CNMS

Coordinated Needs Management Strategy

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Presentation Overview

- CNMS Basics
- Database Components
- Validation Process
- Future of CNMS
- CNMS Demo

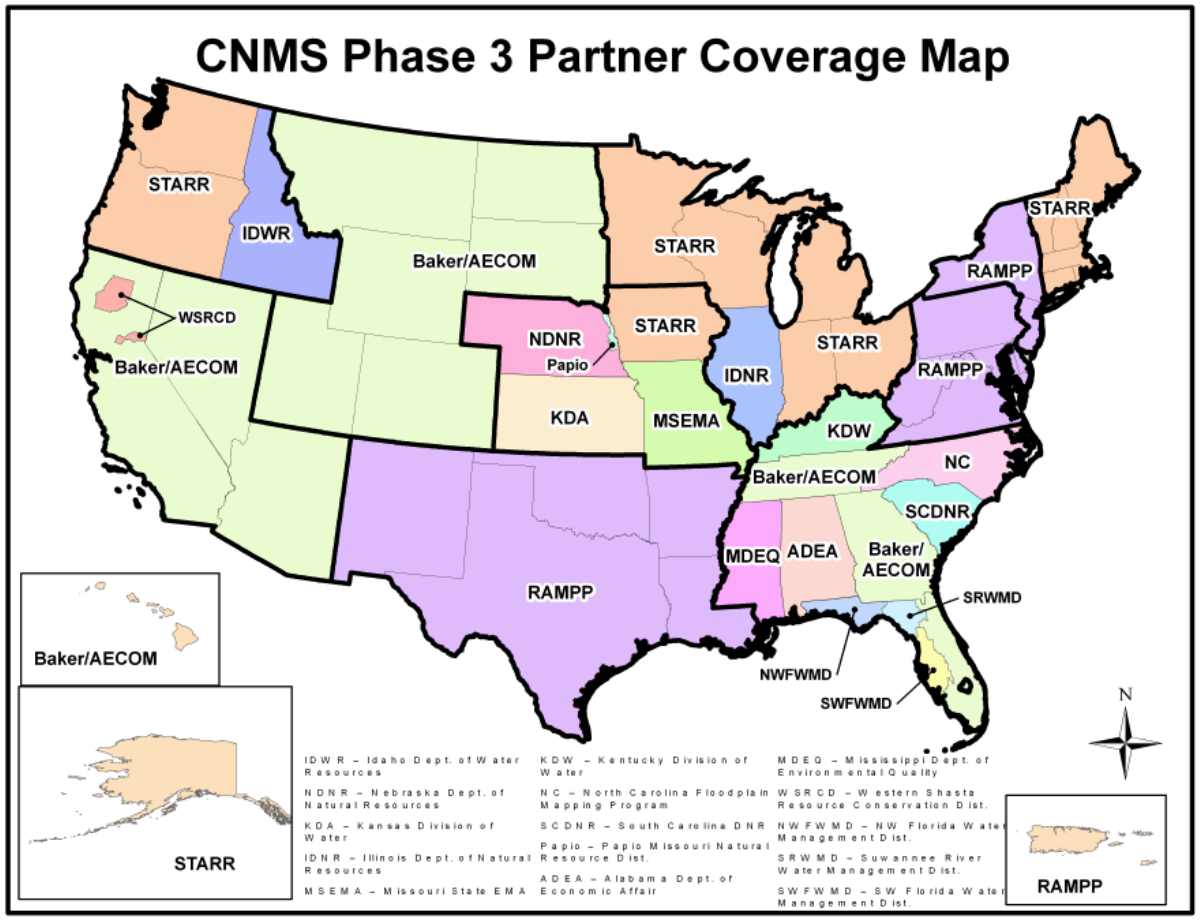
What is CNMS?

