Using Non-Regulatory RiskMAP Products in Floodplain Management

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Goal of this Presentation

Inform
Peak interest
Stimulate creativity

Please think about ideas to share with the group at the end of the presentation
Agenda

• Quick discussion of Risk MAP in general
• Use non-regulatory Risk MAP products to communicate flood risk
• Understand uncertainty and plan ahead with 1% Plus
• Real time demo using Risk MAP products in GIS
Risk Mapping, Assessment and Planning (Risk MAP)

“Regulatory” (NFIP)
Undergone due-process and is a legal document for flood insurance rates
- Flood Insurance Study (FIS)
- Flood Insurance Rate Map (FIRM)
- FIRM Database

“Non-Regulatory” (Risk MAP)
Additional Flood Risk Information
Not for official actions under NFIP
- Flood Risk Report (FRR)
- Flood Risk Map (FRM)
- Flood Risk Database (FRD)
Flood Risk Database

Changes Since Last FIRM (CSLF)

Depth Grids
- Percent Annual Chance
- Percent 30yr Chance

Analysis Grids

Water Surface Elevation (WSE) Grids

*Can include other datasets not discussed in this presentation
Use Non-Regulatory Risk MAP Products to Communicate Risk

CSLF
Depth Grids
Analysis Grids
WSE Grids
Changes Since Last FIRM (CSLF)

Shows the difference between the new and old floodplains

GIS exercise intersecting the effective and new Special Flood Hazard Layers

- SFHA, Floodway, X (shaded)
Depth Grids

Shows the estimated depth of water for a given event

Developed for the 10%, 4%, 2%, 1% and 0.2%-annual-chance events

Based on model results and underlying terrain (usually LiDAR)

A “Grid” is a GIS dataset made up of pixels. Each pixel has a value
Analysis Grids

Percent Annual Chance Grid

• Chance of flooding in a given year for any point in the floodplain
• Based on flood depths from various return periods

10%, 4%, 2%, 1% and 0.2% depths are used to create these grids
Analysis Grids

Percent 30yr Chance Grid

- Chance of flooding over 30 year period for any point in the floodplain
- Gives perspective to the mortgage holder

<table>
<thead>
<tr>
<th>1% Annual Chance</th>
<th>30 yr Chance</th>
</tr>
</thead>
<tbody>
<tr>
<td>10%</td>
<td>96%</td>
</tr>
<tr>
<td>4%</td>
<td>71%</td>
</tr>
<tr>
<td>2%</td>
<td>45%</td>
</tr>
<tr>
<td>1%</td>
<td>26%</td>
</tr>
<tr>
<td>0.2%</td>
<td>6%</td>
</tr>
</tbody>
</table>
Water Surface Elevation (WSE) Grids

Shows estimated water surface elevation for a given event

Developed for the 10%, 4%, 2%, 1% and 0.2%-annual-chance events

Developed from model data and used to map the floodplain

• Interpolation between cross sections
Ideas for Use

Combined Non-Regulatory products with building footprint and/or tax lots to understand/communicate flood risk

• Create mailing lists for community outreach
• Identify properties of primary concern or high risk
• Plan for future development
• Assist in LOMA applications

Note: WSE Grid alone is not sufficient for officially determining a BFE. Supporting model data will also be required
Example - CSLF

Already in SFHA

Added to SFHA

- Decrease
- Increase
- None (Zero)
Example - Depth

Already in SFHA
Depth = 2.0 ft

Added to SFHA
Depth = 0.5 ft
Example – % Annual Chance

Already in SFHA
Depth = 2.0 ft
Ann. Chance. = 5.4%
30yr Chance = 81%

Added to SFHA
Depth = 0.5 ft
Ann. Chance. = 1.6%
30yr Chance = 38%
Example – WSE (BFE Estimate)

Already in SFHA
Depth = 2.0 ft
Ann. Chance. = 5.4%
30yr Chance = 81%
WSE (BFE) = 1287.1

Added to SFHA
Depth = 0.5 ft
Ann. Chance. = 1.6%
30yr Chance = 38%
WSE (BFE) = 1286.9
Understanding “1% Plus”

A tool to understand model uncertainty and how to plan ahead
All riverine engineering Flood Risk Projects shall consist of a hydraulic model with multiple frequencies: 0.2-percent, 1-percent, 2-percent, 4-percent, and 10-percent-annual-chance exceedance events. In addition, the “1-percent plus” flood elevation shall be modeled for all riverine analyses. The 1% plus flood elevation is defined as a flood elevation derived by using discharges that include the average predictive error for the regression equation discharge calculation for the Flood Risk Project. This error is then added to the 1% annual chance discharge to calculate the new 1% plus discharge. The upper 84-percent confidence limit is calculated for stream gage records and rainfall-runoff models for the 1% annual chance event.

The “1-percent plus” flood elevation must be shown on the Flood Profile in the FIS Report to best understand and communicate the uncertainty of the flood elevation.

The mapping of the “1-percent plus” floodplain is optional and will only be produced when it is determined to be appropriate.
A Tale of Two Houses

- First flood study completed with 10 years of record
A Tale of Two Houses

• First flood study completed with 10 years of record
• Restudied 10 years later, new discharges were higher & resulted in BFE increases of 2.1 feet
Ideas for Use

Communicate risk
• Removal from the floodplain is not permanent

Plan for future development
• Consider the 1% Plus as a safety factor
• Critical facility placement
Demonstrations in GIS
First get familiar with the CSLF Attributes
S_CSLF_Ar
"SFHACHG" <> 'Z'
Apply
Select by Location
Target Layers: Taxlots_Clip
Source Layer: S_CSLF_Ar
Use selected features
Target layers features intersect the Source Layer feature
Apply
Export
TaxLots_WithChanges.shp
Demonstration: Depth to Buildings at Risk

Intersect Buildings with TaxLots_WithChanges

Turn off Buildings

Zonal Statistics as a Table
Input: Building_TaxLotChanges
Zone field: FID_Buildi
Input value raster: Depth_01pct
Output Table: Bld_Depth01
Statistics type: All
Join Field
Input Table: Building_TaxLotChanges
Input Join Field: FID_Buildi
Join Table: DepthTable
Output Join Field: FID_BUILDI
JoinFields (optional): “MAX”
Changes symbology
Quantities by MAX, 0, 0.5, 1, 3, 20
Summary

Risk MAP produces non-regulatory products that help communities to…

Communicate flood risk
Regulate development
Plan future development

What can you do with this data?
Identify properties with floodplain changes (CSLF)
Identify properties with high flood risk (Depth and Analysis grids)
Estimate Base Flood Elevations (WSE grids)
Plan for future development (1% Plus)
More…
Contact Information

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