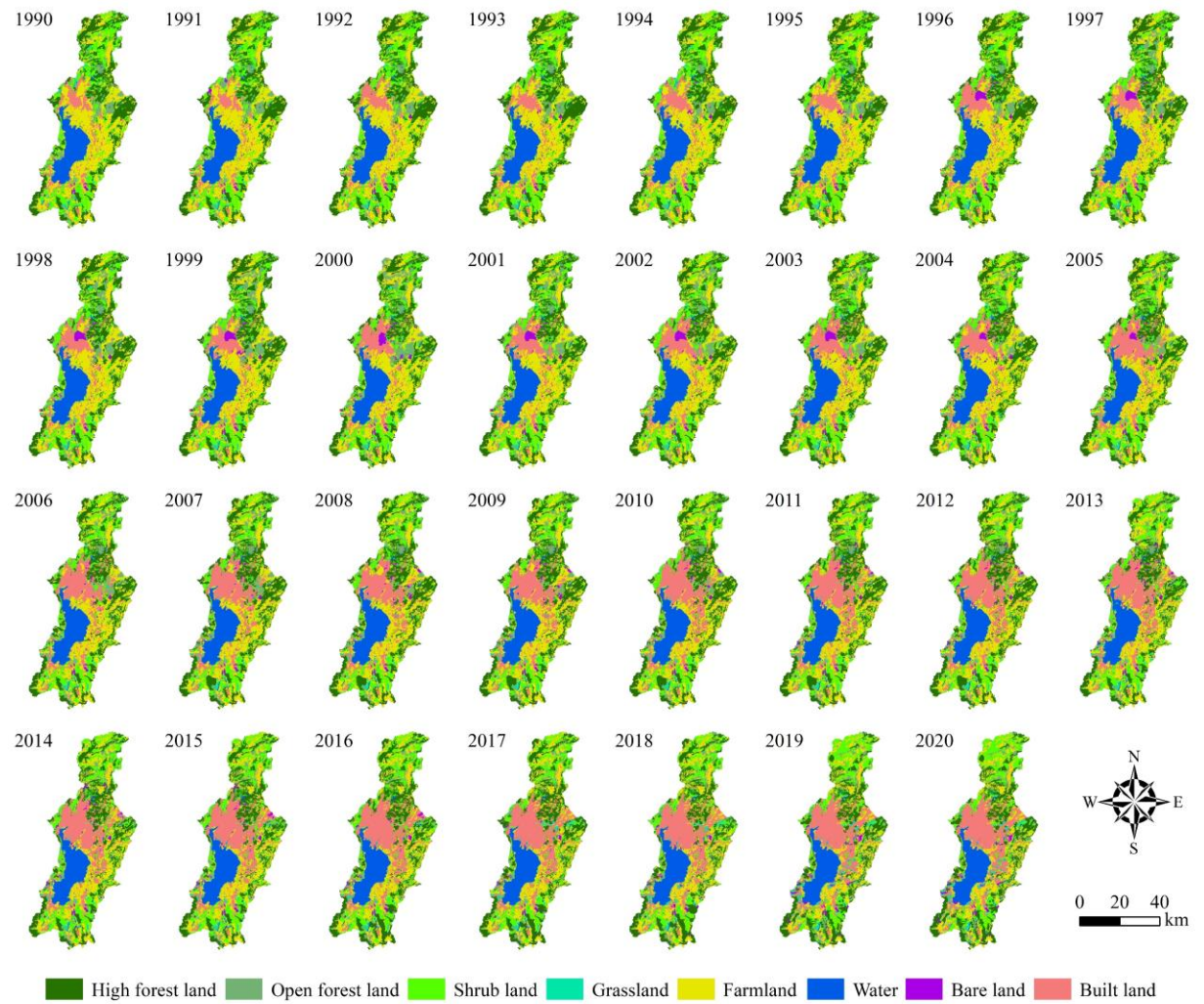


**Supporting data for “Impact of land-use/land-cover and landscape pattern on water quality in Dianchi Lake Basin, Southwest of China”, Zhang et al**



**Figure S1. Land use change pattern in Dianchi Lake Basin from 1990 to 2020**

**Table S1. Water quality data of Waihai Lake from 1990 to 2020**

Note: The average values of the 8 sampling points in Waihai Lake were used to characterize interannual variation in pollutants.