- CNMS is a FEMA initiative to update the way FEMA organizes, stores, and analyzes flood hazard mapping needs information for communities.
- CNMS is a method to enter and update an inventory of floodplain studies in a geospatial environment.
  - FEMA's CNMS Database User's Guide and Database lays out the structure and guidelines for CNMS.
- CNMS assesses validity of current studies using Physical environment, Climate patterns, and Engineering (PCE) factors. (17 Critical and Secondary Elements)
- Tool used to report New, Valid, or Updated Engineering (NVUE) statistics.
- Tool for performing Risk MAP (Risk Mapping, Assessment, and Planning) Discovery and Scoping tasks.

Why CNMS?

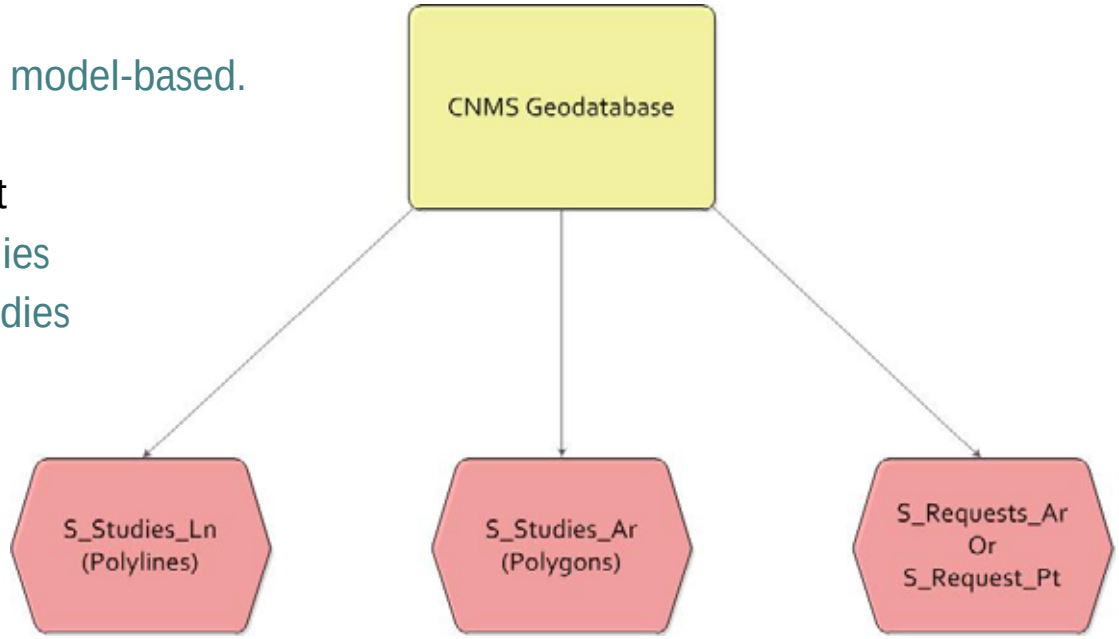
- Under Title 42 of the Code of Federal Regulations Chapter III Section 4101(e) FEMA is to revise and update all floodplain areas and flood risk zones based on an analysis of all natural hazards affecting flood risks on a five-year cycle.
- Due to the changing nature of the landscape from influences of physical, engineering, and climatological processes, timely updates to SFHA info on FIRMs become necessary to maintain accuracy and relevance.

CNMS Partners:

