Nonstructural Analysis: Developing and Applying a Logical Aggregation Methodology
22 September 2022
Q&A Session

This webinar presented strategies for developing and applying a logical aggregation methodology in the first 90 days of a feasibility study, a critical step in study scoping and development of the initial array of alternatives. Presenters Michelle Kniep and Eric Thaut (National Flood Risk Management Planning Center of Expertise (FRM-PCX)) provided best practices, focusing on the study scoping phase prior to the alternatives milestone meeting (AMM).

For further information, planners can join the Nonstructural Working Group for bi-monthly webinars and nonstructural tools, including questions and answers and Flood Damage Reduction Analysis HEC-FDA discourse.

This summary of the Question / Answer session of the webinar is not a transcription; questions and responses have been edited and reordered for clarity.

Logical Aggregation Methodology Development

Is there a proxy for resilience (i.e., the ability to recover from a flood) that can be incorporated into a logical aggregation methodology?
There are no established metrics for evaluating resiliency in planning studies. PDTs should coordinate any approaches for evaluating resilience or using resilience criteria as part of an aggregation methodology with the vertical team, National Nonstructural Committee, and/or the appropriate Planning Center of Expertise.

Should planners consider repetitive loss properties when developing a logical aggregation methodology?
Study teams should consider several factors when developing their logical aggregation methodology, with repetitive loss properties (i.e., frequency of flooding) being just one of those factors.

How do models used by USACE study teams (e.g., Beach-fx, Generation 2 Coastal Risk Model, Hydrologic Engineering Center (HEC) models) force or inform aggregation?
The capabilities and limitations of models selected for use in a study may influence the aggregation methodology, just as they may influence the selection of hydraulic reaches or other aspects of the study analyses. PDTs should critically consider the needs of the study, including potential criteria for aggregation, in the selection of models for use in a study.

How much should study teams expect aggregation to change over the course of a 3x3x3 study?
The degree aggregation changes over the course of a study will vary from study to study depending on the information available to develop the initial aggregation methodology during the first 90 days and new information learned over the course of the study. In most cases, changes to the aggregation methodology are anticipated to be refinements, rather than wholesale changes, but significant changes could be possible if there is a large amount of uncertainty in the information available during the first 90 days.

Is data collected on nonstructural participation rates (e.g., based on income, demographics, structure location) for completed USACE projects? If so, can that data be used to inform estimates about future participation rates?
Due to the limited implementation of nonstructural projects thus far, USACE does not have robust participation rate data. The Federal Emergency Management Agency (FEMA) or other organizations such as the Natural Hazards Center may have some participation rate information. However, it is unlikely that data from these other sources will align with how USACE implements its nonstructural projects. If data from other sources is used, it should be applied with caution and coordinated with the vertical team.

Socially Vulnerable and Disadvantaged Communities

How can socially vulnerable or disadvantaged communities act as nonfederal sponsors in an aggregate area, when typically these do not have the funds to partner with USACE (e.g., cannot afford to cost share or sign a Feasibility Cost Share Agreement)?
Applying an aggregation methodology to facilitate the formulation and evaluation of nonstructural measures and alternatives should not impact the identification of a non-Federal sponsor for a study or project. If a socially vulnerable or disadvantaged community is the non-Federal sponsor for a study or project, applicable programs and policies, such as ability to pay provisions as allowed under U.S. law and USACE policy, should be applied to determine whether lower levels of cost sharing can be applied. There may also be programs available through other State or Federal agencies that potentially could assist such communities.

What is the likelihood that an aggregation could be created to single out disadvantaged or socially vulnerable areas that are not economically justified, causing them to be specifically excluded due to the emphasis on economic justification? Are there any measures in place to prevent this from happening?
Identifying and aggregating disadvantaged or socially vulnerable communities may allow for greater inclusion of these communities in the study area. Study teams should be careful to avoid "gerrymandering" aggregations; however, there are instances where it may make sense to group underserved or disadvantaged communities with areas that do not qualify as such (e.g., where all properties are in the same neighborhood). Planners should focus on using aggregation methodology based on a variety of criteria to tell a story well.

Aggregation in Plan Formulation

Once all structures in a study area are aggregated using a logical method with multiple criteria, should all the different aggregated groups be formulated for the same water surface elevation or flood event design? Should NED (National Economic Development) or other benefits be optimized at different flood levels, depending on the flood risk and consequences for each group? Could a recommended plan include different levels of flood or coastal storm risk management for different groups across the study area?
In general, alternative plans should not be formulated for a single water surface elevation or flood event design. When formulating measures and alternative plans (structural or nonstructural), PDTs should consider the full range of flood events and how various measures and alternatives can effectively and efficiently address the planning objectives across that range. Upon selection of the TSP, the selected plan should be optimized to reasonably maximize net benefits (NED benefits if the TSP is the NED plan or other relevant benefits if criteria other than NED benefits were used to identify the TSP). As a result

of optimization, it is possible the recommended plan provides variable levels of flood risk management performance across the study area.

Is the proposed plan no longer the NED plan when it incorporates structures solely due to Other Social Effects concerns like community cohesion or social vulnerability?
Study teams should not mix solid plan formulation with the identification of the NED plan or NED optimization. When this is done on nonstructural plans, good plan formulation is sacrificed. Once a solid final array of alternative plans has been developed and evaluated following sound planning practices (including use of a logical aggregation methodology), identification of the NED Plan will be based on the plan that reasonably maximizes net NED benefits. Similarly, the identification of the Comprehensive Benefits Plan will be based on reasonably maximizing total net benefits. The NED Plan and Comprehensive Benefits Plan may be the same plan or may be different plans.

Dry Floodproofing
Due to disagreements between FEMA and the American Society of Civil Engineers there is confusion about dry proofing residences. Does USACE have any specific guidance on dry flood proofing?
USACE guidance does not prohibit the use of dry floodproofing on residential structures; however, the National Nonstructural Committee advises against it because there are a number of evaluation and implementation challenges that must be overcome to ensure the desired flood risk management outcome is achieved. Any project-specific consideration of dry floodproofing for residential structures should be coordinated early with the vertical team and National Nonstructural Committee.