Post Storm Rebuilding Behavior

Need   The current approach to evaluating Expected Annual Damages in non-life cycle based models bias damages to structures due to assumed rebuilding time frame, assumed rebuilding quality, and persistence in the floodplain. Within life cycle based models, there is a lack of evidence to inform a rigorous approach to the evaluation of human behavior regarding post-storm reconstruction or repetitive losses.

Within non-life cycle models rebuilding was assumed to be instantaneous and back to pre-storm quality. USACE is developing life cycle models intended to more realistically estimate flood and coastal storm damages and damages reduced. This PMP will assist in parametrizing these life cycle planning models with appropriate assumptions about rebuilding, including the evaluation of "betterments," where post-storm construction is of higher value than the original structure. These models will be used to produce damage estimates that facilitate comparison of alternatives across time, evaluate historical events, and assist in predicting the consequences of future events.

Within life cycle models, floods and storms are generated stochastically with each event impacting the subsequent event, resulting in damages estimates at various points in time within the lifecycle. The extent of damage for an event depends upon the hydraulic event characteristics as well as the value, condition, and other characteristics of the property. These aspects can change because of damages and property owner response to previous events, including abandonment due to repetitive losses from prior floods or storm events. Typically, USACE uses the simplifying assumption that the property is rebuilt to its pre-event characteristics with some assumed time for reconstruction. However, the rebuilding assumption may not be accurate and may be resulting in over or underestimation of future event damages.

This leads to two major problems:
  a.   What is the appropriate way to model this rebuilding behavior
  b.   What are the appropriate parameters for a given location, given an assumed modeling approach?

Approach   a. A research report on historical post-storm building behavior. This report will determine the path forward.

b. A proposal and testing of an algorithm for including rebuilding with life cycle hazard models

If the report provides reasonable information to inform the creation of a reasonable, and usable algorithm, an algorithm will be developed and tested

c. A governing document

The document will describe how existing models should include rebuilding behavior, and how users should use the historical evidence to support their modeling decisions.

d. Implementation within models as necessary

The governing document may require new versions of Beach-fx, G2CRM, and HEC models.

Outcomes   A geodatabase of reconstruction data.

Documentation of key statistics and parameters to support evaluation of reconstruction from hypothetical events.
Updated software

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