

Detailed and Approximate FEMA Flood Hazard Validation

FMA Conference, September 2015

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Purpose & Scope

Purpose

- Title 42 of Code of Federal Regulations: FEMA to revise and update flood hazard risk zones
- Greater than 1 million miles inventory of streams in Coordinated Needs Management Strategy (CNMS)
- Assessment required every five years
- New, Valid and Updated Engineering (NVUE) measures progress
- 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 & 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

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

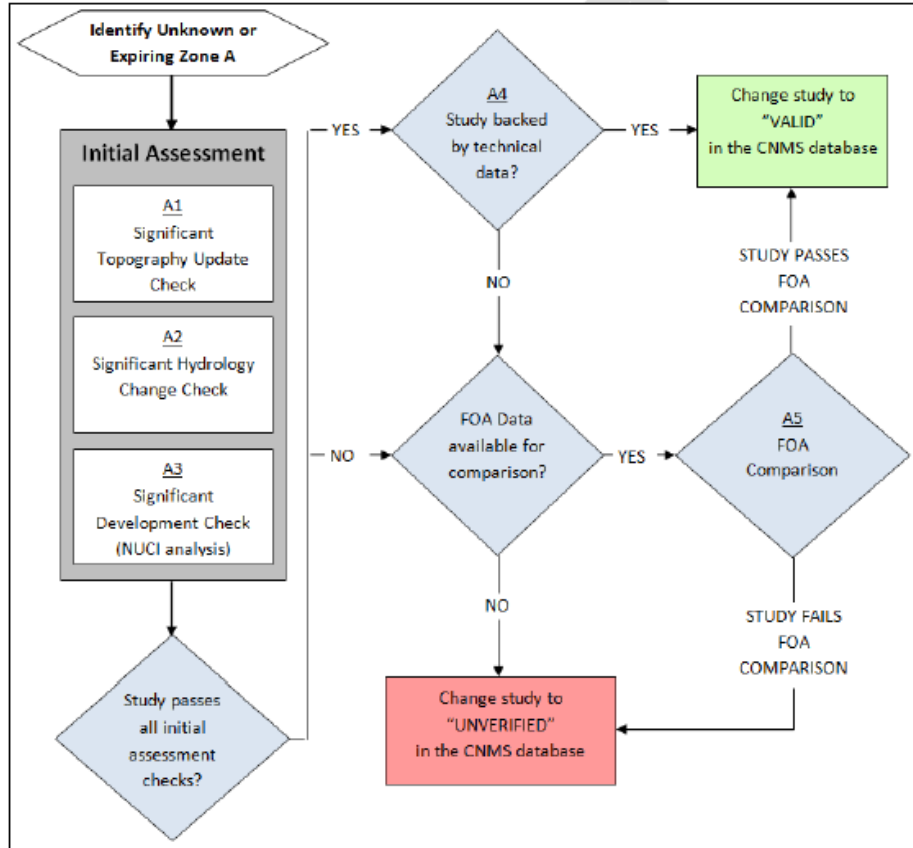
Detailed Validation Rates & Causes for Further Study

- Hurricane Sandy – major changes in gage record
- Midwest and Northwest flooding – channel configuration outside SFHA
- New LiDAR and/or better topo
- Updated and effective peak discharges differ

Region	DETAILED - VALID	
	Total Miles to Assess	Avg. Validation Rate**
I	4,634	65%
V	11,325	55%
VII	402	33%
X	1399	79%

Approximate Validation (Zone A) with First Order Approximation (FOA)

Approximate Validation – Primary Checks



FOA Approach

- Automation: cost-effective, innovative and defensible
- Support future development of regulatory products & Risk MAP Program
- Create floodplains to allow checks for reasonableness

