

Table S1. Factories around Xinghua Bay

ID	Longitude	Latitude	Factory name	Business Scope
1	119.449	25.445	Guorong Concrete Co., Ltd	Commercial concrete production
2	119.455	25.454	Sanjian Construction Engineering Co., Ltd	Construction, decoration, landscaping, urban and road lighting engineering
3	119.452	25.457	Fuqing Nuclear Power Co., Ltd	Power generation, transmission, power supply business and various engineering construction
4	119.472	25.512	Guangyuanda Aquaculture Farm	Aquaculture
5	119.441	25.514	Lanyuan Environmental Protection Co., Ltd	Sewage treatment
6	119.438	25.525	Hongsheng Environmental Protection Technology Co., Ltd	Production of commercial concrete, slag powder, fly ash, metal structural components, etc.
7	119.414	25.506	Huaxing Shrimp Farm	Aquaculture
8	119.420	25.528	Aluminum Corporation of China Limited (CHALCO) Ruimin Co., Ltd. Fuqing Branch	Production and processing of metal materials
9	119.399	25.533	Shangmingde New Energy Co., Ltd	Production of solar power generation systems and accessories, metal products
10	119.400	25.535	Zhongke Electromechanical Chip Co., Ltd	Production of batteries, lighting fixtures, mechanical and electrical equipment, hardware products, etc.
11	119.400	25.534	Difeng Company	Production of sanitary products for bacteriostatic preparations
12	119.399	25.535	Qingmai Shoes Co., Ltd	Production of textiles, plastic products, synthetic materials, dyes, paper products, leather products, rubber products
13	119.399	25.536	Zhengshi Company	Production of plastic products, metal processing machinery, powder metallurgy products, etc.
14	119.397	25.533	Shenggao Machinery Co., Ltd	Production of mechanical and electrical equipment, synthetic materials, metal tools, etc.

15	119.394	25.539	Hemincai Aquaculture Farm	Aquaculture
16	119.378	25.531	Zhenguo Clam Farm	Aquaculture
17	119.372	25.536	Liyong Clam Farm	Aquaculture
18	119.355	25.542	Jinbali Aquaculture Co., Ltd	Nereis, fish, and shrimp farming
19	119.356	25.545	Chaosu Pipe Factory	Wire and cable production
20	119.340	25.518	Runfeng Cement Company	Commercial concrete production
21	119.327	25.487	Red Lion Cement Company	Commercial concrete production
22	119.326	25.479	Qingbo Poultry Farm	Poultry farming and sales
23	119.329	25.442	Hangjiaweilian Building Energy Saving Materials Co., Ltd	Building materials, specialized machinery and mold production
24	119.335	25.440	Guodian Power Generation Co., Ltd	Thermal production and supply, coal and product sales, specialized chemical product manufacturing, etc.
25	119.324	25.427	Jinfeng Technology Co., Ltd	Wind turbine production and power plant construction
26	119.325	25.429	Dongfang Wind Power Co., Ltd	Wind turbine production and power plant construction
27	119.324	25.428	Jiangsu Crrcorporation-limited Electric Machinery Co., Ltd. Fuqing Branch	Production of wind turbines, electric vehicle drive systems, storage and transformation electric power systems, industrial motors and transformers
28	119.321	25.420	Elm Wind Energy Blade Products Co., Ltd	Production of wind power generation equipment
29	119.315	25.423	Rongmei Warehousing Co., Ltd	Production, processing, and sales of agricultural products
30	119.275	25.440	Zhongjiang Chemical Terminal Co., Ltd	Liquid storage construction
31	119.280	25.444	Huanyang Materials Co., Ltd	Production of chemical products, synthetic and metal materials
32	119.281	25.447	Fushi Materials Co., Ltd	Titanium oxychloride materials production and processing
33	119.278	25.449	Wanhua Chemical Co., Ltd	Production of chemical raw materials and finished products
34	119.286	25.453	Zhengtai Materials Technology Co., Ltd	Titanium dioxide and iron oxide materials production and processing
35	119.290	25.463	Lida Technology Co., Ltd	Production of synthetic materials and specialized chemical products