PH(unitless),TP(mg/L),TN(mg/L),COD(mg/L),DO(mg/L),CODMn(mg/L),BOD<sub>5</sub>(mg/L),NH<sub>3</sub>-N(

Year	PH	TP	TN	COD	DO	COD <sub>Mn</sub>	BOD <sub>5</sub>	NH <sub>3</sub> -N	Turbidity	Chla
1990	8.356	0.105	1.322	58.708	8.128	7.817	3.870	0.096	0.581	0.068
1991	8.560	0.124	1.536	58.708	7.814	8.114	3.786	0.197	0.583	0.068
1992	8.764	0.142	1.749	58.708	7.500	8.412	3.702	0.297	0.586	0.068
1993	8.598	0.143	1.442	64.500	7.738	9.305	3.707	0.256	0.502	0.068
1994	8.895	0.211	2.537	68.344	7.624	10.564	4.648	0.353	0.379	0.068
1995	8.620	0.186	1.530	57.394	7.466	5.229	3.176	0.114	0.452	0.068
1996	9.103	0.185	1.754	58.875	7.464	6.700	3.581	0.168	0.498	0.068
1997	9.131	0.204	1.724	54.403	7.950	5.911	4.594	0.359	0.495	0.068
1998	9.061	0.284	1.783	56.611	8.098	5.964	5.669	0.343	0.472	0.068
1999	8.914	0.331	2.130	75.789	7.785	6.751	6.084	0.198	0.422	0.098
2000	8.418	0.273	1.956	55.667	8.965	6.664	5.408	0.232	0.490	0.085
2001	8.257	0.211	2.205	60.471	7.356	7.568	5.723	0.167	0.484	0.068
2002	8.596	0.131	1.877	65.517	8.626	5.480	4.538	0.363	0.731	0.062
2003	9.171	0.154	2.050	66.614	7.698	5.348	4.616	0.314	0.603	0.067
2004	8.908	0.155	1.976	67.058	7.959	5.718	3.696	0.293	0.531	0.072
2005	8.751	0.187	1.818	60.865	7.899	6.248	3.065	0.259	0.534	0.043
2006	8.808	0.176	2.179	70.458	7.999	7.049	3.465	0.327	0.462	0.072
2007	8.329	0.135	3.013	67.375	7.086	10.856	3.004	0.272	0.418	0.060
2008	8.988	0.126	2.443	57.146	6.865	9.893	3.533	0.303	0.416	0.063
2009	9.080	0.136	2.288	54.617	6.928	10.731	3.559	0.304	0.417	0.067
2010	9.165	0.200	2.624	64.708	6.971	10.026	3.828	0.260	0.344	0.091
2011	8.972	0.159	2.804	73.083	6.857	10.997	3.631	0.252	0.478	0.071
2012	8.906	0.175	1.957	79.156	6.970	11.326	3.591	0.300	0.407	0.088
2013	8.878	0.153	2.160	77.844	7.108	11.402	4.186	0.378	0.429	0.072
2014	8.748	0.136	1.732	69.479	7.274	9.705	3.299	0.265	0.491	0.058
2015	8.669	0.106	1.606	48.094	7.321	7.859	3.532	0.203	0.466	0.050
2016	8.722	0.091	1.582	37.135	7.840	5.236	3.959	0.305	0.399	0.064
2017	8.447	0.134	1.956	41.802	8.627	6.767	3.878	0.292	0.386	0.085
2018	8.890	0.067	1.177	29.385	8.423	4.793	2.113	0.211	0.467	0.045
2019	9.023	0.069	0.944	32.052	7.605	5.886	1.891	0.128	0.440	0.071
2020	8.813	0.061	1.591	29.384	7.906	5.516	2.109	0.504	0.493	0.045

mg/L),Turbidity(m),Chla(μg/L).

