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Performance of porous asphalt pavements: stormwater quantity and quality mitigation

Anand Jayakaran

Washington State Univ., United States, anand.jayakaran@wsu.edu

Thorsten Knappenberger

Auburn Univ., United States, knappi@auburn.edu

John D. Stark

Washington State Univ., United States, starkj@wsu.edu

Curtis Hinman

Herrera Environmental Consultants, Inc., United States, chinman@herrerainc.com

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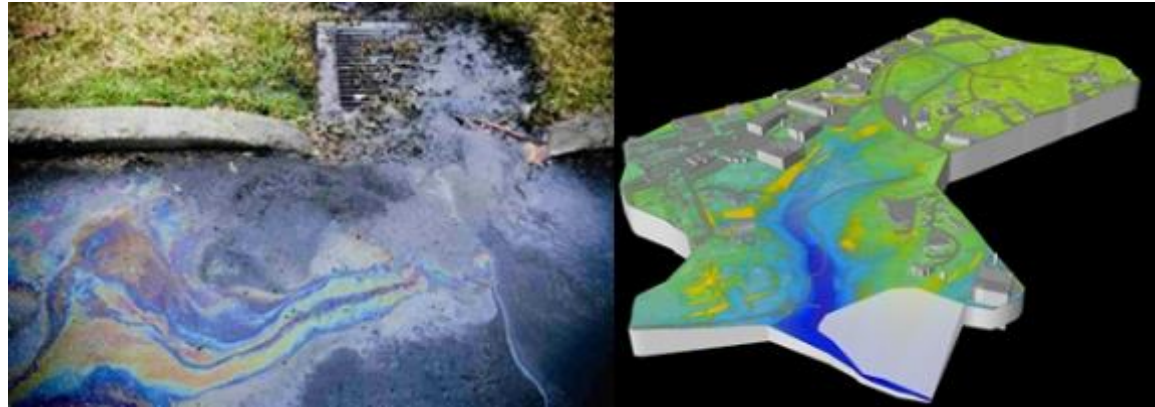
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Performance of Porous Asphalt Pavements - Stormwater Quantity & Quality Mitigation



Ani Jayakaran¹, Thorsten Knappenberger², John Stark³

¹Assoc. Prof., ³Prof. - Washington State University, Washington Stormwater Center

²Asst. Prof. - Auburn University

1) **Porous asphalt QUANTITY**– ability to attenuate stormwater, and effect of maintenance on infiltration rates

Attenuates peak flows, absorbs a LOT of rainfall

2) **Porous asphalt QUALITY**– pollutant treatment in general, effect of drain depth

Great for particulate matter!

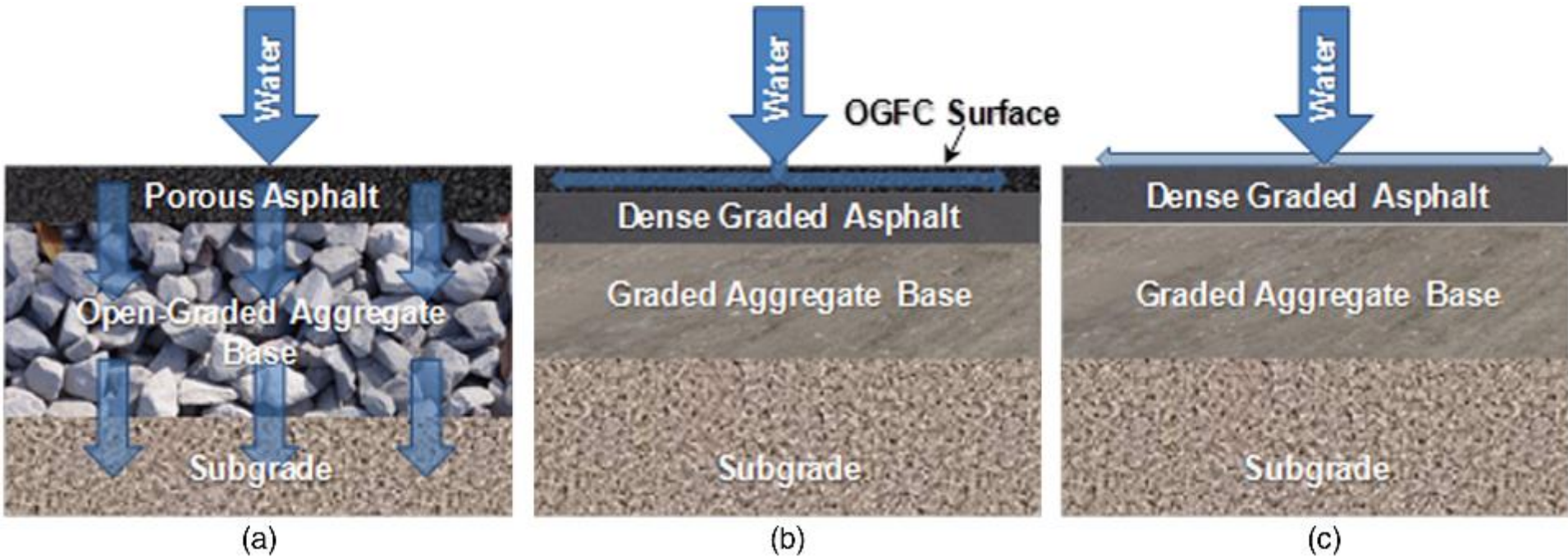
Permeable Pavements

An aerial photograph of a parking lot. The top portion of the lot is highlighted with a semi-transparent yellow overlay, and the bottom portion is highlighted with a semi-transparent blue overlay. The text 'Pervious Concrete' is centered over the yellow area, and 'Porous Asphalt' is centered over the blue area. Several cars are parked in the lot, and a light pole stands in the center. The background shows a grassy hillside and some trees.

