Supporting materials

Supporting materials (I): ILP model formulation

The goal of optimal nutrient load reduction analysis is to minimize the implementation cost while meeting the water quality targets. Since significant uncertainty exists in the system characterization and no data were available to specify the probabilistic or possibilistic distribution of model coefficients, interval numbers were used to represent the uncertainty in a LP framework, resulting in an ILP model for the watershed. In our previous studies, a multi-stage ILP-based optimization model was developed to deal with the nutrient load reduction issues in Lake Qionghai Watershed in three 5-year periods [4,26]. In this study the formulation of the ILP is essentially the same as that described in Liu et al. [4,26] except that the time factor has been removed from the formulation to better represent the real-world adaptive management condition. The same data that were used in [39], except for a few minor changes mentioned in the following model details, are used in this study.

$$\min \quad f^{\pm} = \sum_{i=1}^{I}\sum_{j=1}^{J}\left(X_{i,j}^{\pm} \cdot IIC_{j}^{\pm} \cdot a_{i,j}\right) + \sum_{i=1}^{I}\sum_{j=1}^{J}\left(X_{i,j}^{\pm} \cdot ASC_{j}^{\pm} \cdot a_{i,j} \cdot YR\right), \tag{1}$$

subject to

Environmental capacity constraints:

$$\left(TPDQ - \sum_{i=1}^{I}\sum_{j=1}^{J} X_{i,j}^{\pm} \cdot APR_{j}^{\pm} \cdot a_{i,j}\right) \cdot REC \leq TEC^{\pm}$$

$$TPDQ = \sum_{i=1}^{I} TPD_{i} \quad , \tag{2}$$

Farmland constraints:

$$\sum_{i=1}^{I} X_{i,7}^{\pm} \cdot a_{i,7} / TLAQ \leq RML^{\pm} \quad , \tag{3}$$

Domestic wastewater treatment constraints:

$$\sum_{j=4}^{5} X_{i,j}^{\pm} \cdot a_{i,j} / TWD_{i} \geq RWT^{\pm} \quad , i = 8, 9, 10, 20 \quad , \tag{4}$$

Rural waste treatment constraints:

$$X^{\pm}_{i,8} \cdot a_{i,8} / TRW_{i} \geq RRW^{\pm}, \forall i \quad , \qquad (5)$$

Soil erosion constraints:

$$X^{\pm}_{i,j} \cdot a_{i,j} \geq RLS^{\pm}_{l} \cdot TLS_{i,l} \quad , \; j,l = 1,..,3 \; , \forall i \; , \qquad (6)$$

Slope of land constraints:

$$X^{\pm}_{i,7} \cdot a_{i,j} \geq RSL^{\pm} \cdot TSL_{i}, \forall \, i \quad , \qquad (7)$$

Land coverage constraints:

$$\sum_{j=1}^{3} X^{\pm}_{i,j} \cdot a_{i,j} + X^{\pm}_{i,7} \cdot a_{i,7} + X^{\pm}_{i,9} \cdot a_{i,9} + FLA_{i} \geq RFL^{\pm}_{i} \cdot TLA_{i} \quad , \forall i \; , \qquad (8)$$

Pollution abatement reduction constraints for sub-watersheds I1, I2, II6, II7, and VI 20:

$$\sum_{i=1,2,6,7,20} \sum_{j=1}^{J} X^{\pm}_{i,j} \cdot APR^{\pm}_{j} \cdot a_{i,j} \geq \sum_{i=1,2,6,7,20} TPD_{i} \cdot RPE^{\pm} \quad , \qquad (9)$$

River riparian vegetation buffer constraints:

$$\sum_{i=1}^{I} X^{\pm}_{i,9} \cdot a_{i,j} \geq RRE^{\pm} \cdot TRE \quad , \forall i \; , \qquad (10)$$

Lake riparian vegetation buffer constraints:

$$\sum_{i=1}^{I} X^{\pm}_{i,10} \cdot a_{i,10} \geq RLR^{\pm} \cdot TLR \quad , \forall i \; , \qquad (11)$$

