

# Coordinated Needs Management Strategy (CNMS) Technical Reference

## CNMS Database User's Guide

May 2015



**FEMA**

## Implementation Instructions

This version of the Technical Reference must be used on projects as described below. Generally, the changes in this version may also be implemented on any project, in coordination with the FEMA Project and Contracting Officer’s Representative.

Revision Date	Implementation
May 2015	Implemented for all 10 Regional CNMS File Geodatabases as of the FY15Q2 (March 31, 2015) NVUE Quarterly Roll-Up

## Table of Revisions

The following summary of changes details revisions to the *Consolidated Needs Management System (CNMS) Technical Reference* subsequent to its most recent version in May 2013.

Affected Section or Subsection	Revision Date	Revision Description
	May 2015	Integration of Coastal CNMS, QC Tool update, Zone A Validation Procedures
	May 2015	Added field to S_Request features for CDS tracking

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## List of Acronyms

BF E	Base Flood Elevation
CE	Critical Element
CNMS	Coordinated Needs Management Strategy
CTP	Cooperating Technical Partner
Esri	Environmental Systems Research Institute
FEMA	Federal Emergency Management Agency
FGDB	Esri file geodatabase
FIPS	Federal Information Processing Standard
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
FOA	First Order Approximation
FY	Fiscal Year
GIS	Geographic Information System
LFD	Letter of Final Determination
LOMR	Letter of Map Revision
MAS	Mapping Activity Statement
MIP	Mapping Information Platform
MSC	Flood Map Service Center
NAIP	National Agricultural Imagery Program
NFIP	National Flood Insurance Program
NHD	National Hydrography Dataset
NOAA	National Oceanic and Atmospheric Administration
NUCI	National Urban Change Indicator data
NVUE	New, Validated, or Updated Engineering
OCS	Office of Coast Survey
RSC	Regional Service Center
SE	Secondary Element
SFHA	Special Flood Hazard Area
USGS	United States Geological Survey

## Alphabetical List of Definitions

ASSESSED Validation Status	An ASSESSED Validation Status is assigned to flooding source centerlines in unmapped areas considered for a new study. This status is used for: allocation of resources for a new study in the current or a future fiscal year; or a deferment of the new study request. Streams not part of the Federal Emergency Management Agency's (FEMA's) Special Flood Hazard Area (SFHA) inventory (e.g., Zone X, Zone D, or Area Not Included), that have been, or are being considered for a new study, would fall under this category.
Bathymetry	The measurement and study of underwater topography.
CNMS	The Coordinated Needs Management Strategy (CNMS) is comprised of processes and data for tracking: New, Validated, Updated Engineering (NVUE); unverified study reaches with identified change characteristics; and requests for the flood mapping program.
CNMS Database	The CNMS database is stored in an Esri File Geodatabase (FGDB) format. The May 2015 schema is comprised of the following tables: Studies Inventory (S_Studies_Ln, S_Coastal_Ln), Requests (S_Requests_Pt and S_Requests_Ar), County Status Tables (County_Status, County_Coastal_Status), and unmapped streams not in FEMA's SFHA inventory (S_Unmapped_Ln).
CNMS Inventory	The CNMS Inventory includes flooding source centerlines and coastlines representing FEMA's modernized inventory of FIRMs; its unmodernized inventory of FIRMs; and unmapped areas. The centerlines enable calculation of NVUE. The feature classes associated with the CNMS Inventory are S_Studies_Ln, S_Coastal_Ln and S_Unmapped_Ln.
CNMS Request Record	A CNMS Request Record represents either a flood data related, or cartographic, mapping need. Flood data requests may address: the lack of an existing floodplain model; areas that remain unstudied; or SFHAs with approximate designations for which models are not available. The feature classes associated with CNMS Request Records are S_Requests_Ar and S_Requests_Pt.

CNMS Study Record	A CNMS Study Record represents the most current knowledge of a mapped SFHA in FEMA's inventory, or a stream or coastal reach considered for inclusion in FEMA's SFHA inventory.
CNMS Validation Checklist	The Validation Checklist (Appendix A and B) outlines a suggested format for documenting a Validation Status assignment decision that categorizes flood studies as VALID or UNVERIFIED. The Validation Checklist is used as the basis for data entry while populating CNMS study records.
Critical Element	For Riverine studies, one of seven elements documenting Physiological, Climatological and Engineering (PCE) methodology changes reviewed during the engineering study validation process. Individually, if any Critical Element is evaluated to a YES as a result of the identification of a deficiency, it is significant enough to trigger an UNVERIFIED Validation Status. ( <i>Note - the Critical Element count for Coastal CNMS is still being determined.</i> )
Raster Data	Data that are arranged in a continuous grid typically associated with imagery or terrain data.
Reach	The geographic extent, or upstream and downstream limits, defined by a CNMS Study Record.
Secondary Element	For Riverine studies, ten additional elements, secondary to the Critical Elements, which document PCE changes reviewed during the engineering study validation process. These elements, if evaluated to 'YES' as a result of identification of deficiencies, and totaling four or more secondary element deficiencies, are significant enough to trigger an UNVERIFIED validation status. A secondary deficiency is considered less impactful than a critical deficiency. ( <i>Note - the Secondary Element count for Coastal CNMS is still being determined.</i> )
Stream Centerline	A geometric approximation of a flooding source centerline. Stream centerlines in the CNMS Inventory represent studies in FEMA's mapped SFHA inventory, or flooding sources considered for inclusion in FEMA's SFHA inventory.
Status Type	Status Type records the actions being taken, or that will be taken, once the Validation Status is determined for a study during update and maintenance cycles of the CNMS

