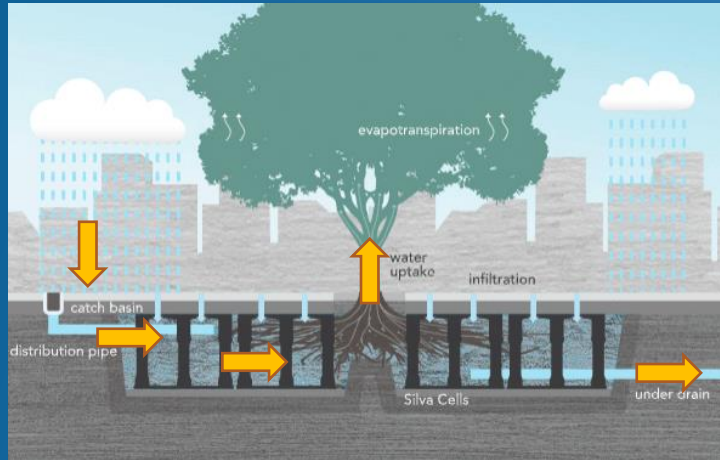




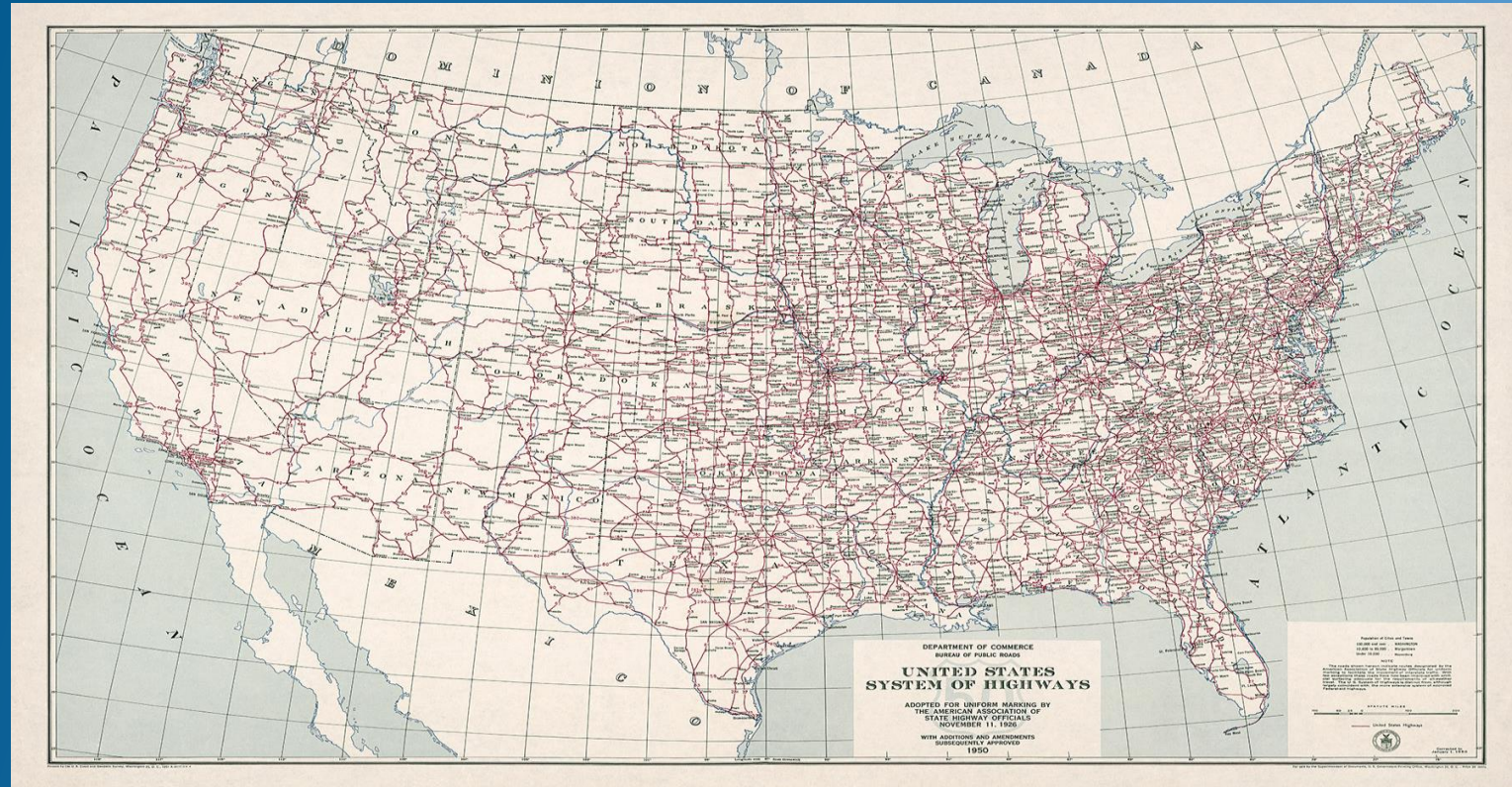
Turning the Nation's road infrastructure into a network of stormwater treatment systems