Technical constraints:

$$X^{\pm}_{i,j} \geq 0 \quad , \qquad (12)$$

$$
[a_{i,j}] = \begin{bmatrix}
1 & 1 & 1 & 0 & 0 & 1 & 1 & 1 & 0 & 1 \\
0 & 0 & 0 & 0 & 0 & 1 & 0 & 1 & 1 & 0 \\
1 & 1 & 1 & 0 & 0 & 1 & 1 & 1 & 1 & 0 \\
1 & 1 & 1 & 0 & 0 & 1 & 1 & 1 & 1 & 0 \\
1 & 1 & 1 & 0 & 0 & 1 & 1 & 1 & 1 & 0 \\
1 & 1 & 1 & 0 & 0 & 1 & 1 & 1 & 1 & 0 \\
0 & 0 & 0 & 0 & 0 & 1 & 0 & 1 & 1 & 1 \\
1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \\
1 & 1 & 1 & 1 & 0 & 1 & 1 & 1 & 0 & 1 \\
1 & 1 & 1 & 1 & 0 & 1 & 0 & 1 & 0 & 1 \\
1 & 1 & 1 & 0 & 0 & 1 & 1 & 1 & 1 & 0 \\
0 & 0 & 0 & 0 & 0 & 1 & 0 & 1 & 0 & 1 \\
1 & 1 & 1 & 0 & 0 & 1 & 0 & 1 & 1 & 0 \\
1 & 1 & 1 & 0 & 0 & 1 & 1 & 1 & 1 & 0 \\
1 & 1 & 1 & 0 & 0 & 1 & 1 & 1 & 1 & 0 \\
1 & 1 & 1 & 0 & 0 & 1 & 1 & 1 & 1 & 0 \\
1 & 1 & 1 & 0 & 0 & 1 & 1 & 1 & 0 & 1 \\
1 & 1 & 1 & 0 & 0 & 1 & 1 & 1 & 0 & 1 \\
1 & 1 & 1 & 0 & 0 & 1 & 0 & 1 & 0 & 1 \\
1 & 1 & 1 & 0 & 1 & 0 & 1 & 0 & 0 & 1
\end{bmatrix}, \tag{13}
$$

