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CLIMAS Environment and Society Fellowship

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Project Reflection

Cottonwood, Arizona was home to a large copper smelter as part of the United Verde Extension mine in the neighboring Jerome, Arizona; the smelter operated from 1915 to 1950. The result of this industrial smelting is a copper slag pile, which sits directly in the center of their town and is surrounded by key community identified gathering points, like the children's park, the local Veterans of Foreign Wars (VFW), and the Verde Valley Fairground. The copper slag, a solid, black byproduct of the smelting, is currently being repurposed by Minerals Research, Inc and sold locally and globally as filler in turf, additivities to asphalt and concrete, and as a blast abrasive. The processing of material raised concerns for the community, since the operations create fugitive black dust that commonly coats people's homes, yards and cars.

The work conducted for this fellowship, Gardenroots: Cottonwood, Heart of the Verde Valley, was co-designed and created **WITH** community members to identify questions, collect samples, and disseminate results. The community members were the core scientists on the project identifying their concerns and collecting samples. Our job, at the University of Arizona, was to provide guidance on what research can answer verses what it cannot, what research our laboratory could conduct, providing material and training to collect the environmental samples, and running analysis and initial dissemination on the

results. This partnership means that the data collected in this community can be used by and for the community.

For the purpose of this report, I will focus the findings on two metal(loid)s of concern, arsenic and lead. These two elements are the top two pollutants of concern from the Agency of Toxic Substances and Disease Registry (ASTDR) and were identified as two of the top elements of concern for the Cottonwood community. Overall, 13 participants collected 11 soil samples, 12 indoor and 13 outdoor dust samples, and set up 6 PurpleAir air quality monitors. The results of the data were reported back to the participants at two data report back events on March 20th and 21st, 2026. These results can be viewed by participants and the public on a bilingual website, with passcode protected login for participants to see their person data. This website was the primary deliverable of this phase of the project.

While the data analysis is still ongoing, 6 of the 11 soil samples (55%) were above the Arizona Department of Environmental Quality (ADEQ) Soil Remediation Level for Residential Soil (10 mg/kg; March 2009). No soils samples were above the protective California Environmental Protection Agency (CalEPA) regional risk-based soil screening level of 80 mg/kg. These two values were the values our project used to alert community members to elevated levels prior to the data report back events. Only 1 sample (8%) was above the United States Environmental Protection Agency's (US EPA) Indoor Dust Action Level for lead (5 µg/ft^2; November 2024). There are no screening levels for arsenic, or any metal(loid) other than lead, for indoor dust and no screening levels for outdoor dust. This

highlights the need for developing risk-based screening levels for these media based on human toxicological information, something our lab is trying to work towards.

The impacts of this research span across three main areas: conceptual, connectivity, and capacity building impacts. For conceptual impacts, new knowledge was generated to understand the state of environmental media of Cottonwood during a non-operational period of the repurposing company. This will serve as a baseline for future work in the area during operational periods. Additionally, this work was able to chemically analyze the copper slag in Cottonwood, Arizona, which will be the first work published on this slag. Connectivity impacts including the building of new partnerships with Cottonwood community members and elected officials across the town and county, along with continued partnership building with state agencies including ADEQ and the Arizona Department of Health Services (ADHS). Finally, capacity building impacts allow the community to advocate for themselves with their data that they can disseminate and ask critical questions of their leadership for a safe future.