NVUE Expiring Miles: The effects of the NVUE Cliff on the NVUE Attained Metric: FEMA Region I, V, VII, and X

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Overview

• List of Acronyms
• Calculating the NVUE Metric
• 2015 NVUE Assessment
  – Detailed and Approximate Validation
  – Effect on NVUE Metric
  – Factors Influencing NVUE Metric
• Avoiding another Cliff
• Questions
Acronyms

- NVUE – New, Valid, Updated Engineering
- CNMS - Coordinated Needs Management Strategy
- LSAE – Large Scale Automated Engineering
NVUE Metric
NVUE Initiated vs. Attained

• NVUE Initiated - Stream miles “Being Studied” prior to preliminary issuance
  – Replace “Unknown” or “Unverified” inventory
  – Newly mapped areas

• NVUE Attained – Valid miles + “Being Studied” post preliminary issuance
Calculating the NVUE Metric

NVUE Attained % Calculation
Valid Miles + Being Studied” post preliminary issuance
Full Inventory

NVUE Attained + Initiated % Calculation
Attained miles + “Being Studied” prior to preliminary issuance
Full Inventory
NVUE Metric – Official Sources

NVUE Initiated

NVUE Attained

CNMS Database

Total NVUE Calculation

National NVUE Attained Summary Table: FY16 - Q2
by FEMA Region

Region | VALID Miles | Full Inventory | NVUE % Attained | NVUE Initiated Miles | NVUE % Attained + Initiated Total Inventory
--- | --- | --- | --- | --- | ---
01 | 6,000 | 32,941 | 18.5% | 1,769 | 23.9%
02 | 15,404 | 33,342 | 46.3% | 546 | 47.8%
03 | 43,207 | 66,715 | 65.0% | 4,116 | 59.0%
04 | 164,540 | 248,627 | 66.0% | 5,716 | 66.9%
05 | 47,304 | 123,216 | 38.4% | 15,896 | 51.2%
06 | 36,914 | 241,146 | 15.1% | 30,249 | 20.5%
07 | 78,832 | 194,946 | 40.9% | 9,670 | 40.5%
08 | 11,417 | 63,941 | 17.9% | 7,003 | 28.9%
09 | 33,797 | 62,160 | 54.0% | 912 | 58.1%
10 | 3,786 | 41,690 | 8.7% | 3,715 | 17.2%
National | 463,269 | 1,128,843 | 41.0% | 75,82 | 47.8%

28 June 2016
FY15 NVUE Assessment
Purpose

• Title 42 of Code of Federal Regulations FEMA to revise and update flood hazard risk zones
• Assessment required every five years
• New, Valid and Updated Engineering (NVUE) measures progress
• Greater than 1 million miles inventory of streams in Coordinated Needs Management Strategy (CNMS)
• Avoid “NVUE Cliff” or rapid metric decline
Scope

- Refresh validation status for 86,000 miles
- FEMA Regions I, V, VII and X
Detailed Validation (Zone AE)
Detailed Validation – Critical Checks

- Gage record changes
- Peak discharges
- Model methodology
- Major flood control structures (dam)
- Channel reconfiguration
- New/removed hydraulic structures (5 or more)
- Channel fill/scour
Detailed Validation – Secondary Checks

- Use rural regression in urban areas
- Repetitive losses outside SFHA
- Increase impervious area > 50 percent
- New/removed hydraulic structures (1-4)
- Channel improvements
- Better topo/bathymetry
- Land use change
- Storms with high water marks
- New regression equations
Detailed Validation

Critical & Secondary Checks

• Valid:
  – Pass all critical and six or more secondary checks
  – Refreshes valid status against NVUE metric

• Unverified:
  – Fails one critical or four secondary checks
  – Becomes unverified and requires further study
Approximate Validation (Zone A) with Large Scale Automated Engineering (LSAE)
Approximate Validation – Primary Checks

- Initial Assessment
  - A1: Significant Topography Update Check
  - A2: Significant Hydrology Change Check
  - A3: Significant Development Check (NUCI analysis)

- Study passes all initial assessment checks?
  - YES: A4: Study backed by technical data?
    - YES: Change study to "VALID" in the CNMS database
    - NO: FOA Comparison
  - NO: FOA Data available for comparison?
    - YES: A5: FOA Comparison
    - NO: Change study to "UNVERIFIED" in the CNMS database

STUDY PASSES
FOA COMPARISON
STUDY FAILS
FOA COMPARISON
How was LSAE comparison done?