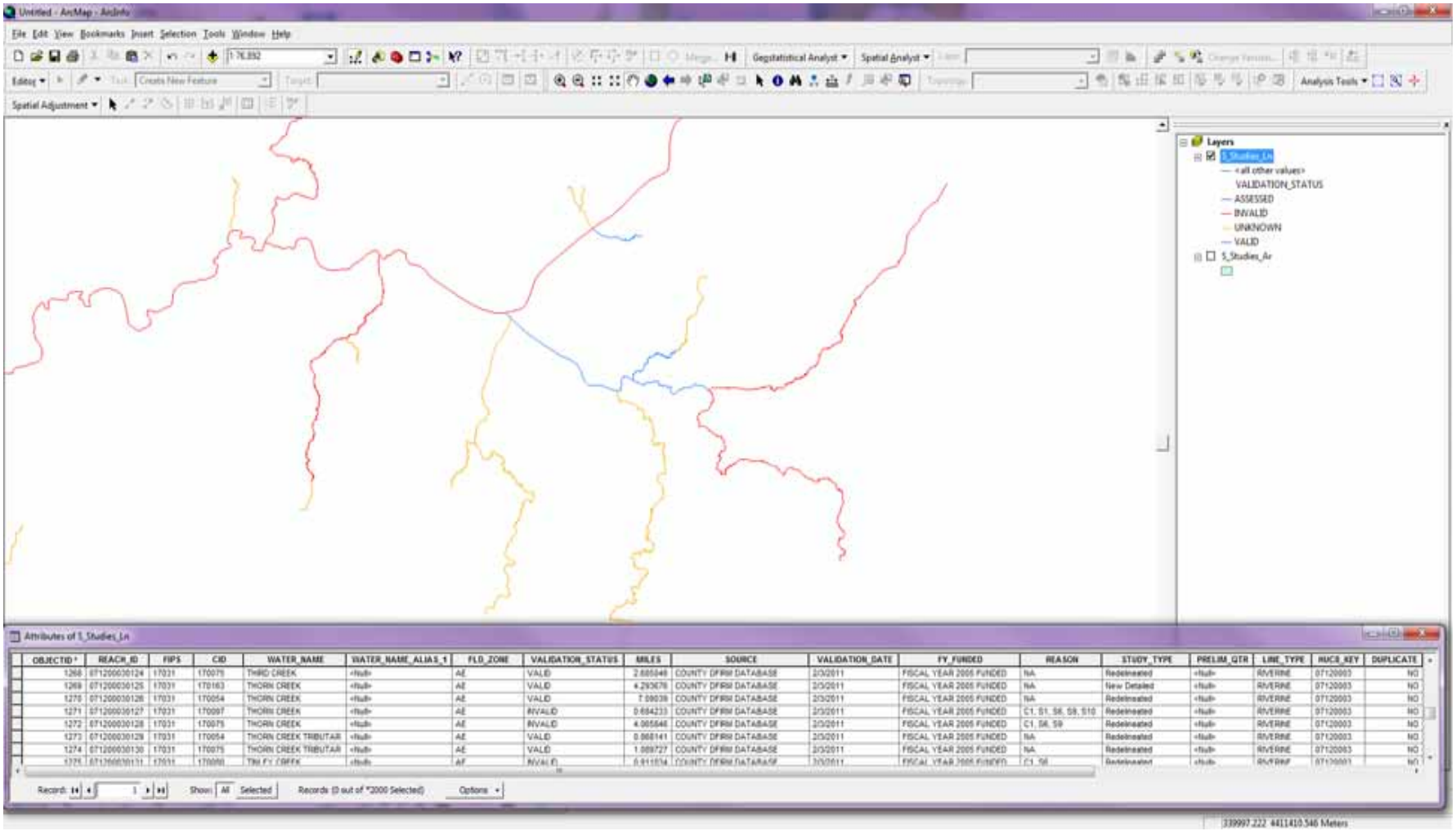


Main Geodatabase Components:

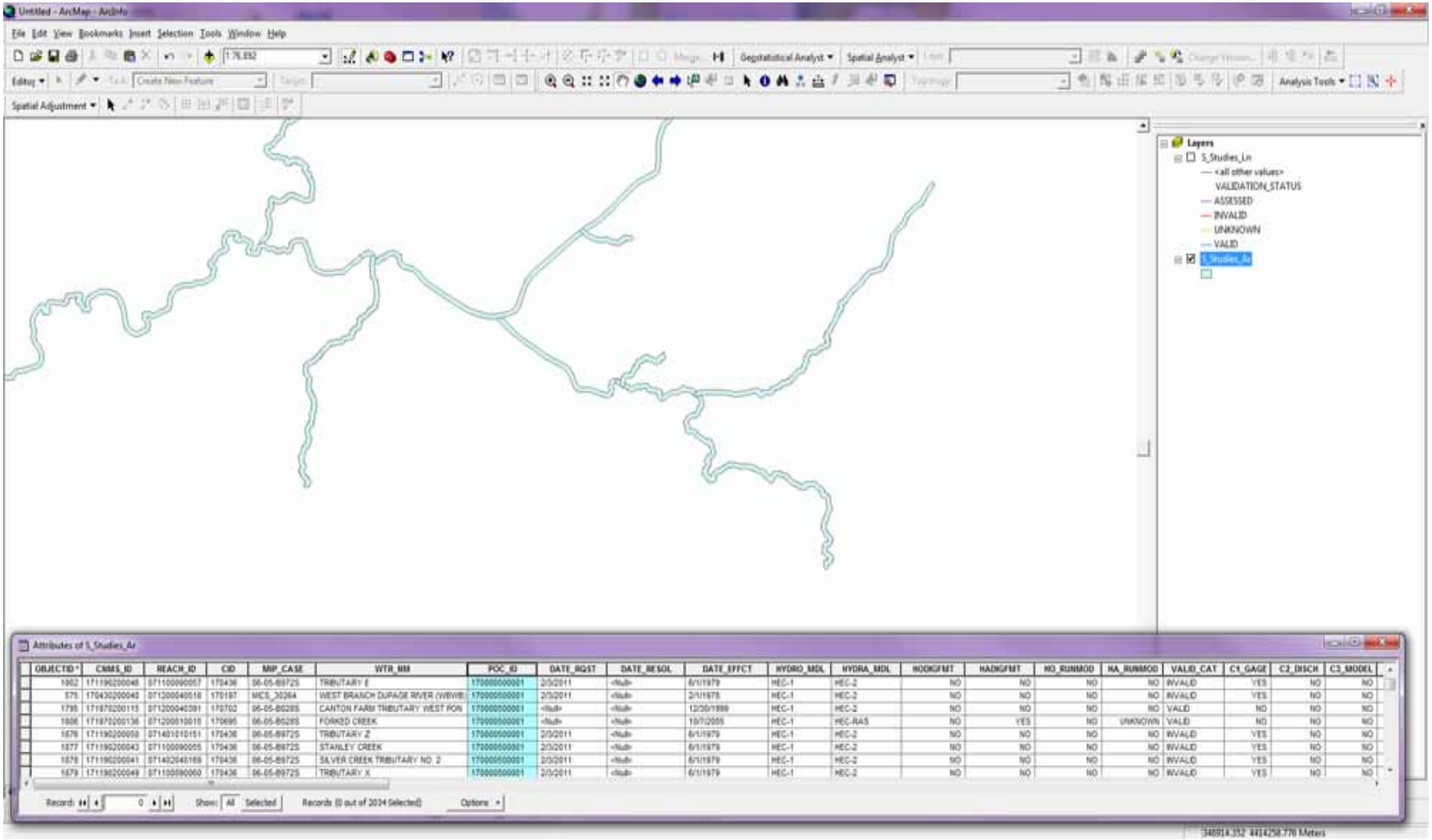
- S_Studies_Ln (Lines)
  - Represent the centerlines of flooding sources.
  - Can also include any requested study for a stream that is unmapped.
- S_Studies_Ar (Polygons)
  - Detailed studies
  - Approximate studies that are model-based.
- S_Requests_Ar or S_Requests_Pt
  - Community requests for studies
  - Comments about existing studies



Polylines


Layers
VALIDATION_STATUS
ASSESSED
INVALID
UNKNOWN
VALID
Attributes of S_Studies_Ln