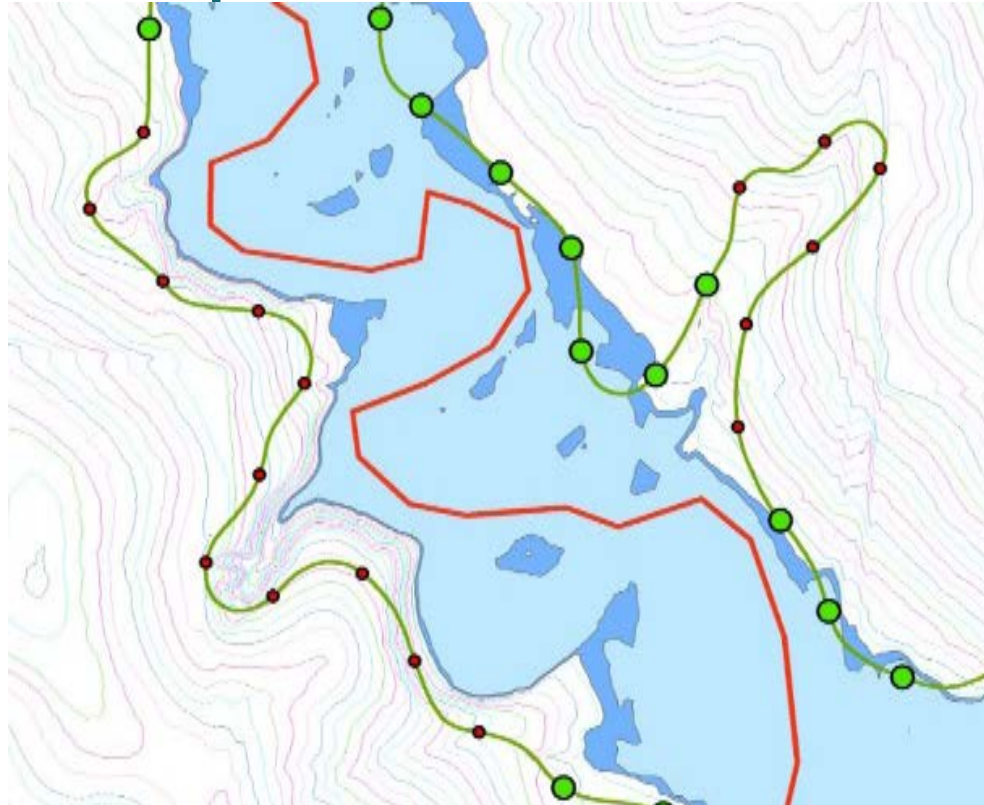
FOA comparisons

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

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

Sample Check for Reasonableness



Legend

Validation Points

● Fail

● Pass

— CNMS Lines

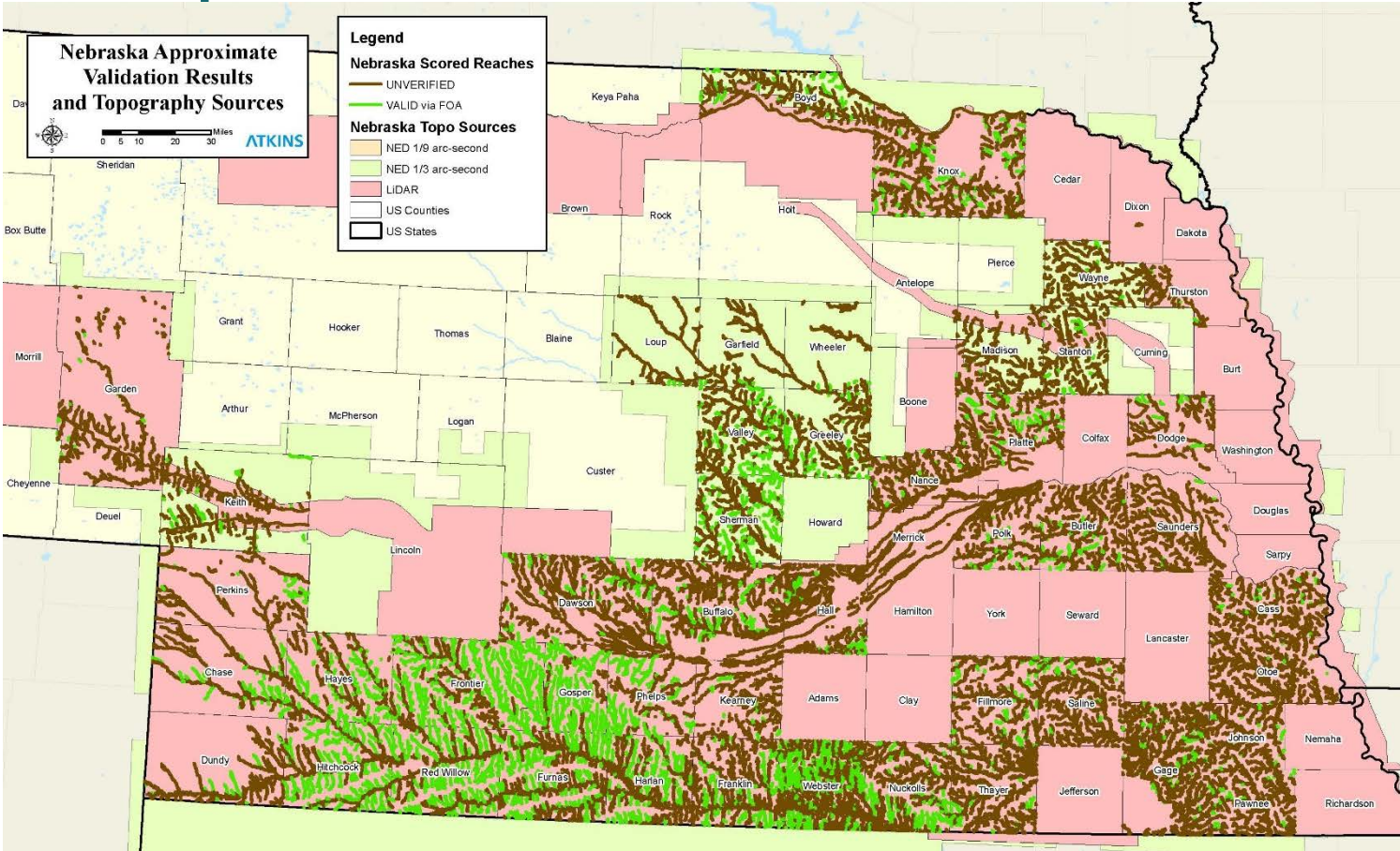
□ Effective Zone A Boundary

□ 1% Minus Floodplain

□ 1% Plus Floodplain

Contour Interval: 2 feet

Sample Zone A Validation



Project Effect on NVUE Cliff & Benefits of FOA

Project Impact on NVUE Cliff

Region	Pre-Project NVUE	NVUE Cliff Effect	Post-Project NVUE	Post-Project NVUE with FOA Analysis
I	23.3%	9.0%	18.3%	18.3%
V*	48.9%	33.5%	42.3%	43.0%
VII	68.9%	22.5%	28.0%	34.7%
X	8.6%	5.4%	7.9%	7.9%

Zone A validation miles

Region	Approximate Miles Assessed	Miles Validated (A1-A4)	Miles Validated A5 (FOA)
I	n/a	n/a	n/a
V	15,498	4,623	3,391
VII	52,005	323	11,009
X	21.1	19.6	0.0

FOA moving forward

- CNMS Maintenance
- 2-D element
- FOA guidance updates Nov 2015 updates
- Future regulatory and Risk MAP products



Thank you

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