Integrated Natural Resources and Extreme Events Management: Decision Support Tools for More Resilient Communities

C.S. Renschler\textsuperscript{1,2}

\textsuperscript{1}Natl. Center for Geographic Information & Analysis, University at Buffalo, Buffalo, USA; \textsuperscript{2}MCEER-Earthquake Engineering to Extreme Events, University at Buffalo, Buffalo, USA

Over the past decade various federally and internationally funded research projects on natural resources and extreme events lead to the development a series of geospatial modelling tools to assist communities in their ability to assess natural disasters as well as their planning efforts for a more sustainable and resilient future. The author summarizes the challenges and best management practices of successful integration and tool development of long-term assessment of natural resources with short-term risk assessment of natural hazards. The collaboration in teams of researchers, stakeholders and industry partners resulted in a rich experience in basic and applied modelling tools using remote sensing, GIS, environmental modelling, and policy mechanisms to assess extreme events such as soil erosion, wildfire, floods, earthquakes, hurricanes, volcanic debris flows, etc. The author developed a holistic, geography-based systems approach to define user needs in natural resources and extreme events management, performing targeted research and development of management products and tools, to develop a sustainable cyber-infrastructure for collaborative knowledge and technology transfer, thereby spurring creativity and innovation in the natural hazard risk and disaster management communities. The paper highlights projects ranging from the response to the 2010 Haiti earthquake (utilizing a new airborne sensor platform and crowd sourcing techniques of a global expert network of hundreds of volunteers), to post-fire soil and water conservation of wildlands, to flood management of ungauged rural watersheds with tribal communities, to quantitative approaches such as the PEOPLES resilience framework for enhancing communities ability to plan for a more sustainable and resilient future.