GINIS, URI
DHS Coastal Resilience Center
DRAFT Research Project Work Plan

1/1/2016 – 12/31/2017

1. **Project Title**.

   Modeling the combined coastal and inland hazards from high-impact hypothetical hurricanes

2. **Principal Investigators**.

   PI: Isaac Ginis, University of Rhode Island, Professor Co-

   PIs:
   - Chris Kincaid, University of Rhode Island, Professor
   - Tetsu Hara, University of Rhode Island, Professor
   - Lewis Rothstein, University of Rhode Island, Professor
   - David Ullman, University of Rhode Island, Marine Research Scientist

3. **Other Research Participants/Partners**.

   Research Participant: Wenrui Huang, Florida State University, Professor

   Key Partners:

   - NOAA/NWS/NCEP Environmental Modeling Center (EMC), Arun Chawla, Head Wave Modeling
   - NOAA/NWS Northeast River Forecast Center (NERFC), David Vallee, Directory
   - NOAA/OAR Geophysical Fluid Dynamics Laboratory (GFDL), Morris Bender, Meteorologist
   - U.S. Army Corps of Engineers (USACE), Chris Massey, Research Mathematician
   - Daniel Cox, Oregon State University, Professor

4. **Short Project Description**.

   This project will advance modeling capabilities for assessing the potential impacts of landfalling hurricanes on critical infrastructure and communities, exacerbated by the effects of climate change. The primary focus is on hypothetical, yet plausible high-impact hurricane scenarios in the Northeastern United States by combining multiple hazard impacts, including coastal flooding due to storm surge and inland flooding due to rainfall. An innovative modeling approach will be utilized that follows hurricane-ocean interactions from open-ocean to shelf, estuarine, and inland waters, within a unified framework.

5. **Abstract**.

   The major goal of this project is to comprehensively investigate the hazards in the focus region using the most advanced coupled hurricane-ocean prediction, coastal ocean circulation/storm surge, wave, climate, and hydrological models. To attain this goal, the following specific tasks will be accomplished: 1) Creating physically consistent, hypothetical high-impact scenarios that combine widespread, multiple hazard impacts (e.g.

storm surge and rainfall-induced flooding; 2) using a multi-model ensemble approach that combines 2D and 3D coastal circulation models with watershed and 1D river models to provide the best possible coastal and inland flood guidance; 3) using a newly developed air-sea coupling module for coupling storm surge/wave models; and 4) providing hazard model output informat suitable for HAZUS or other risk modeling software and tools.