Pervious Concrete

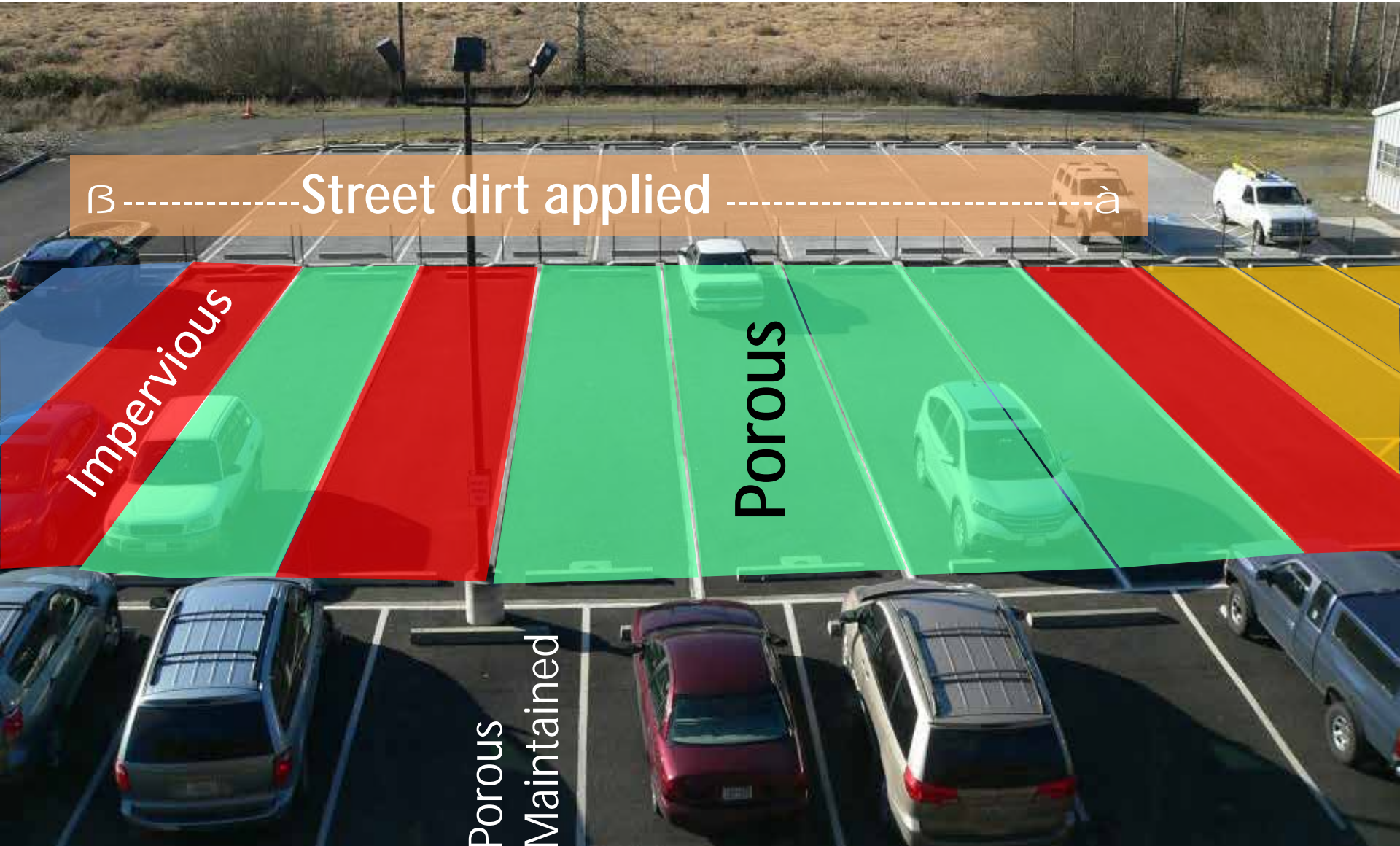
Porous Asphalt

Porous Asphalt Study



Putman, B.J. and Kline, L.C., 2012. Comparison of mix design methods for porous asphalt mixtures. *Journal of Materials in Civil Engineering*, 24(11), pp.1359-1367.