Polygons


Untitled - ArcMap - ArcInfo
File Edit View Bookmarks Insert Selection Tools Window Help
Geostatistical Analyst
Spatial Analyst
Analysis Tools
Spatial Adjustment
Layers
S_Studies_Ln
<all other values>
VALIDATION_STATUS
ASSESSED
INVALID
UNKNOWN
VALID
S_Studies_Ar
Attributes of S_Studies_Ar
OBJECTID
CNMS_ID
REACH_ID
CID
MIP_CASE
WTR_NM
POC_ID
DATE_RQST
DATE_RESOL
DATE_EFFCT
HYDRO_MDL
HYDRA_MDL
HODIGFMT
HADIGFMT
NO_RUNMOD
NA_RUNMOD
VALID_CAT
C1_GAGE
C2_DSCH
C3_MODEL
TRIBUTARY E
WEST BRANCH DUPAGE RIVER (WBWB)
CANTON FARM TRIBUTARY WEST FOR
FORKED CREEK
TRIBUTARY Z
STANLEY CREEK
SILVER CREEK TRIBUTARY NO. 2
TRIBUTARY X
Record:
Show:
All
Selected
Records (0 out of 2034 Selected)
Options

Useful Information in the feature class attribute tables:

Polylines

- Water name
- Stream Miles
- Validation Status of stream (Valid, Invalid, or Unknown)
- Flood Zone
- Reason the stream is 'Invalid'

Polygons

- Water name
- Date of Study
- Hydrologic and Hydraulic methods/models used
- Each Critical and Secondary Element's Evaluation
- Validation Status (Valid, Invalid, or Unknown)

Validation Process

- For Detailed and Model-Based Studies (Polygons), each study goes through 17 checks to determine validity:
  - Of these 17 checks, there are 7 Critical and 10 Secondary Elements:
    - Invalid Study = 1 Critical or 4 or more Secondary deficiencies
    - Valid Study = 0 Critical and <4 Secondary deficiencies

- If the study reach is non-model based (most Zone A's), then the validation status is "Unknown" and there will be no polygon for the polyline.

