MS Defense Announcement
Olivia Sablan
Friday, August 18, 10:30 a.m.

Olivia Sablan
MS Defense

August 18, 2023
10:30 a.m.

Defense
CIRA Commons or Teams

Post Defense Meeting
Riehl Room (211 ACRC)

Committee:
Emily Fischer (Adviser)
Jeffrey Pierce (Co-adviser)
Bonne Ford
Sheryl Magzamen (Environmental and Radiological Health Sciences)

The influence of prescribed burning on springtime $PM_{2.5}$ concentrations in eastern Kansas

Annual springtime (March - May) prescribed burning is practiced in the Flint Hills of eastern Kansas to mitigate wildfire risk, improve nutritional value of vegetation for cattle grazing, limit woody encroachment, and maintain the health of the tall grass prairie ecosystem. Smoke from these prescribed fires produces fine particulate matter (PM2.5), degrading air quality. Smoke from prescribed fires is understudied due to their short duration and a lack of monitoring in the rural regions where prescribed burning occurs. To quantify the contribution of springtime prescribed burning to PM2.5 concentrations in the Flint Hills and downwind regions, we deployed 38 PurpleAir PM2.5 sensors for the 2022 burning season. We used observations from this ground-based network alongside a suite of satellite products to determine the PM2.5 attributable to smoke. In 2022, the Flint Hills were also impacted by dust and transported smoke from high winds, drought, and wildfires in New Mexico. We separated the local and transported smoke effects for our exposure estimates. Across the low-cost sensor network, 24-hour median PM2.5 increased by 5.2 µg m-3 on days impacted by smoke from fires in the eastern Kansas region versus smoke-free days. We compared our findings to two existing PM2.5 estimates derived from satellites and ground-based measurements. Satellite-based products show a similar daily smoke-driven median increase in PM2.5 concentration and a consistent increase in seasonal average PM2.5 concentrations in the Flint Hills region as our estimates based on in situ monitors.