Porous Asphalt Experiment



β Street dirt applied α

Impervious

Porous

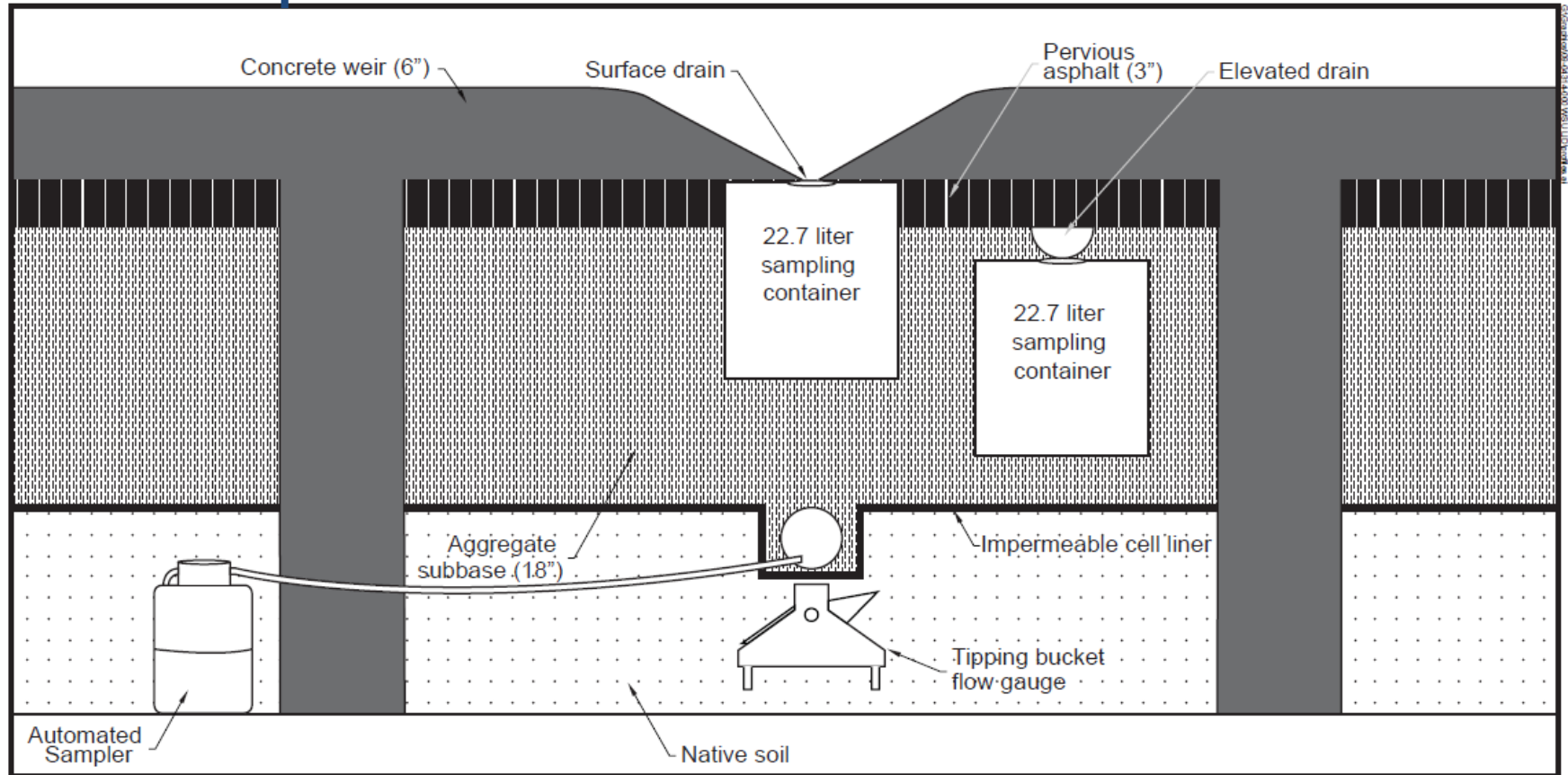
Porous
Maintained

Porous asphalt outflow



Porous Asphalt – water quality

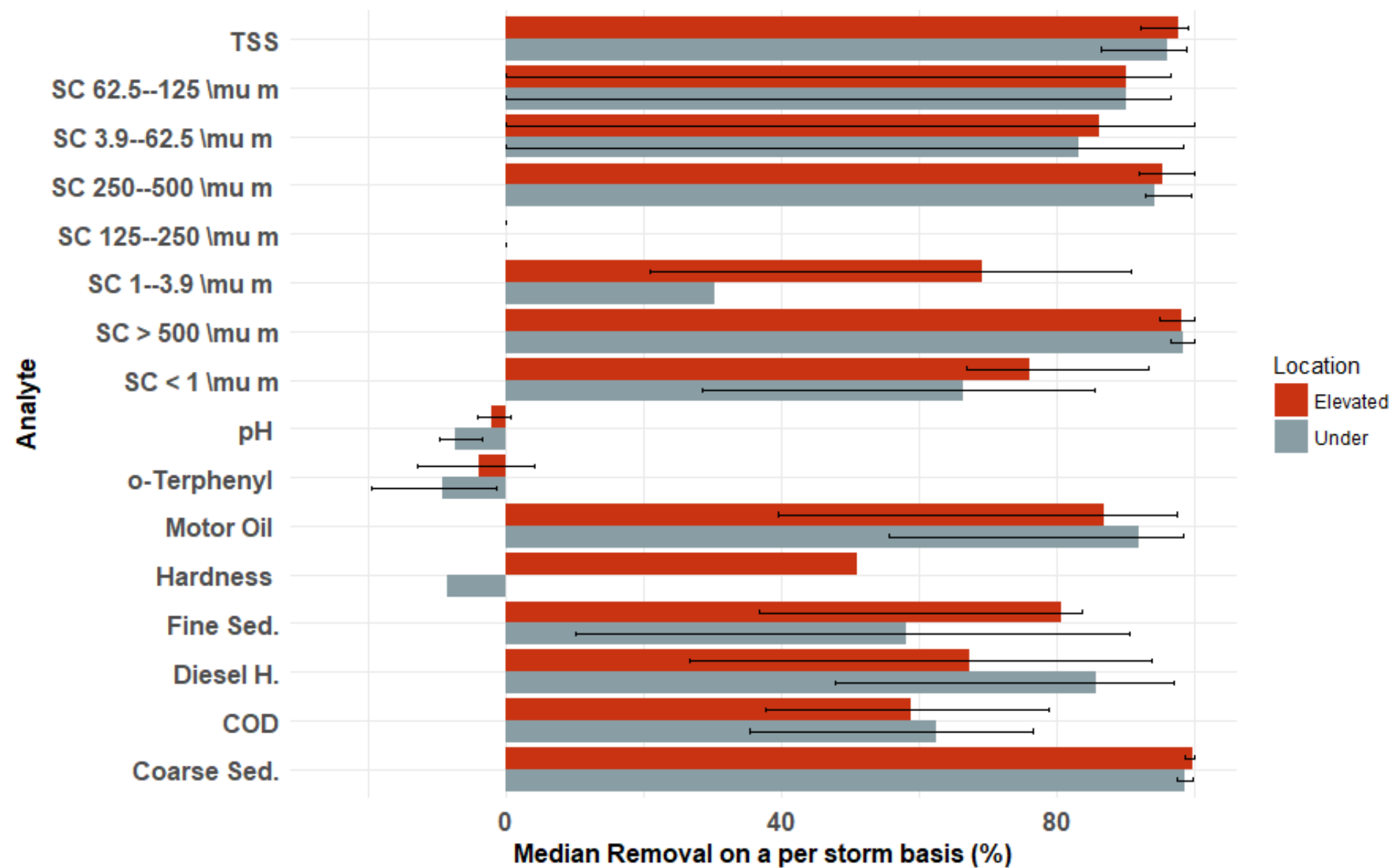
Porous asphalt



