

GIScience for Community Driven Environmental Health Equity Research with Indigenous Communities

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ABSTRACT:

The complex spatio-temporal relationships between the environment, society, and health/health disparities remain an interdisciplinary research challenge. More than half of the Native American population lives in the western US, where contaminants from more than 160,000 abandoned hard rock mines has created a legacy of chronic exposures to mine. Human exposure to these contaminants contributes to health disparities, which are often exacerbated by other common environmental contaminants on Tribal lands, including oil and gas production, power generation, open burning and dumping of trash. These above environmental determinants have also been compounded by many social determinants in these communities. It remains a research challenge to understand and address these environmental and social determinants of health disparities among Native Americans. Moreover, this is an understudied research area in geography writ large, and the role of geographers in addressing these interdisciplinary research challenges is unclear. In this paper, we present an interdisciplinary research objective and three related sets of research activities through a geographic lens to disentangle the environmental and social determinants of health disparities in Native American communities leveraging geographic Big Data and small data, geospatial modeling, and community-driven research design, including: 1) A geospatial model to estimate potential environmental exposure to abandoned uranium mines; 2) A spatiotemporal model for individual livestock exposure potential assessment based on GPS data in partnership with Native American Communities; and 3) Development of a human exposure study using passive sampling devices paired with activity log, Geo-narrative, and health survey. The geospatial research activities are centered on community engagement that enabled co-production of the projects from inception to implementation and evaluation and maintain FAIR and CARE data management principles respectful of Indigenous Data Sovereignty.

KEYWORDS: *geospatial model, spatiotemporal, community-engaged, GPS, environmental health, health disparity*

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