36	119.286	25.468	Yaoda Fertilizer Technology Co., Ltd	Compound fertilizer production and sales
37	119.281	25.467	Fuhua Environmental Protection Technology Co., Ltd	Hazardous waste and sewage treatment
38	119.279	25.471	Kaleli Building Materials Co., Ltd	Production of building materials such as water-based coatings and synthetic materials
39	119.291	25.474	Tianchen Gas Co., Ltd	Non-hazardous gas production
40	119.291	25.476	Yaolong Chemical Co., Ltd	Production of fertilizers, synthetic detergents, industrial ammonia, etc.
41	119.294	25.481	Tianchen Materials Co., Ltd	Production of hazardous chemicals
42	119.291	25.489	Lvjian Paper Co., Ltd	Paper product production
43	119.277	25.498	Xingao Daily Necessities Co., Ltd	Production of daily necessities such as cleaning agents, alcohol disinfectants, and composite mineral oils
44	119.282	25.504	Zhihu Industrial Co., Ltd	Paper product production
45	119.279	25.508	Siwei Material Co., Ltd	Production of plastics, rubber products, and synthetic materials
46	119.287	25.514	Intermediate electromechanical equipment Co., Ltd	Metal equipment production
47	119.281	25.520	Hongsheng Building Materials Co., Ltd	Production and sales of building materials
48	119.249	25.501	Caotangshan Biotechnology Co., Ltd	Peptone series product production
49	119.191	25.467	Juneng Electric Power Co., Ltd	Product development, equipment production, and construction of solar cells and other products
50	119.148	25.443	China Oil and Foodstuffs Corporation (COFCO) manufacturing tanks Co., Ltd	Beverage can production, metal coating, and packaging
51	119.132	25.429	Yangfeng Compound Fertilizer	Compound fertilizer production and sales
52	119.131	25.427	Ganghui Commercial Concrete	Commercial concrete production
53	119.135	25.421	Huaxing Glass Co., Ltd	Glass and plastic products production

Table S2. Locations and types of sampling sites

Sample site type	Sample site	Latitude	Longitude	Site type
Sewage outlet	A	25.508	119.435	Enterprise centralized sewage outlet
	B	25.513	119.410	Enterprise centralized sewage outlet
Spoonbill habitat	a	25.490	119.462	Reservoir
	b	25.507	119.457	Aquaculture pond
	c	25.505	119.449	Reservoir
	d	25.527	119.428	Aquaculture pond
	e	25.532	119.403	Aquaculture pond
	f	25.524	119.389	Pond
	g	25.523	119.388	Pond
	h	25.446	119.223	Sea reclamation
	i	25.449	119.157	Aquaculture pond
	j	25.448	119.157	Aquaculture pond
	k	25.410	119.123	Mulan river estuary
Xinghua Bay coast	1	25.459	119.464	Xinghua Bay at low tide period
	2	25.452	119.444	
	3	25.472	119.443	
	4	25.493	119.456	
	5	25.507	119.454	
	6	25.503	119.447	
	7	25.517	119.390	
	8	25.525	119.373	
	9	25.538	119.355	
	10	25.537	119.345	
	11	25.517	119.343	
	12	25.500	119.333	
	13	25.482	119.327	
	14	25.469	119.332	
	15	25.458	119.330	
	16	25.446	119.337	
	17	25.423	119.347	
	18	25.416	119.314	
	19	25.416	119.295	
	20	25.442	119.261	
	21	25.452	119.262	
	22	25.461	119.262	
	23	25.469	119.265	
	24	25.476	119.270	
	25	25.482	119.276	

26	25.485	119.264
27	25.493	119.256
28	25.485	119.233
29	25.475	119.224
30	25.444	119.176
31	25.442	119.152
32	25.427	119.144

Table S3. Detection method based on “The specification for marine monitoring—Part 4: Seawater analysis (GB 17378.4-2007)” of China (AQSIG & SAC 2007); standard values of class I level based on “Sea water quality standard of China (GB 3097-1997)” (MEE 1998).