	<p>Inventory. Status types are useful in understanding and tracking map update investment decisions.</p>
Study	<p>A study represents a contiguous extent of FEMA's investment to perform an engineering-based evaluation of potential impacts of a flooding source. A single study in CNMS may be represented by one or more stream or coastal reaches.</p>
UNKNOWN Validation Status	<p>An UNKNOWN Validation Status is assigned to existing detailed and approximate flood hazard studies for which a CNMS evaluation is planned and in queue; currently being assessed under CNMS; or when CNMS evaluation is deferred. An UNKNOWN Validation status is also assigned to those studies for which inaccessibility of information results in an incomplete evaluation of the Critical and Secondary CNMS elements. In such cases, the UNKNOWN Validation Status may only be assigned after due diligence research has been performed.</p>
Unmapped Streams	<p>Flooding sources that have not been included in the FEMA inventory of studied streams in the CNMS Study Records.</p>
UNVERIFIED Validation Status	<p>An UNVERIFIED study has not passed the Critical and Secondary Element checks part of the Validation Checklist and may either be assigned resources for restudy in a future fiscal year or is currently being restudied.</p>
Validation Status	<p>Validation Status characterizes the engineering and mapping data used in FEMA's Flood Insurance Rate Maps (FIRMs) evaluated against the specifications provided in this document. This evaluation could result in a Validation Status of VALID (targeted condition), UNVERIFIED (requires map update investment), or UNKNOWN (needs further investigation). It is assigned for each CNMS Study Record.</p>
VALID Validation Status	<p>All VALID studies are considered NVUE compliant, and contribute to the NVUE Attained metric calculation. A VALID Validation Status is assigned to CNMS study records based on the standards provided in this document.</p>
Vector Data	<p>Typical forms of Geographic Information Systems (GIS) vector data which include polygons, points, and polylines. Vector data are composed of vertices with relative or geospatially referenced coordinates sometimes containing vertical measurements.</p>

## Executive Summary

Under Title 42 of the Code of Federal Regulations, Chapter III, Section 4101(e), the Federal Emergency Management Agency (FEMA) is to revise and update all floodplain areas and flood risk zones identified, delineated, or established, based on an analysis of all natural hazards affecting flood risks on a five-year cycle. Revisions to floodplain risk zones are dependent upon the identification of instances where information on Flood Insurance Rate Maps (FIRMs) does not reflect current risks in flood-prone areas.

The Coordinated Needs Management Strategy (CNMS) is a FEMA initiative to update the way FEMA organizes, stores, and analyzes flood hazard mapping needs information for communities. CNMS defines an approach and structure for the identification and management of flood hazard mapping needs that will provide support to data-driven planning and the flood map update investment process in a geospatial environment. CNMS tracks the lifecycle of needs, specifying opportunities to capture needs and proposing methods for their evaluation to inform planning, tracking, and reporting processes. CNMS establishes a geospatially enabled effective means for users to enter, monitor, and update their inventory of floodplain studies. In addition, CNMS will be used to document the areas across the Nation where flood studies meet FEMA's current validity standards and, until otherwise noted, do not need to be updated on the FIRM.

Validity of flood hazard studies is determined by identifying study attributes and change characteristics as specified in the Validation Checklist (Appendix A). Flood hazard studies are evaluated for critical and secondary change indicators of physical environment, climate patterns, and engineering methods (PCE) since the date of the effective analysis. When a study is found to be deficient as a result of this validation process, it is classified as UNVERIFIED in the CNMS database. An UNVERIFIED Validation Status indicates studies for which resources for restudy have been assigned in the current fiscal year (FY) or will be assigned in a future FY, or those that are currently being restudied.

Apart from documenting basic study attributes, critical and secondary elements are evaluated for detailed flood hazard studies and this information including study validity is captured within CNMS Study Records. The CNMS Study Records should also include Validation Status of approximate studies, and those unmapped areas that have been considered for a new study.

FEMA will utilize the CNMS Study Records as the sole mechanism for reporting New, Validated, or Updated Engineering (NVUE) percentage. The NVUE percentage metric helps identify the portion of FEMA's inventory of studies that do not have identified needs that would warrant a restudy. Appendix F provides more information for NVUE calculation.

This *CNMS Technical Reference* document is to be used by local, state, regional and national users for development, management, tracking, and reporting of data related to suggested improvements and validity of flood hazard data nationwide.

## 1.0 Introduction

FIRMs are FEMA's most widely distributed flood hazard identification product. Flood hazard data presented on FIRMs are based on historic, meteorological, hydrologic, and hydraulic data, as well as open-space and land cover conditions, flood control works, and development. Due to the changing nature of the landscape from the influences of physical, engineering, and climatological processes, timely updates to Special Flood Hazard Area (SFHA) information on FIRMs become necessary to maintain accuracy and relevance. For successful maintenance of flood hazard information across the Nation, one must effectively identify and manage flood hazard mapping requirements expressed by individuals at the local, state, regional, and national levels.

FEMA's CNMS is a collection of procedures for the identification and management of flood hazard mapping requirements utilizing a standard database model. In addition to recording and validating studies, CNMS defines an approach for the identification and management of flood hazard mapping needs and requirements that will provide support to data-driven planning and the flood hazard information production planning process. By utilizing and maintaining Geographic Information System and relational database technologies, CNMS has been designed to track the study attributes of the current state of FEMA's study inventory and the lifecycle of studies from origination of a CNMS Study Record as an identified need or a CNMS Request Record to its resolution as a new, valid, or updated study. As such, CNMS allows tracking and management of existing, ongoing, and planned studies. GIS technology adds the capability of spatial analysis allowing communities and FEMA an effective means to visualize, enter, review, and update its study attributes and to visualize how studies relate spatially to other features. The terms and use of CNMS as it relates to other FEMA initiatives will be dictated and directed by FEMA policy.

This document details the FEMA CNMS data model, providing an overview of its purpose and structure. Definitions, examples of all database fields, and population guidelines are included to ensure the database can be populated correctly and accurately, as well as used properly for analysis after it is compiled. The Validation Checklist (Appendix A) is designed to guide the assessment of the validity FEMA's study inventory.

