

Stormwater Infiltration Patterns in Vacant Lots in the Phoenix Metro Area



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How do soil conditions vary across urban vacant lots in Phoenix? How do they compare to previously mapped national soil survey data? What are the implications for stormwater retention and flooding prevention?

Overview

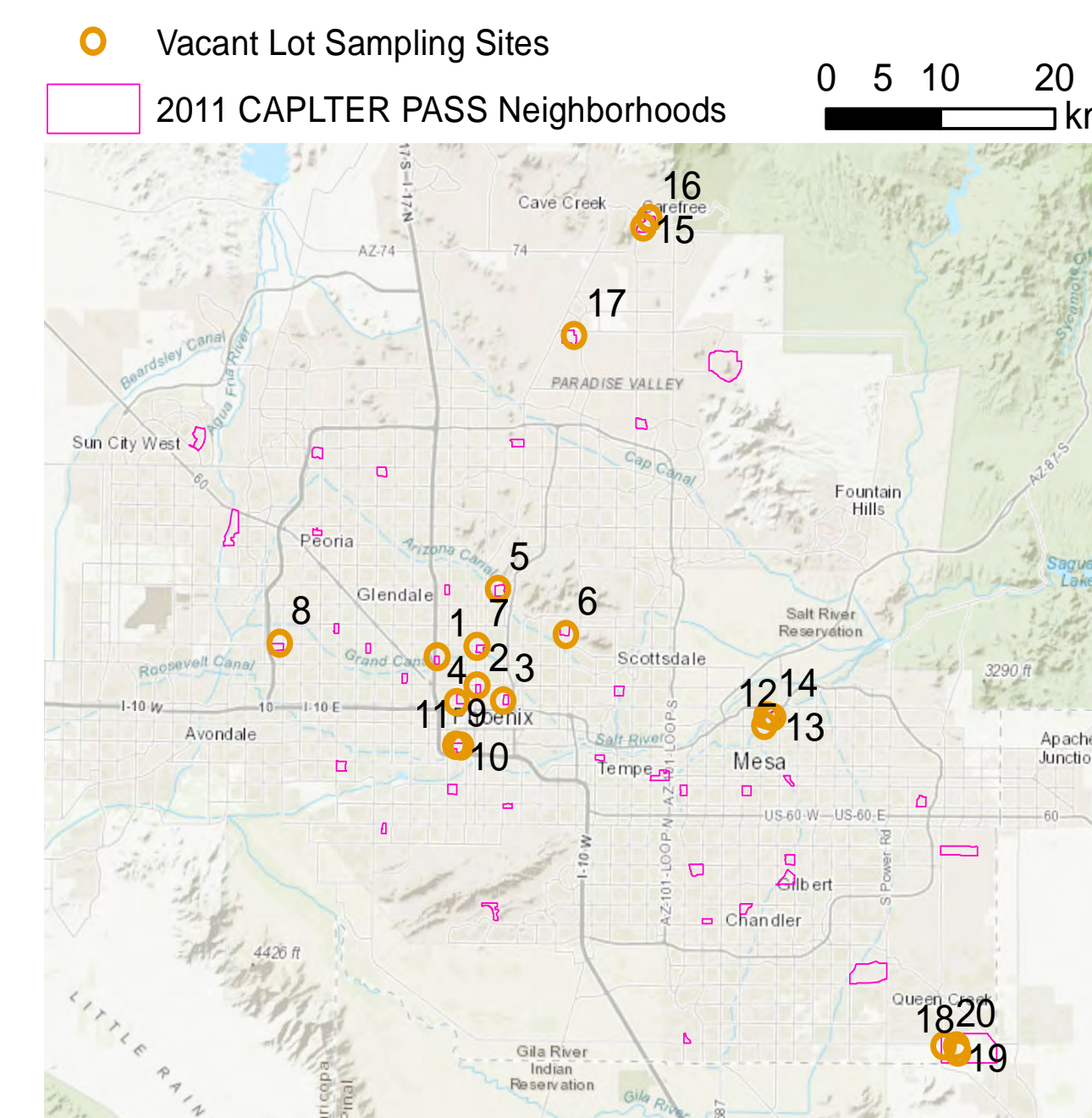
Vacant land in Phoenix comprises 6.5% of the total city area. This land could be a potential asset or a vulnerability, depending on the state of these vacant properties.

