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PURPOSE

- We aimed to quantify **contaminants of concern (COC)** in the soil and water of the University of Arizona Community Garden

BACKGROUND

- Urban garden sources of contamination can come from
 - Nearby construction
 - Proximity to heavily-congested roads
 - Garden creation over former residential site
- No recorded soil or water monitoring for contaminants has been conducted in the Garden since its founding in 2012
- Rainwater harvested from parking garage roof is used to water plants



Image 1. (A) The University of Arizona Community Garden (left) and (B) Garden rainwater harvesting cistern (right)

METHODS

Determined site-specific COCs

- Per- and polyfluorinated substances (PFAS)
- Polycyclic aromatic hydrocarbons (PAHs)
- Metalloids

Collected samples from site

- 10 composite soil samples
- 3 water replicate samples collected from rainwater harvesting cistern at 10-second intervals
- Spatial field blanks

Samples analyzed for COCs using GC-MS, LC-MS, and ICP-MS

Concentrations of 19 measured metalloids, including arsenic, cadmium and lead, in rainwater measured well below EPA drinking water MCLs and USDA-recommended max concentrations of trace elements in irrigation water.

Metalloid concentrations in harvested rainwater are at suitable levels for Garden irrigation.

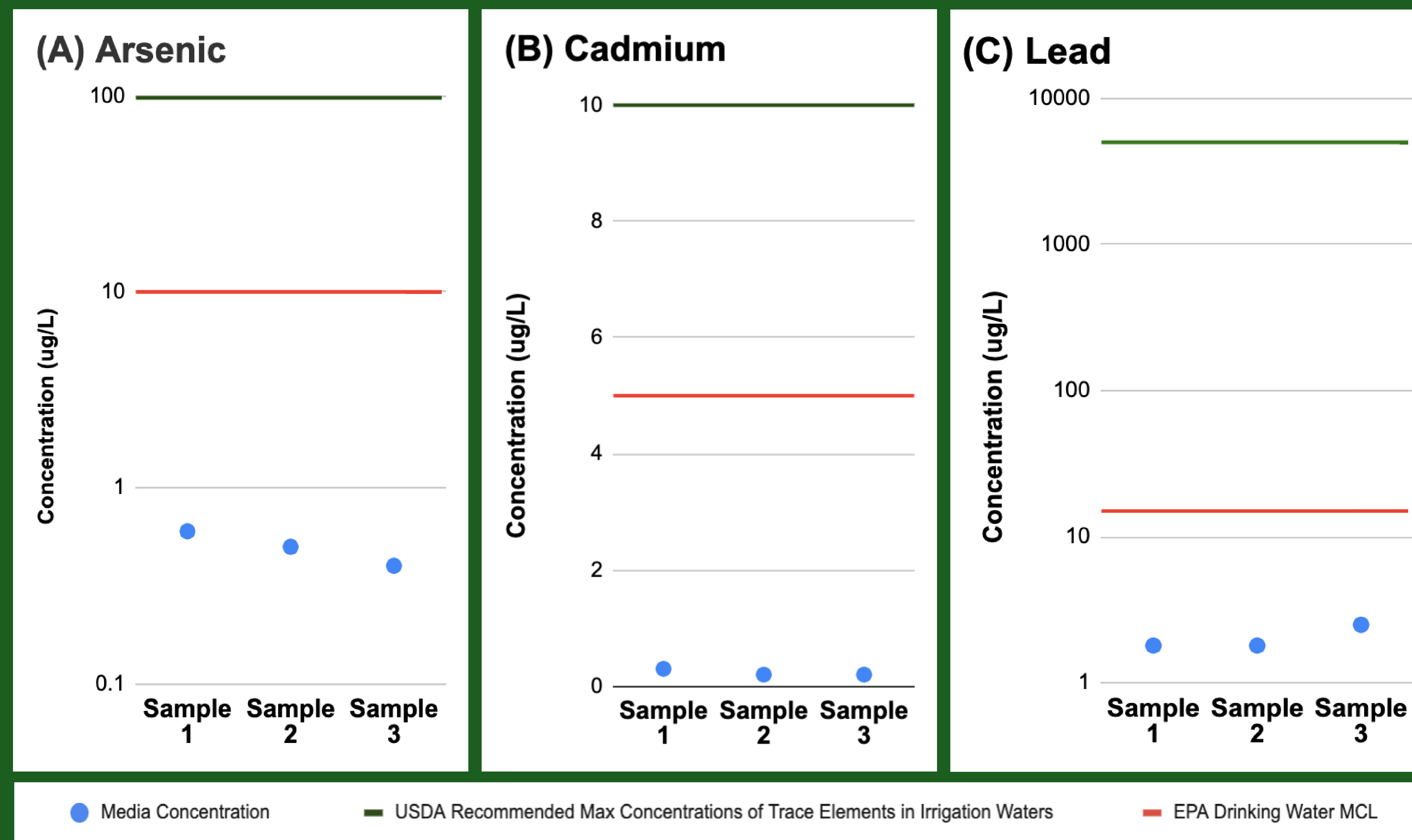


Figure 1: Contaminant concentrations in rooftop harvested rainwater compared to EPA drinking water MCLs and USDA-recommended max concentrations of trace elements in irrigation water : (A) Arsenic, (B) Cadmium, and (C) lead.

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Image 2. The rainwater sample collection process

ANALYSIS

- Media-specific concentrations were compared to federal enforceable standards and recommendations
- Currently, only data for metalloids in harvested rainwater is available
- COC concentrations in water compared to:
 - EPA enforceable drinking water Maximum Contaminant Levels (MCLs) (EPA, n.d.)**
 - USDA Recommended Maximum Concentrations of Trace Elements in Irrigation Water (Pick, 2011)**

DISCUSSION

- Rainwater is harvested off the roof of an adjacent parking garage to the Garden; data suggest low levels of metalloid transport from roof to Garden
- Federal standards are not developed for every COC. Gaps in standards are addressed through comparison to multiple standards and federal recommendations
- Due to temporal constraints and since the Garden hosts users of differing frequencies, formal risk assessment calculations were not conducted

FUTURE WORK

- To evaluate and assure the site's environmental quality, COCs should be monitored regularly in irrigation water and soil

REFERENCES

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Pick, T. (2011). Assessing Water Quality for Human Consumption, Agriculture, and Aquatic Life Uses Environment Technical Note No. MT-1 (Rev. 2). United States Department of Agriculture Natural Resources Conservation Service. Available at: <https://mwcc.kjpc.tech/media/library/content/Assessing-Water-Quality-for-Human-Consumption-Agriculture-and-Aquatic-Life-Uses.pdf>

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