

Management Measures to Control Nonpoint Source Pollution from Expressway

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Introduction

- Pollutants accumulated in expressway road deposited sediments(RDS) are intensively discharged into the water system during rainfall, affecting water quality and aquatic ecosystems.
- Since the enforcement of legal regulations on nonpoint pollution, the number of expressway nonpoint pollution reduction facilities has increased rapidly from 9 in 2009 to 1,505 in 2019. It is expected to reach about 4,000 by 2025.
- This study was conducted to provide fundamental data for establishing a management system.

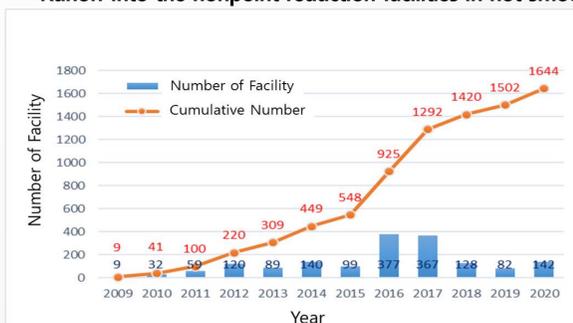
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Methodology

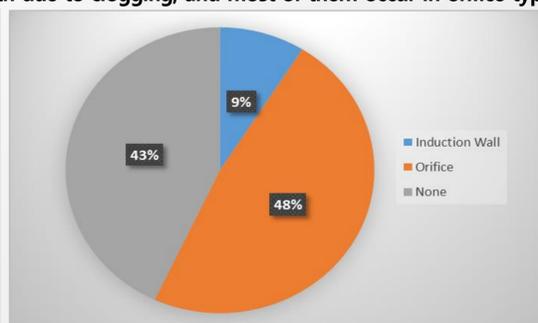
- A database of 1,505 (as of 2020) facilities nationwide was established through GIS analysis
 - Reservoirs : 297 places, Grassed Waterway type : 349 places, Infiltration ditches : 320 places, Sand filter : 258 places, Device type facilities : 281 places
 - Changing the location of nonpoint pollution reduction facilities to address for identify spatial distribution, location, and approach through GIS analysis
- The Degree of maintenance is classified into cleaning, dredging, harvesting, and repair, and classified into A(healthy), B(management required), and C(management hourly)
- The simplified checklist evaluates the need for cleaning, dredging, harvesting, and facility maintenance on a quantitative basis, taking into account the inflow parts, detention basin, facilities, and the current status of facilities around them.

Results

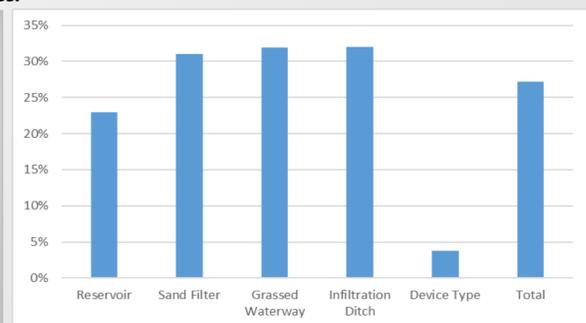
- 1,291 surveys completed (85.8%, total 1,505 sites)
 - Data that can be used for analysis were available in 1,138(88.1%) out of 1,291 sites in consideration of on-site conditions
- If there is no flow distribution structure, it accounts for 43.1% of total, 48.0% of the facilities in the form of orifices, and 9.0% of the facilities in the form of induction wall.
- Runoff into the nonpoint reduction facilities in not smooth due to clogging, and most of them occur in orifice types.



<Increase Trend of Facility>

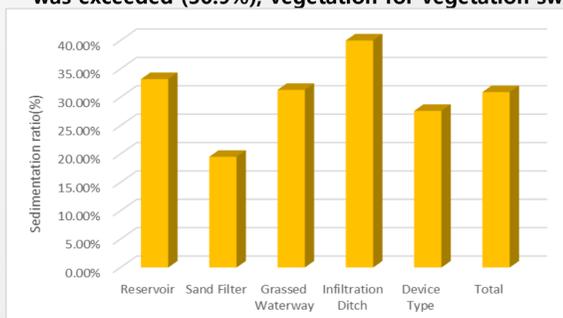


<Inlet Type of Facility>

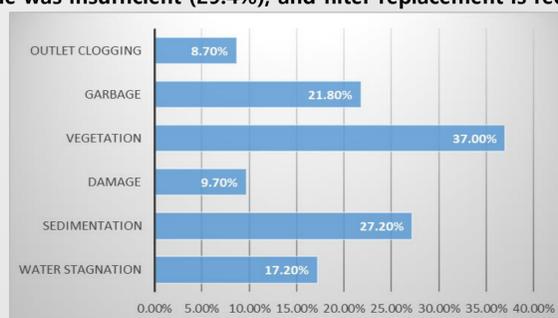


<Operational Status of Facility>

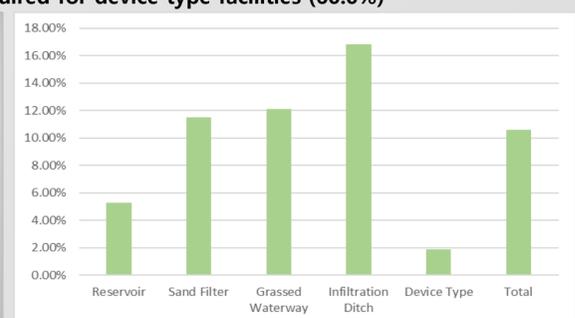
- Among 1,138 facilities, 310 facilities (27.2%) had clogged inlet, 352 facilities (30.9%) had sediment deposited on pre-treatment tank and 421 facilities (37.0%) had overgrown vegetation.
- Filtration materials of sand filter were blocked (28.3%), infiltration ditch have reduced infiltration performance (61.3%), the amount of sediment for detention basin was exceeded (30.9%), vegetation for vegetation swale was insufficient (29.4%), and filter replacement is required for device type facilities (60.0%)



<Sedimentation ratio of Detention Basin>



<Status of Treatment Basin>



<the ratio of Facility in needed of maintenance>

Conclusion

As a result of on-site investigation of nonpoint pollution reduction facilities, the current maintenance status is evaluated to be poor, and maintenance and management system need to be supplemented. It was intended to enhance the professionalism and efficiency of nonpoint pollution managers by publishing the management manual of nonpoint pollution reduction facility.