We focused here on soil properties, with the goal of understanding how these vacant lot soils might play a role in stormwater retention and prevent local flooding.



Sites & Methods

We selected 20 vacant lots which were all located in CAP PASS (Phoenix Area Social Survey) neighborhoods distributed throughout the Phoenix metropolitan area.



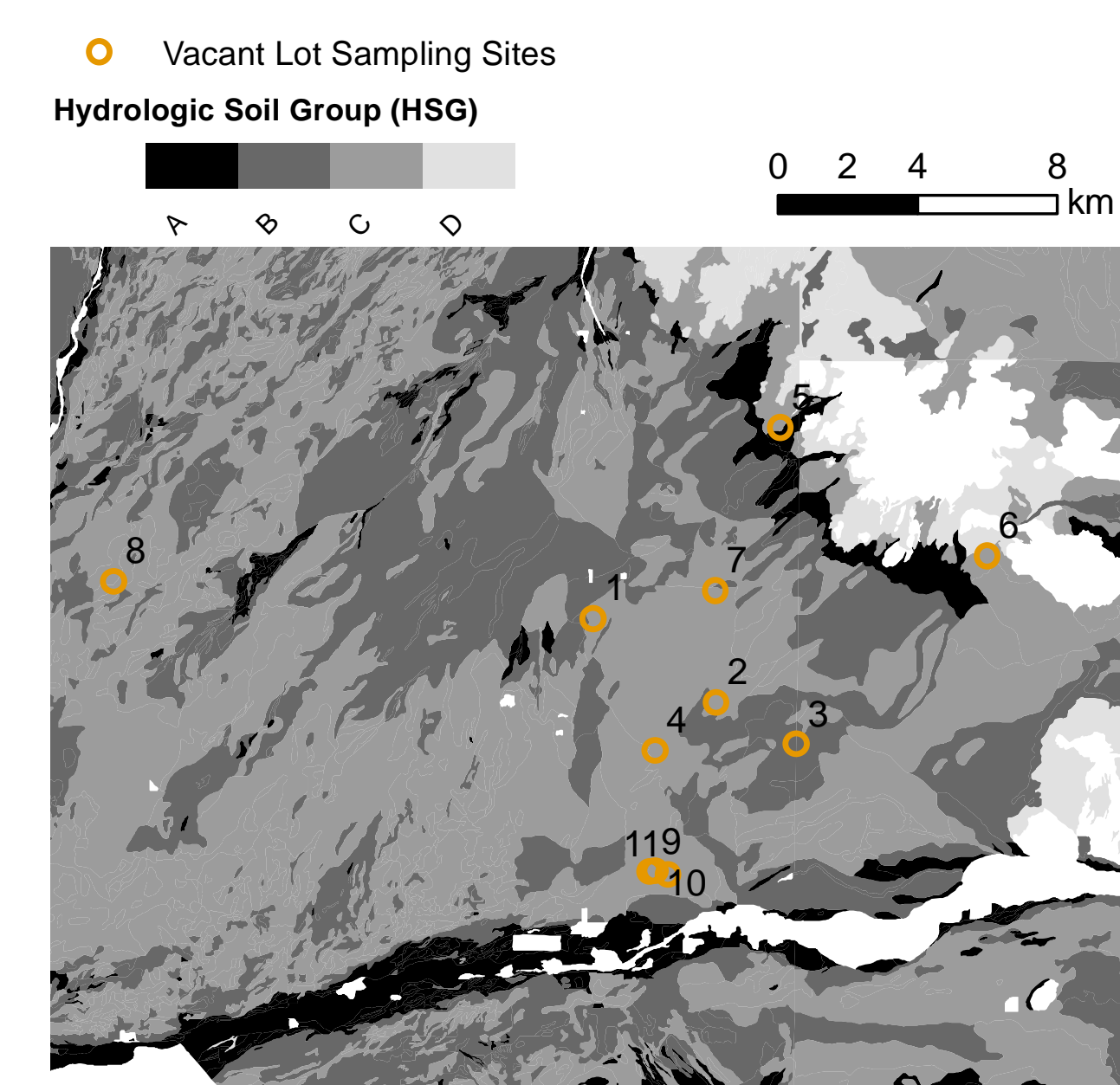
Field sampling of soil physical characteristics