**Table S2. Water quality data of Caohai Lake from 1990 to 2020**

Year	PH	TP	TN	COD	DO	CODMn	BOD5	NH3-N	Turbidity	Chla
1990	7.900	0.503	4.588	55.530	5.817	18.233	20.300	0.628	0.408	0.110
1991	8.350	0.737	4.508	55.530	8.417	16.583	12.650	0.717	0.500	0.110
1992	8.333	0.993	7.251	55.530	5.292	15.467	10.258	3.435	0.373	0.110
1993	7.808	1.168	8.988	88.333	3.851	15.120	13.117	5.438	0.247	0.110
1994	8.067	0.921	6.768	75.917	6.110	14.067	12.925	3.277	0.379	0.110
1995	7.800	0.801	7.863	69.500	4.517	9.925	11.217	3.213	0.342	0.110
1996	8.127	0.966	8.048	76.545	5.564	8.564	16.100	3.691	0.403	0.110
1997	8.010	1.066	8.926	82.450	3.985	9.930	18.610	4.500	0.355	0.110
1998	8.138	0.571	8.216	69.667	5.213	7.196	12.930	4.411	0.548	0.110
1999	7.946	0.611	8.201	74.154	5.367	7.021	9.138	4.219	0.624	0.163
2000	7.796	1.063	11.893	145.875	6.108	12.513	15.388	6.206	0.425	0.135
2001	7.725	1.237	13.509	61.813	4.292	12.463	13.171	8.003	0.590	0.126
2002	7.904	1.066	11.483	79.625	5.054	8.146	10.871	7.288	0.588	0.191
2003	8.438	1.146	12.338	63.727	4.758	6.963	10.633	6.873	0.636	0.104
2004	8.117	1.295	13.115	65.958	4.504	7.650	11.692	8.623	0.552	0.182
2005	7.792	1.074	13.063	60.333	4.196	6.996	9.654	9.537	0.640	0.097
2006	7.758	1.434	14.310	61.333	3.800	7.071	9.750	11.209	0.608	0.089
2007	8.033	1.394	14.509	53.250	5.004	10.742	7.579	11.573	0.584	0.113
2008	8.025	1.243	15.339	44.292	6.104	9.958	10.417	11.689	0.570	0.064
2009	8.179	1.456	16.790	41.208	5.371	12.596	12.754	13.018	0.517	0.140
2010	7.754	0.605	11.138	34.250	5.017	8.492	10.942	6.339	0.942	0.071
2011	7.850	0.240	6.110	38.292	6.729	8.854	8.750	1.585	0.809	0.105
2012	8.004	0.195	6.292	34.458	5.421	8.404	10.279	1.853	0.679	0.115
2013	8.350	0.271	4.441	41.417	6.663	8.867	12.792	1.458	0.657	0.083
2014	8.175	0.213	4.800	57.875	7.446	9.825	10.375	1.781	0.457	0.129
2015	8.154	0.181	5.091	42.083	7.554	7.096	6.708	1.192	0.493	0.118
2016	8.638	0.139	3.466	22.042	7.708	4.621	6.500	0.313	0.576	0.085
2017	8.400	0.151	3.595	23.000	8.708	5.429	6.654	0.328	0.759	0.108
2018	8.469	0.118	3.000	20.806	8.451	4.694	4.940	0.263	0.732	0.081
2019	8.475	0.081	2.531	13.125	7.892	3.708	2.346	0.190	0.632	0.050
2020	8.750	0.053	2.650	13.500	8.350	3.000	2.875	0.213	0.663	0.074

Note: The average values of the 2 sampling points in Caihai Lake were used to characterize interannual variation in pollutants.

PH(unitless), TP(mg/L), TN(mg/L), COD(mg/L), DO(mg/L), CODMn(mg/L), BOD5(mg/L), NH3-N(mg/L), Turbidity(m), Chla(μg/L).

