

THE ENVIRONMENTAL EVALUATION OF CHEONGGYE STREAM RESTORATION WORK

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Introduction

The Cheonggyecheon(stream) with 10.92km-length is a typical urban stream flows through downtown Seoul from west to east and is going into the Jungrang stream and then reaches to the Han River. According to Industrialization and modernization, the concrete covering up the stream and the elevated highway were built to meet the increasing traffic capacity from 1958 to 1979. From this time, the Cheonggyecheon was getting lost the function of natural stream because of inflow of large amount of wastes. After the removal of concrete covering up the stream and the elevated highway, the restoration work of 5.84km section with water supply was conducted for shifting to the paradigm for a sustainable urban development being together nature and human, restoring ecosystem, getting rid of risks related to the old concrete structures, and restoring historical and cultural space from July 1st 2003 to August 30th 2005. The level of pollution is compared before and after the Cheonggyecheon restoration and the effectiveness of restoration is evaluated for contributing to attempt environmental police in the future.

Key word : Cheonggye stream, Restoration, environment,

Method

The water quality of Cheonggyecheon was analyzed in 2002, 2003, 2005 and aquatic fauna are investigated in 2003 and 2005. Air pollutants were seasonally measured at the upper, the middle, the lower region of Cheonggyecheon and temperature is hourly measured at Cheonggyecheon 4 Ga(Street) and other 4 roadside air quality monitoring stations in Seoul

Result and Discussion

Before restoration work, the Cheonggyecheon was normally dried, because sewer and rain water ran through sewerage pipes to wastewater treatment plant, but the lower region of Cheonggyecheon was flowing because of incoming water from Chungreung stream. After restoration work, the Cheonggyecheon is always flowing by water supply of both

98,000 ton per day from the Han River and 22,000 ton per day of underground waters from nearby subway stations. Before restoration work, the BOD and T-N, and T-P in the lower region of Cheonggyecheon were 3.2mg/l, 3.990mg/l, and 0.450mg/l, respectively, while after restoration, those of Cheonggyecheon were 0.8mg/l, 2.904mg/l, and 0.068mg/l, respectively. The water quality of Cheonggyecheon was obviously improved to meet the goal of water quality established by Seoul city government.

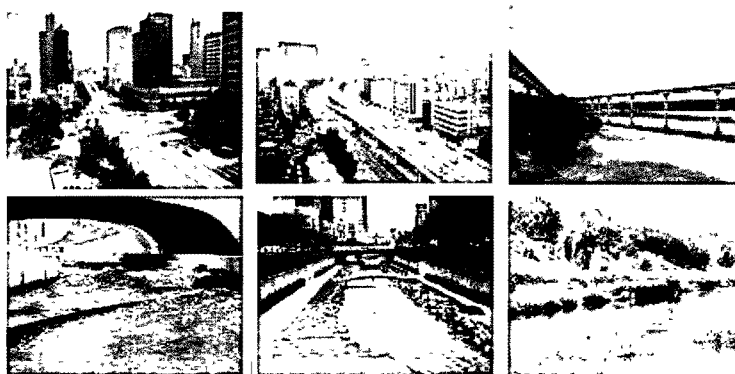


Fig. The sight of Cheonggye stream before(up) and after(down) restoration work

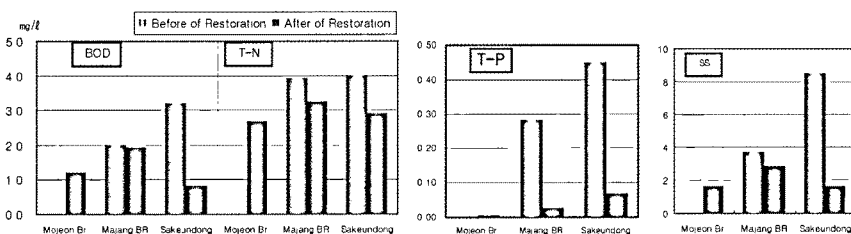


Fig. The comparison of water quality between before and after Cheonggye restoration.

In aquatic fauna survey, before restoration 2 benthos and 2 aquatic insects appeared in sewerage pipes, and 2 benthos and 4 aquatic insects and 3 fishes inhabited in open water area. After restoration, 5 benthos and 9 aquatic insects and 1 fish appeared in the upper region of Cheonggyecheon, and more than 2 benthos species, more than 8 aquatic insects, and more than 5 fishes were observed in the lower region of Cheonggyecheon. The diversity of species was sharply increased within one month after starting water supply. The diversity of species can be more increased if the bed of stream is stable and water is continued to keep clean.

The stability of stream ecosystem is possibly destroyed by inflow of overflowing combined sewer, inflow of road surface water in the raining and sediment of settling particles on the bed, therefore supervision is continuously required to keep this natural stream.

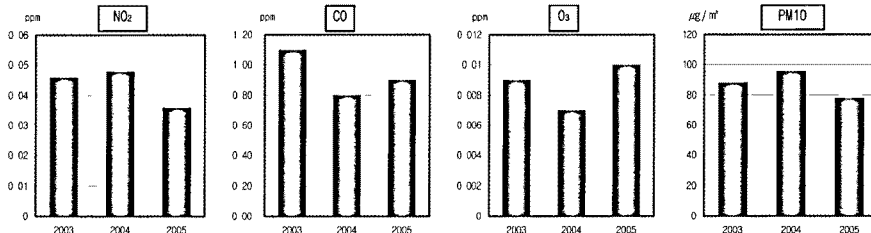


Fig. The comparison of air pollution between before and after Cheonggye restoration.

completion of restoration work of 2005. During restoration, the Cheonggye 4ga was showing air temperature about 0.3°C–1.0°C higher than the average air temperature of the other 4 roadsides, but the temperature of Chenggyecheon dropped about 0.2°C–0.6°C lower after the removal of concrete covering and elevated highway. This is reason that the number of vehicles entering downtown decreased and wind passage was engendered by the removal of the elevated highway over the stream. The decrease of traffic amount, sufficient water volume of stream, and green areas for growing aquatic plants and trees is required to continue abatement effect of air pollution even after the completion of restoration.

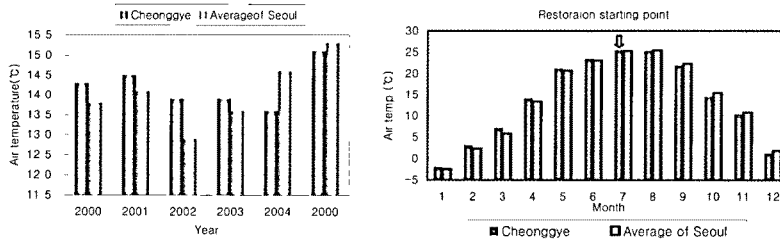


Fig. The air temperature comparison between Cheonggye and the average of the other 4 roadsides in Seoul before and after the Cheonggye restoration.

Environmental aspect, the Cheonggyecheon restoration is meaningful in giving recreation and relaxation of the citizens, supplying biological habitats, and mitigating the heat island phenomenon. After this, the continuous monitoring and management of the Cheonggyecheon is necessary to keep successful restoration work of urban stream.