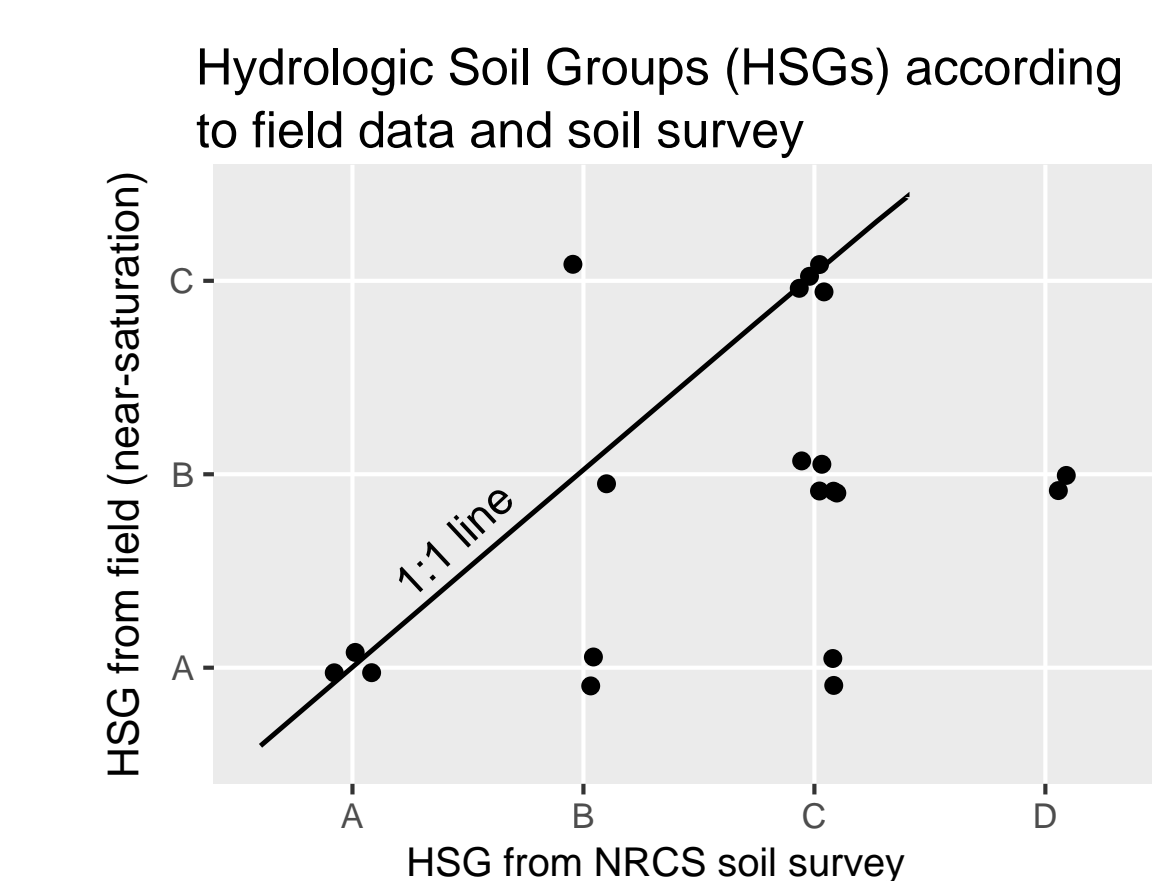