	Detection method	Standard value of class I level
Cu	Flameless Atomic Absorption Spectrometry	≤ 5 µg/L
Zn	Flame Atomic Absorption Spectrometry	≤ 20 µg/L
Cr	Flameless Atomic Absorption Spectrometry	≤ 50 µg/L
Cd	Flameless Atomic Absorption Spectrometry	≤ 1µg/L
Pb	Flameless Atomic Absorption Spectrometry	≤ 1µg/L
Hg	Cold Vapour Atomic Absorption Spectrometry	≤ 0.05µg/L
As	Hydride Generation Atomic Absorption Spectrometry	≤ 20 µg/L
DO	Iodimetry	> 6 mg/L
COD	Alkalescent Permanganate Titration	≤ 2 mg/L
BOD	Five-days Biochemistry Culture Method	≤ 1 mg/L
DIN	Naphthalene Ethylenediamine Spectrophotometry and Indophenol-Blue Spectrophotometer Method	≤ 0.2 mg/L
PO ₄ ³⁻ -P	P-Mo Blue Photometric Method	≤ 0.015 mg/L
TN	Potassium Persulfate Oxidation Method	-
TP	Potassium Persulfate Oxidation Method	-

Detection method based on “The specification for marine monitoring—Part 4: Seawater analysis (GB 17378.4-2007)” of China (AQSIG & SAC 2007); standard values of class I level based on “Sea water quality standard of China (GB 3097-1997)” (MEE 1998).

Table S4. Artificial sources of target heavy metals (Agarwal, 2009) based on the factories around Xinghua Bay

	Cu	Zn	Cr	Cd	Pb	Hg	As
Chemical industry	G	G	G	G	G	G	G
Alloy	NG	NG	NG	NG	G	NG	NG
Paint and coating industry	NG	G	G	G	G	NG	NG
Glass industry	NG	NG	NG	NG	G	G	G
Paper industry	G	NG	G	NG	G	G	NG
Leather processing	NG	G	G	NG	NG	G	G
Textile printing and dyeing industry	G	G	NG	G	G	G	G
Fertilizer industry	G	G	G	G	G	G	G
Chlor-alkali industry	NG	G	G	G	G	G	G
Fuel combustion	G	NG	G	G	G	G	G

G and NG represent the heavy metal that will or not be generated during the production process, respectively.

