NNA Track 1: Collaborative Research: Arctic Urban Risks and Adaptations (AURA): a co-production framework for addressing multiple changing environmental hazards

Key Project Contact(s): Name, Institution, Email Address, & Role
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Project Website Urls & Social Media Accounts:
Website: https://www.respondtorisk.com/
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Respond To Risk

Respond to risk logo.

Project Objectives: Briefly explain the overall goals of the project, specific aims, methods, and broader impact activities/

Climate change is increasing vulnerability of arctic urban communities to natural hazards such as unstable permafrost, wildfire, and rain-in-winter events. These hazards put residents and property at risk and impose economic costs. Households, businesses, and governments must adapt to these multiple co-occurring hazards, which may have compound or off-setting interactions. The proposed research undertakes a spatially explicit assessment of the three natural hazards as they have evolved *simultaneously* in the Municipality of Anchorage and the Fairbanks North Star Borough, Alaska, and Whitehorse, Yukon, Canada over the past several decades, and how they might change over the next 40 years. Our interdisciplinary research team of economists, permafrost, fire, weather/climate, environmental scientists, and policy experts will conduct transdisciplinary research on arctic natural hazards and their impacts on the natural and built environments and society. The research team will work closely with local governments and non-governmental organizations (NGOs), Indigenous groups, insurance companies, and residents to co-produce knowledge on the costs, risks and actions taken to mitigate and adapt to these hazards. They will work with these stakeholders to identify trade-offs and interactions, develop a multiple-hazard risk assessment, and generate options for future adaptive planning. Research activities over four years include: (1) spatial modeling and mapping of natural hazards and their interactions; (2) gathering data to assess perceived risks, values at risk, and adaptation costs with interviews, property owner surveys, and citizen science; (3) economic modeling of costs and risks; and (4) developing in a series of scenario planning workshops an adaptive policy framework that can be used to adapt to and mitigate multiple hazards and reduce future costs and risks.

Keywords:
Arctic, risk, natural hazards, economics, urban, wildfire, permafrost, rain-in-winter

Progress to Date/Future Plans: Provide a brief research update describing progress to date or future plans.

We have created a website for the project and social media outlets (e.g. Facebook page and group). Monthly team meetings have been occurring since the start of the project and in November 2019 we had our in-person team kickoff meeting in Anchorage. A kickoff meeting

was also held with the Fairbanks North Star Borough. Kickoff meetings were scheduled with Anchorage and Whitehorse but have been called off due to the virus.

We have been working with Sustainable Earth, LCC. and the Anchorage Waterways Council, a NGO, to monitor water quality along Chester Creek in Anchorage since November. The goal is to assess the effect of chemicals used to treat icing on water quality. One November 22, 2019 we hosted a water quality monitor training with the Anchorage Watershed Council for residents and students to assist with data collection.

Highlights or Expected Outcomes: Provide a brief overview of any noteworthy deliverables or expected outcomes related to research or broader impacts.

We expect to produce vegetation and hazard maps showing location of historical and likely future permafrost thaw, annual fuel loads, and rain-in-winter frequency 10-year increments from 1980-2060. Then spatial data on the interaction of wildfire, permafrost, and rain-in-winter hazards with the social and built environment; measurements of environmental effects of actions to respond to rain-in-winter events; estimated total community costs associated with these hazards and maps showing the spatial distribution of costs and tax payments from property owners to cover estimated public costs; quantification of economic impacts on property values and risk associated with hazards at the individual property and community levels. By combining the hazards produce multiple hazard and risk maps; risk model that allows for the quantification of the effects, including interactions with other hazards, of actions taken to reduce risks; integrated costs of multiple hazards. Finally a consensus place-based management strategies for developing multiple-hazard plans, co-produced with stakeholders in each community.

NNA Community Collaboration and Research Coordination: What would you like to get from the NNA Community? Is there anything you would like to offer? Is your project working in any specific communities or geographic areas? When will you be there? What kind of resource sharing or project coordination opportunities would you like to explore?

Given that we are forced to do more distance-based interactions with communities what tools are there out there to help facilitate this new type of communication and outreach. From the NNA community I think we can learn valuable lessons on how to work with communities, both successes and struggles. It should be the responsibility of the PI/individual projects to gather feedback from communities and partners as to how the partnership is going. I would welcome advise about how to best do this so I can get real-time feedback without overwhelming them. A deeper reflectance on how community partnerships happened by an outside research project is appropriate after projects have been completed, but not during. The communities are already taxed enough and the COVID-19 virus is further limiting their resources. We work with Anchorage and Fairbanks Alaska and Whitehorse, Yukon. I had visits planned, but they are now postponed until an unknown time. Insights as to how to hold a community meeting virtually would be appreciated. This would include technology, but also how to keep them engaged and leave feeling the meeting was successful.

It seems that some of the projects might be using the same data and if we can find a way to share that data among projects without the communities having to compile the data for multiple

projects that would be in everyone's best interest.   Some examples are property, real estate, historic infrastructure, etc. that might not be publicly available and thus require effort on the part of the community to get. Maybe a clearinghouse of data collected with the project/PI to contact about accessing.

Advice for Overcoming NNA Project Challenges: Are there any unique challenges that your project has had to overcome or is facing now? Are there any lessons learned or things you would suggest others do/do differently?

I am not sure why but providing funding from NSF to communities seems to be difficult for communities. Maybe one solution is to figure out a way money can go directly to communities rather than routed through universities. I don't have a good solution.