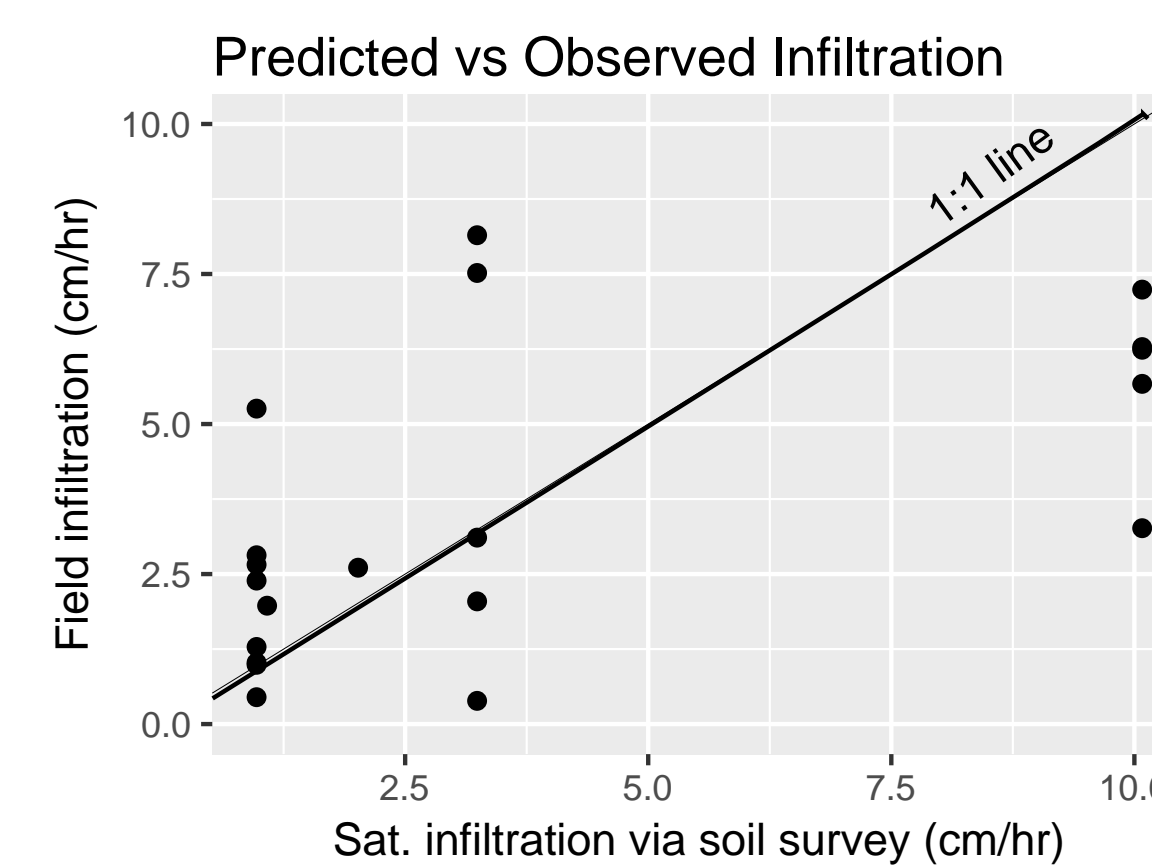
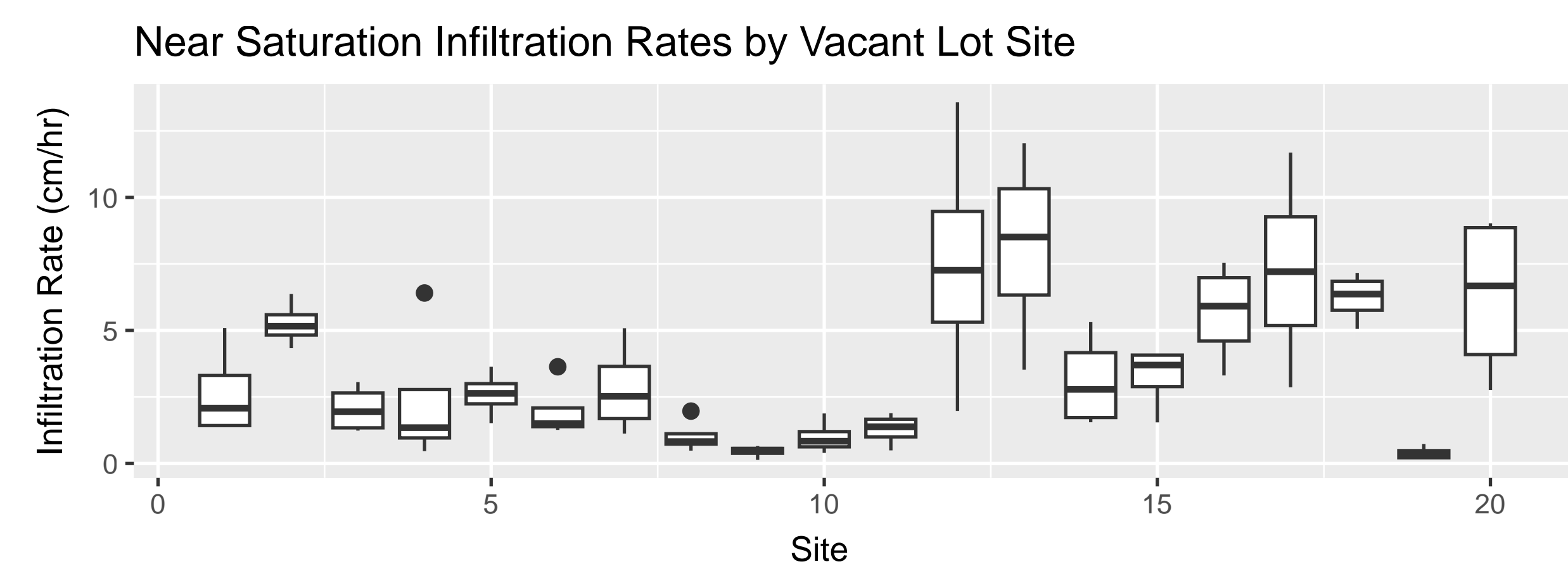
Tension infiltrometer for near-saturated infiltration rate

