

Research Proposal

Cost-Benefit Analysis of Landscape-Scale Water Quality Treatments

Problem Title. What would be the more effective landscape-scale water quality solution given limited financial resources; a relatively small aerial coverage with high efficiency BMPs (e.g. large ponds and sand filters) or widespread coverage using low efficiency but low cost BMPs (e.g. hydrodynamic separators, compost-amended filter strips, biofiltration swales)?

Problem Statement. In the last NPDES municipal permit cycle; Ecology concluded that permittees' stormwater management programs were "ineffective" because large-scale water quality improvements were not observed over the permit cycle. The prescribed solution to this perceived ineffectiveness was to specify very large detention ponds designed to maintain pre-development hydrology and sand filters. These solutions are also the most expensive stormwater management options.

It is possible that watershed-scale improvements were not observed because of population growth and the low percentage of land-use using stormwater BMPs. Could wide application of inexpensive stormwater management options have a greater overall effect on water quality than limited application of expensive but highly efficient BMPs? Hydrodynamic separators, compost-amended filter strips, these broad management decisions may have a significant effect on the overall perceived effectiveness of NPDES and the Clean Water Act.

An additional question that could be addressed by this research proposal is:

Would an 80 percent coverage with low efficiency but low-cost BMPs provide better overall water quality on watershed scales as compared to a 20 percent coverage with high efficiency BMPs, which would cost approximately the same?

Literature Search. There is very little current activity. While there is a desire to incorporate the most efficient BMPs into stormwater management programs, economic considerations would preclude large scale implementation of these high efficiency BMPs. Phrased differently, when BMPs get prohibitively expensive, developers will do the absolute minimum amount of treatment to get the project's permits.

Research Methods. Conduct pilot tests on small watersheds to examine the effect of level of implementation on overall water quality benefits on a watershed scale.

Partnering Opportunities. Some may be possible within the expanded field of NPDES municipal permittees.

Estimate of Costs and Research Duration. Estimated costs have not been developed, but are expected to be greater than \$100,000 in order to get adequate sample size and representative geographical and geological coverage.

Urgency, Payoff Potential, and Implementation. Research could result in revised guidance that allows more cost-effective stormwater management techniques.

Research Proposer.

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