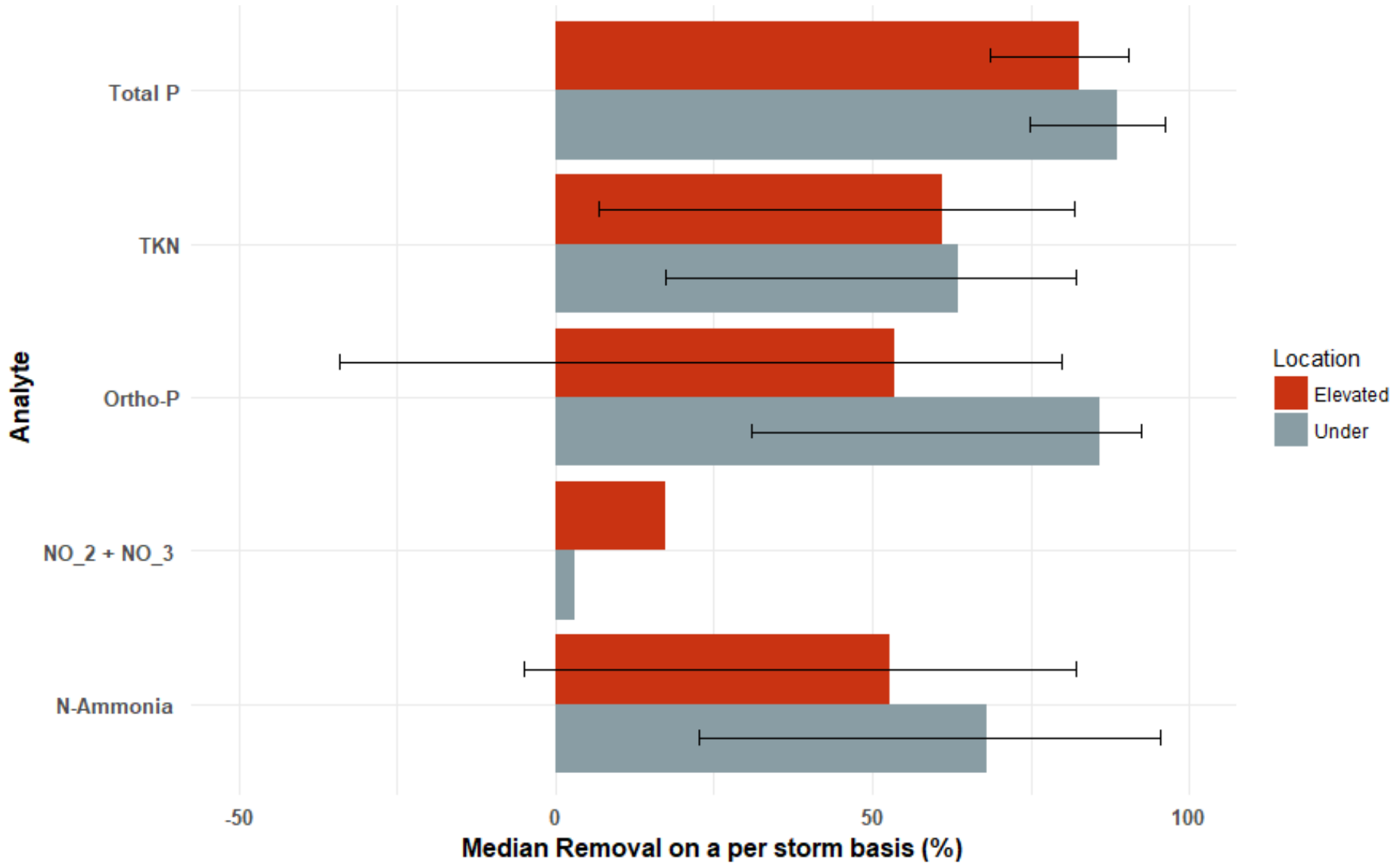
Water Quality Results



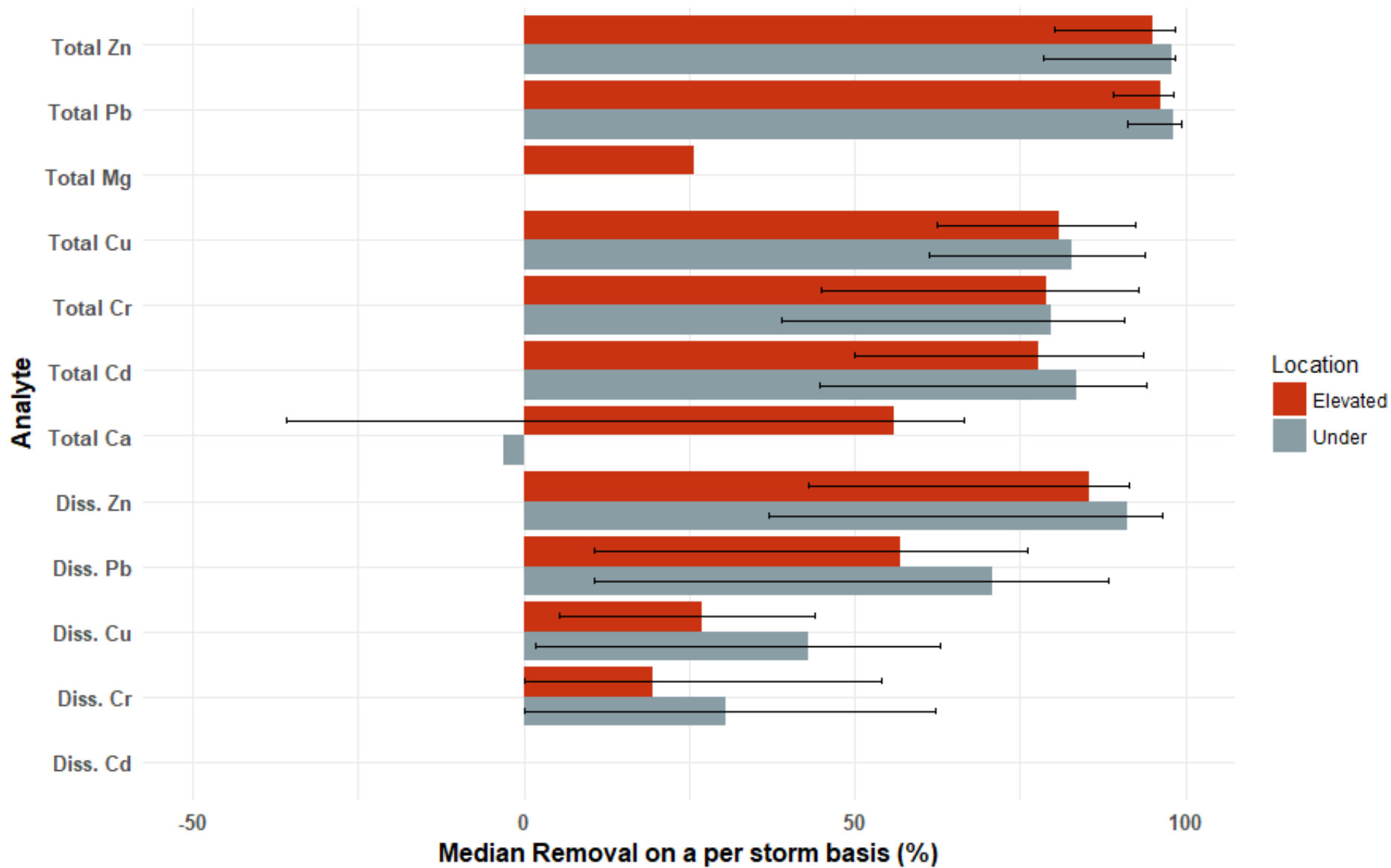
Conventionals



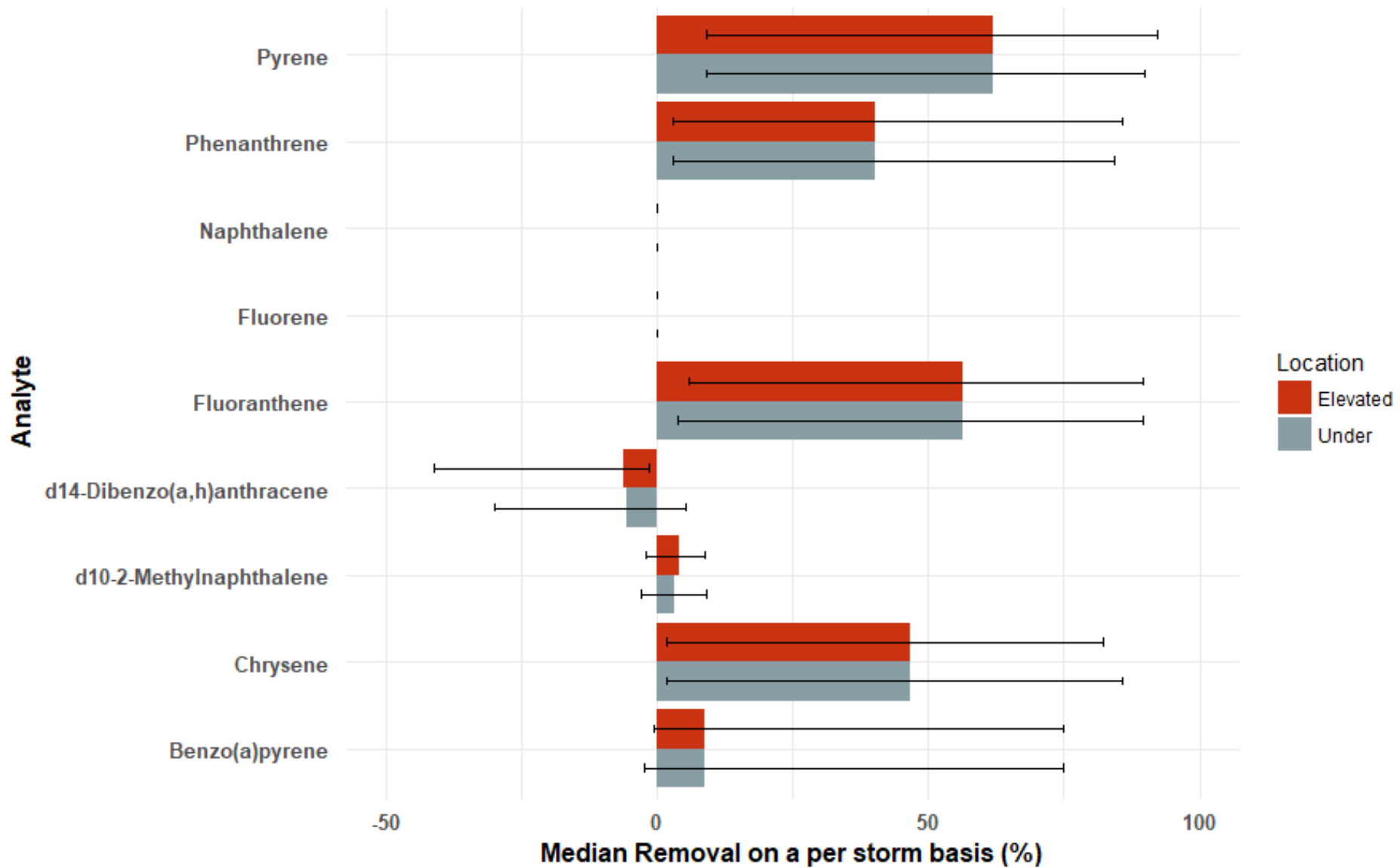
Nutrients



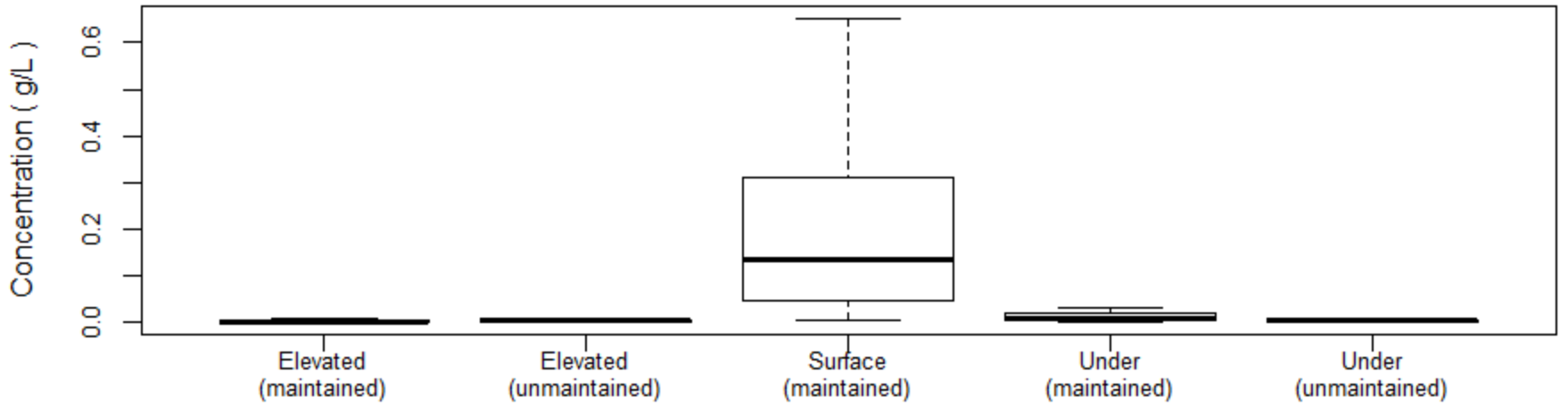
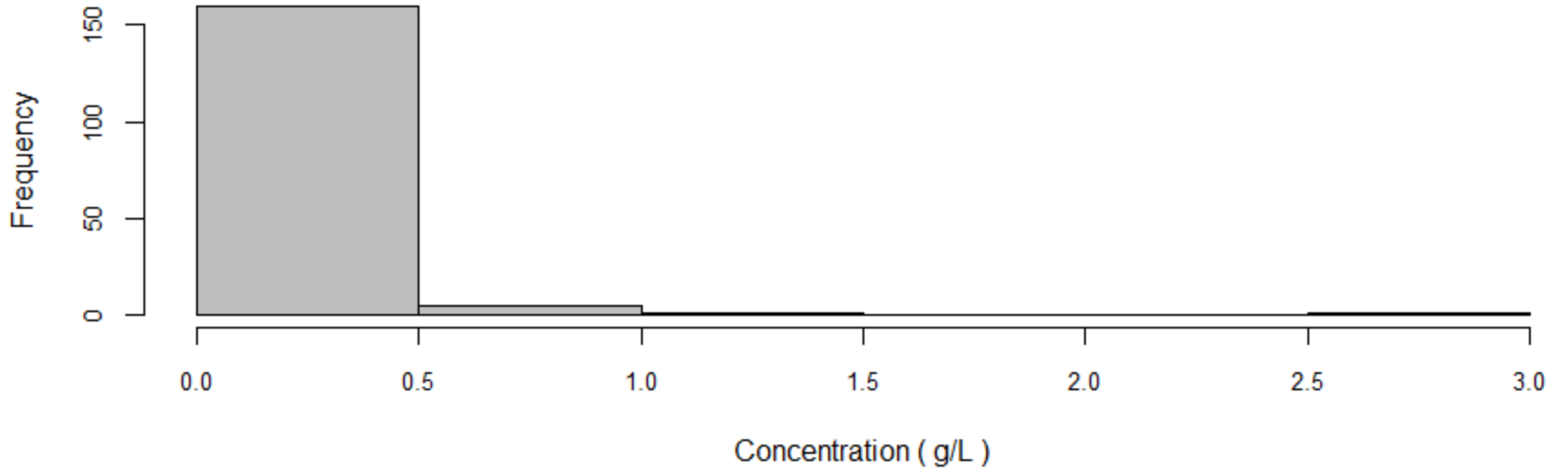
Metals