Single ring infiltrometer for saturated infiltration rate

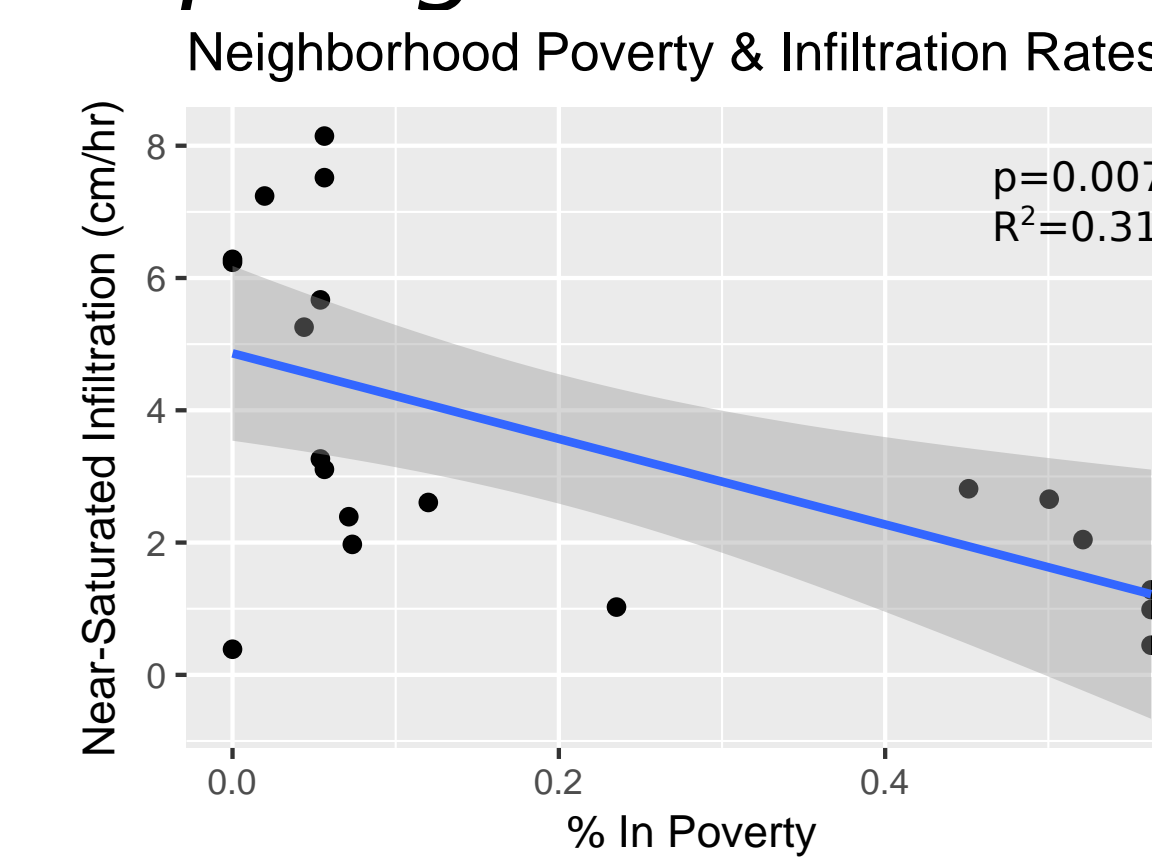
Comparison with NRCS spatial soil survey data