where

$X_{i,j}^{\pm}$ = management strategies; i is the sub-watershed, i = 1, …, 20 for the 20 sub-watersheds, I1, I2, …., VI20 (Fig. 1)—the Roman numerals in the naming convention simply refer to major tributary-groups; j is the strategy type, j = 1, …, 10 for: 1) moderate erosion restoration, 2) strong erosion restoration, 3) extreme erosion restoration, 4) constructed wetland, 5) wastewater treatment plants, 6) NPS controlling measures, 7) reverting slope farmlands to forest, 8) rural waste treatment, 9) river riparian vegetation buffers, and 10) lake riparian vegetation buffers; YR is the anticipated number of years for implementing the load reduction schemes; $TEC^{\pm}$ is the total environmental capacity for Total Phosphorus (TP), in ($t \cdot a^{-1}$), equals to [64.50, 70.50] [4]; $TPDQ$ is the total TP loading to Lake Qionghai ($t \cdot a^{-1}$) [4]; $IIC_j^{\pm}$ is the unit initial capital cost of strategy j based on available data; $ASC_j^{\pm}$ is the annual unit operating cost of strategy j based on available data; TPD_i is the TP loading in sub-watershed i ($t \cdot a^{-1}$); REC is the satisfactory degree of TEC, values at 1.0; $APR_j^{\pm}$ is the unit TP abatement for strategy j, values at [5.82, 6.77]$\times 10^{-4}$ $t \cdot ha^{-1}$, [4.80, 6.01]$\times 10^{-4}$ $t \cdot ha^{-1}$, [1.15, 1.23]$\times 10^{-3}$ $t \cdot ha^{-1}$, [5.40, 6.46]$\times 10^{-4}$ $t \cdot m^{-3} \cdot d^{-1}$, [2.53, 2.65]$\times 10^{-4}$ $t \cdot m^{-3} \cdot d^{-1}$, [1.74, 1.86]$\times 10^{-3}$ $t \cdot ha^{-1}$, [1.23, 1.41]$\times 10^{-3}$ $t \cdot ha^{-1}$, [4.78, 4.84]$\times 10^{-5}$ $t \cdot m^{-3} \cdot d^{-1}$, [3.60, 3.68]$\times 10^{-4}$ $t \cdot ha^{-1}$, and [3.72, 3.88]$\times 10^{-4}$ $t \cdot ha^{-1}$, for j=1,2,…,10, respectively; $RML^{\pm}$ is the government requirements on the maximum ratio of farmlands occupied, values at [0.10, 0.11]; $TLAQ$ is the current farmland area with a value of 3.19×10^7 m^2; $TWD_i^{\pm}$ is the wastewater volume in sub-watershed i (m^3·d^{-1}); $RWT^{\pm}$ is the treatment rate of domestic wastewater, values at [0.95, 1.00] ; $RRW^{\pm}$ is the treatment rate of rural wastes, values at [0.80, 1.00]; $TRW_i^{\pm}$ is the rural wastes in the sub-watershed i (m^3·d^{-1}); $RLS_l^{\pm}$ is the restoration ratio of soil erosion type l, where l = 1, 2, 3 indicate moderate erosion, strong erosion, and extreme erosion; $TLS_{i,l}$ is the area of the soil erosion type l in sub-watershed i (ha); TSL_i is the area of slope of land in sub-watershed i (ha); $RSL^{\pm}$ is the government requirements for the ratio of reverting slope farmlands to forests with a slope higher than 25°, values at 0 [0.8, 0.9]; FLA_i is the current forest area in sub-watershed i (ha); $RFL_i^{\pm}$ is the anticipated minimum forest coverage in sub-watershed i; TLA_i is the total area of sub-watershed i (ha); $RPE^{\pm}$ is the minimum ratio of pollution reduction, values at [0.30, 0.35]; $RRE^{\pm}$ is the minimum area ratio of the river riparian vegetation buffer, values at [0.8, 1.0]; TRE is the anticipated area of the river riparian vegetation buffer (=176 ha); $RLR^{\pm}$ is the minimum area ratio of the lake riparian vegetation buffer, values at [0.8, 1.0]; TLR is the anticipated area of the lake riparian vegetation buffer (=361.9 ha); $[a_{i,j}]$ is the suitability factor; $a_{i,j} = 1$ means that strategy j is suitable in sub-watershed i, and $a_{i,j} = 0$ means that strategy j is unsuitable in sub-watershed i.

Supporting materials (II): REILP model formulation

A REILP model was developed for Lake Qionghai watershed based on the above ILP equation [39]:

$$\min \quad RISK = \sum_{i=1}^{I}\sum_{j=1}^{J} X_{i,j} \cdot \gamma_{1j} \cdot (APR_j^+ - APR_j^-) \cdot a_{i,j} / (TPDQ - TEC^- / REC\ ) +$$

$$\left(\gamma_2 (TEC^+ - TEC^-) / REC\right) / (TPDQ - TEC^- / REC) + \gamma_3 (RML^+ - RML^-) / RML^- +$$

$$\gamma_4 (RWT^+ - RWT^-) / RWT^- + \gamma_5 (RRW^+ - RRW^-) / RRW^- +$$

$$\sum_{l=1}^{L} \gamma_{6_l} (RLS_l^+ - RLS_l^-) / RLS_l^- + \gamma_7 (RSL^+ - RSL^-) / RSL^- + \sum_{i=1}^{I} \gamma_{8i} (RFL_i^+ - RFL_i^-) / RFL_i^- +$$

$$\left\{ \sum_{i=1,2,6,7,20} \sum_{j=1}^{J} X_{i,j} \cdot \gamma_{9j} (APR_j^+ - APR_j^-) \cdot a_{i,j} \right\} / \left(\sum_{i=1,2,6,7,20} TPD_i \cdot RPE^- \right) +$$

$$\left\{ \sum_{i=1,2,6,7,20} TPD_i \cdot \gamma_{10} (RPE^+ - RPE^-) \right\} / \left(\sum_{i=1,2,6,7,20} TPD_i \cdot RPE^- \right)$$

