Presentation Outline

- **Overview**
  - Map Mod vs. Risk MAP

- **Phased Discovery**
  - Phase 1
    - Information Exchange
    - Flood Study Needs
    - Automated Engineering
  - Phase 2
    - Mitigation Action Needs
    - Technical Assistance

- **Mitigation Technical Assistance Success Stories**

- **Next Steps**
  - “So what?”

- **Questions**
Overview: Risk MAP

- Five year effort to modernize maps
- Result: digital flood data and digital maps for 92% of population
- Improved flood data quality
- Limited up-front coordination
- Scoping not mandatory

- Collaborative approach
- Goals: quality data, public awareness, action that reduces risk
- Watershed-oriented
- Focus on up-front coordination
- Discovery is mandatory
Discovery

Discovery is the process of data mining, collection, and analysis with the goal of initiating a flood risk or mitigation project and risk discussions with the watershed

When:

• After an area/watershed has been prioritized
• Before a Risk MAP project is scoped or funded

Phase 1

• Flood studies / mapping needs
• Automated Engineering Results
• Data availability
• Individual Community Breakout Sessions

Phase 2

• Flood risk assessments
• Mitigation planning technical assistance projects
Information Exchange

Information Exchange: Phase 1 Pre-Meeting Stage

- Webinar(s) to introduce Discovery project
- Requested each Community to Fill Out Questionnaire:
  - Desired Flood Study Areas
  - Existing Local Study Data
  - Existing Local GIS Data
    - LiDAR
    - Orthophotography
  - Mitigation Planning Needs
  - Desired Mitigation Projects
  - Communication and/or Outreach
  - Compliance and/or Training

Effective method for initially gathering needs in watershed with nearly 200 communities
Automated Engineering

- Zone A streams categorized in Coordinated Needs Management Strategy (CNMS) as “Unverified” or “Unknown”
- Assesses the quality and relevance of an effective study
- Determines if significant changes are likely to result from a future improvement to a flood study
- The 1%+ and 1%- events are calculated to help provide a confidence range within which the actual 1%-annual-chance discharge is likely to fall
- Draft guidance (First Order Approximation — Methodology, Validation, and Scalability Guidance Procedures Version 1.5, April 2014)
## Automated Engineering

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Flood Study Needs Prioritized

- Hundreds to Flood Study Needs Gathered (total)
- Flood Study Needs Prioritized using a Ranking System
  - Needs Evaluated Based on Mapping Parameters, such as:
    - Average Annualized Loss (AAL) Level (high/medium/low)
    - Coordinated Needs Management Strategy (valid/unverified/to be assessed)
    - Local/State Mapping Need (yes/no)
    - Leverage Data Available (yes/no)
    - Area of Mitigation Interest (yes/no)
  - Needs receive a ranking, or total score, between 0 and 10:
    - 0-4 points = Low Priority
    - 5-7 points = Medium Priority
    - 8-10 points = High Priority
Mitigation Technical Support Prioritized

- Hundreds of Mitigation Technical Support Needs Gathered
- Mitigation Needs Prioritized Using a Different Ranking System
  - Needs are Evaluated Based on Mitigation Parameters, such as:
    - Same geographic location as mapping need (yes/no)
    - Likelihood Action will be Advanced (high/medium/low)
    - Inside regulated floodplain (yes/no)
    - Critical facility involved (yes/no)
    - Community Has Current Hazard Mitigation Plan (yes/no)
    - Is the Technical Assistance a Non-Regulatory FEMA Product (yes/no)
    - Flood Hazard Related Need (yes/no)
  - Needs receive a ranking, or total score, between 0 and 10:
    - 0-3 points = Low Priority
    - 4-6 points = Medium Priority
    - 7-10 points = High Priority
Mitigation Technical Assistance - Indiana Success Stories

- **Mitigation Technical Support Needs Gathered:**
  - Roads Overtopping During Flood:
    - Depth Grids & Maps developed using NOAA forecasted gage elevations for more accurate indication of potential flooding extents;
    - Hydraulic impact assessment of elevating local roads;
    - Hydrologic and hydraulic modeling to determine proper sizing of storm water infrastructure;
      - Harrison County, IN
      - Jackson County, IN
      - Washington County, IN
      - Town of Brooklyn, IN
      - City of New Albany, IN
      - City of Noblesville, IN
      - City of Salem, IN
Mitigation Technical Assistance - Indiana Success Stories