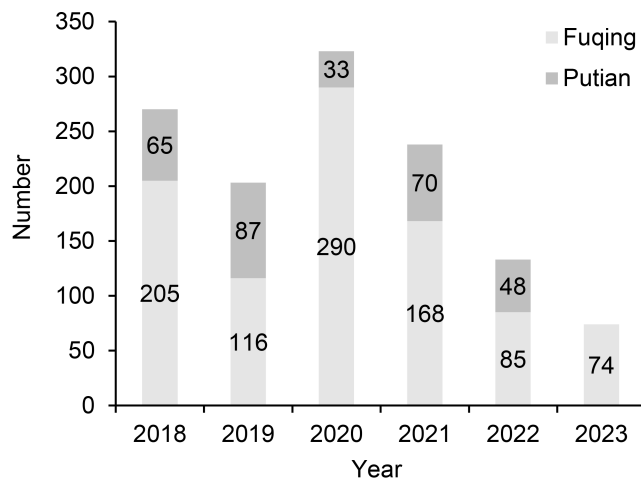


Fig. S1. Number of the wintering spoonbills in Xinghua Bay

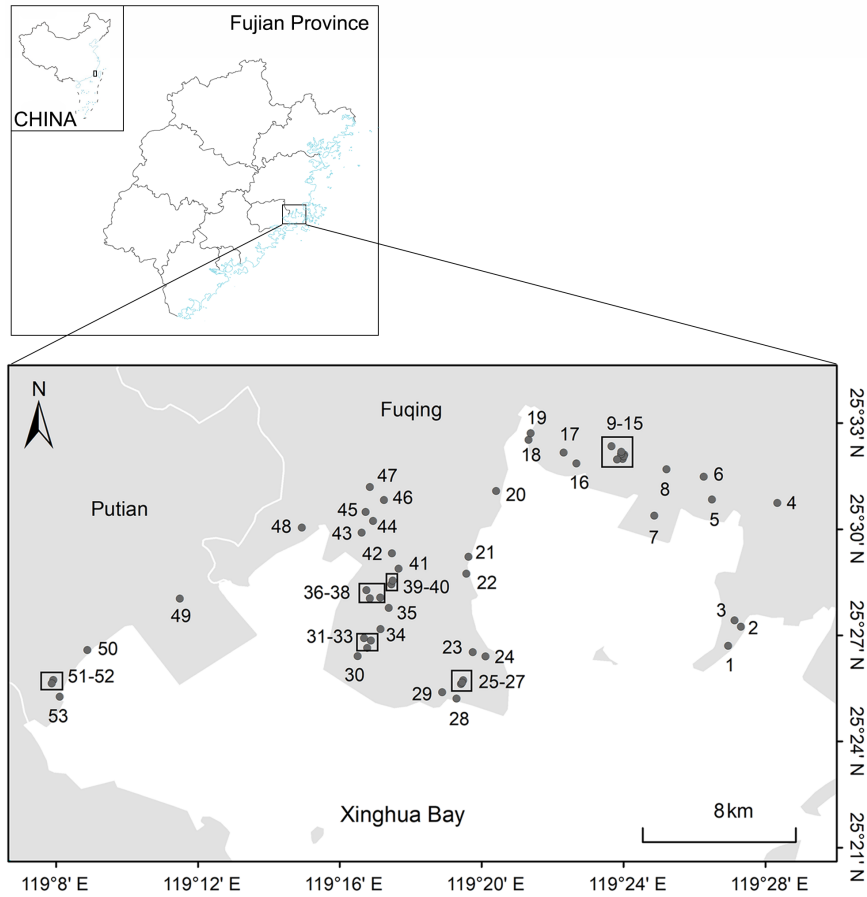