$$+\gamma_{11} (RRE^+ - RRE^-) / RRE^- + \gamma_{12} (RLR^+ - RLR^-) / RLR^-, \tag{14}$$

subject to

$$\sum_{i=1}^{I}\sum_{j=1}^{J} \left\{ X_{i,j} \cdot \left(IIC_j^+ - \gamma_0 (IIC_j^+ - IIC_j^-) \right) + X_{i,j} \cdot YR \cdot \left(ASC_j^+ - \gamma_0 (ASC_j^+ - ASC_j^-) \right) \right\} \cdot a_{i,j}$$

$$\leq f^+ - \gamma_0 (f^+ - f^-), \tag{15}$$

$$\sum_{i=1}^{I}\sum_{j=1}^{J} X_{i,j} \cdot APR_j^- \cdot a_{i,j} - TPDQ + TEC^- / REC \ \geq$$

$$\sum_{i=1}^{I}\sum_{j=1}^{J} X_{i,j} \cdot (APR_j^- - APR_j^+) \cdot a_{i,j} \cdot \gamma_{1j} + \gamma_2 (TEC^- - TEC^+) / REC,$$

(16)

$$\sum_{i=1}^{I} X_{i,7} \cdot a_{i,7} \leq TLAQ\left(RML^+ - \gamma_3 (RML^+ - RML^-) \right), \tag{17}$$

$$\sum_{j=4}^{5} X_{i,j} \cdot a_{i,j} - RWT^+ \cdot TWD_i \geq \gamma_4 (RWT^- - RWT^+) TWD_i, \ i = 8, 9, 10, 20, \tag{18}$$

$$X_{i,8} \cdot a_{i,8} - RRW^+ \cdot TRW_i \geq \gamma_5 (RRW^- - RRW^+) TRW_i, \forall i,$$

(19)

$$X_{i,j} \cdot a_{i,j} - RLS_l^+ \cdot TLS_{i,l} \geq \gamma_{6_l}(RLS_l^- - RLS_l^+) \cdot TLS_{i,l},\ j,l = 1,..,3,\ \forall i, \tag{20}$$

$$X_{i,7} \cdot a_{i,j} - RSL^+ \cdot TSL \geq \gamma_7(RSL^- - RSL^+) \cdot TSL, \forall i, \tag{21}$$

$$\sum_{j=1}^{3} X_{i,j} \cdot a_{i,j} + X_{i,7} \cdot a_{i,7} + X_{i,9} \cdot a_{i,9} + FLA_i - RFL_i^+ \cdot TLA_i \geq \gamma_{8i}(RFL_i^- - RFL_i^+) \cdot TLA_i, \forall i, \tag{22}$$

$$\sum_{i=1,2,6,7,20} \sum_{j=1}^{J} X_{i,j} \cdot APR_j^- \cdot a_{i,j} - \sum_{i=1,2,6,7,20} TPD_i \cdot RPE^+ \geq$$
$$\sum_{i=1,2,6,7,20} \sum_{j=1}^{J} X_{i,j} \cdot \gamma_{9j}(APR_j^- - APR_j^+) \cdot a_{i,j} + \sum_{i=1,2,6,7,20} TPD_i \cdot \gamma_{10}(RPE^- - RPE^+), \tag{23}$$

$$\sum_{i=1}^{I} X_{i,9} \cdot a_{i,j} - RRE^+ \cdot TRE \geq \gamma_{11}(RRE^- - RRE^+) \cdot TRE, \forall i, \tag{24}$$

$$\sum_{i=1}^{I} X_{i,10} \cdot a_{i,10} - RLR^+ \cdot TLR \geq \gamma_{12}(RLR^- - RLR^+) \cdot TLR, \forall i, \tag{25}$$

$$0 \leq \gamma_{1j}, \gamma_2, \gamma_3, \gamma_4, \gamma_5, \gamma_{6_l}, \gamma_7, \gamma_{8i}, \gamma_{9j}, \gamma_{10}, \gamma_{11}, \gamma_{12} \leq 1, \forall i, j, \tag{26}$$