7 Critical Elements:

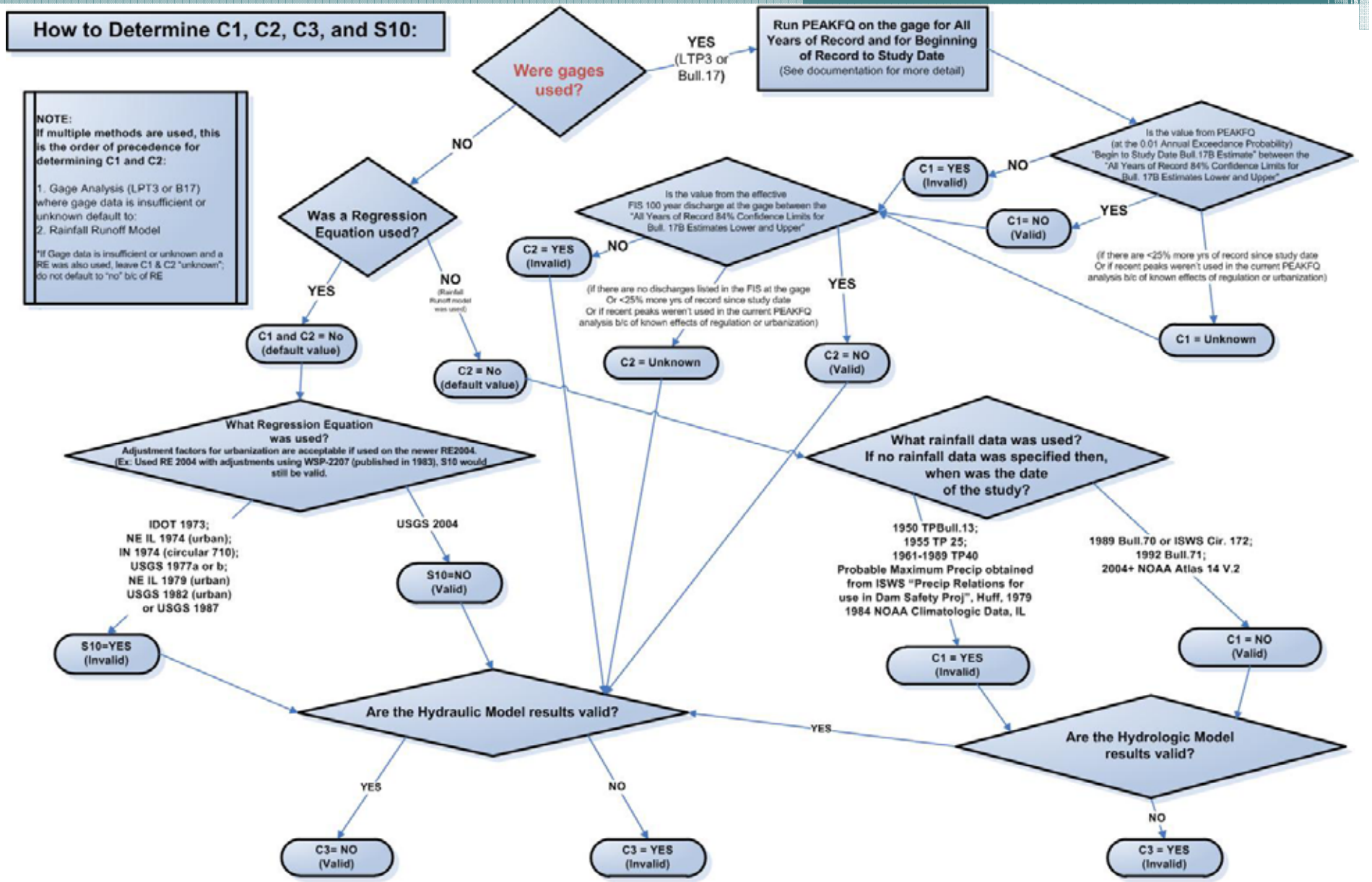
- **C1_GAGE – Change in gage record**. Major change in gage record since effective analysis that includes major flood events?
- **C2_DISCH – Change in Discharge**. Do the updated and effective peak discharges differ significantly based on confidence limits criteria in FEMA's Guidelines and Specifications for Flood Hazard Mapping Partners?
- **C3_MODEL – Model methodology**. Model methodology no longer appropriate based on Guidelines and Specifications for Flood Hazard Mapping Partners?
- **C4_FCSTR - Hydraulic Change**. Addition/removal of a major flood control structure?
- **C5_CHANN - Channel Reconfiguration**. Current channel reconfiguration outside effective SFHA?
- **C6_HSTR - Hydraulic Change 2**. More than 5 new or removed hydraulic structures (bridge/culvert) that impact BFEs?
- **C7_SCOUR** - **Channel Area Change**. Significant channel fill or scour?

If one or more elements are true then Flood Hazard Information is 'Invalid'

10 Secondary Elements:

- **S1_REGEQ - Regression Equation**. Use of rural regression equations in urbanized areas?
- **S2_REPLO - Repetitive Loss**. Repetitive losses outside the SFHA?
- **S3_IMPAR - Impervious Area**. Increase in impervious area in the sub-basin of more than 50 percent (i.e., 10 percent to 15 percent, 20 percent to 30 percent, etc.)?
- **S4_HSTR - Hydraulic Structure**. More than 1 and less than 5 new or removed hydraulic structures (bridge/culvert) impacting BFEs?
- **S5_CHIMP - Channel Improvements**. Channel improvements / Shoreline changes?
- **S6_TOPO - Topography Data**. Availability of better topography/bathymetry?
- **S7_VEGLU - Vegetation or Land Use**. Changes to vegetation or land use?
- **S8_DUNE - Coastal Dune**. Failure to identify primary frontal dune in coastal areas?
- **S9_HWMS - High Water Mark**. Significant storms with High Water Marks.
- **S10_REGEQ - Regression Equation**. New regression equations available?