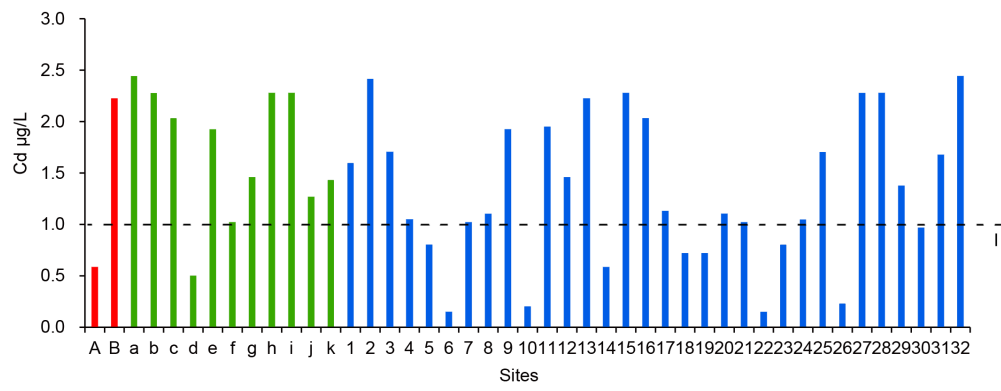
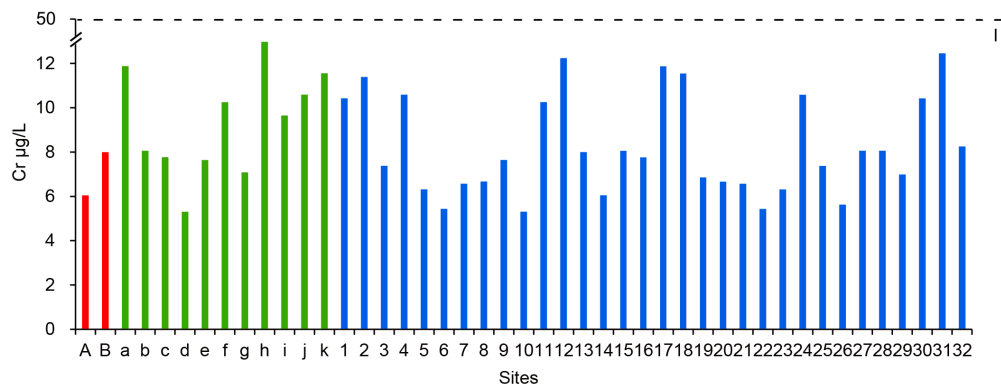
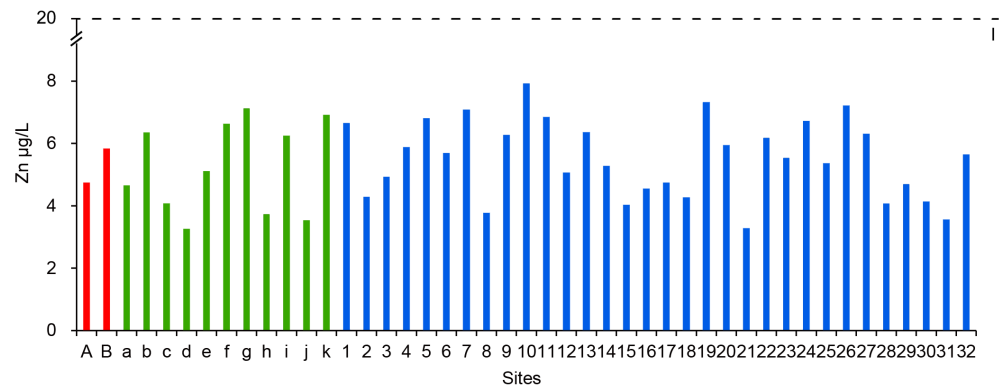
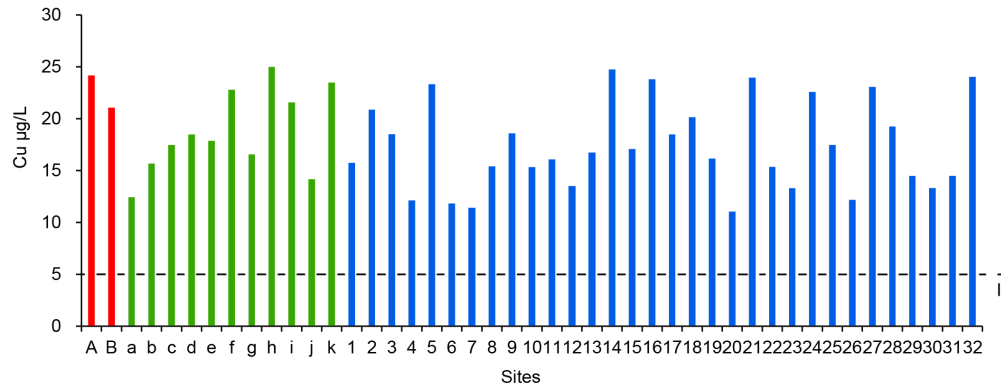