Table S1 Parameter values in the REILP model

(a) TWD and RLS

parameter	i,l	
$TWD^{\pm}_{i,k}$		
	i=8	[308,308]
	i=9	[505,505]
	i=10	[394,394]
	i=20	[10000,10000]
$RLS^{\pm}_{l,k}$		
	l=1	[0.60,0.85]
	l=2	[0.90,0.95]
	l=3	[0.85,1.00]

(b) IIC and ASC

parameter	unit	$IIC^{\pm}_{j,k}$	$ASC^{\pm}_{j,k}$
j=1	·ha	[0.008201,0.00957]	[0.0014,0.00196]
j=2	yuan·hm^{-2}	[0.014223,0.01716]	[0.0015,0.0021]
j=3	yuan·hm^{-2}	[0.04092,0.049104]	[0.00205,0.00285]
j=4	yuan·m^{-3}·d^{-1}	[0.00071,0.000825]	[0,0]
j=5	yuan·m^{-3}·d^{-1}	[0.0015,0.0066]	[0.000146,0.0002]
j=6	yuan·hm^{-2}	[0.03102,0.037224]	[0.0006,0.00084]
j=7	yuan·hm^{-2}	[0.021863,0.026235]	[0.0015,0.0021]
j=8	yuan·m^{-3}·d^{-1}	[0.001617,0.00198]	[0.000245,0.00034]
j=9	yuan·hm^{-2}	[0.160017,0.19173]	[0.00075,0.00105]
j=10	yuan·hm^{-2}	[0.237273,0.6435]	[0.0014,0.00196]

(c) TPD, FLA, RFL, TLS, TSL, TLA and TRW

	TPD_i	FLA_i	RFL_i	TLS_i			TSL_i	TLA_i	$TRW_i^{\pm}$
				l=1	l=2	l=3			
i=1	89.4	1053.5	[0.35,0.40]	179.06	20	29.17	10.0	3572.5	[9100,9100]
i =2	69.2	0.0	[0.00,0.00]	0	0	0	0.0	564.5	[1340,1340]
i =3	139.8	1434.9	[0.35,0.35]	425.54	310	135	29.0	4802.3	[11390,11390]
i =4	58.9	440.7	[0.30,0.30]	368.08	85	10	24.0	2269.3	[5390,5390]
i =5	70.4	1193.9	[0.45,0.48]	341.23	160	50	22.0	2842.6	[6214,6214]
i =6	69.4	998.6	[0.40,0.40]	311.38	150	63.33	20.0	2555.2	[6145,6145]
i =7	42.3	0.0	[0.00,0.00]	0	0	0	0.0	999.4	[2225,2225]
i =8	12.2	369.3	[0.58,0.60]	89.51	60	20	7.0	640.8	[1540,1540]
i =9	34.7	100.3	[0.20,0.22]	283.89	25	0	19.0	955.1	[2233,2233]
i =10	18.3	305.5	[0.55,0.58]	33.92	0	0	0.0	622.2	[1407,1407]
i =11	84.1	2550.3	[0.55,0.55]	1113.25	398.74	105	74.0	5070.2	[12040,12040]
i =12	2.7	0.0	[0.00,0.00]	0	0	0	0.0	22.5	[70,70]
i =13	6.4	136.6	[0.45,0.45]	21.22	40	4	0.0	371.6	[870,870]
i =14	12.6	262.5	[0.50,0.50]	107.33	20	9	7.0	534.1	[1200,1200]
i =15	5.5	62.7	[0.32,0.35]	138.76	5	3	9.0	217.2	[505,505]
i =16	23.1	311.5	[0.40,0.40]	450.31	20	12	30.0	895.0	[2125,2125]
i =17	5.8	54.2	[0.30,0.30]	74.12	0	0	10.0	249.3	[592,592]
i =18	11.9	0.5	[0.05,0.12]	5.64	0	0	0.0	32.7	[75,75]
i =19	6.6	1.7	[0.05,0.12]	23.08	0	0	0.0	55.7	[130,130]
i =20	127.3	541.7	[0.60,0.60]	106.28	0	0	9.0	970.0	[0,0]