In order to consolidate the data reporting process, a CNMS database has been created to take advantage of spatial data inventory tools and procedures. By standardizing, centralizing, and storing CNMS data in a geospatial format, FEMA will improve analysis and reporting by maintaining data that are current, readily available, and reliable.

A complete CNMS Study Record holds the validation evaluation results. There is potential for an extensive investigative effort to determine appropriate attribute values for a record. Users of CNMS must develop a plan and implement the plan for capturing background information used in the validation and subsequent attribute determination processes. Appendix B outlines the need for capturing this background information and also suggests ways to provide a summary of

this information to FEMA. Delivery of these summaries to FEMA for all flood hazard studies evaluated is required as part of quarterly National CNMS data consolidation efforts.

A calculation and reporting mechanism for the New, Validated, or Updated Engineering (NVUE) metric is provided in Appendix F. FEMA will utilize the CNMS study records as the basis for reporting NVUE metrics. Appendix G provides procedures to update CNMS resulting from Conditional Letters of Map Revision (CLOMRs), Letters of Map Revision (LOMRs), and the Letter of Map Amendment (LOMA) process. Appendix H provides the CNMS Quality Management Plan (QMP) currently recommended for all CNMS development teams and includes step-by-step instructions for using the CNMS File Geodatabase (FGDB) Quality Control (QC) Tool.

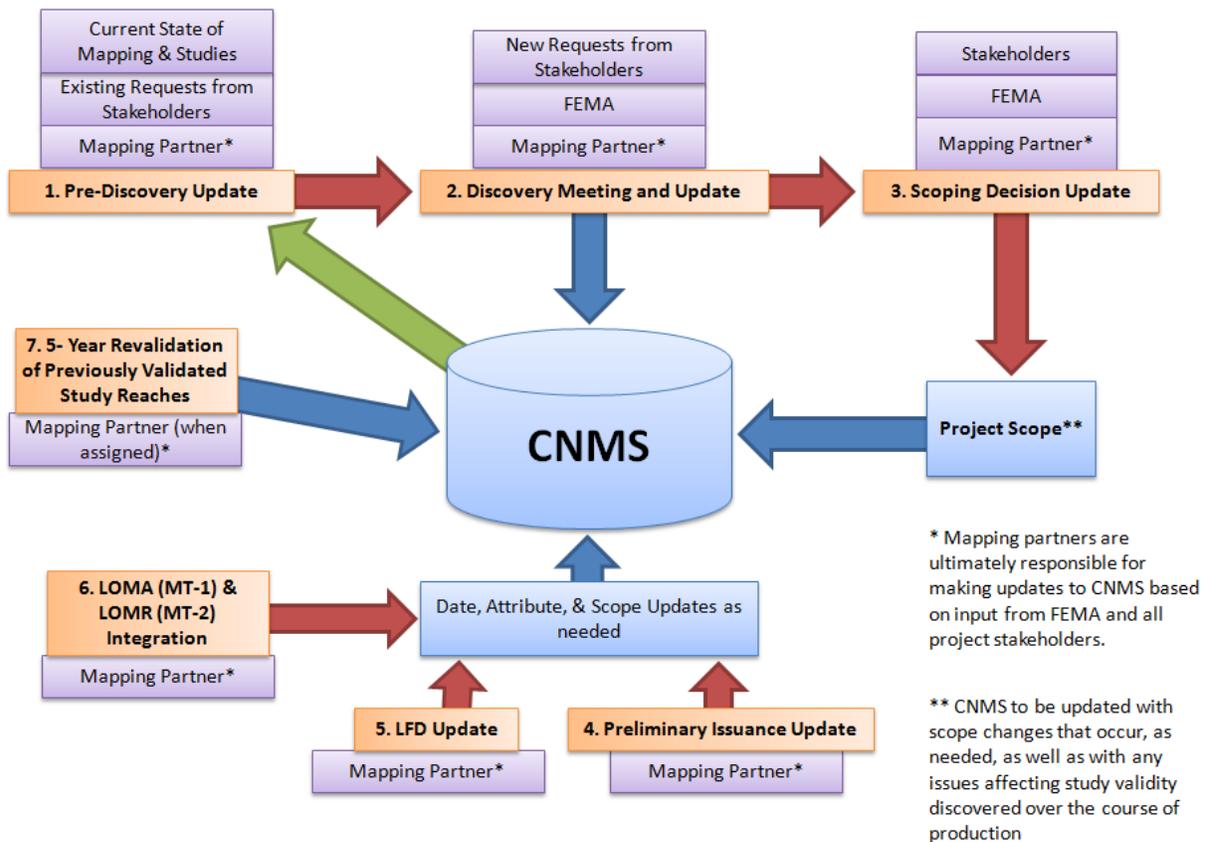
## 2.0 CNMS Data Development

This section identifies the key CNMS data development milestones and the steps needed to populate the CNMS FGDBs appropriately at each milestone. Section 2.1 describes the workflow and process to create and update the CNMS FGDB for each milestone. Section 2.2 describes the data required to make updates to the CNMS FGDBs. Section 2.3 identifies additional documentation for maintenance of the CNMS FGDBs. Section 2.4 identifies the data that may be created from the CNMS FGDBs. Section 2.5 provides the Quality Assurance/Quality Control (QA/QC) procedures for updating and maintaining CNMS FGDBs.