**Table S3. Landscape metrics data of Dianchi Lake Basin from 1990 to 2020**

<b>Year</b>	<b>LPI</b>	<b>LSI</b>	<b>IJI</b>	<b>COHESION</b>	<b>SHDI</b>
1990	13.871	38.836	73.952	99.351	1.911
1991	13.673	38.979	73.529	99.355	1.915
1992	11.788	39.202	74.227	99.326	1.925
1993	11.034	39.465	74.337	99.307	1.928
1994	10.690	40.127	75.632	99.298	1.955
1995	10.051	40.411	74.791	99.238	1.949
1996	10.041	40.225	76.145	99.217	1.975
1997	10.044	41.014	76.281	99.204	1.989
1998	10.044	40.812	76.587	99.153	1.994
1999	10.041	41.219	77.171	99.143	2.013
2000	10.039	41.425	77.446	99.185	2.024
2001	10.041	42.169	77.019	99.104	2.008
2002	10.041	42.180	76.547	99.109	2.004
2003	10.041	42.288	76.881	99.138	2.005
2004	10.036	42.043	77.169	99.175	1.989
2005	10.042	42.639	76.749	99.165	1.990
2006	10.042	42.710	76.737	99.218	1.984
2007	10.786	42.751	77.116	99.202	1.985
2008	10.042	42.779	77.494	99.121	1.987
2009	10.039	41.425	77.446	99.185	2.024
2010	12.417	42.853	77.653	99.194	1.985
2011	12.620	43.789	76.830	99.157	1.979
2012	12.615	43.373	77.320	99.157	1.979
2013	12.758	43.076	77.920	99.140	1.995
2014	12.895	43.181	78.562	99.150	1.995
2015	13.271	45.002	77.524	99.113	1.984
2016	14.911	44.736	77.892	99.139	1.983
2017	15.991	44.298	77.071	99.197	1.969
2018	15.275	44.251	77.469	99.165	1.975
2019	15.606	45.401	77.899	99.136	1.989
2020	14.754	45.012	80.456	99.127	2.016

Note:LPI(unitless),LSI(%),IJI(%),COHESION(%),SHDI(unitless).

**Table S4. Classification of the CWQI values**

CWQI value	Water quality rank	Description
<b>95-100</b>	Excellent	Water quality is protected and can meet the requirements of the functional areas.
<b>80-94</b>	Good	Water quality is protected and only occasionally slightly polluted, which basically meets the requirements of the functional areas.
<b>65-79</b>	General	Generally, water quality is protected, but sometimes it is polluted. Sometimes it cannot meet the requirements of the functional areas.
<b>50-64</b>	Poor	Water quality is often polluted, which cannot meet the requirements of the functional areas.
<b>0-49</b>	Very poor	Water quality has been seriously polluted almost all the time, which can hardly meet the requirements of the functional areas.

**Table S5. Standards used to evaluate the coupling coordination state for the water quality and land-use structure systems in Dianchi Lake Basin**

Index	Range	Status	Sub-category	Characteristics
C Value	$0 < C \leq 0.3$	Low-level coupling		
	$0.3 < C \leq 0.5$	Antagonistic stage		
	$0.5 < C \leq 0.8$	Running-in stage		
	$0.8 < C \leq 1$	High-level coupling		
D Value	$0 < D \leq 0.2$	Severe maladjustment	$f(x) - f(yn) > 0.1$	Severe maladjustment—Water quality impact lags behind
			$f(yn) - f(x) > 0.1$	Severe maladjustment—landscape pattern impact lags behind
			$0 \leq  f(yn) - f(x)  \leq 0.1$	Severe maladjustment coordination
	$0.2 < D \leq 0.35$	Mild maladjustment	$f(x) - f(yn) > 0.1$	Mild maladjustment—Water quality impact lags behind
			$f(yn) - f(x) > 0.1$	Mild maladjustment—landscape pattern impact lags behind
			$0 \leq  f(yn) - f(x)  \leq 0.1$	Mild maladjustment coordination
	$0.35 < D \leq 0.5$	Near maladjustment	$f(x) - f(yn) > 0.1$	Near maladjustment—Water quality impact lags behind
			$f(yn) - f(x) > 0.1$	Near maladjustment—landscape pattern impact lags behind
			$0 \leq  f(yn) - f(x)  \leq 0.1$	Near maladjustment coordination
	$0.5 < D \leq 0.8$	Intermediate	$f(x) - f(yn) > 0.1$	Intermediate coordination—Water

		coordination		quality impact lags
			$f(y_n) - f(x) > 0.1$	Intermediate coordination—landscape pattern impact lags behind
			$0 \leq  f(y_n) - f(x)  \leq 0.1$	Intermediate coordination
	$0.8 < D \leq 1$	High quality coordination	$f(x) - f(y_n) > 0.1$	High quality coordination—Water quality impact lags behind
			$f(y_n) - f(x) > 0.1$	High quality coordination—landscape pattern impact lags behind
			$0 \leq  f(y_n) - f(x)  \leq 0.1$	High quality coordination