Table S2 Objective risk with different risk tradeoff values

λ_0	α=0.01	α=0.1	α=1	α=2	α=5	α=10	α=100
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.1	0.090	0.075	0.030	0.030	0.005	0.000	0.000
0.2	0.180	0.150	0.050	0.030	0.010	0.000	0.000
0.3	0.270	0.225	0.075	0.030	0.015	0.000	0.000
0.4	0.360	0.300	0.100	0.090	0.040	0.015	0.000
0.5	0.450	0.375	0.175	0.125	0.060	0.027	0.004
0.6	0.540	0.480	0.210	0.150	0.090	0.070	0.040
0.7	0.630	0.560	0.315	0.245	0.160	0.117	0.097
0.8	0.760	0.720	0.400	0.360	0.251	0.240	0.198
0.9	0.855	0.810	0.645	0.470	0.450	0.375	0.370
1	0.950	0.950	0.900	0.899	0.870	0.870	0.870

Table S3 Constraint risk with different risk tradeoff values

λ_0	α=0.01	α=0.1	α=1	α=2	α=5	α=10	α=100
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.1	0.028	0.028	0.036	0.036	0.059	0.073	0.073
0.2	0.057	0.057	0.078	0.101	0.119	0.146	0.146
0.3	0.087	0.088	0.118	0.152	0.178	0.250	0.263
0.4	0.118	0.120	0.159	0.166	0.239	0.307	0.408
0.5	0.151	0.153	0.182	0.220	0.307	0.449	0.935
0.6	0.187	0.189	0.259	0.304	0.416	0.505	0.935
0.7	0.249	0.251	0.304	0.367	0.486	0.629	0.935
0.8	0.322	0.322	0.415	0.449	0.629	0.668	0.999
0.9	0.473	0.474	0.507	0.629	0.660	0.921	0.999
1	0.930	0.930	0.937	0.937	1.000	1.000	1.000

Table S4 Load reduction in 10 strategies under standard REILP and refined REILP with different tradeoff factors at aspiration level 0.7

strategies	**standard**	**%**	**α=0.01**	**%**	**α=0.1**	**%**	**α=1**	**%**	**α=2**	**%**	**α=5**	**%**	**α=10**	**%**	**α=100**	**%**
j=1	24.75	13.18	24.75	13.19	24.75	13.19	24.75	13.20	24.75	13.53	21.27	12.06	14.62	8.28	14.65	8.48
j=2	7.39	3.94	7.39	3.94	7.39	3.94	7.39	3.94	5.90	3.22	5.90	3.34	5.90	3.34	5.59	3.24
j=3	5.42	2.88	5.42	2.88	5.42	2.88	5.42	2.89	5.42	2.96	5.08	2.88	5.08	2.88	4.32	2.50
J=4	5.40	2.88	5.40	2.88	5.40	2.88	5.40	2.88	5.40	2.95	5.40	3.06	5.40	3.06	5.40	3.13
j=5	42.63	22.70	42.63	22.71	42.63	22.71	42.69	22.76	27.01	14.76	42.86	24.29	43.00	24.37	41.58	24.08
j=6	69.01	36.75	69.00	36.75	69.12	36.82	71.47	38.11	84.20	46.02	66.22	37.54	73.05	41.41	71.92	41.64
j=7	3.43	1.82	3.43	1.83	3.43	1.83	3.43	1.83	3.43	1.87	2.99	1.69	2.99	1.69	2.99	1.73
j=8	27.75	14.78	27.75	14.78	27.62	14.71	25.01	13.34	24.99	13.66	24.99	14.16	24.68	13.99	24.68	14.29
j=9	0.65	0.35	0.63	0.34	0.63	0.34	0.63	0.34	0.63	0.35	0.63	0.36	0.63	0.36	0.51	0.29
j=10	1.35	0.72	1.35	0.72	1.35	0.72	1.35	0.72	1.24	0.68	1.08	0.61	1.08	0.61	1.08	0.62
total	187.77	100.00	187.74	100.00	187.73	100.00	187.54	100.00	182.97	100.00	176.42	100.00	176.43	100.00	172.71	100.00