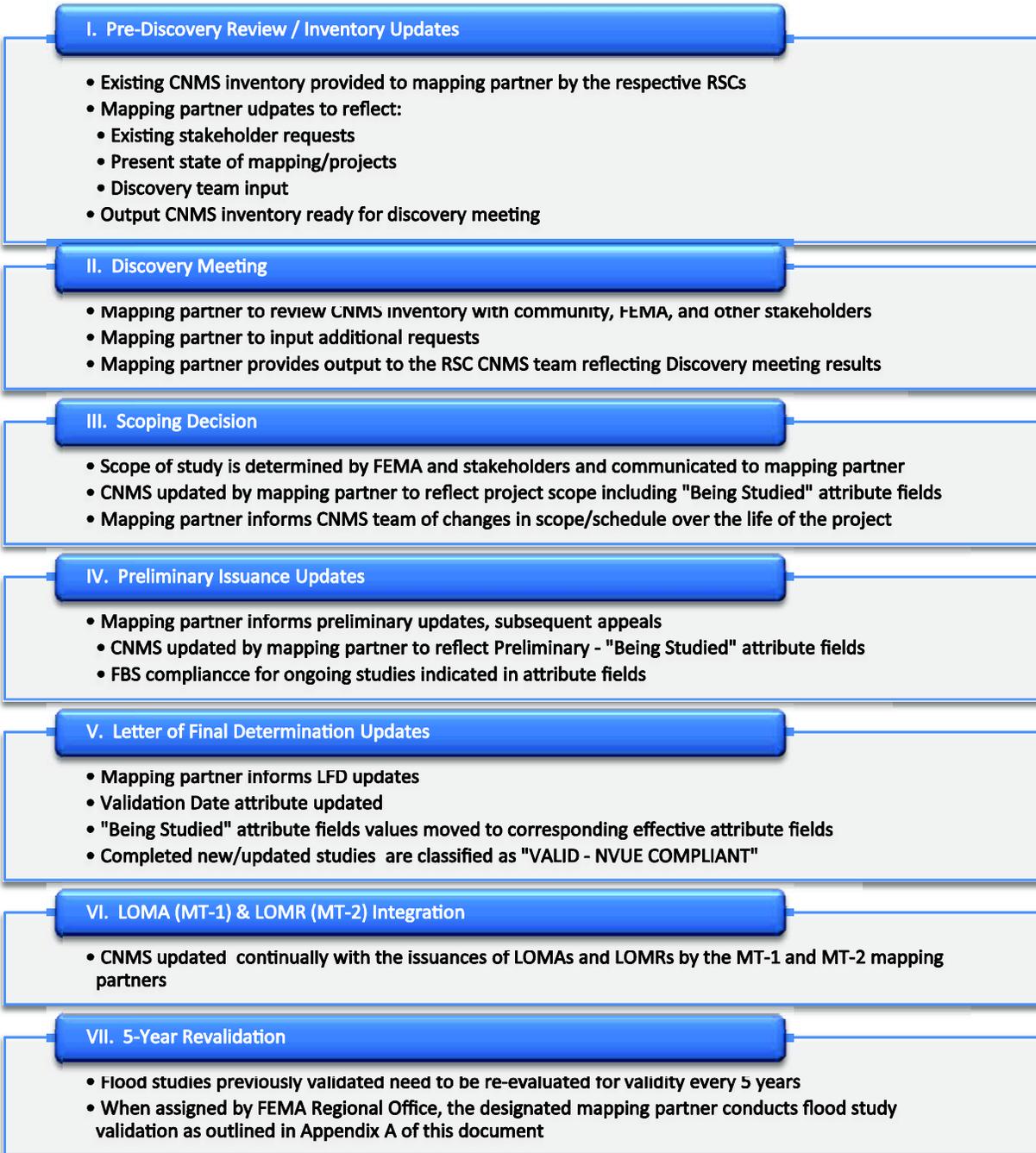
### 2.1 Workflow and Process

Figure 2.1.1 and 2.1.2, and Sections 2.1.1 – 2.1.8 detail workflows and processes that warrant an update of the Regional CNMS FGDBs. CNMS Data are organized by FEMA Regions and most ongoing update and maintenance is conducted at a Regional level by utilizing the Regional CNMS FGDBs.

Figure 1: CNMS Update Touchpoints



**Figure 2: CNMS Update Touchpoints**



## 2.1.1 Discovery and Scoping Phase Updates

Upon initiation of the Discovery phase for a new project, the RSC will export the project area from the Regional CNMS FGDB, and present it to the responsible Mapping Partner for initial review. The Mapping Partner will then provide input regarding the current status of the SFHA inventory for their area of interest, which will be used to update the CNMS Inventory. They will

also compile and review existing CNMS Request Records. Once this initial review is complete, the Mapping Partner will use the CNMS FGDB as a resource and repository for Discovery activities, including collection of new community input in the form of CNMS Requests.

Once scope is decided upon by FEMA and other stakeholders, or the Discovery efforts are concluded for the area of interest, the Mapping Partner will gather the data necessary to update the CNMS FGDB to reflect the proposed study scopes and any additional requests identified for the pending Production phase, and will submit back to the RSC for updating the Regional CNMS FGDB, within 15 days of scope finalization.

The Mapping Partner may choose to utilize the CNMS FGDB to capture CNMS Study and Request data during the course of the Discovery effort. The Mapping Partner is required to submit updated CNMS data only at the conclusion of the Discovery effort or at finalization of project scope, whichever is sooner. The minimum required attributes of the inventory file for all scoped engineering study reaches will be updated as outlined in Sections 3, 3.2, 3.9, and the Validation Checklist in Appendix A if more detailed study assessments were to be performed as part of Discovery. For coastal studies, the County\_Coastal\_Status table must be updated per guidance in Section 3.10.

Because project scope is prone to change after initiation, it is the responsibility of the Mapping Partner to inform the RSC regarding any subsequent changes in project scope and to maintain accuracy of the CNMS FGDB. In this way, the inventory may be updated several times between initial project scope and Letter of Final Determination (LFD). For previously unmapped areas where new riverine studies are being proposed and/or incorporated, a new stream centerline feature will be added to the CNMS Study Records and all required attributes will be populated. New additions to the inventory must be topologically correct and maintain the existing database structure. Appendix A indicates which updated values are required or optional for CNMS FGDB feature class attribution. For a complete description of attributes and definitions please refer to Section 3.

