

USING BIG DATA, SCENARIOS DEVELOPMENT, AND GAME THEORY TO MONITOR, UNDERSTAND AND ADAPT TO CLIMATE CHANGE IN THE CIRCUMPOLAR ARCTIC

Magdalena AK Muir¹, Michael Evans Goodsite²,

¹*AResearch Associate, Arctic Institute of North America and Associate Professor, Nordic Centre of Excellence for Strategic Adaptation Research, Aarhus University*

²*Centre Director, Professor of Atmospheric Chemistry, Climate and Global Processes, Aarhus University Herning*

mamuir@ucalgary.ca

Adaptation to climate change in the circumpolar Arctic requires strategic and innovative approaches. One of the major adaptation challenges in the circumpolar Arctic is engagement and making effective societal decisions to adapt to climate and other global changes at local and regional scales. Complexity and uncertainty around climate and other changes make existing analysis and governance approaches inadequate. Hierarchical and simplistic decision making will not be successful, given the expanding and exponential nature of change and information, and increasing expectations of participation. The Nordic Centre of Excellence for Strategic Adaptation Research, along with the Arctic Institute of North America, is exploring the use of big data analytics, scenarios development approaches, and games theory to engage the local residents, industry, government and the external stakeholders in monitoring, understanding and adapting to climate change throughout the circumpolar Arctic. As the amount of data and information increases, how that data is analyzed and informs and supports decision making becomes increasingly important. Scenarios are stories that describe a possible future, and building and using scenarios allows an exploration what the future may look like, and preparation for change. Games theory is the study of strategic decision making, and games provide alternative means of sharing information and knowledge and participating in decision making. The research compares and contrast specific examples of big data analytics, scenarios development approaches, and games to evaluate their successes in engaging all these actors in monitoring, understanding and adapting to climate change. Based on the research and these examples, recommendations are made for future uses of big data, scenarios and games theory.