Characteristics of the Urban Sewer System and Rat Presence

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Overview

Background

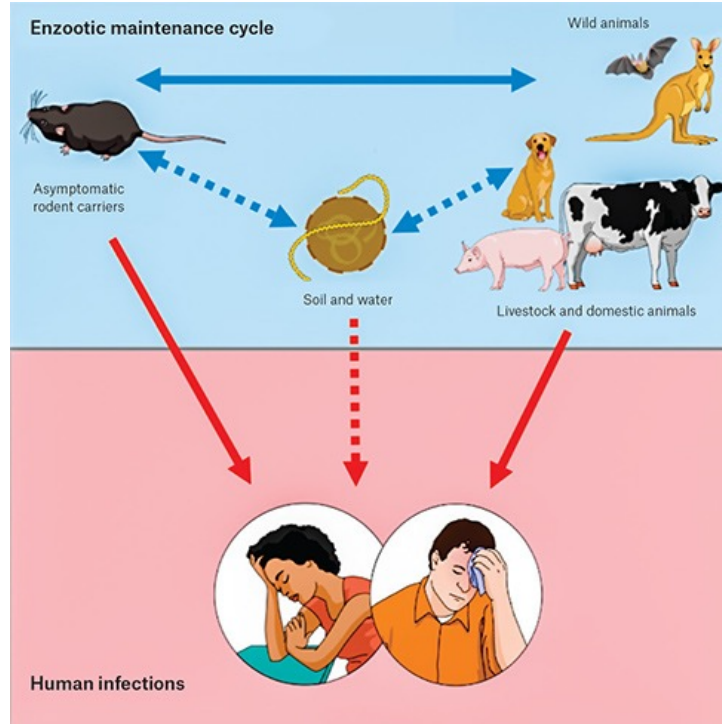Systematic Review

Predictive Modeling

Strengths and Limitations

Implications

Why Manage Rats?

Enzootic maintenance cycle

Wild animals

Asymptomatic rodent carriers

Soil and water

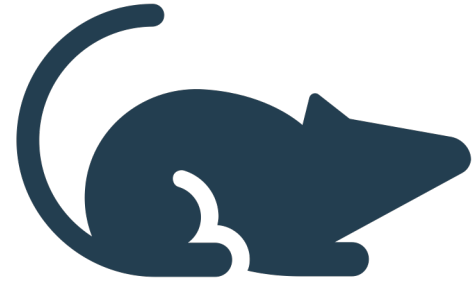Livestock and domestic animals

Human infections

Systematic Review   Predictive Model   Rat Management

A systematic review of Rat Ecology in Urban Sewer Systems

Xiaocong Guo[1] · Chelsea G. Himsworth[1,2,3] · Michael J. Lee[1,3] · Kaylee A. Byers[1,3]

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Sewer Diameter & Flow Rate
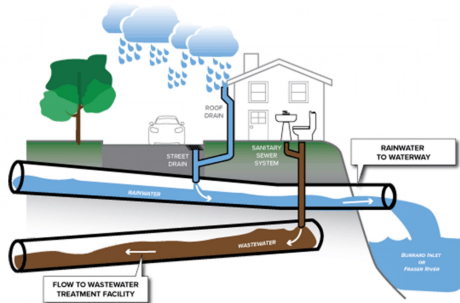

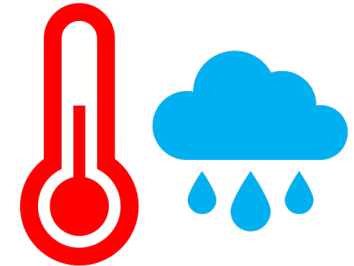## Sewer Materials

Sewer Maintenance

Sanitary vs Storm vs Combined

Residential Zoning & Vegetation Coverage

Temperature & Precipitation

Characteristics of the urban sewer system and rat presence in Seattle

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Chelsea G. Himsworth[1,2,4]