The Mapping Partner will follow the quality guidelines in Section 2.5 and utilize the CNMS FGDB QC Tool to verify feature attributes. Following receipt of data reflecting project scope from the Mapping Partner, the Region or RSC will perform a review to confirm format consistency and that all required attributes have been populated. The Region will then use this submission to replace CNMS data for the project area of interest in the Regional CNMS FGDB. The version of the CNMS Data for the project area of interest should be archived in a centralized location, typically the RSC, for a duration of 3-years from date of extraction.

### **2.1.2 FIRM Production Phase Update**

The Mapping Partner will use the latest version of the CNMS FGDB within the area of interest to track mapping and engineering issues encountered over the course of the production phase. Issues that will not be resolved by the new or updated engineering or mapping study should be

documented appropriately in CNMS per guidelines in Section 3, 3.2, 3.5, 3.9. For coastal studies, the County\_Coastal\_Status table must be updated per guidance in Section 3.10.

### 2.1.3 Preliminary Issuance Phase Update

Within 15 days of Preliminary issuance, the Mapping Partner will submit an updated version of the CNMS FGDB for the project area of interest to the FEMA RSC. If necessary, the Mapping Partner will procure the latest copy of the CNMS data for the area of interest prior to starting this update which is typical when multiple projects are active within the area of interest and the CNMS FGDB is updated quarterly.

For riverine studies, this version will incorporate all new and revised geospatial elements of the vector flooding source centerline data developed during the production phase, including flooding sources which may not have been updated during the Flood Risk Project, but for which new vector data was produced to align with the current base map. For riverine and coastal studies, all data should be topologically correct and reflect the CNMS Study Record attribute update requirements per guidelines in Section 3.2.1 and 3.9.1.

Other CNMS feature class data should be updated, as needed, to reflect changes in the S\_Studies\_Ln and S\_Coastal\_Ln feature classes. For coastal studies, the County\_Coastal\_Status table must be updated per guidance in Section 3.10.

Following creation of the updated CNMS FGDB incorporating data from the Preliminary phase, the Mapping Partner and RSC will perform a review and use the CNMS FGDB QC Tool to confirm format consistency and that all required attributes have been populated as outlined above. The RSC will then query and extract the corresponding geographic extent of CNMS FGDB from the regional CNMS FGDB and replace it with the updated version provided by the Mapping Partner. The extract of CNMS data from the regional CNMS database will be archived in the same centralized location mentioned in section 2.1.1. This extract will not replace the prior archived version from the Discovery or Production phase updates. This process should be completed within 15 days following receipt of the updated S\_Studies\_Ln feature class from the Mapping Partner.

### 2.1.4 LFD Issuance Phase Update

Within 15 days of issuance of LFD, the Mapping Partner will submit data communicating the effective status of the project area of interest to the RSC for updating the regional CNMS FGDB. These data may simply be correspondence acknowledging no change in the data since Preliminary when applicable. If necessary, the Mapping Partner will procure the latest copy of the CNMS data for the geography of interest prior to starting this update. A final version of the CNMS FGDB for the project will be prepared by the RSC. At a minimum, when there are no changes since preliminary issuance of the FIRM, this version will update the validation date attribute to reflect the effective date established by the LFD. All data should be topologically correct and reflect the CNMS study attribute update requirements per guidelines in Section 3 and 3.2.4 for riverine studies, and Section 3.9.4 for coastal studies. Other CNMS feature class

data should be updated, as needed, to reflect changes in the S\_Studies\_Ln and/or S\_Coastal\_Ln feature classes. For coastal studies, the County\_Coastal\_Status table must be updated per guidance in Section 3.10.

Following creation of the updated CNMS FGDB incorporating data from the LFD Issuance phase, the Mapping Partner and RSC will perform a review and use the CNMS FGDB QC Tool to confirm format consistency and that all required attributes have been populated as outlined above. The RSC will then query and extract the corresponding geographic extent of CNMS FGDB from the Regional CNMS FGDB and replace it with the updated version provided by the Mapping Partner. The extract of CNMS data from the Regional CNMS database will be archived in the same centralized location mentioned in section 2.1.1. This extract will not replace the prior archived version from the Discovery, Production or Preliminary Issuance phase updates. This process should be completed within 15 days following receipt of the updated S\_Studies\_Ln and/or S\_Coastal\_Ln feature classes from the Mapping Partner.

In the event that a revised Preliminary is warranted, the Mapping Partner should follow the process outlined for the Preliminary Issuance phase update.

### **2.1.5 LOMA (MT-1) & LOMR (MT-2) Integration Workflow**

Apart from gathering and incorporating LOMRs into CNMS during flood study validation as outlined in Appendix G, the efforts of the MT-1 and MT-2 teams within the Production and Technical Services (PTS) firms must be integrated with CNMS efforts to continually update the CNMS Inventory based on LOMR issuance. The Mitigation (MT)-1 & MT-2 teams would incorporate mapping and flood data issues found as CNMS Requests Records using the process described in Sections 2.1.8 and Section 3.4.

### **2.1.6 Validation Checklists**

The Validation Checklists in Appendix A guides the assessment of FEMA's study inventory. The central purpose of the Validation Checklists is to outline a consistent process that should be used to determine and document the Validation Status of flood studies and whether they should be categorized as VALID, UNVERIFIED, or UNKNOWN in the CNMS Study Records. The UNKNOWN category is to be used only as a placeholder during the time that a CNMS evaluation is in queue, in progress, deferred, or is found insufficient to assess its validity. Studies with the UNKNOWN Validation Status should transition into one of the other two categories listed above as soon as warranted. The decision to defer CNMS evaluation of flood studies with validation status UNKNOWN shall be coordinated with FEMA Headquarters. Regions will need to re-assess flood studies in the deferred category at least every 5 years with the understanding that such assessment may be required sooner. Flood studies with the validation status of UNVERIFIED are to be prioritized and funded for study updates. Therefore, as the Regional CNMS data are rolled up for quarterly reporting, Regions will need to review the list of newly unverified studies and initiate assessment as to how these studies will be prioritized and funded for updates.

