

## Supplementary File

### Land Cover and Human Disturbance Impact on Water Chemistry and Ecological Health in an Asian Temperate Lotic System

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Table S1. Chemical health assessment based on multi-metric water pollution index (WPI) model in the Nakdong River basin.

Domination	Sites code	M1 Value	M2 value	M3 value	M4 value	M5 value	M6 value	M7 value	Overall WPI scores	Health Status
Agricultural	35.263569	5	5	5	5	5	5	5	35	Excellent
Agricultural	35.575686	5	5	5	5	5	5	5	35	Excellent
Agricultural	36.651139	3	5	5	3	5	5	5	31	Excellent
Agricultural	35.524861	3	3	5	3	3	5	5	27	Good
Agricultural	36.740097	1	3	5	3	5	1	5	23	Fair
Agricultural	36.516147	1	5	5	5	5	3	5	29	Good
Agricultural	36.962422	5	5	5	5	5	5	5	35	Excellent
Agricultural	35.432361	3	3	3	3	5	1	5	23	Fair
Agricultural	35.464461	5	5	5	5	3	5	5	33	Excellent
Agricultural	35.255275	3	5	5	3	5	5	5	31	Excellent
Agricultural	36.591133	3	5	5	5	5	3	5	31	Excellent
Agricultural	35.582408	3	3	5	5	5	1	3	25	Good
Agricultural	35.572036	3	3	5	3	1	5	3	23	Fair
Agricultural	36.056358	3	5	5	3	5	5	3	29	Good
Agricultural	36.536606	3	3	5	3	1	3	3	21	Fair
Agricultural	35.282344	3	5	5	3	3	5	3	27	Good
Agricultural	36.400094	3	5	5	3	5	3	3	27	Good
Agricultural	35.48985	3	3	5	3	3	5	3	25	Good
Agricultural	35.512556	3	3	5	3	3	5	3	25	Good
Agricultural	35.878086	5	5	5	3	5	5	3	31	Excellent
Agricultural	36.540714	1	5	5	3	3	1	3	21	Fair
Agricultural	36.116144	3	3	5	3	1	5	3	23	Fair

Agricultural	36.587222	1	3	5	5	1	3	3	21	Fair
Agricultural	35.811922	3	5	5	3	5	5	3	29	Good
Agricultural	36.186558	3	5	5	3	3	3	3	25	Good
Agricultural	36.225539	1	3	5	3	1	1	3	17	Poor
Agricultural	35.629269	3	3	5	3	3	5	3	25	Good
Agricultural	35.323817	3	3	5	3	3	1	3	21	Fair
Agricultural	35.702694	3	3	5	5	3	5	3	27	Good
Agricultural	35.616664	3	3	5	3	3	3	3	23	Fair
Agricultural	36.048853	3	3	5	3	5	3	3	25	Good
Agricultural	35.747306	3	3	3	5	3	3	3	23	Fair
Agricultural	36.375528	3	3	5	3	3	1	3	21	Fair
Agricultural	36.536753	3	5	5	3	3	1	3	23	Fair
Agricultural	36.552003	5	5	5	3	5	3	3	29	Good
Agricultural	36.551053	3	5	5	3	3	3	3	25	Good
Agricultural	36.548564	3	5	5	5	3	3	3	27	Good
Agricultural	35.676011	3	3	5	3	3	3	3	23	Fair
Agricultural	34.903544	3	3	3	3	1	1	3	17	Poor
Agricultural	36.562594	3	5	5	3	3	3	3	25	Good
Agricultural	35.560169	1	1	5	3	3	3	3	19	Fair
Agricultural	35.212633	3	3	5	3	3	5	3	25	Good
Agricultural	35.410797	3	3	5	3	1	3	3	21	Fair
Agricultural	36.434247	3	3	5	3	1	3	1	19	Fair
Agricultural	35.894183	1	3	5	3	3	1	1	17	Poor
Agricultural	36.354642	3	5	5	3	3	3	1	23	Fair
Agricultural	35.514722	3	3	5	3	1	3	1	19	Fair
Agricultural	36.405503	3	3	5	3	1	1	1	17	Poor
Agricultural	36.495861	3	5	5	3	3	3	1	23	Fair
Agricultural	35.313233	3	3	5	3	1	5	1	21	Fair
Agricultural	35.842731	3	3	5	3	3	3	1	21	Fair
Agricultural	36.400661	3	3	5	3	1	3	1	19	Fair
Agricultural	35.412017	3	3	5	3	3	3	1	21	Fair