- Calculate Base Flood Elevations (BFEs) for repetitive loss structures/properties and/or critical facilities:
  - Enhance existing approximate (Zone A) flood studies to calculate BFE’s and identify best mitigation project locations;
  - Create depth grids to identify flood risks surrounding critical facilities and provide potential flooding depths to address evacuation needs.
    - Jackson County, IN
    - Morgan County, IN
    - Washington County, IN
    - City of Martinsville, IN
    - City of Noblesville, IN
Mitigation Technical Assistance - Indiana Success Stories

- **Higher standards for community ordinances**
  - Provided documentation for compensatory storage and subdivision regulations:
    - City of New Albany, IN
    - Floyd County, IN
    - Harrison County, IN
    - Town of French Lick, IN
    - Town of West Baden Springs, IN
    - City of Salem, IN
    - Washington County, IN

- **Identify Fluvial Erosion Areas**
  - Erosion prone areas shown on fluvial erosion maps (provided by Indiana POLIS Center) & development ordinance language:
    - Town of Mooresville, IN
    - Town of Morgantown, IN
Mitigation Technical Assistance - Indiana Success Stories

- **Enhance Community Preparedness Pre/Post-Disaster**
  - Outreach documentation, based on FEMA & IDHS fact sheets, customized for hazards preparedness needs.
  - City of Columbus, IN
Next Steps... So What?

- **Advancing Mitigation Actions:**
  - Flood depth maps/grids uses:
    - Identify emergency response areas & alternate evacuation routes;
    - Enhance Benefit Cost Analysis for hazard mitigation grant opportunities;
  - Hydrologic and/or hydraulic analyses:
    - Preliminary design improvements (storm-water infrastructure or flood-proofing)
Next Steps…So What?

- **Advancing Mitigation Actions:**
  - Community Ordinances with Higher Standards:
    - Compensatory storage, subdivision regulations, and fluvial erosion;
    - Community Rating System (CRS) credit
  - Increased Awareness & Preparedness
    - Checklists to educate/prepare community for pre/post-disaster

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**Compensatory Storage**

*Information for Public and Elected Officials*

Communities participating in the National Flood Insurance Program (NFIP) must adopt and enforce minimum requirements for development in the floodplain. However, communities may need to enact additional regulations to ensure public safety, reduce risk, and guide sustainable development. The NFIP minimum standards do not require compensatory storage; however, this action often benefits multiple structures throughout the community since it requires new water storage areas to be created to make up for the loss of space that occurs when soil or other fill material is brought into the floodplain for new construction.

**What is Compensatory Storage?**

Sometimes referred to as “cut and fill,” this type of provision requires that any fill added to the floodplain is compensated for with an equivalent amount of storage space or “cut.” An easy way to understand compensatory storage is to think of the floodplain as a bed/biome with a layer of rocks on the bottom and soil on top. Adding more rocks to one end of the bed will naturally cause it to overflow, so to ensure that the water does not rise and cause your bedroom to overflow, you must first remove an equal volume of rocks from the other end of the bed.

**How does this expanded regulation reduce risk?**

Compensatory storage reduces risk by preventing new construction from raising the height of flooding in an area by requiring newly added material be offset by an equal amount of storage space. For example, if 10,000 cubic yards of fill are needed for a proposed development, the same amount of space must also be excavated to offset the loss of storage area for floodwaters. By doing this, there is no “net gain” in material added to the floodplain and when flooding does occur, the height of floodwaters will not have increased.

**Regulatory Language Recommendations**

There are a number of ways to include compensatory storage language in a local ordinance. The following sample language is developed from a review of existing regulations:

*Fill within the area of special flood hazard shall result in no net loss of natural floodplain storage. The volume of the net of floodplain storage due to filling in the special flood hazard area shall be offset by providing an equivalent volume of flood storage in excavation or other compensatory measures or at an equivalent site.

In short, wherever any portion of a floodplain is modified for development, regulatory language for this standard should require that the volume of space occupied by fill material must be balanced and be compensated for and balanced by at least an equivalent volume of excavation taken from below that restored flood hazard.

The benefits of this standard can be increased if the ratio of excavation to storage to fill is increased. In addition, a provision should be included that requires all such excavations be constructed to drain finally to the watershed.*
Questions?

- **Presenters:**
  - Emily Whitehead, emily.whitehead@stantec.com
  - Mark Seidelmann, mark.seidelmann@stantec.com
  - Darrin Miller, dmiller@dnr.in.gov *(could not attend conference in-person)*