Results

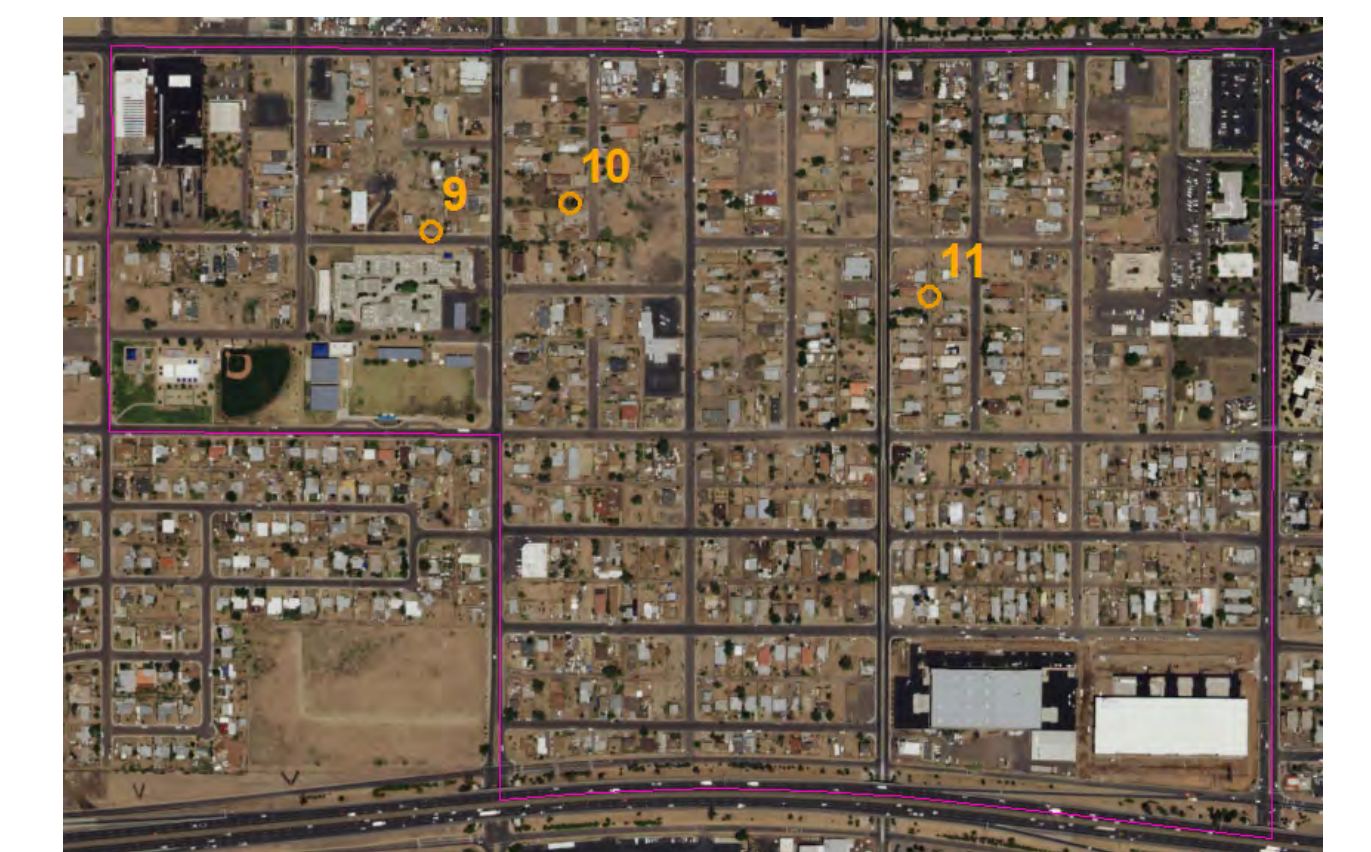


Spotlight on vulnerability related to vacancy & drainage



Lower (worse) infiltration rates were found in vacant lots in more impoverished neighborhoods

Sites 9-11 in SevenEleven PASS neighborhood



The SevenEleven PASS neighborhood in South Phoenix has high vacancy, poor engineered drainage, and lowest observed infiltration rates

There is substantial variability in infiltration rates in vacant lots across the region.

The two field infiltration methods do not always agree, even in terms of relative trends.