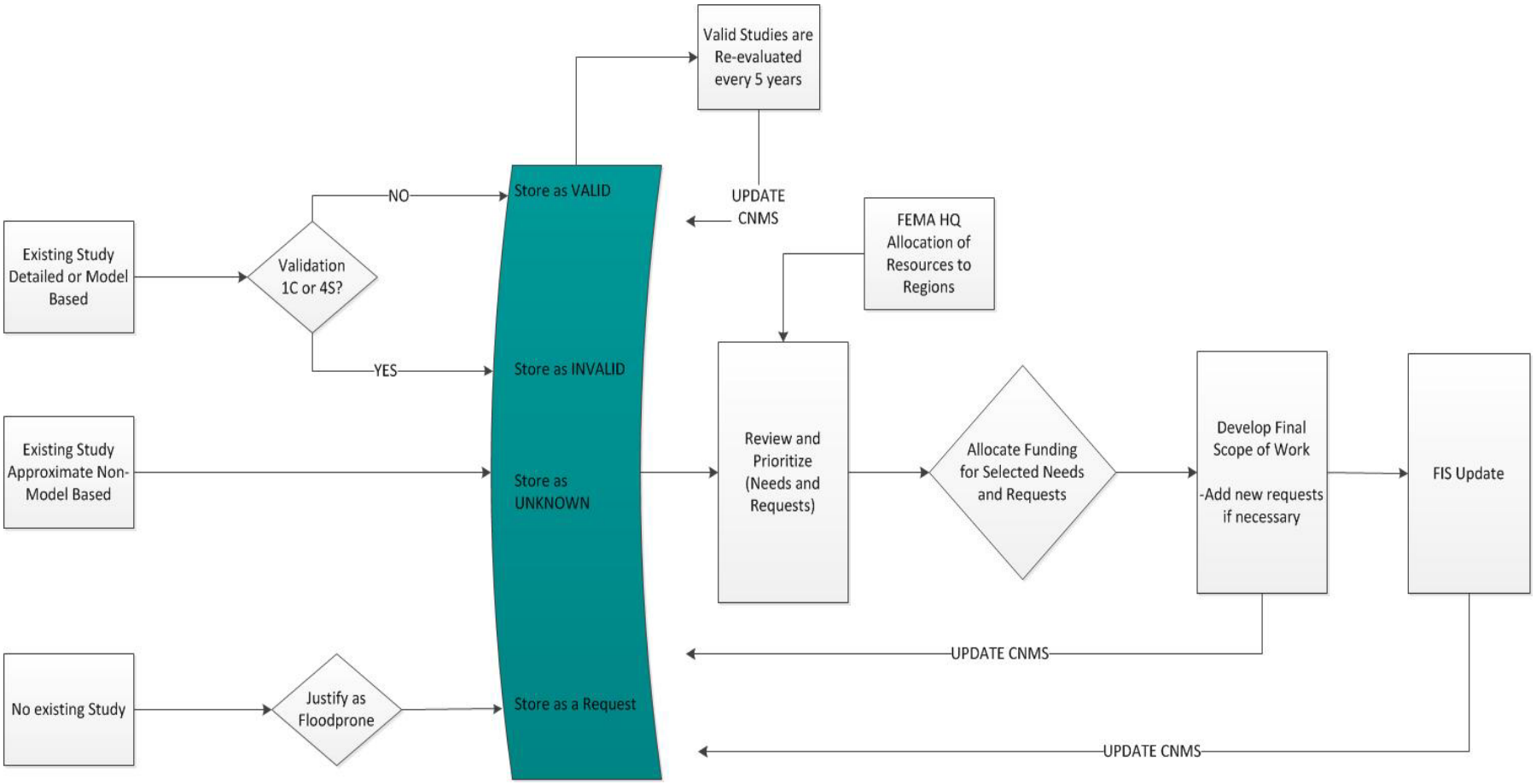
If four or more elements are true then Flood Hazard Information is 'Invalid'