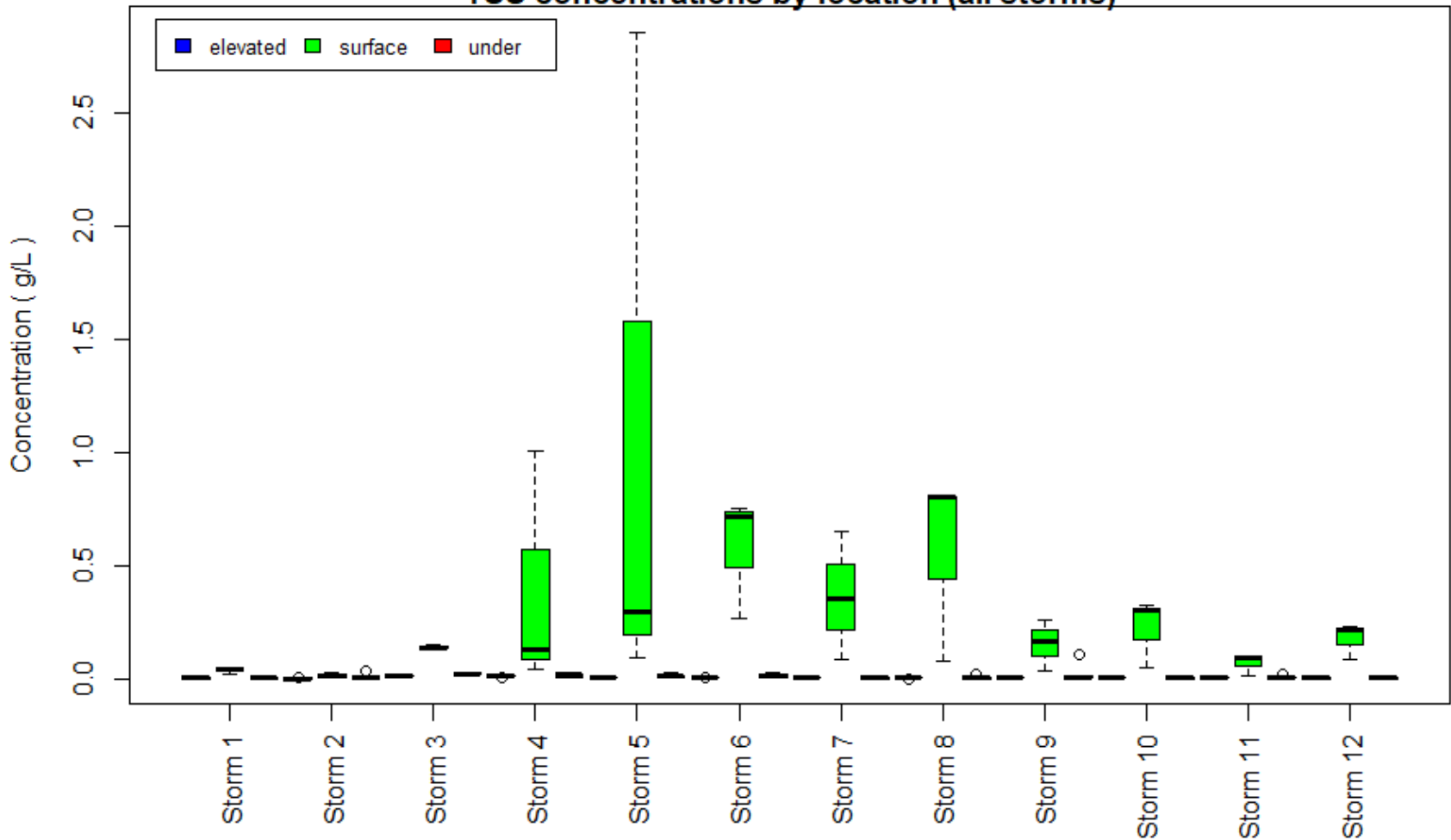
PAHs



TSS Concentrations (all samples)

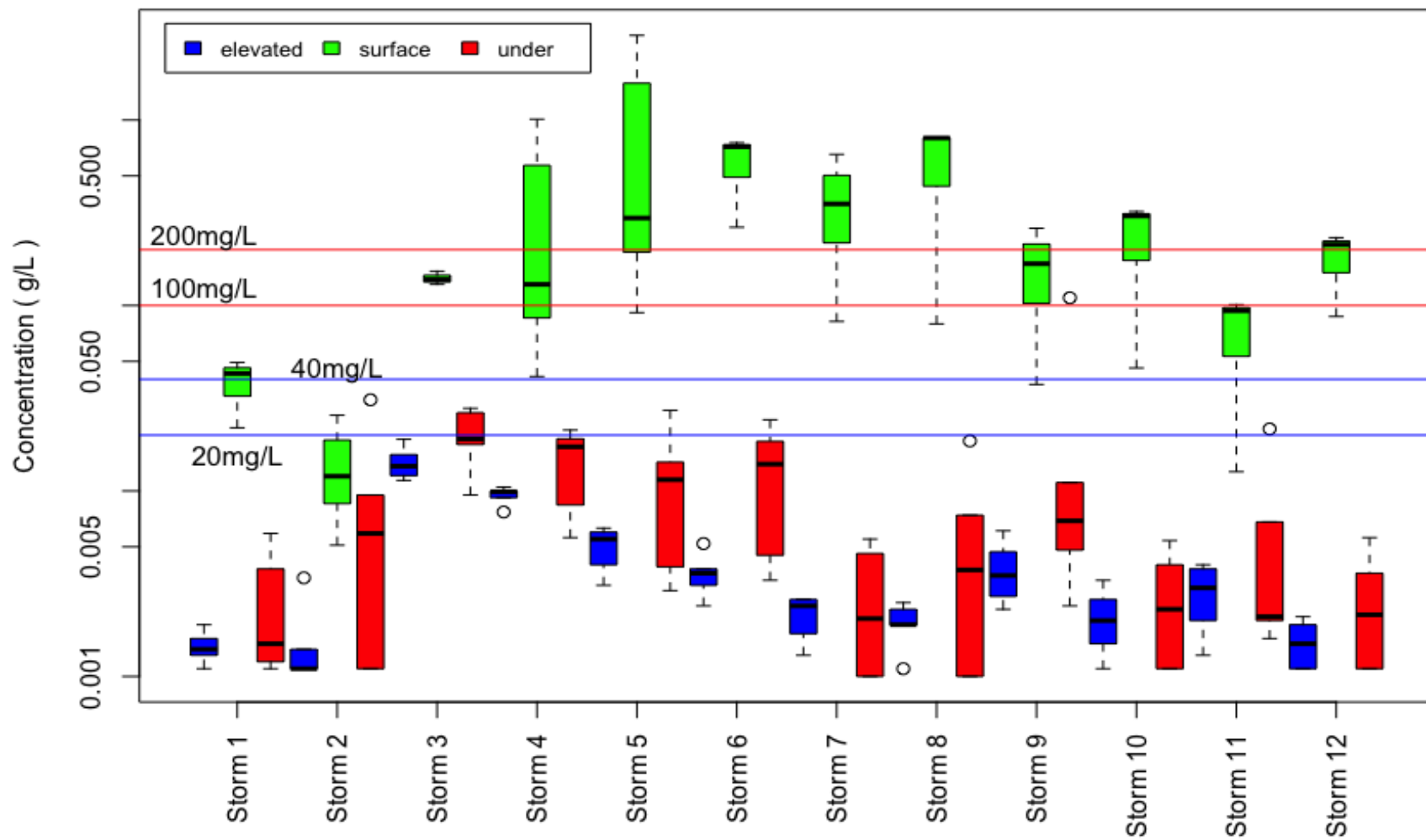


TSS concentrations by location (all storms)