Agricultural	36.018556	3	3	5	3	3	1	1	19	Fair
Agricultural	35.410781	3	3	3	3	1	1	1	15	Poor
Agricultural	35.525186	1	3	5	3	1	1	1	15	Poor
Agricultural	35.380631	3	3	5	3	1	3	1	19	Fair
Agricultural	35.611328	1	3	5	3	1	1	1	15	Poor
Agricultural	35.439853	1	3	5	3	1	1	1	15	Poor
Agricultural	35.459281	1	1	3	1	3	1	1	11	Very poor
Agricultural	35.839433	3	3	5	3	3	3	1	21	Fair
Agricultural	35.622475	1	3	5	3	1	1	1	15	Poor
Agricultural	35.380917	3	3	5	3	1	3	1	19	Fair
Agricultural	35.808539	1	3	5	3	3	1	1	17	Poor
Agricultural	35.390736	3	3	5	3	1	5	1	21	Fair
Agricultural	35.750056	1	3	5	1	3	1	1	15	Poor
Agricultural	35.978189	3	3	5	3	3	1	1	19	Fair
Agricultural	35.192078	3	3	3	1	1	1	1	13	Poor
Agricultural	35.853797	1	3	5	1	1	1	1	13	Poor
Agricultural	35.519658	3	1	3	1	1	1	1	11	Very poor
Barren	36.434525	3	5	5	3	3	3	1	23	Fair
Barren	36.069942	3	3	5	3	3	1	1	19	Fair
Barren	36.270139	3	5	5	3	3	3	1	23	Fair
Forest	35.506583	3	3	5	3	1	5	5	25	Good
Forest	35.760314	3	5	5	5	5	5	5	33	Excellent
Forest	36.368606	3	5	5	5	5	3	5	31	Excellent
Forest	35.615028	3	3	5	5	5	5	5	31	Excellent
Forest	37.092472	3	5	5	5	5	1	5	29	Good
Forest	36.106278	3	3	5	5	3	5	5	29	Good
Forest	37.092361	3	5	5	5	5	1	5	29	Good
Forest	36.447883	3	5	5	5	5	3	5	31	Excellent
Forest	35.577847	3	5	5	5	5	5	3	31	Excellent
Forest	35.666278	3	3	5	5	5	5	3	29	Good

Forest	35.557403	3	5	5	3	3	5	3	27	Good
Forest	36.955439	3	5	5	5	5	5	3	31	Excellent
Forest	35.563717	3	3	5	5	5	5	3	29	Good
Forest	36.577472	3	5	5	5	5	3	3	29	Good
Forest	36.043436	5	5	5	5	5	5	3	33	Excellent
Forest	36.778919	3	5	5	5	3	3	3	27	Good
Forest	35.458717	5	5	5	3	5	5	3	31	Excellent
Forest	35.632558	3	3	5	3	3	5	3	25	Good
Forest	36.549553	3	5	5	3	3	3	3	25	Good
Forest	36.534367	3	5	5	3	3	3	3	25	Good
Forest	36.715969	3	3	5	3	1	3	1	19	Fair
Urban	35.022475	3	3	5	3	3	5	5	27	Good
Urban	35.388033	3	5	5	5	3	5	5	31	Excellent
Urban	35.232711	3	3	3	1	3	1	3	17	Poor
Urban	35.471011	3	3	5	3	3	5	3	25	Good
Urban	35.685481	3	3	5	3	3	5	3	25	Good
Urban	35.993519	3	3	3	3	5	1	3	21	Fair
Urban	35.551653	3	3	5	5	3	1	3	23	Fair
Urban	35.54925	3	3	3	3	1	1	3	17	Poor
Urban	35.999325	3	3	3	3	1	1	1	15	Poor
Urban	35.315297	3	3	5	3	1	3	1	19	Fair
Urban	35.7051	1	3	5	3	3	1	1	17	Poor
Urban	35.380864	3	3	5	3	1	3	1	19	Fair

Table S2. Biological health assessment based on the multi-metric index of biotic integrity (IBI) model in the Nakdong River basin.