The CNMS data model also provides for storing information for unmapped streams that have been considered for a new study. Such stream centerlines are stored as CNMS Study Records and assigned a Validation Status of ASSESSED to indicate that the stream has been assessed for a new study. The outcome of such consideration may be that resources are allocated in the current or a future FY, or that the request for new study has been deferred. Section 3.2 outlines the attribution policy for CNMS Study Records.

### 2.1.7 NVUE Metrics Calculation and Reporting

National CNMS data is consolidated on a quarterly basis using the latest Regional CNMS FGDBs to produce the NVUE Summaries reported at local, state, regional and national levels. The process and methodology for NVUE metric calculations and reporting is described in Appendix F.

### 2.1.8 CNMS Requests

In order to capture flood data and SFHA mapping needs on an ongoing basis from FIRM production teams, MT-1 and MT-2 teams, and local stakeholders, a CNMS Requests dataset within the CNMS FGDB has been included. CNMS Requests Records are typically of the CARTOGRAPHIC type, or FLOOD DATA type.

Users including, but not limited to, Discovery teams, FIRM production teams, MT-1 and MT-2 teams, and local stakeholders will use CNMS Requests as an intermediate state before each CNMS Request Record is reviewed in the making of map update investment decisions. If the issue identified is recognized as warranting action, then a resolution will be put in place that will address the issue. This could lead to a CNMS Study Record update identifying a critical or secondary need, or a decision to issue a new/updated study for the area of interest. Section 3.4 outlines the attribution policy for CNMS Request Records.

## 2.2 Data Input

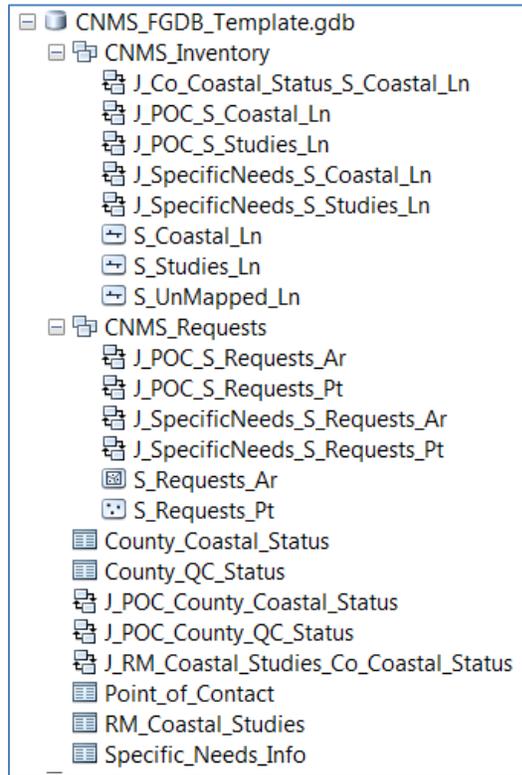
### 2.2.1 CNMS Data model

The CNMS data model has three major components:

- CNMS Esri file geodatabase – This template geodatabase contains all spatial entities defined in the CNMS Entity Relationship Diagram (ERD) with the proper geometry, relationship classes, fields, and domains. The CNMS FGDB contains two feature datasets and data tables and associated relationship classes:
  1. the CNMS Inventory Feature Dataset [S\_Studies\_Ln, S\_Coastal\_Ln, S\_Unmapped\_Ln], and
  2. the CNMS Requests Feature Dataset [S\_Requests\_Pt, S\_Requests\_Ar].
  3. Figure 2.2.1.1 identifies all other tables and relationship classes within the CNMS FGDB.

Although CNMS information is stored in an Esri file geodatabase (FGDB) format, information can be extracted for use in other GIS platforms.

**Figure 3: CNMS FGDB Components as Seen in Esri ArcCatalog**



- CNMS ERD (Appendix C) - This schematic diagram illustrates the entities in the database, their relationships, and domains.
- CNMS Data Dictionary (Appendix D) - This comprehensive dictionary defines the type, format, domains, and field definitions of every entity in the database.

## 2.2.2 Flood Insurance Study (FIS) Report

Study information to be tracked in the CNMS inventory would primarily be obtained from Effective or Preliminary FIS Reports. The Effective FIS text may be procured from the FEMA Flood Map Service Center (MSC) and Preliminary FIS Reports may be procured by accessing the Mapping Information Platform (MIP) Citrix Drive K. The FIS report documents study engineering and mapping methodology and a list of studied streams associated with the geography represented in the FIS report.

## 2.2.3 LOMRs

LOMR case files may be procured from the MIP and in collaboration with the LOMR/MT-2 teams. The process to be followed to incorporate LOMRs is outlined in Appendix G.

### 2.2.4 FEMA Library

Some flood insurance studies are digital conversions of historic SFHA maps or redelineation of historic engineering studies to represent those flood hazard areas superimposed upon the best available imagery and topographic data. In such instances, the need may arise to access historic Effective FIS reports and FIRM panels. The FEMA Library is the primary source for accessing such historic data.

### 2.2.5 FIRM Data and Linework Sources

Sources of polylines to enter into the S\_Studies\_Ln feature class are varied and are the responsibility of the user to determine, but some potential sources of stream centerlines in a recommended order of priority are: 'S\_Profil\_BasIn' from FIRM Database, 'S\_Wtr\_Ln' from the FIRM Database; National Hydrography Dataset (NHD) High, Medium, Low resolutions; or heads up digitization of a representative line for the SFHA. Effective FIRM Databases may be procured from the FEMA MSC and Preliminary FIRM Databases may be procured from the MIP Citrix Drive K.

The above guidance is provided for S\_Studies\_Ln features representing SFHAs that are mapped for riverine flooding sources. Additional details on populating S\_Studies\_Ln attributes, including mileage calculation guidelines for handling various riverine flood source types, are provided in Section 3.2 and Appendix F.