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Nation's road as a network of stormwater treatment systems



Compaction Study - Challenges



Design of urban stormwater treatment sites



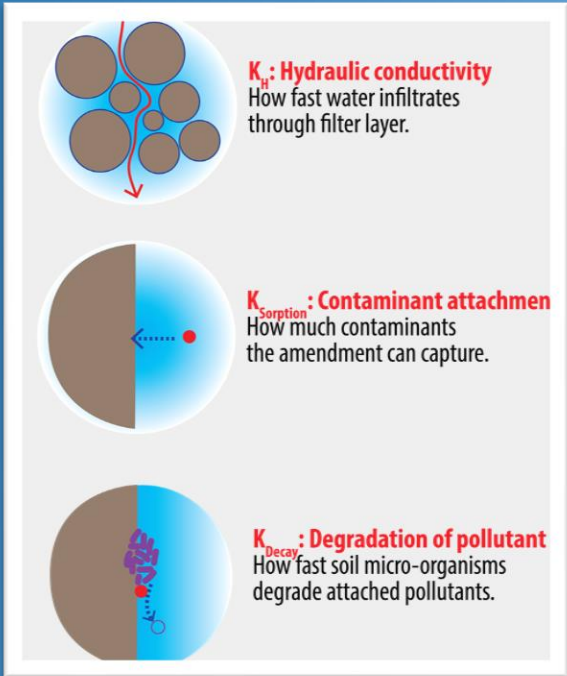
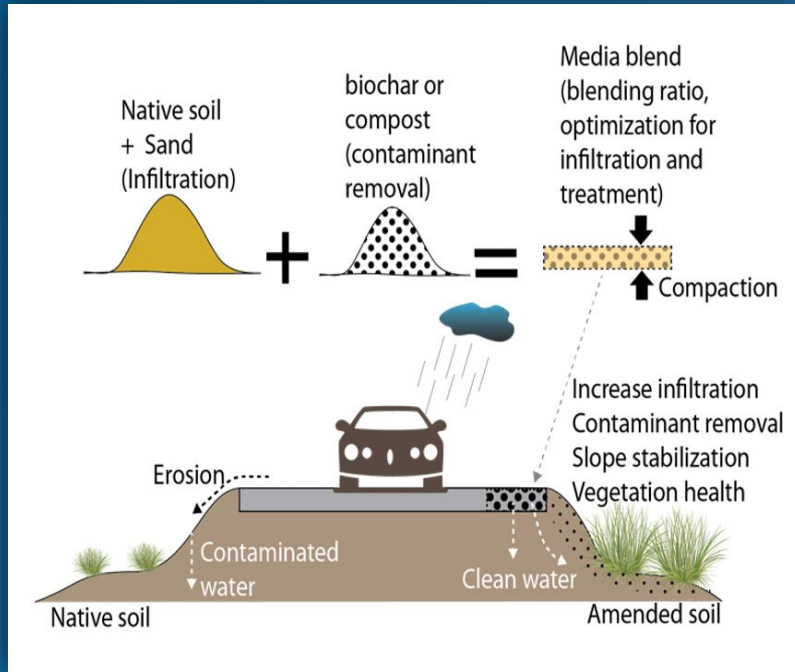
Selection of appropriate size range for compaction minimization and pollutant removal



