Stormwater Action Monitoring

Project Title

Using Western Washington Catch Basin Inspection and Maintenance Data to Predict Maintenance Schedules and Identify Cost-Efficiencies

Effectiveness Study

Lead Entity

King County

Partners

Osborn Consulting, Inc., Kitsap County, City of Kent, City of Everett, City of Seattle

Collectively improving stormwater management

Stormwater Action Monitoring (SAM) is a collaborative, regional stormwater monitoring program that is funded by more than 90 Western Washington cities and counties, the ports of Seattle and Tacoma, and the Washington State Department of Transportation. SAM's goal is to improve stormwater management to reduce pollution, improve water quality, and reduce flooding. We do this by measuring stormwater impacts on the environment and evaluating the effectiveness of stormwater management actions.

Questions about SAM? Send an email to SAMinfo@ecy.wa.gov

Study goals

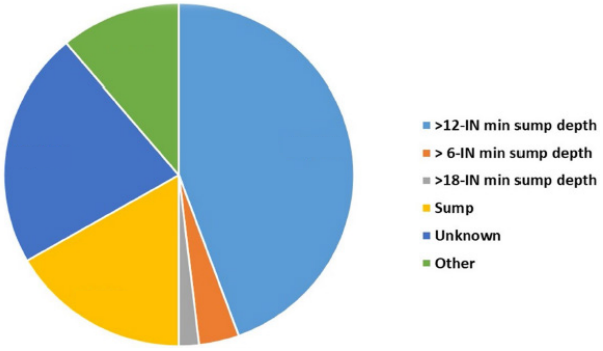
The primary goal of this study was to identify factors that could be used to predict municipal stormwater catch basin (CB) maintenance needs by evaluating existing CB inspection and maintenance records from across Western Washington. A secondary goal was to identify cost efficiencies in CB program implementation by reviewing CB inspection and maintenance program designs and interviewing stormwater managers.

Stormwater management problem

This study helps inform efficient predictions of CB maintenance needs and management of inspection and cleaning costs. The current default CB inspection frequency requirement is annual for Phase I permittees, and generally every 2 years for Phase II permittees. Additionally, both of the permits allow alternative schedules or approaches to meet the maintenance standards.

Project findings

Figure 1: Varying definitions of Catch Basins



The study could not completely meet the original goals. Significant data quality issues exist across jurisdictions. Approximately half of the 54 survey respondents use paper, at least in part, to record inspection and/or maintenance activities. Record errors were common. For example, sometimes CB cleaning records were missing or showed different sump depths for the same CB. Variable definitions of a CB are in use, mostly relating to sump depth (see Figure 1). Some jurisdictions included inspections of CBs without any sump; these features are not designed to collect suspended solids.

These data quality issues along with an overall lack of existing drainage basin delineations precluded the intended correlation analysis. Instead, the study evaluated records with the highest certainty and then focused on making recommendations in three areas: improving records quality, increasing program cost efficiency, and designing a tool for predicting inspection needs. From the best records compiled for this project (from seven permittees) it appears that, usually, over 80% of CBs do not require more frequent cleaning than the standard inspection schedules.

Due to variable accounting approaches, a quantitative program cost comparison among these permittees was infeasible. However, approximate median annual costs are around $21 per CB, regardless of jurisdiction size and CB count. Permittees have realized substantial cost reductions by transitioning from paper records to integrated digital data management, such as asset management software.

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Few permittees are utilizing alternative CB inspection schedules allowed by the permits and published guidance (Ecology Publication 13-10-019). This may be due to permittees' confusion as to how to propose a different schedule using an individual jurisdiction's records. Examples are provided in the report that can guide others. The circuit-based alternative schedule was disregarded by some jurisdictions because of confusion about the definition. A circuit can be defined as a land area with similar rates of solids accumulation and maintenance needs; it does not need to discharge to a single point. These alternative schedule clarifications may support future adjustments to permittees' inspection schedules.

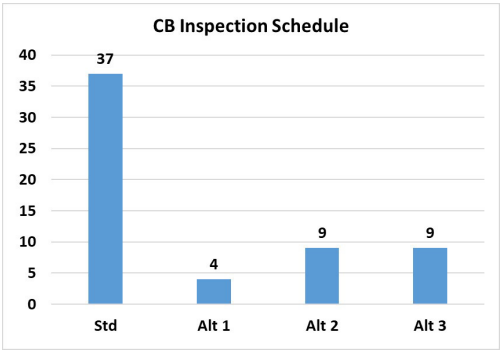
Recommendations

Permittees should consider:

- Implementing improved protocols for data measurement and data entry, and conducting periodic quality control checks of their databases to improve data quality and consistency.
- Migrating data collection and management to an integrated digital system to improve cost-efficiency.
- Using available examples of alternative schedules (e.g., Marysville and Federal Way), to propose a less frequent inspection schedule, once enough jurisdiction-specific inspection data are available.
- Revisiting the definition of a circuit to consider if this alternative will work alone or in combination with other approaches.

Ecology should clarify the CB definition by highlighting its purpose, which is to remove solids from stormwater runoff, and excluding inlets or other structures without sumps. This would improve future understanding and use of inspection data and ensure that maintenance standards are being applied appropriately.

Finally, a modest field study of CB dynamics would provide a foundation for long-term, science-based prediction of CB accumulation.



Why does this study matter?

Although permittees may believe that certain factors such as land use, construction site activity, sanding, etc. may drive accumulation more than other factors, no data analyses have been conducted to date that identify which factors are most important. Analysis from the limited data in this study indicates that, usually, over 80% of CBs do not require more frequent cleaning than the standard permit requirements.

The study identified tips for stormwater managers to both improve efficiency and quality of CB inspection and maintenance programs, and to reduce program costs.

What should we do with this information?

Stormwater managers should evaluate software, alternative schedules, and circuit options to direct limited inspection and maintenance resources to provide the greatest environmental benefit. Permittees should work to improve internal approaches to data collection and management and consider utilizing asset management software for CB inspection and maintenance if they have not already done so. Permittees should continue to inspect inlets, but focus maintenance on addressing solids accumulation in CB sumps.

What will Ecology do with this information?

Ecology's definition of CB in the *Stormwater Management Manual* includes only features with a sump, but it does not specify a required sump depth. Ecology's permit managers will work with permittees to answer questions about alternative CB inspection and maintenance schedules. Ecology does not approve individual programs, so Ecology's focus will be on helping permittees ensure that they have adequate data to support their proposed schedules.

For more information

For more information: Visit the SAM website at ecology.wa.gov/SAM and search for "Catch Basin Cleaning Study."

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This was written by the SAM program for the Department of Ecology. It was originally hosted on EZview and was transferred to Biblio for records purposes as a publication in 2026.

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