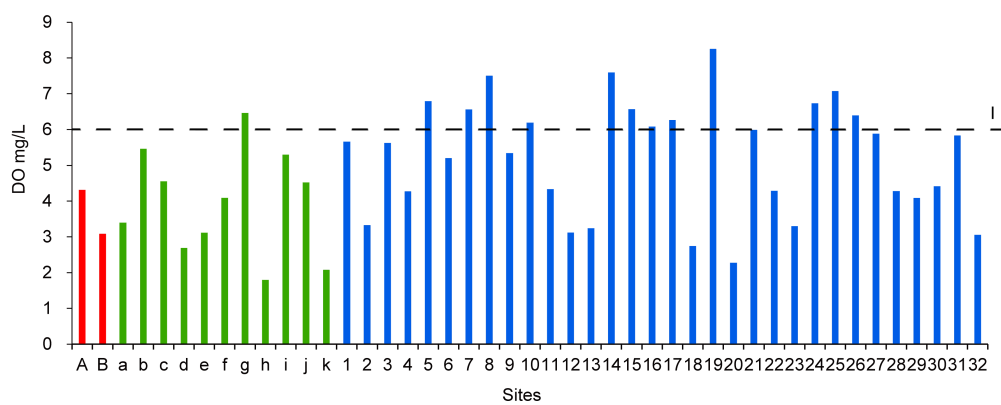
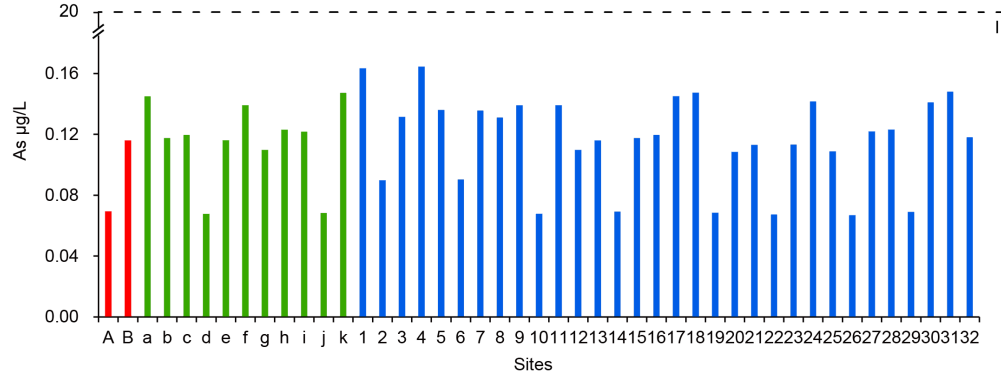
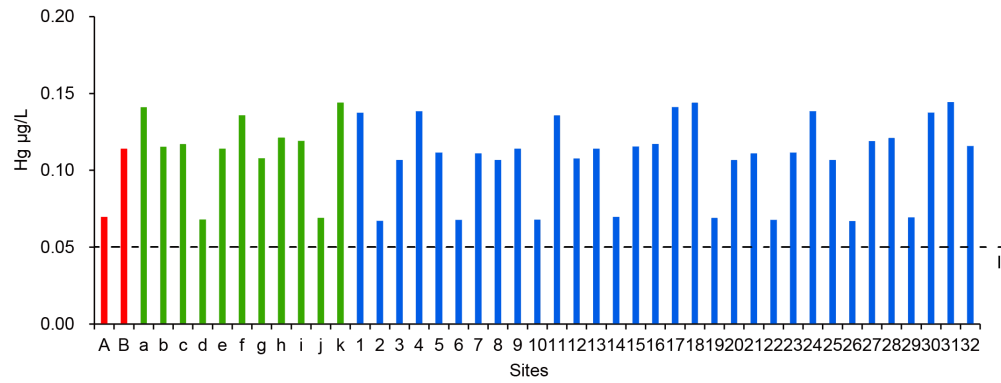
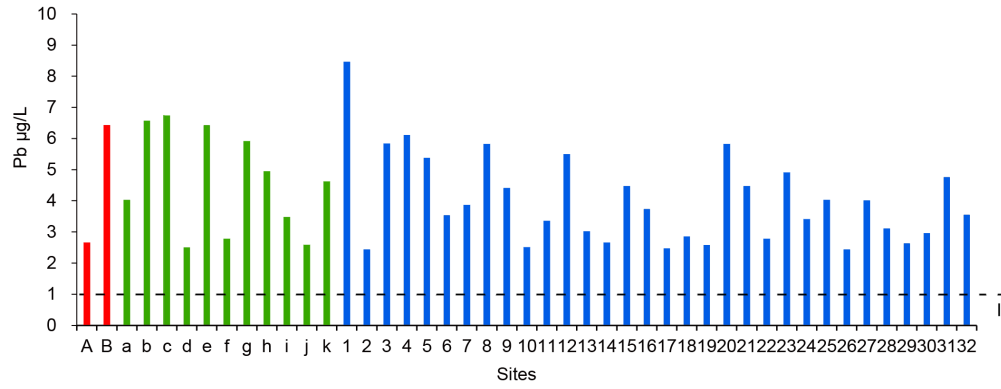
