO_4^{2-}, F^-, NO_3^-, TDS, Mo, Be, Zn, Se, Cu, As, Cd, Ba, Cr, Pb, Mn, Ni, Co, I-, Ag+, TI, Sb, Volatile Phenols, NO_2^-, COD_{Mn}, Total hardness, Anthracene, Naphthalene, Fluoranthene	32
Unnatural	Trichlorophenol，2,4-Dichlorophenoxyacetic acid, Pentachlorophenol，atrazine，Parathion-methyl ， Hexachlorobenzene, 1,1,1-Trichloroethane, 1,2,4-Trichlorobenzene,1,1-Dichloroethylene ， 1, 2-Dichloroethylene ， Carbon tetrachloride，Methylbenzene， Tetrachloroethylene，Ethylbenzene， 1, 4 – Dichlorobenzene, 1, 2 – Dichlorobenzene， Benzo[a]pyrene，Benzo[b]fluoranthene	18

Table S4. The detection limits of unnatural components.

Component	Detection Limit （μg/L）	Component	Detection Limit （μg/L）
Trichlorophenol	0.03	1,2-Dichloroethylene	0.03
2,4-Dichlorophenoxyacetic acid	0.03	Carbon tetrachloride	0.3
Pentachlorophenol	0.03	Methylbenzene	0.3
Atrazine	0.0015	Tetrachloroethylene	0.001
parathion-methyl	0.06	Ethylbenzene	0.3
Hexachlorobenzene	0.5	1,4-Dichlorobenzene	0.003
1,1,1-Trichloroethane	0.004	1,2-Dichlorobenzene	0.011
1,2,4-Trichlorobenzene	0.002	Benzo (a) pyrene	0.002
1,1-Dichloroethylene	0.02	Benzo[b]fluoranthene	0.002

Table S5. Weight assignment scheme.

Assignment Scheme	W_Q	W_M	W_C
a	0.33	0.33	0.33
b	0.25	0.25	0.5
c	0.2	0.2	0.6
d	0.25	0.5	0.25
e	0.5	0.25	0.25

W_Q represent the weight of total pollution degree Q, W_M represent the weight of median pollution degree M, and W_C represent the weight of toxicity C.

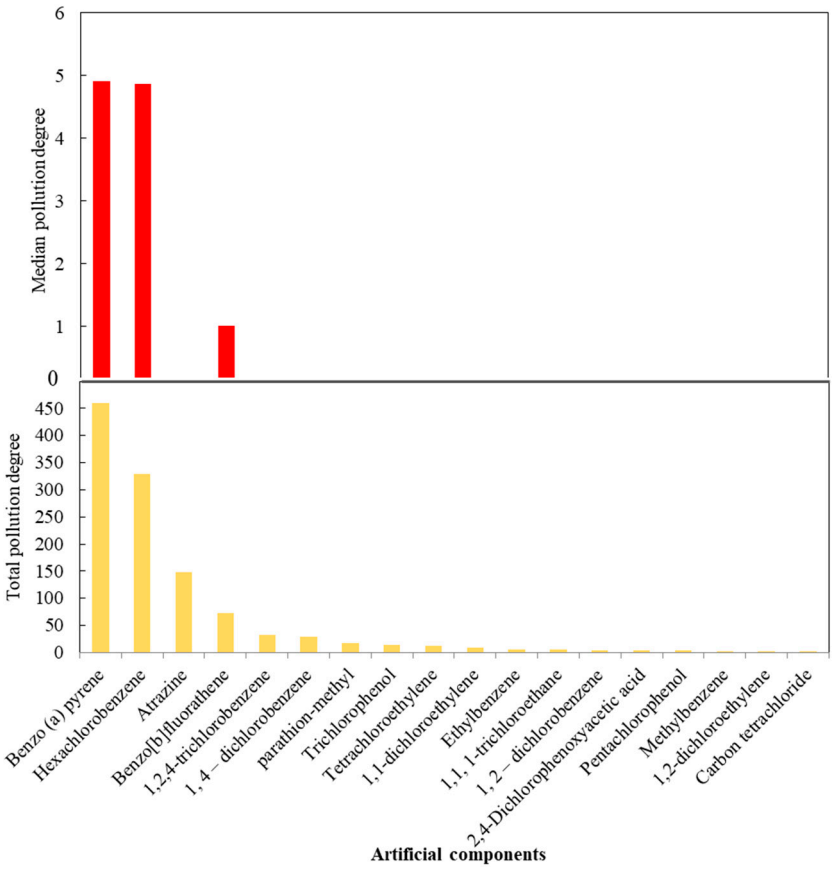

Figure S1. The pollution degree of unnatural components.

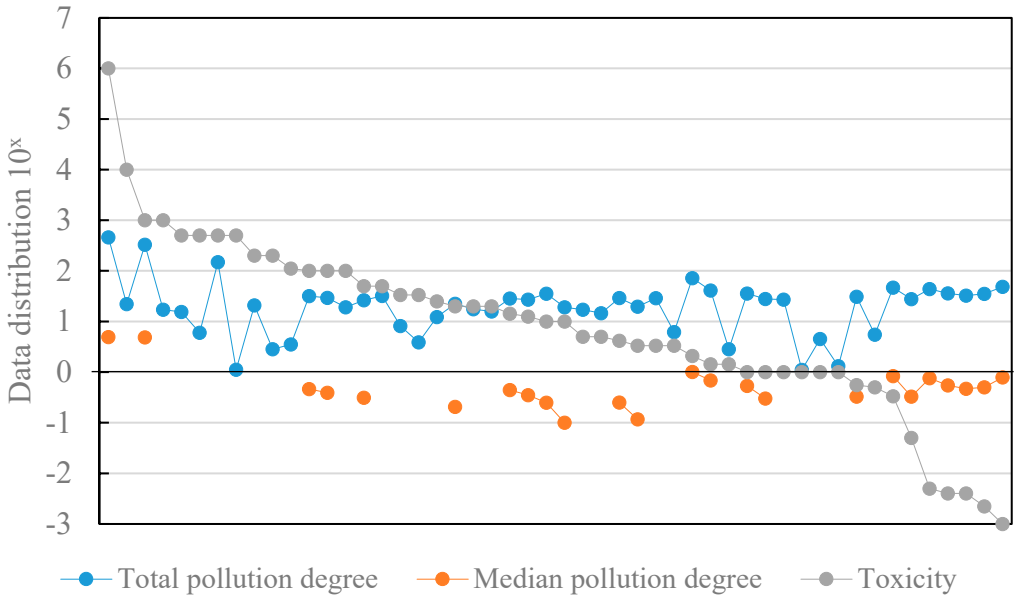

Figure S2. The data distribution in the study.