For Coastal CNMS, the National Oceanic and Atmospheric Administration's (NOAA's) Office of Coast Survey (OCS) shoreline data set is the sole line source representing the S\_Coastal\_Ln feature class. No new or additional linework should be loaded into S\_Coastal\_Ln as the entire OCS shoreline is already represented in this feature class. The only geometry modifications of S\_Coastal\_Ln will be splitting or grouping of the existing coastal line segments to represent coastal study extents. Additional details on populating S\_Coastal\_Ln attributes, including mileage calculations are provided in Section 3.2 and Appendix F.

## 2.3 Documentation

The following is a list of documentation for CNMS:

- Appendix B describes the requirements for documentation of the validation process. Most data processed during the CNMS pilots and CNMS Phase 3 have associated documentation in a validation process documentation checksheet described in Appendix B.
- Procedure Memorandum 56, revised June 2011, describes CNMS as the official reporting mechanism for the NVUE Attained metric and the source-of-record for stream-reach-level study status information.
- The Flood Study (Mapping Activity Statement) MAS (issued one per FY) contains Discovery and Study scope requirements related to CNMS activities.

### 2.4 Data Output

This section lists the most common uses and outputs that may be derived from the CNMS FGDBs.

- For Discovery
  - List of current effective studies with Validation Status
  - List of causes of failure at an element level per study
  - Mileage distribution by study types of current effective data
  - Engineering methodology by study reach
  - Identification of specific study differences along political jurisdiction boundaries
  - Identification of streams with associated repetitive loss properties
  - Visualization of new removed structures against trends in urbanization
  - Other Critical and Secondary validation element issues
- For CTP regional or national planning and reporting
  - Multi-Year Planning
  - Post-Purchase Management
  - NVUE Attained Metric
  - Life Cycle Cost Model (LCCM)

### 2.5 Quality

The Mapping Partner is responsible for the implementation of a QMP consistent with Appendix H: CNMS Quality Management Plan (QMP).

To meet the quality standards set forth by FEMA, the Mapping Partner will use the CNMS FGDB User's Guide to update and maintain the CNMS FGDBs for their area of interest. The FEMA RSCs will make use of the CNMS FGDB QC tool outlined in Appendix H to verify the attribute quality and database integrity of the data submitted for the phases identified in Section 2.1. It is possible for the Mapping Partner to procure the CNMS FGDB QC tool from the FEMA RSC to conduct a final quality review of the CNMS FGDB prior to submission.

The CNMS QMP includes independent quality audits from time-to-time conducted by external entities.

Figure 4: CNMS Record Entry Determination (Section titles are in parentheses)

Riverine Component GIS Feature Classes and Business Tables of the CNMS File Geodatabase Model

	"The Inventory" of Studied Streams	Streamlines for Unmapped Areas	Mapping Requests Information	Floodplain Studies Subject Matter Experts (SMEs)	Ancillary Information
<b>CNMS Touchpoints</b>	<b>S_Studies_Ln (3.2)</b>	<b>S_Unmapped_Ln (3.5)</b>	<b>S_Request_Ar / S_Request_Pt (3.4)</b>	<b>Point_of_Contact (POC) (3.8)</b>	<b>Specific_Needs_Info (3.6)</b>
<b>Pre-Discovery</b>	Review current status of studies within Watershed	Review unmapped stream reaches within Watershed for awareness purposes	Review for Request Records on file within the Watershed to consider for inclusion in a study Statement of Work (SOW)	Review information contained within to refresh working knowledge of local persons and contact information to facilitate communication with SMEs	Review information contained within to increase working knowledge of watershed being considered for the study update process
<b>Discovery Meeting</b>	Current CNMS inventory status for the Discovery area of interest is presented on Discovery Map (Section 3.2.1)	If necessary, unmapped streams are displayed in the Discovery Map.	Normal Request Record generation is applied. Should a production team discover mapping issues through the Discovery process or during production that are not covered by the study MAS/SOW, Request Records should be developed to capture the details of a request	Update POC names and contact information where applicable	No actions required
<b>Post-Discovery (3.2.2, 3.7.2)</b>	Data in S_Studies_Ln are to be updated to reflect extent of floodplain study, that the study process has been initiated, and the estimated Preliminary Issuance and LFD dates are entered. (Section 3.2.2)	Migrate flooding source centerline data for floodplains being studied but are not yet represented in S_Studies_Ln (the Inventory)	Request Records can be included in the Discovery Map (materials) presented at Discovery Meetings for refinement and the collection of new Request Records.	Update POC names and contact information where applicable	Update Specific_Needs_Info information where applicable
<b>Preliminary Issuance (3.2.3, 3.7.3)</b>	Set study PRELM_DATE with actual Preliminary Issuance date and revise the estimated LFD date (Section 3.2.3)	Suggestion: Delete the study related flooding source centerlines from the S_Unmapped_Ln feature class data (specifically, the lines that were migrated to S_Studies_Ln)	Request_Ar and Request_Pt should be edited to indicate resolution of Request Records that have been addressed during the study process	Update POC names and contact information where applicable	Update Specific_Needs_Info information where applicable
<b>Letter of Final Determination (LFD) (3.2.4, 3.7.4)</b>	New or Updated studies are to be set to "Valid" at this milestone. Information in the "Being Studied" (BS) Fields is to be migrated to the complimentary S_Studies_Ln fields to indicate that the study is completed once LFD is issued. The actual LFD date is to be recorded, and the "Being Studied" (BS) fields should be cleared after their values are migrated (Section 3.2.4)	No actions required	Resume/maintain fundamental, ongoing Request capture process	Update POC names and contact information where applicable	Update Specific_Needs_Info information where applicable
<b>Post-Production Updates - LOMA, LOMR, 5-Year Revalidation</b>	Use Appendix A and G to address S_Studies_Ln updates during Post-Production Activities	No actions required	Resume/maintain fundamental, ongoing Request capture process	Update POC names and contact information where applicable	Update Specific_Needs_Info information where applicable