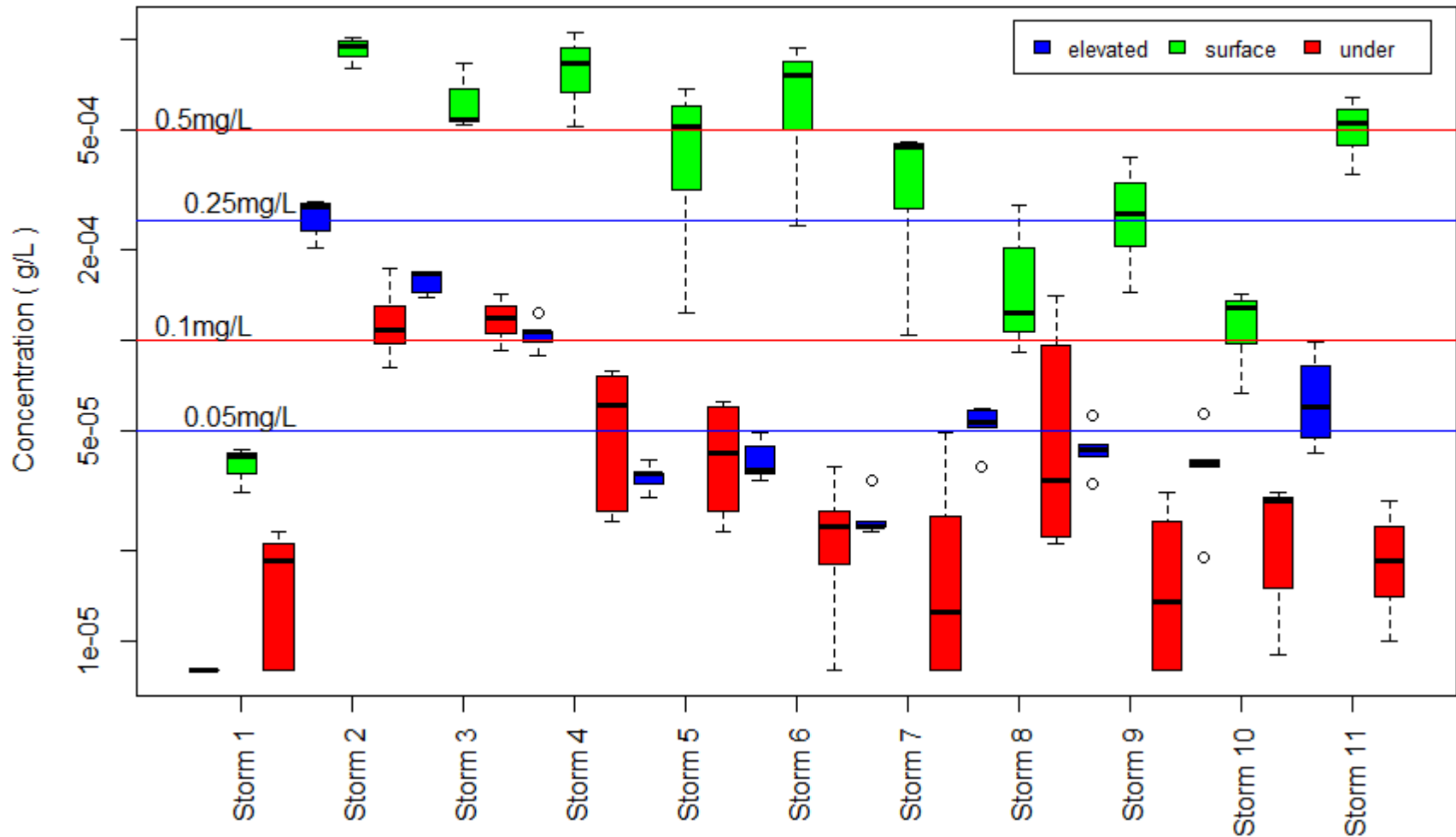


Performance Goal: The Basic Treatment Menu facility choices are intended to achieve 80% removal of total suspended solids for influent concentrations that are greater than 100 mg/l, but less than 200 mg/l. For influent concentrations greater than 200 mg/l, a higher treatment goal may be appropriate. For influent concentrations less than 100 mg/l, the facilities are intended to achieve an effluent goal of 20 mg/l total suspended solids.

TSS concentrations by location (all storms)



Total P concentrations by location (all storms)

