

Investigation on the effects of microbial community presence and survival to the water quality performance of urban stormwater nature-based solutions

Franz Kevin Geronimo*, Heidi Guerra**, Minsu Jeon***, Nash jett Reyes****,
Lee-Hyung Kim*****

.....

Abstract

Nature-based solutions (NBS) involved conservation or rehabilitation of natural ecosystems or the creation of natural processes in modified or artificial ecosystems to mimic natural processes for the improved management of water (UN-Water, 2018). This study investigated the relationship between microbial presence and survival to the pollutant treatment performance of seven different stormwater NBS managing urban stormwater runoff. In this study, seven different stormwater nature-based solution (NBS) was investigated to identify the relationship of microbial community to the pollutant removal performance of stormwater NBS. Based on this study, *Proteobacteria* was found to be the most dominant microorganism for all stormwater NBS and IS followed by *Acidobacteria* and *Actinobacteria*. *Acidobacteria*, *Actinobacteria*, *Chloroflexi*, *Gemmatimonadetes*, *WS3*, and *AF234118_p* were found to have high positive correlation to most pollutant removal efficiency of different stormwater NBS (r-value: 0.62 to 0.68). Using *Proteobacteria* and *Acidobacteria* count in stormwater NBS, equations predicting pollutant removal performance were also developed and may be used in minimizing the cost for stormevent monitoring to identify the pollutant removal performance of stormwater NBS.

Keywords : Microorganism; nature-based solutions; stormwater management

Acknowledgment

This research was supported by Basic Science Research Program through the National Research Foundation of Korea (NRF) funded by the Ministry of Education (NRF-20181D1A3B07050936).

* Member · Postdoctoral researcher, Dept. of Civil and Environ. Eng., Kongju National University · E-mail : fkgeronimo@kongju.ac.kr

** Postdoctoral researcher, Dept. of Civil and Environ. Eng., Kongju National University · E-mail : heidiguerra@kongju.ac.kr

*** Postdoctoral researcher, Dept. of Civil and Environ. Eng., Kongju National University · E-mail : minsu91@kongju.ac.kr

**** Ph.D Student, Dept. of Civil and Environ. Eng., Kongju National University · E-mail : reyesnashjett@gmail.com

***** Professor, Dept. of Civil and Environ. Eng., Kongju National University · E-mail : leehyung@kongju.ac.kr