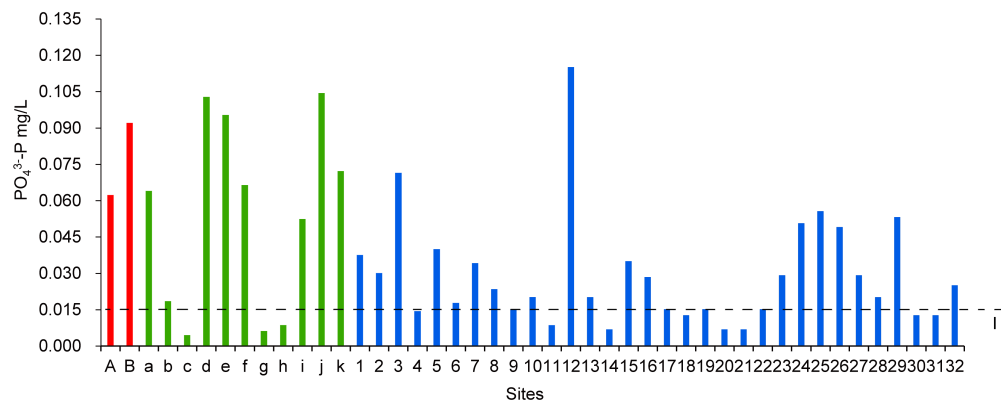
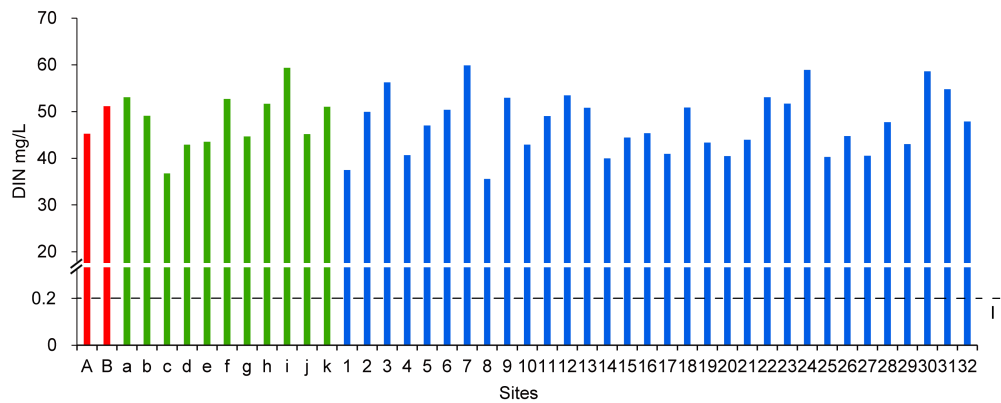
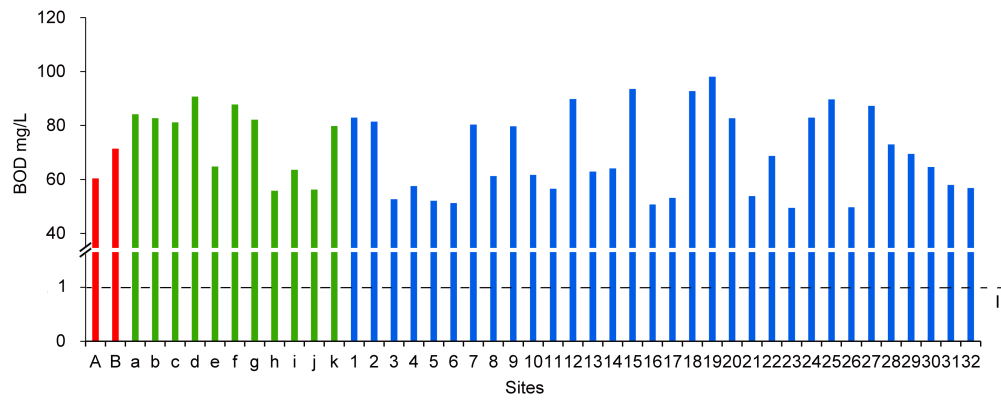
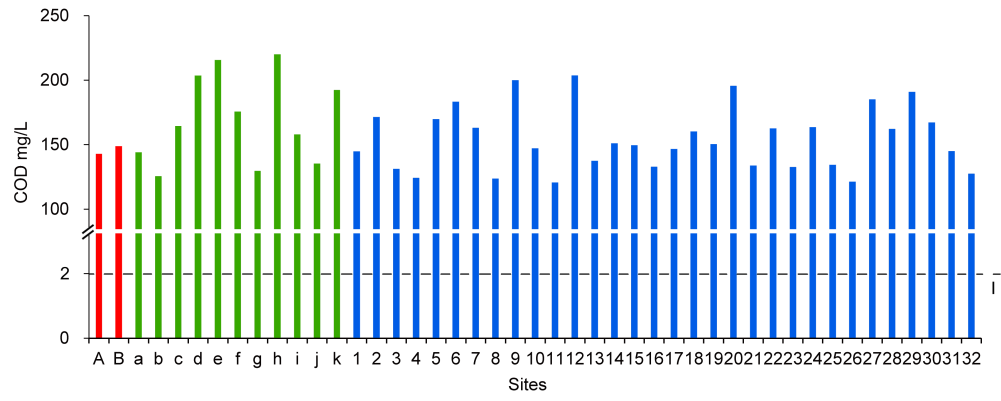


