



Evolution Trend of Water Quality in Dongping Lake after South to North Water Transfer Project Running in China

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Abstract: To investigate the evolution trend of water quality in Dongpinglake after South to North Water Transfer Project operation as well as to ensure the safe usage of water receiving area, samples were collected before and after water delivery in different hydrological seasons and determined, then comprehensive pollution index method, comprehensive nutrition state index method and health risk assessment model were utilized to evaluate the quality, nutrition, and health risk of Dongping Lakewater. Results showed that the quality of Dongping Lake water still satisfied level III (light pollution) no matter before or after water delivery with comprehensive pollution index verified from 0.49 to 0.46. The nutrition state was improved from mesotropher to light eutropher before water delivery to mesotropher after water delivery with comprehensive nutrition state index reduced from 49.89 to 44.94. The health risk level was reduced from high-medium before water delivery to medium level after water delivery with health risk value fell from 2.91×10^{-4} a-1 to 9.54×10^{-5} a-1. In summary, running of east route of South to North Water Transfer Project is benefit for water environment improvement of Dongping Lake.

Table 1 Nutrition before and after SNWTP operation

Sampling season	Sampling sites	Before SNWTP operation		After SNWTP operation	
		TLI	Nutrition grade	TLI	Nutrition grade
Dry season	S1	47.37	Mesotropher	43.17	Mesotropher
	S2	47.80	Mesotropher	45.60	Mesotropher
	S3	46.70	Mesotropher	47.74	Mesotropher
	S4	42.19	Mesotropher	51.06	Light eutropher
	S5	40.03	Mesotropher	48.48	Mesotropher
	S6	41.99	Mesotropher	54.42	Light eutropher
Wet season	S1	54.87	Light eutropher	38.94	Mesotropher
	S2	59.04	Light eutropher	37.65	Mesotropher
	S3	59.68	Light eutropher	44.68	Mesotropher
	S4	48.10	Mesotropher	44.69	Mesotropher
	S5	56.37	Light eutropher	39.52	Mesotropher
	S6	54.47	Light eutropher	43.34	Mesotropher

Note: Classification of trophic level based on TLI: Oligotropher ($TLI < 30$), Mesotropher ($30 \leq TLI \leq 50$), Lighteutropher ($50 < TLI \leq 60$), Middle eutropher ($60 < TLI \leq 70$), Hypereutropher ($TLI > 70$).

Table 2 Health risk before and after SNWTP operation

Sampling season	Sampling sites	Before SNWTP operation		After SNWTP operation	
		Health risk	Risk level	Health risk	Risk level
Dry season	S1	3.43E-04	IV	8.02E-05	III
	S2	2.53E-04	IV	8.63E-05	III
	S3	2.53E-04	IV	8.02E-05	III
	S4	3.61E-04	IV	1.14E-04	IV
	S5	3.83E-04	IV	1.00E-04	IV
	S6	3.83E-04	IV	8.02E-05	III
Wet season	S1	2.53E-04	IV	1.07E-04	IV
	S2	2.53E-04	IV	1.14E-04	IV
	S3	2.53E-04	IV	9.37E-05	III
	S4	2.53E-04	IV	1.21E-04	IV
	S5	2.53E-04	IV	1.21E-04	IV
	S6	2.53E-04	IV	1.07E-04	IV

Note: Grading standard for health risk level is: I (E-06~E-05), II (E-05~E-04), III (5E-05~E-04), IV (E-04~E-03), V (5E-04~E-03), VI (E-03~E-02).

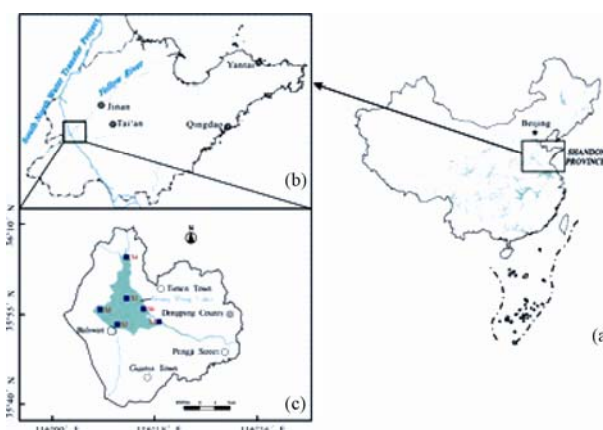


Fig. 1. Map of Shandong Province in China. (a) over location of the project in Shandong province; (b) route of SNWTP (green line); (c) location of Dongping lake and sampling sites.

Keywords: South to North Water Transfer Project, Dongping Lake, water quality, nutrition, health risk

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