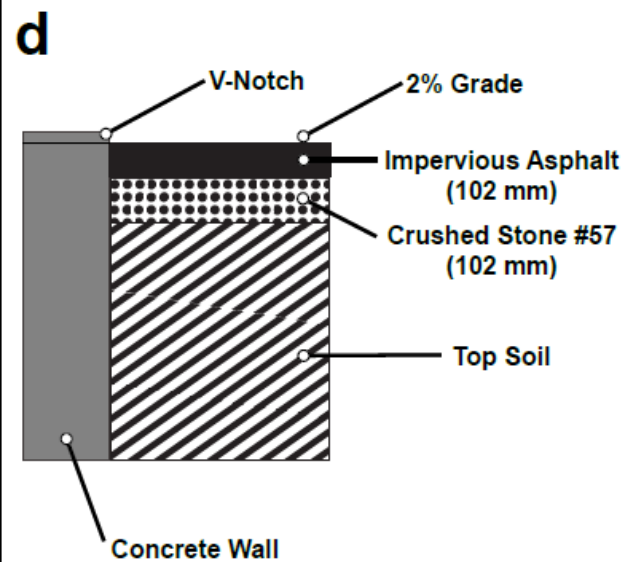
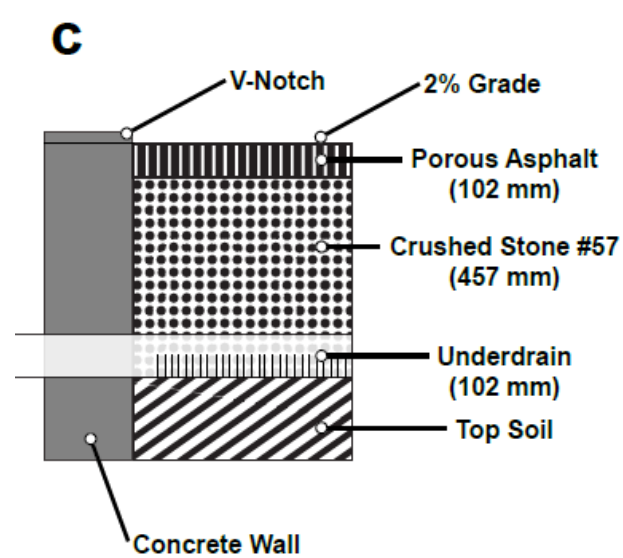
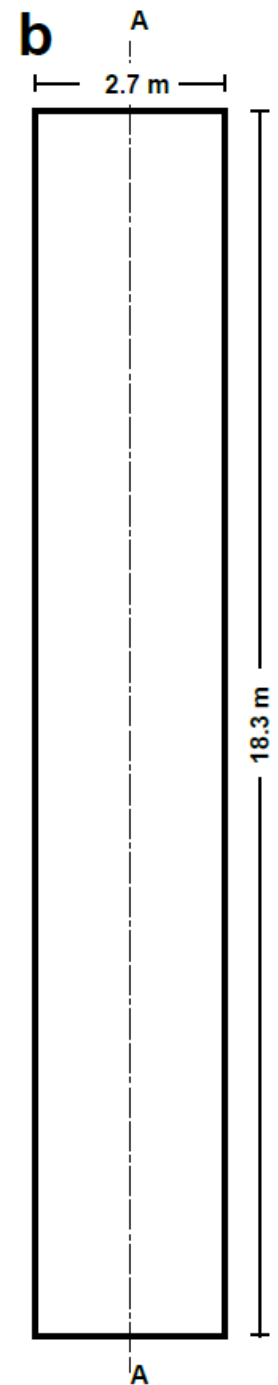
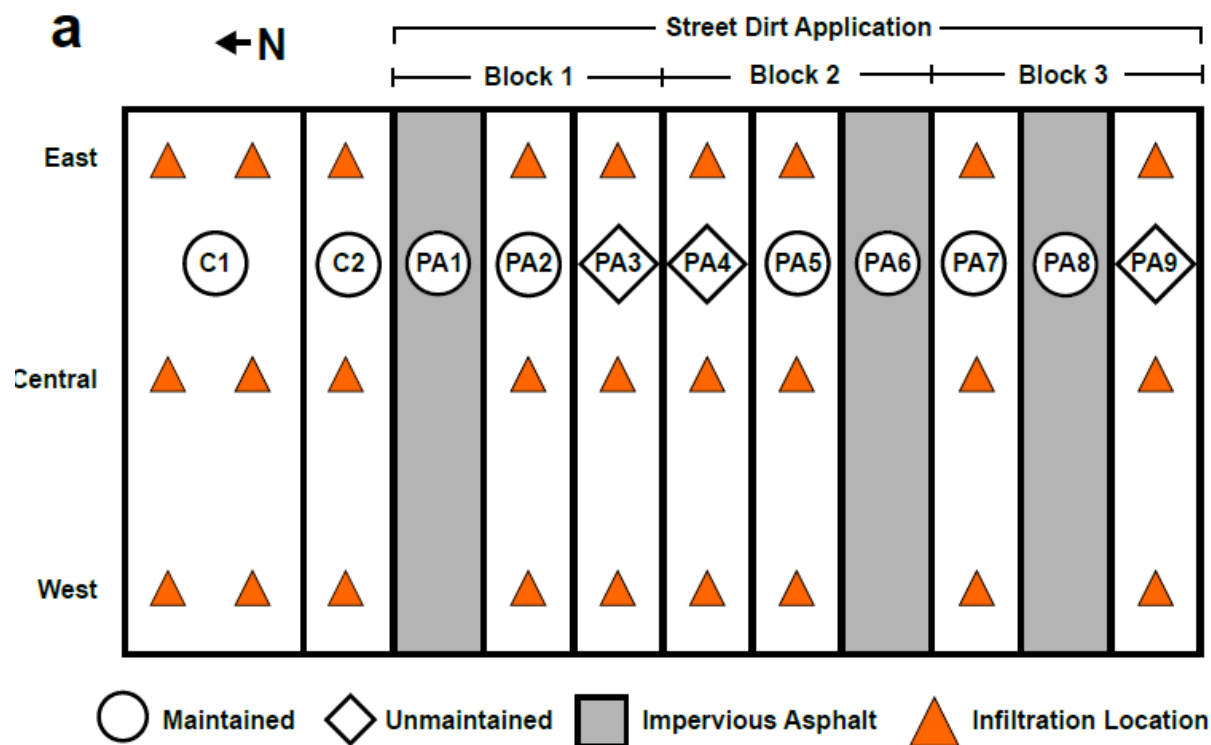


- Phosphorus Treatment: 50 percent removal of TP for influent concentrations ranging from 0.1 to 0.5 mg/L.



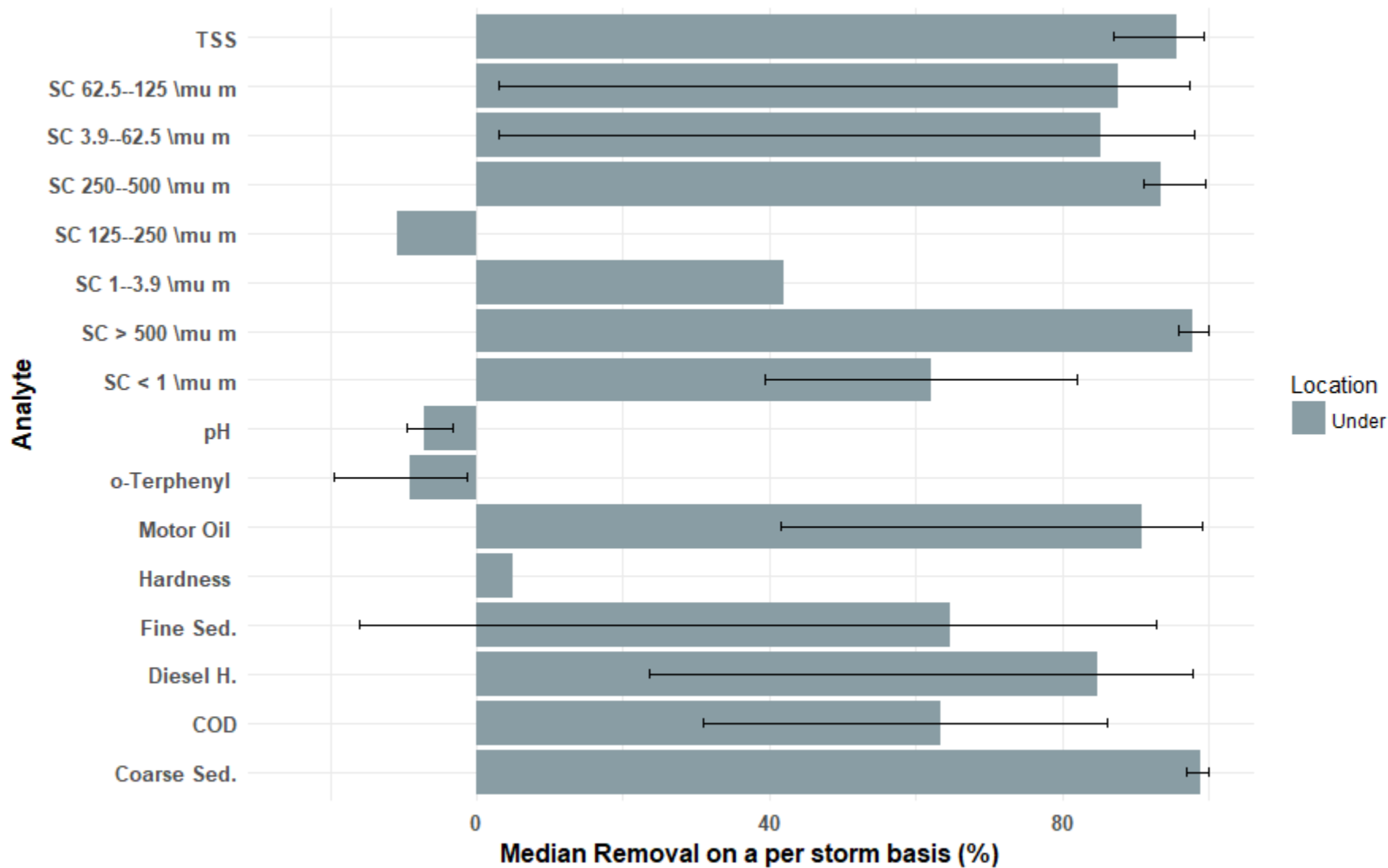
Thank you!