Fig. S2. Distribution map of factories around Xinghua Bay (See Table S1 for the factory represented by the numbers.)







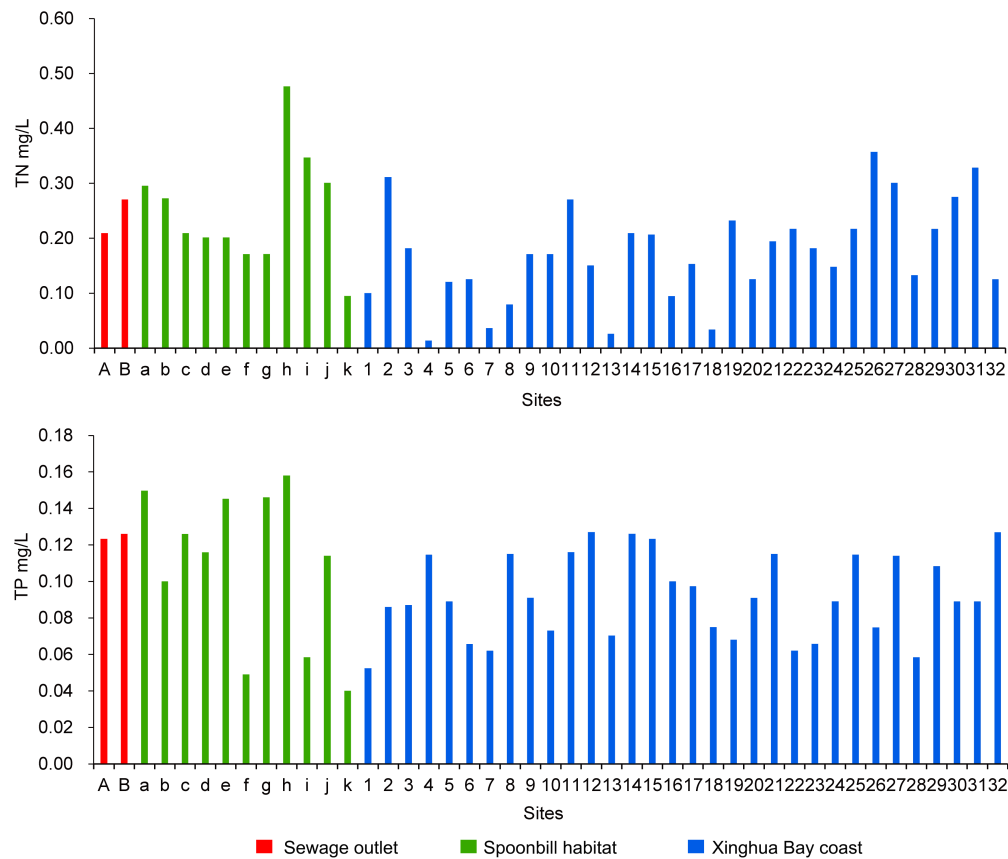


Fig. S3. Concentration of target heavy metals and water quality parameters in samples. (Dotted line represent class I level of “Sea water quality standard of China (GB 3097-P997)” of target heavy metal and water quality parameters (MEE 1998); TN and TP do not provide the standard values in normative document.)

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