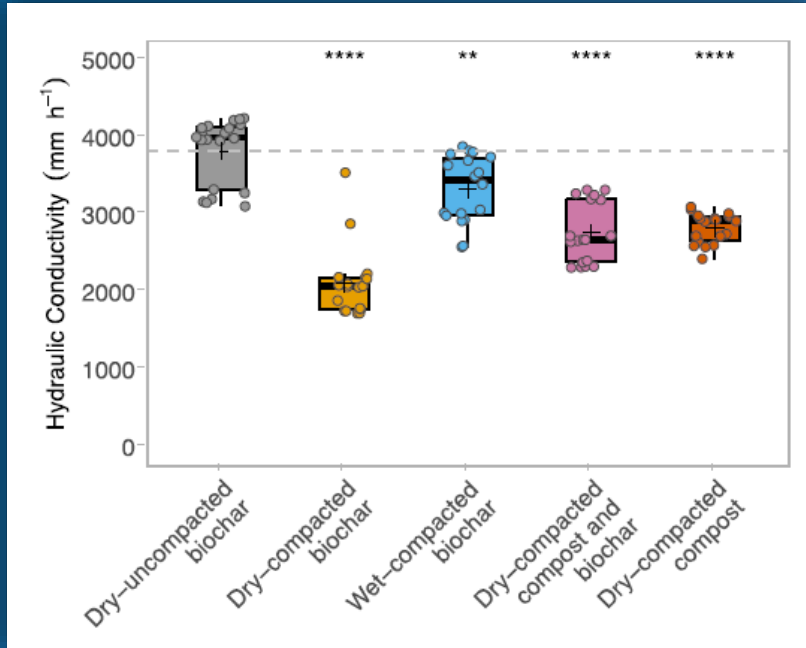
Cost-effective method for prediction of clogging of the biofilter



CALTRANS: Next-Generation Green Infrastructure for Stormwater Treatment



Biochar helps infiltration (K_H)



Science of The Total Environment
Volume 735, 15 September 2020, 139180



Compaction conditions affect the capacity of biochar-amended sand filters to treat road runoff

Maryam Ghavanloughajar ^a, Renan Valenca ^a, Huong Le ^a, Merrick Rahman ^a, Anness Borthakur ^a, Sujith Ravi ^b, Michael K. Stenstrom ^a, Sanjay K. Mohanty ^{a, R, OR}

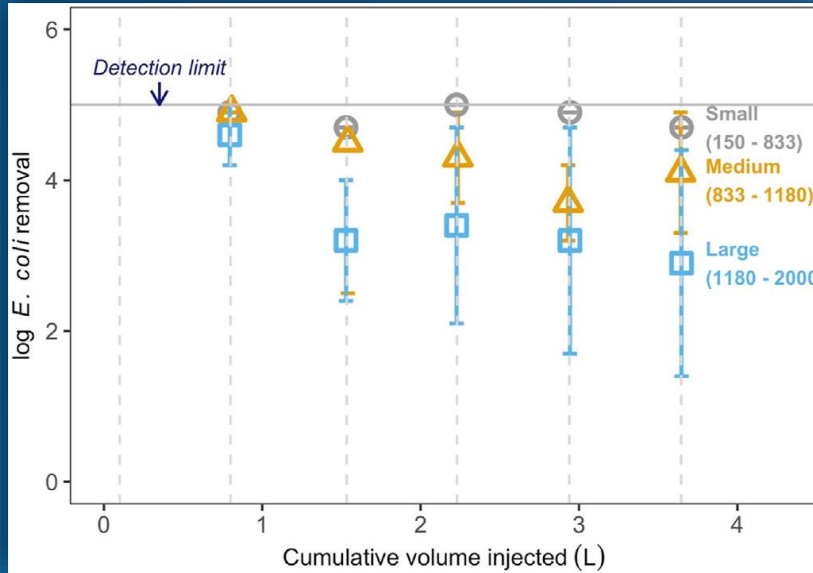
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<https://doi.org/10.1016/j.scitotenv.2020.139180> [Get rights and content](#)

Highlights

- Wet-compacted columns released more biochar particles than dry-compacted columns.
- Net initial loss of biochar particles due to compaction was insignificant.
- Compaction decreased hydraulic conductivity, but the presence of water reduced the impact.
- Compaction increased stormwater interaction with filter media.
- Wet-compacted columns removed more *E. coli* than dry-compacted columns.