anand.jayakaran@wsu.edu

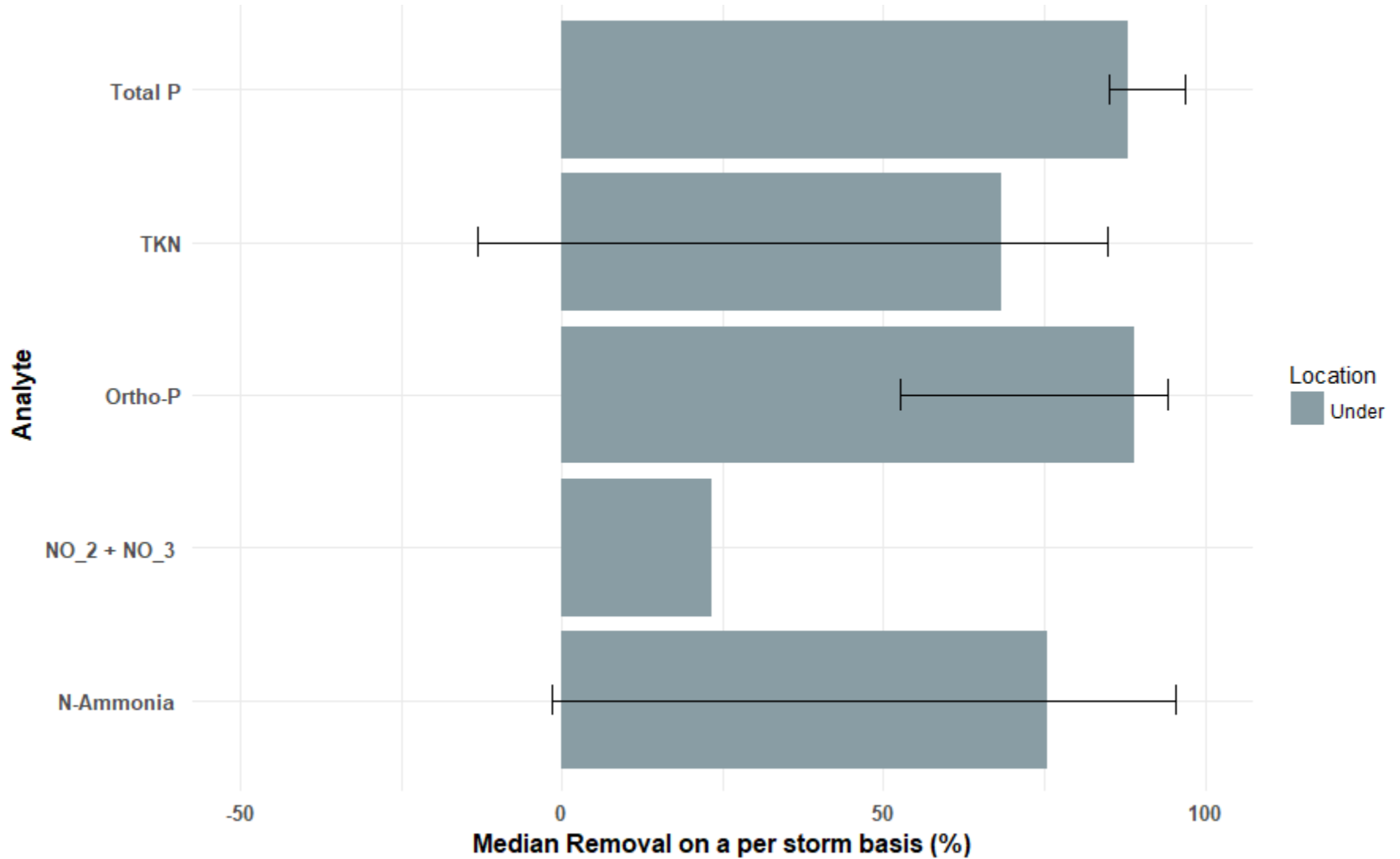


- **Basic Treatment:** 80 percent removal of TSS for influent concentrations that are greater than 100 milligrams/liter (mg/L), but less than 200 mg/L. For influent concentrations greater than 200 mg/L, a higher treatment goal may be appropriate. For influent concentrations less than 100 mg/L, the facilities are intended to achieve an effluent goal of 20 mg/L TSS.
- **Enhanced Treatment:** Provide a higher rate of removal of dissolved metals than most basic treatment facilities. The performance goal assumes that the facility is treating stormwater with dissolved copper typically ranging from 0.003 to 0.02 mg/L, and dissolved zinc ranging from 0.02 to 0.3 mg/L. Data collected for an “enhanced” best management practice (BMP) should demonstrate significantly higher removal rates than basic treatment facilities.
- **Phosphorus Treatment:** 50 percent removal of TP for influent concentrations ranging from 0.1 to 0.5 mg/L.
- **Oil Treatment:** No ongoing or recurring visible sheen, a daily average total petroleum hydrocarbon concentration no greater than 10 mg/L, and a maximum of 15 mg/L for a discrete (grab) sample.

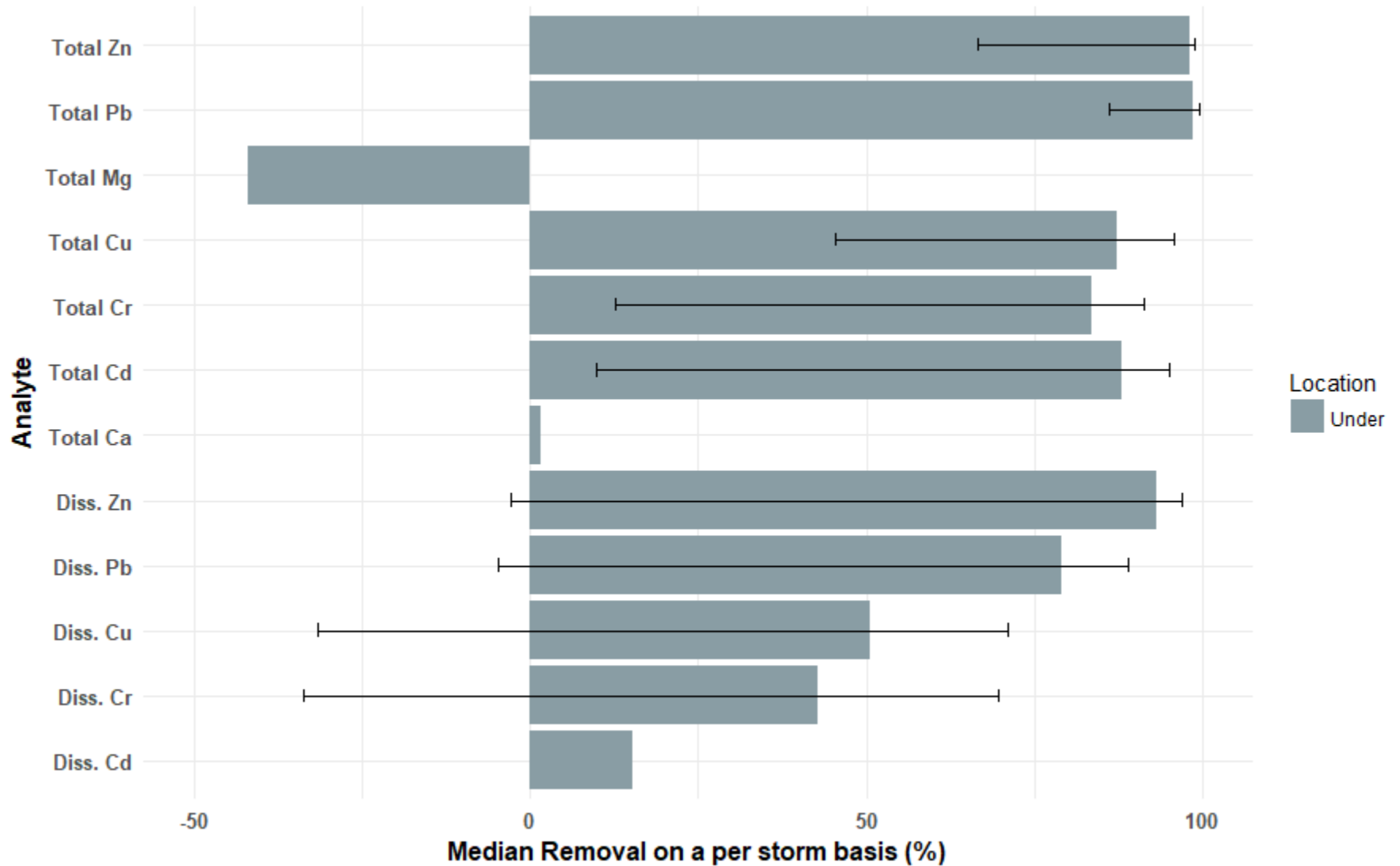
Conventionals Loads



Nutrient Loads



Metals Loads



PAH Loads