Domination	Sites code	M1 Value	M2 value	M3 value	M4 value	M5 value	M6 value	M7 value	M8 value	Overall IBI score	Health status
Agricultural	35.102361	3	3	3	3	5	5	3	3	28	Good
Agricultural	35.192139	1	1	1	1	5	1	1	3	14	Poor
Agricultural	35.212639	1	1	1	1	3	5	1	3	16	Poor
Agricultural	35.255361	5	1	1	1	1	5	3	3	20	Fair
Agricultural	35.263333	3	1	3	3	3	5	3	3	24	
Agricultural	35.277861	1	1	1	1	1	3	1	3	12	
Agricultural	35.282083	1	1	1	1	5	5	1	3	18	
Agricultural	35.311111	1	1	1	1	5	3	1	3	16	Poor
Agricultural	35.32375	3	1	1	1	1	3	3	3	16	Poor
Agricultural	35.379722	1	1	1	1	3	5	1	3	16	Poor
Agricultural	35.382083	1	1	1	1	5	1	1	3	14	Poor
Agricultural	35.387222	1	1	1	1	5	5	1	3	18	
Agricultural	35.410694	3	1	1	1	1	3	3	3	16	Poor
Agricultural	35.410778	1	1	1	1	5	1	1	3	14	Poor
Agricultural	35.411722	1	1	1	1	5	5	1	3	18	
Agricultural	35.434917	1	1	1	1	1	1	1	3	10	Very poor
Agricultural	35.439917	1	1	1	1	5	3	1	3	16	Poor
Agricultural	35.462139	1	1	1	1	1	1	1	3	10	Very poor
Agricultural	35.464583	5	3	3	3	3	5	3	3	28	Good
Agricultural	35.490361	3	1	1	3	3	5	1	3	20	Fair
Agricultural	35.51475	1	1	1	1	3	3	1	3	14	Poor
Agricultural	35.517944	1	1	1	1	1	3	1	3	12	
Agricultural	35.519583	1	1	1	1	1	1	1	3	10	Very poor
Agricultural	35.529056	1	1	1	1	5	5	1	3	18	
Agricultural	35.560167	1	1	1	1	1	1	1	3	10	Very poor
Agricultural	35.571639	1	1	1	1	3	5	1	3	16	Poor
Agricultural	35.577417	1	1	3	5	5	5	1	3	24	
Agricultural	35.585333	1	1	1	1	1	1	1	3	10	Very poor
Agricultural	35.611	1	1	1	1	3	5	1	3	16	Poor
Agricultural	35.615472	1	1	1	1	3	3	1	3	14	Poor
Agricultural	35.622472	1	1	1	1	5	1	1	3	14	Poor
Agricultural	35.679111	3	1	1	1	1	1	1	3	12	
Agricultural	35.684222	5	3	3	1	1	5	3	3	24	
Agricultural	35.697	5	1	3	3	5	5	5	3	30	
Agricultural	35.708056	1	1	1	1	1	1	1	3	10	Very poor

