JERSEY COUNTY
LOSS AVOIDANCE STUDY

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PROJECT PARTNERS

- Illinois Department of Natural Resources
- Illinois Emergency Management Agency
- Jersey County
- U.S. Army Corps of Engineers
- City of Grafton
- Illinois Silver Jacket Study
AGENDA

• What is a Loss Avoidance Study?
• Jersey County Overview
• Historical Flooding
• Mitigation Activity
• Data Sources
• Hydraulic Analysis
• Economic Analysis
• Return on Investment
WHAT IS A LOSS AVOIDANCE STUDY?

• Typically, a FEMA-led effort, to quantify the losses avoided due to implementation of mitigation activity
• Standardized template available for communities or other agencies to determine the return on investment (ROI)

• USACE conducted a “modified” Loss Avoidance Study by incorporating some value-added deviations and to be consistent with USACE policy and regulations
OVERVIEW – JERSEY COUNTY

• Located in “Southern Illinois”
• Just north of the St. Louis Metropolitan area
OVERVIEW – JERSEY COUNTY

- Jersey County, IL
- Population: 22,985
- Rural agricultural communities
- Confluence of Illinois River and Mississippi River
OVERVIEW – JERSEY COUNTY REGIONS

• Four floodprone communities:
  • Elsah
    • “Boats ‘N’ mobile homes”
  • Grafton
    • “Ground zero”
  • Coon Creek
    • “Corps’ Cabins”
  • Nutwood
    • “Protected, but not protected”
OVERVIEW – HISTORICAL FLOODING

• The Great Flood of 1993 started it all
• Within Jersey County the 1993 flood inundated hundreds of homes and businesses, thousands of acres of crops and 35 miles of roads
• Floods in 1994 and 1995 exacerbated the recovery process
• Post 1995, Jersey County was one of the worst Counties in the state for repetitive losses
• By 2001, Jersey County placed on probation status within the NFIP
MITIGATION ACTIVITY

• Mitigate, mitigate, mitigate…
  • Between 1993 and 1996, Jersey County acquired 268 structures
  • After 1997, Jersey County acquired or elevated an additional 147 structures
  • Total of 415 structures mitigated at an estimated cost of $14 million

• Total Mitigation Count:
  • Elsah – 93
  • Grafton – 146
  • Coon Creek – 107
  • Nutwood - 69
DATA SOURCES

- Issues with data availability
  - Lost hard copy files
  - Obsolete electronic file formats
  - Retired knowledge

- Non-traditional data sources:
  - Closing documents
  - Cabin demolition reports
  - Asbestos surveys

- Traditional data sources:
  - Property record cards
  - FEMA elevation certificates
  - HMGP monitoring reports
HYDRAULIC ANALYSIS

• Hydraulic Modeling (HEC-RAS)
  • USACE used data from a flow frequency study within HEC-RAS to output detailed depth grids
    • Depth grids show the depth of flooding at a 4.5 foot intervals for the nine historical storm events

• Mitigated structures extracted flood depth data to determine historical flood heights

1993 Event Depth Grid (Elsah)
ECONOMIC ANALYSIS

- Structure inventory built in ArcGIS using available data:
  - Geospatial location
  - First floor elevation
  - Ground surface elevation
  - Structure value
  - Structure occupancy type
  - Type/Cost/Date of mitigation

- Once each structure was assigned a flood depth, a depth damage relationship was applied to compute damages avoided

Depth-Damage Relationship
ECONOMIC ANALYSIS

Elsah structure inventory overlaid with the 1993 event depth grid

Distribution of losses avoided

- Structure: 68%
- Contents: 20%
- Vehicle: 12%
• Losses avoided calculation based on:
  1. Mitigation Timing
  2. Post-Mitigation Elevation
  3. Post-Mitigation Storm Events

• 84 mitigated structures have not yet yielded losses avoided

• An event the size of 1993 occurring today would yield approximately $17 million in losses avoided for the Jersey County study area

<table>
<thead>
<tr>
<th>Date</th>
<th>Mitigated Structures</th>
<th>Losses Avoided</th>
</tr>
</thead>
<tbody>
<tr>
<td>August 1993</td>
<td>9</td>
<td>598,000</td>
</tr>
<tr>
<td>May 1994</td>
<td>2</td>
<td>113,000</td>
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<tr>
<td>May 1995</td>
<td>98</td>
<td>1,851,000</td>
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<tr>
<td>May 2002</td>
<td>81</td>
<td>2,282,000</td>
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<tr>
<td>June 2008</td>
<td>184</td>
<td>4,588,000</td>
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<tr>
<td>June 2013</td>
<td>320</td>
<td>9,199,000</td>
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<tr>
<td>June 2015</td>
<td>273</td>
<td>7,553,000</td>
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<tr>
<td>December 2015</td>
<td>327</td>
<td>9,317,000</td>
</tr>
<tr>
<td>May 2017</td>
<td>260</td>
<td>7,420,000</td>
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</table>
### JERSEY COUNTY RETURN ON INVESTMENT

<table>
<thead>
<tr>
<th>Date</th>
<th>Cumulative Losses Avoided</th>
<th>Cumulative Mitigation Cost</th>
<th>Cumulative ROI</th>
</tr>
</thead>
<tbody>
<tr>
<td>August 1993</td>
<td>598,000</td>
<td>706,414</td>
<td>0.85</td>
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<tr>
<td>May 1994</td>
<td>711,000</td>
<td>769,365</td>
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<td>May 1995</td>
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<td>May 2002</td>
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<tr>
<td>December 2015</td>
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<td>42,921,000</td>
<td>14,831,963</td>
<td>2.89</td>
</tr>
</tbody>
</table>

- 20-year payback period (1993 to 2013)
- For every dollar invested in mitigation, two dollars and 89 cents of losses have been avoided
JERSEY COUNTY RETURN ON INVESTMENT

The graph shows the distribution of structure counts based on different return on investment (ROI) ranges:

- Less than 1 ROI: 141 structures
- 1 to 2 ROI: 23 structures
- 2 to 3 ROI: 29 structures
- 3 to 4 ROI: 34 structures
- 4 to 5 ROI: 24 structures
- Greater than 5 ROI: 164 structures

These data points indicate a higher concentration of structures with a return on investment greater than 5, compared to those with lower ROIs.
QUESTIONS