- Data collected in Seattle

- February 2016 - September 2019

- 1752 baited manholes

- Data

  - Baiting records

  - Manhole characteristics

  - Sewer line characteristics

  - Surface characteristics

  - Meteorological parameters

- Statistical Analysis

  - GAM
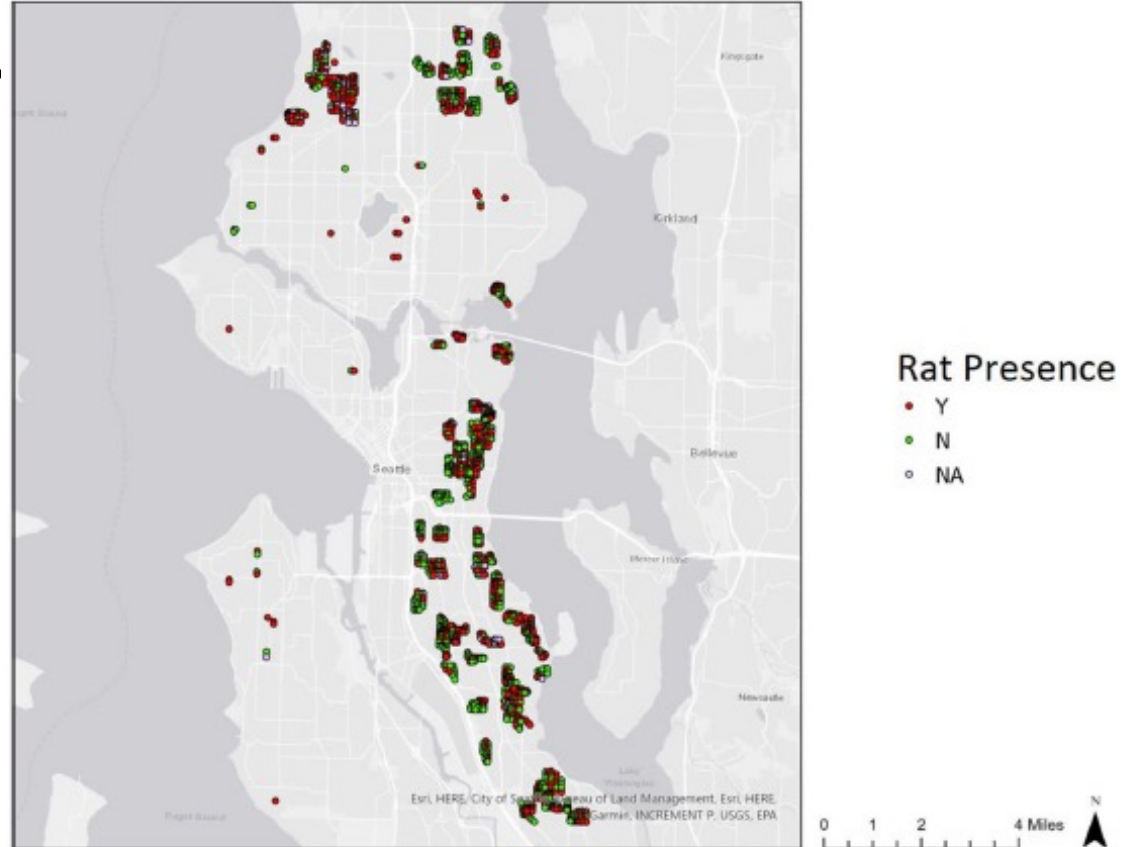
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Narrower Pipes

Sanitary Pipes
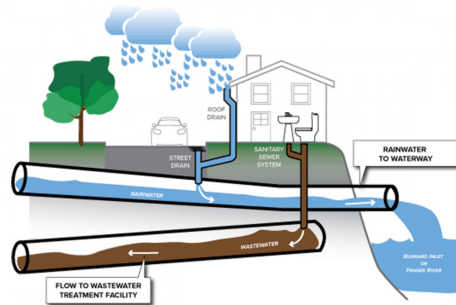
Older Pipes

Shallower Pipes

Higher Elevation above Sea Level

Strengths and Limitations

Strengths

Considered the complexity of sewer networks that encompass multiple sewer lines, all comprised of their own unique characteristics

Limitations

Lack of consideration of rat behavior and movement using bait consumption at the manholes

Implications

Sewer rats need to be managed

Target the identified features of the built environment for urban planning and rat management to reduce the carrying capacity for rat populations

Future work: Explore the frequency, location, and drivers of rat movement between above and below ground environments

The Research Team

- Dr. Chelsea Himsworth
- Dr. Kaylee Byers
- Dr. Michael Lee
- The sewer baiting team at the Seattle & King County Public Health