Table S5 Load reduction in 20 sub-watersheds under standard REILP and refined REILP with different tradeoff factors at aspiration level 0.7

sub-watershed	**standard**	**%**	**α=0.01**	**%**	**α=0.1**	**%**	**α=1**	**%**	**α=2**	**%**	**α=5**	**%**	**α=10**	**%**	**α=100**	**%**
i=1	6.67	3.55	6.67	3.55	6.65	3.54	6.28	3.35	6.25	3.42	5.91	3.35	4.83	2.74	4.80	2.78
i=2	0.58	0.31	0.58	0.31	0.57	0.31	0.52	0.28	0.52	0.28	0.52	0.29	0.51	0.29	0.51	0.30
i=3	11.96	6.37	78.59	41.86	11.93	6.36	73.61	39.25	85.84	46.92	66.76	37.84	71.17	40.34	71.58	41.44
i=4	5.41	2.88	5.40	2.88	5.39	2.87	5.17	2.76	5.16	2.82	4.90	2.77	5.78	3.28	4.13	2.39
i=5	70.40	37.49	6.50	3.46	6.83	3.64	6.23	3.32	6.05	3.31	5.70	3.23	5.47	3.10	5.22	3.02
i=6	6.37	3.39	6.32	3.37	6.31	3.36	6.06	3.23	5.89	3.22	5.55	3.15	5.07	2.87	4.93	2.85
i=7	1.00	0.53	0.96	0.51	0.95	0.51	0.86	0.46	0.86	0.47	0.86	0.49	0.85	0.48	0.85	0.49
i=8	12.20	6.50	12.20	6.50	12.20	6.50	12.20	6.51	2.81	1.54	12.20	6.92	12.20	6.91	12.20	7.06
i=9	6.69	3.56	5.71	3.04	5.70	3.04	5.61	2.99	5.58	3.05	5.37	3.04	4.90	2.78	5.73	3.32
i=10	4.04	2.15	4.69	2.50	3.78	2.01	3.59	1.92	3.05	1.67	4.44	2.52	3.66	2.07	3.53	2.05
i=11	16.80	8.95	16.87	8.98	75.42	40.18	16.36	8.72	15.90	8.69	14.80	8.39	13.13	7.44	12.87	7.45
i=12	0.74	0.39	0.03	0.02	1.58	0.84	1.46	0.78	1.46	0.80	1.45	0.82	1.46	0.83	1.34	0.78
i=13	1.32	0.70	0.83	0.44	1.83	0.98	1.74	0.93	1.74	0.95	1.74	0.99	1.76	1.00	1.77	1.02
i=14	1.51	0.81	1.50	0.80	2.57	1.37	2.17	1.16	2.18	1.19	2.18	1.24	2.24	1.27	2.22	1.28
i=15	1.26	0.67	1.50	0.80	1.91	1.02	1.17	0.63	1.17	0.64	1.34	0.76	0.83	0.47	0.83	0.48
i=16	4.15	2.21	5.03	2.68	5.06	2.69	4.94	2.63	4.92	2.69	4.50	2.55	3.84	2.18	3.84	2.22
i=17	1.43	0.76	0.95	0.51	0.96	0.51	1.97	1.05	1.87	1.02	0.76	0.43	1.39	0.79	0.76	0.44
i=18	1.11	0.59	0.06	0.03	3.07	1.64	2.67	1.42	2.65	1.45	2.64	1.49	2.68	1.52	2.43	1.41
i=19	1.12	0.60	0.35	0.19	2.00	1.07	1.90	1.01	1.89	1.03	1.89	1.07	1.90	1.08	1.88	1.09
i=20	33.01	17.58	33.01	17.58	33.01	17.58	33.01	17.60	27.19	14.86	32.91	18.65	32.75	18.56	31.29	18.12
total	187.77	100.00	187.74	100.00	187.73	100.00	187.54	100.00	182.97	100.00	176.42	100.00	176.43	100.00	172.71	100.00