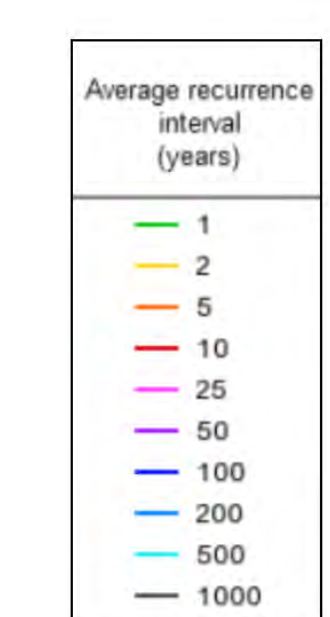
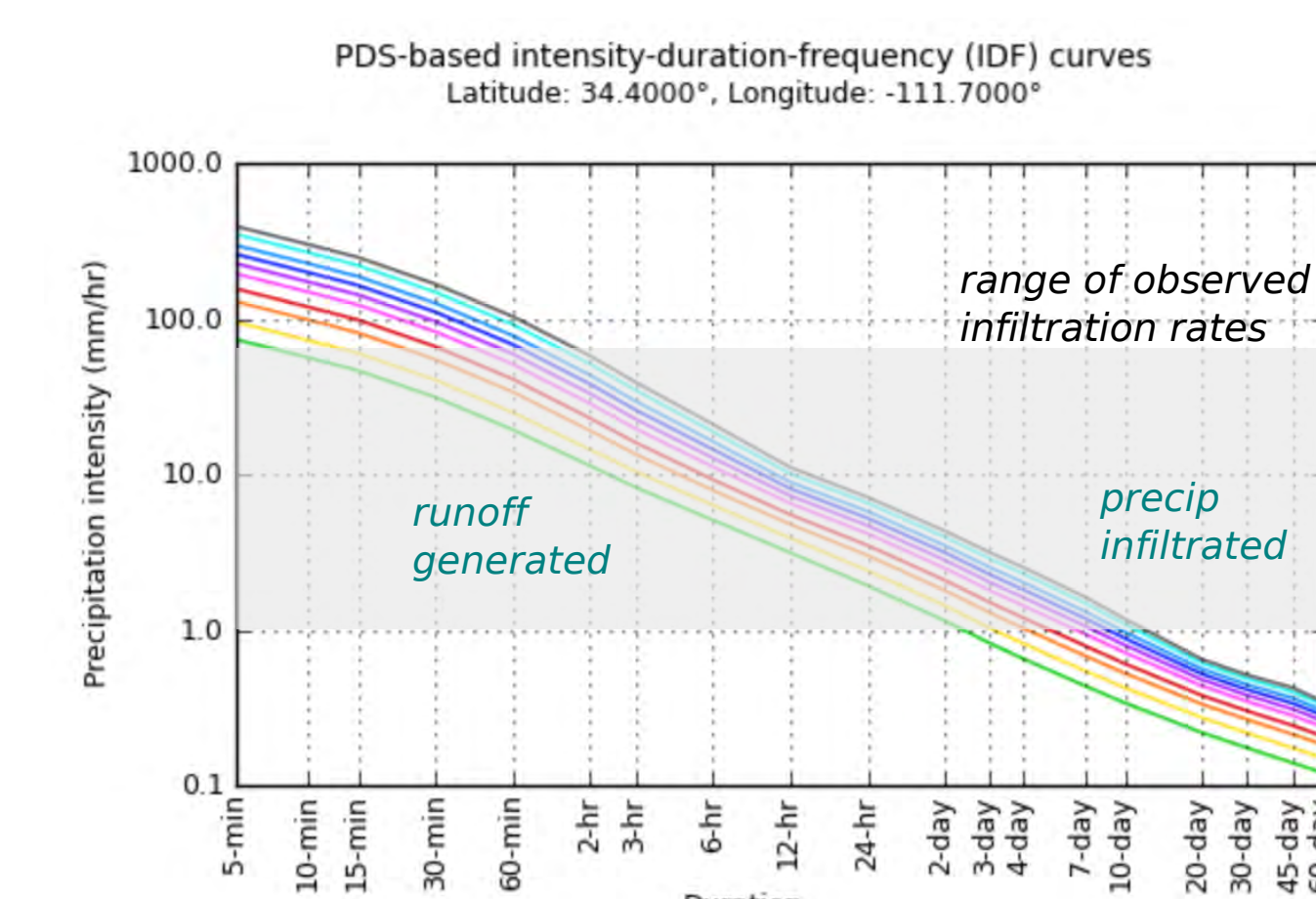
There is mediocre agreement between soil survey data and measured field infiltration, though observed infiltration was often better than predicted

Conclusions

- Infiltration rates were highly variable across vacant lots, and this has important implications for whether or not runoff is generated during storm events
- Some of the lowest infiltration rates were in socially vulnerable neighborhoods
- There are substantial discrepancies between these observations and NRCS soil survey data

Next Steps

- Assess influence of demolition history on soil properties at these lots
- Possible field evaluation of vacant lots in other UREx SRN cities
- Incorporation of these findings into runoff modeling of vacant lots



Observed infiltration rates in these vacant lots will influence whether runoff is generated in various storm events

Acknowledgements

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