Biochar removes pollutants (K_{Sorption})



Environmental Pollution
Volume 266, Part 1, November 2020, 115195

ELSEVIER

Size-dependent biochar breaking under compaction: Implications on clogging and pathogen removal in biofilters ☆

Huong Le ^a, Renan Valença ^a, Sujith Ravi ^b, Michael K. Stenstrom ^c, Sanjay K. Mohanty ^{a, R, E}

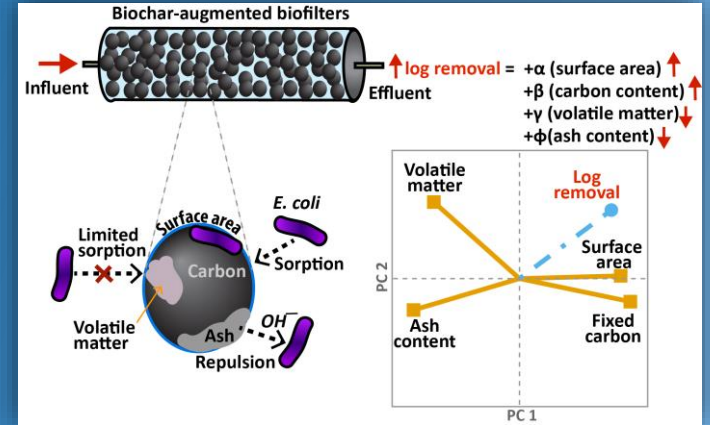
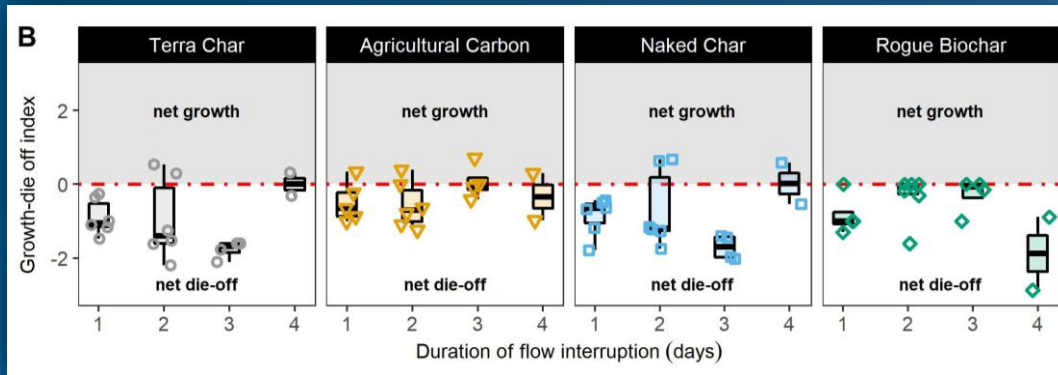
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<https://doi.org/10.1016/j.envpol.2020.115195> Get rights and content

Highlights

- Most of broken biochar particles during compaction were trapped in biofilters.
- Dominant biochar breaking process was disintegration, not abrasion.
- Disintegration was prominent when biochar particle size was small.
- Exponential model predicted the clogging of compacted biofilters.
- *E. coli* removal and clogging rate was highest in the filters with smallest biochar.

Biochar affects microbial community (K_{Decay})



Valenca, R., Mohanty, S. K. et al. (2020) Biochar selection for Escherichia coli removal in stormwater biofilters. *Journal of Environmental Engineering*, just accepted.



Summary



In compacted soil,

Biochar helps:

- ✓ **Infiltrate** water
- ✓ **Adsorb** pollutant
- ✓ **Degrade** pollutant



Biochar could transform the roadside soil into a natural filter!

OBRIGADO! THANK YOU!



UCLA SEALab

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