Uses the 1%+ and 1%-flood profiles and horizontal and vertical tolerances

- Vertical tolerance – equal to one-half the contour interval of the USGS 24K quadrangle
- Horizontal tolerance – 75 feet

<table>
<thead>
<tr>
<th>Risk Class</th>
<th>Characteristics</th>
<th>% Sample Points that Must “Pass” for Stream Reaches Called “Valid”</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>High population and densities in the floodplain and/or large amount of anticipated growth</td>
<td>95%</td>
</tr>
<tr>
<td>B</td>
<td>Medium population and densities in the floodplain and/or modest anticipated growth</td>
<td>90%</td>
</tr>
<tr>
<td>C</td>
<td>Low population and densities in the floodplain and little or no anticipated growth</td>
<td>85%</td>
</tr>
<tr>
<td>D</td>
<td>Undetermined risk; likely subject to flooding</td>
<td>N/A</td>
</tr>
<tr>
<td>E</td>
<td>Minimal risk of flooding; area not studied</td>
<td>N/A</td>
</tr>
</tbody>
</table>
Atkins/STARR Approach to LSAE

- Cost-effective, innovative and defensible approach
- Support development of regulatory products
- Use in Risk MAP Program
- Use customized tools to prepare H&H
- Create floodplains, check for reasonableness
Sample Check for Reasonableness
Effect on NVUE Metric & Benefits of LSAE
# Project Impact on NVUE Metric

<table>
<thead>
<tr>
<th>Region</th>
<th>Pre-Project NVUE</th>
<th>Post-Project NVUE</th>
<th>Post-Project NVUE with LSAE Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>23.3%</td>
<td>18.3%</td>
<td>18.3%</td>
</tr>
<tr>
<td>V*</td>
<td>48.9%</td>
<td>42.3%</td>
<td>43.0%</td>
</tr>
<tr>
<td>VII</td>
<td>68.9%</td>
<td>28.0%</td>
<td>34.7%</td>
</tr>
<tr>
<td>X</td>
<td>8.6%</td>
<td>7.9%</td>
<td>7.9%</td>
</tr>
</tbody>
</table>

NVUE Expiring Miles - ASFPM Conference - June 21, 2016
What is benefit of LSAE?

<table>
<thead>
<tr>
<th>Region</th>
<th>Approximate Miles Assessed</th>
<th>Miles Validated (A1-A4)</th>
<th>Miles Validated A5 (LSAE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>V</td>
<td>15,498</td>
<td>4,623</td>
<td>3,391</td>
</tr>
<tr>
<td>VII</td>
<td>52,005</td>
<td>323</td>
<td>11,009</td>
</tr>
<tr>
<td>X</td>
<td>21.1</td>
<td>19.6</td>
<td>0.0</td>
</tr>
</tbody>
</table>
Factors influencing the decline in the NVUE metric
Factors influencing NVUE decline

• Age of Study
• Updated Topography
• Amount of Approximate Study with expiring miles
• LSAE procedure
Avoiding another Cliff
Ideas to avoid another NVUE Cliff

• Assessment of 20% of total CNMS inventory every year
• Coordinate with States and Cooperating Technical Partners (CTPs) to fund assessment work
• Development of procedures to increase efficiency of validation.
• Develop rules for zero/low risk areas to reduce the frequency of assessment of these areas
Questions?