How to Determine C1, C2, C3, and S10:
NOTE:
If multiple methods are used, this is the order of precedence for determining C1 and C2:
1. Gage Analysis (LPT3 or B17) where gage data is insufficient or unknown default to:
2. Rainfall Runoff Model
*If Gage data is insufficient or unknown and a RE was also used, leave C1 & C2 "unknown"; do not default to "no" b/c of RE
Were gages used?
YES (LTP3 or Bull.17)
Run PEAKFQ on the gage for All Years of Record and for Beginning of Record to Study Date
(See documentation for more detail)
NO
Was a Regression Equation used?
YES
NO
(Rainfall Runoff model was used)
C1 and C2 = No (default value)
C2 = No (default value)
Is the value from PEAKFQ (at the 0.01 Annual Exceedance Probability) "Begin to Study Date Bull.17B Estimate" between the "All Years of Record 84% Confidence Limits for Bull. 17B Estimates Lower and Upper"
NO
C1 = YES (Invalid)
YES
C1= NO (Valid)
(if there are <25% more yrs of record since study date Or if recent peaks weren't used in the current PEAKFQ analysis b/c of known effects of regulation or urbanization)
C1 = Unknown
Is the value from the effective FIS 100 year discharge at the gage between the "All Years of Record 84% Confidence Limits for Bull. 17B Estimates Lower and Upper"
NO
C2 = YES (Invalid)
(if there are no discharges listed in the FIS at the gage Or <25% more yrs of record since study date Or if recent peaks weren't used in the current PEAKFQ analysis b/c of known effects of regulation or urbanization)
C2 = Unknown
YES
C2 = NO (Valid)
What Regression Equation was used?
Adjustment factors for urbanization are acceptable if used on the newer RE2004. (Ex: Used RE 2004 with adjustments using WSP-2207 (published in 1983), S10 would still be valid.
IDOT 1973; NE IL 1974 (urban); IN 1974 (circular 710); USGS 1977a or b; NE IL 1979 (urban) USGS 1982 (urban) or USGS 1987
USGS 2004
S10=YES (Invalid)
S10=NO (Valid)
What rainfall data was used? If no rainfall data was specified then, when was the date of the study?
1950 TPBull.13; 1955 TP 25; 1961-1989 TP40 Probable Maximum Precip obtained from ISWS "Precip Relations for use in Dam Safety Proj", Huff, 1979 1984 NOAA Climatologic Data, IL
1989 Bull.70 or ISWS Cir. 172; 1992 Bull.71; 2004+ NOAA Atlas 14 V.2
C1 = YES (Invalid)
C1 = NO (Valid)
Are the Hydraulic Model results valid?
YES
Are the Hydrologic Model results valid?
YES
NO
C3= NO (Valid)
NO
C3 = YES (Invalid)
NO
C3 = YES (Invalid)

CNMS and Beyond….

- CNMS is a ‘Living Database’
  - Continuous new input and updates whenever there are new or revised studies.
  - ‘Valid’ streams will get reassessed every 5 years.
  - ‘Invalid’ streams will get prioritized for potential funding.
- Stream Inventory (polylines) will be used for regional and national NVUE (New Validated Updated Engineering) reporting.
- CNMS will provide support to data-driven planning efforts and will be used in prioritization for funding of new hydrologic and hydraulic watershed projects.
- Watershed Discovery Meetings will provide input for CNMS community requests (Requests Polygons and Points) and help prioritize studies in the watershed.
- The CNMS geodatabase will eventually be available online to the public.

CNMS Lifecycle:



CNMS Sneak Peak

Questions?

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