Agricultural	35.750333	3	1	1	3	3	5	3	3	22	Fair
Agricultural	35.753	1	1	1	1	5	3	1	3	16	Poor
Agricultural	35.814972	1	1	1	1	5	1	1	3	14	Poor
Agricultural	35.8175	1	1	1	1	3	3	1	3	14	Poor
Agricultural	35.88125	3	3	3	5	5	5	1	3	28	Good
Agricultural	35.897444	1	1	1	1	1	1	1	3	10	Very poor
Agricultural	35.981361	1	1	1	1	5	1	1	3	14	Poor
Agricultural	36.022778	1	1	1	1	5	5	1	3	18	
Agricultural	36.046083	3	1	1	3	5	5	1	3	22	Fair
Agricultural	36.051778	3	1	1	1	3	5	3	3	20	Fair
Agricultural	36.056556	3	1	3	3	5	5	1	3	24	
Agricultural	36.189722	3	1	1	1	1	3	1	3	14	Poor
Agricultural	36.225111	1	1	1	1	3	1	1	3	12	
Agricultural	36.354722	1	1	1	1	3	3	1	3	14	Poor
Agricultural	36.378278	1	1	1	1	1	3	1	3	12	
Agricultural	36.403	1	1	1	3	1	3	1	3	14	Poor
Agricultural	36.4055	1	1	1	1	5	1	1	3	14	Poor
Agricultural	36.433333	1	1	1	1	3	3	1	3	14	Poor
Agricultural	36.434444	1	1	1	1	1	3	1	3	12	
Agricultural	36.516147	3	1	1	1	5	5	1	3	20	Fair
Agricultural	36.528917	1	1	1	1	1	3	1	3	12	
Agricultural	36.536556	3	1	1	1	1	1	1	3	12	
Agricultural	36.540694	3	1	1	1	3	5	1	3	18	
Agricultural	36.550889	1	1	1	1	1	1	1	3	10	Very poor
Agricultural	36.551989	3	1	1	1	1	3	3	3	16	Poor
Agricultural	36.555528	3	1	1	1	1	1	1	3	12	
Agricultural	36.587028	1	1	1	1	1	3	1	3	12	
Agricultural	36.591028	3	1	1	3	3	5	3	3	22	Fair
Agricultural	36.650036	5	3	5	1	3	5	5	3	30	
Agricultural	36.719444	3	1	1	1	1	1	3	3	14	Poor
Agricultural	36.742942	3	1	1	1	1	1	5	3	16	Poor
Agricultural	36.964139	3	1	1	1	1	3	5	3	18	
Barren	36.07	1	1	1	1	5	5	1	3	18	
Barren	36.273111	1	1	1	1	3	3	1	3	14	Poor
Barren	36.40425	1	1	1	1	3	1	1	3	12	
Barren	36.498472	1	1	1	1	3	1	1	3	12	
Forest	35.315417	1	1	1	1	5	5	1	5	20	Fair
Forest	35.465722	3	3	5	3	5	5	3	5	32	Excellent
Forest	35.471	1	1	1	1	1	1	1	5	12	
Forest	35.5065	3	1	1	1	3	5	5	5	24	
Forest	35.526944	1	1	1	1	5	1	1	5	16	Poor
Forest	35.555083	1	1	1	1	1	1	1	5	12	
Forest	35.563806	1	1	1	1	5	1	1	5	16	Poor

Forest	35.577278	3	1	3	1	5	5	1	5	24	
Forest	35.608833	1	1	1	5	5	5	1	5	24	
Forest	35.632028	3	1	1	1	1	3	1	5	16	Poor
Forest	35.66625	3	3	3	5	5	5	3	5	32	Excellent
Forest	35.760194	3	1	3	3	5	5	1	5	26	Good
Forest	35.842167	1	1	1	1	5	5	1	5	20	Fair
Forest	35.861694	1	1	1	1	1	3	1	5	14	Poor
Forest	36.107778	1	1	1	5	5	5	1	5	24	
Forest	36.368547	3	1	3	5	5	5	3	5	30	
Forest	36.447306	1	1	1	1	1	3	1	5	14	Poor
Forest	36.537111	1	1	1	1	3	1	1	5	14	Poor
Forest	36.549553	1	1	1	1	3	3	1	5	16	Poor
Forest	36.564889	1	1	1	1	1	5	1	5	16	Poor
Forest	36.577472	1	1	1	1	1	3	1	5	14	Poor
Forest	36.778611	3	1	1	3	3	5	3	5	24	
Forest	36.952511	3	3	5	5	5	5	5	5	36	Excellent
Forest	37.093806	1	1	3	5	5	5	5	5	30	
Forest	37.09425	3	3	3	5	5	5	3	5	32	Excellent
Urban	34.903278	3	1	1	1	5	5	3	3	22	Fair
Urban	35.0225	5	1	1	1	1	3	3	3	18	
Urban	35.234028	5	1	1	1	1	1	5	3	18	
Urban	35.381056	1	1	1	1	3	1	1	3	12	
Urban	35.388056	3	1	1	1	3	5	3	3	20	Fair
Urban	35.514861	5	1	3	5	5	5	3	3	30	
Urban	35.549278	1	1	1	1	3	1	1	3	12	
Urban	35.553806	1	1	1	1	3	1	1	3	12	
Urban	35.993528	3	3	1	3	3	3	3	3	22	Fair
Urban	36.001083	1	1	1	1	5	5	1	3	18	
Urban	36.118889	1	1	1	1	1	1	1	3	10	Very poor