CNMS Usage Matrix for Floodplain Studies

Figure 5: Coastal CNMS Record Entry Determination (Section titles are in parentheses)

Coastal Component GIS Feature Classes and Business Tables of the CNMS File Geodatabase Model

CNMS Usage Matrix for Floodplain Studies

	"The Inventory" of Studied Coastline	Mapping Requests Information	County Coastal Status	Floodplain Studies SMEs	Ancillary Information
CNMS Touchpoints	S_Coastal_Ln (3.9)	S_Request_Ar / S_Request_Pt (3.4)	County_Coastal_Status (3.10)	Point_of_Contact (3.8)	Specific_Needs_Info (3.6)
<b>Pre-Discovery</b>	Review current status of studies within the coastal project footprint	Review for Request Records on file within the coastal project footprint to consider for inclusion in a study SOW	No actions required (Section 3.10.1)	Review information contained within to refresh working knowledge of local persons and contact information to facilitate communication with SMEs	Review information contained within to increase working knowledge of watershed being considered for the study update process
<b>Discovery Meeting</b>	Current CNMS inventory status for the Discovery area of interest is presented on Discovery Map (Section 3.9.1)	Normal Request Record generation is applied. Should a production team discover mapping issues through the Discovery process or during production that are not covered by the study MAS/SOW, Request Records should be developed to capture the details of a request	No actions required (Section 3.10.1)	Update POC names and contact information where applicable	No actions required
<b>Post-Discovery (3.2.2, 3.7.2)</b>	Data in S_Coastal_Ln are to be updated to reflect attributes of the ongoing study, that the study process has been initiated, and the estimated Preliminary Issuance and LFD dates are entered. (Section 3.9.2)	Request Records can be included in the Discovery Map (materials) presented at Discovery Meetings for refinement and the collection of new Request Records.	Data in S_Coastal_Ln are to be updated to reflect attributes of the ongoing Risk MAP study, that the study process has been initiated, and the estimated Preliminary Issuance and LFD dates are entered. (Section 3.10.2)	Update POC names and contact information where applicable	Update Specific_Needs_Info information where applicable
<b>Preliminary Issuance (3.2.3, 3.7.3)</b>	Set study PRELM_DATE with actual Preliminary Issuance date and revise the estimated LFD date (Section 3.9.3). S_Coastal_Ln not receiving new regulatory products attributed with effective study attributes.	Request_Ar and Request_Pt should be edited to indicate resolution of Request Records that have been addressed during the study process	Update records as needed (Section 3.10.3)	Update POC names and contact information where applicable	Update Specific_Needs_Info information where applicable
<b>Letter of Final Determination (LFD) (3.2.4, 3.7.4)</b>	New or Updated studies are to be set to "Valid" at this milestone. Information in the "Being Studied" (BS) Fields is to be migrated to the complimentary S_Coastal_Ln fields to indicate that the study is completed once LFD is issued. The actual LFD date is to be recorded, and the "Being Studied" (BS) fields should be cleared after their values are migrated (Section 3.9.4)	Resume/maintain fundamental, ongoing Request capture process	Update records as needed (Section 3.10.4)	Update POC names and contact information where applicable	Update Specific_Needs_Info information where applicable
<b>Post-Production Updates - LOMA, LOMR, 5-Year Revalidation</b>	Use Appendix A and G to address S_Coastal_Ln updates during Post-Production Activities	Resume/maintain fundamental, ongoing Request capture process	Update records as needed (Section 3.10)	Update POC names and contact information where applicable	Update Specific_Needs_Info information where applicable

### 3.0 Data Entry Process

Figure 3.1 summarizes the workflows and touch points that warrant CNMS data inputs. Structurally, these data inputs are separated into two types of feature classes: the CNMS Inventory feature dataset with feature classes 'S\_Studies\_Ln', 'S\_Coastal\_Ln', and 'S\_Unmapped\_Ln', and the CNMS Requests feature dataset: with feature classes 'S\_Requests\_Ar' and 'S\_Requests\_Pt'. In addition to these feature datasets, several tables within the CNMS FGDB require specific update. Attribute population policies for each feature class and table are outlined in sections 3.1 – 3.9.

The validation checklist tables in Appendix A may be used as a working document while performing flood study validation, results of which need to be transferred to the Validation Process Documentation Checklist in Appendix B and to the appropriate CNMS Study Records in the CNMS FGDB.

Point of Contact (POC) information is to be populated at the time of updating the CNMS FGDB for associated CNMS Study and Request records, or during the use of the CNMS FGDB QC Tool (Appendix H). The POC information can change at an organizational level over time. A user should not feel obligated to retroactively update all records submitted by the organization if the primary POCs for CNMS updates change. FEMA ensures that any data provided to the agency that is personal in nature such as POC name, will not be distributed and will be considered private. Should a POC be identified, it is suggested that the individual be knowledgeable about the record and be someone who will be accessible by FEMA for follow-up questions or requests for additional information.

#### 3.1 Primary Key Considerations

The primary key in a relational database table allows each record to be uniquely identified. When generating primary key values for records within relational database tables it is important that a well-documented methodology be followed for the sake of consistency, and to ensure that any information intended to be imbedded within the primary key is appropriately represented.

CNMS is expected to have many data entry points so special care must be taken to prevent primary key duplication. If there are multiple sources for record generation for a county, coordination between or among the multiple sources will be required prior to consolidation of the two databases. However, if coordination takes place prior to record generation, the parties involved can agree to assigned number ranges and thereby avoid encroachment on the primary keys created by others.

Primary key generation for most tables within CNMS is based upon a standard scheme consisting of the concatenation of the appropriate 5-digit County Federal Information Processing System (FIPS) code, a 2-digit table identification code, and a 5-digit counter in which leading zeros are always populated and serve as place holders. For example, to generate a REACH\_ID in S\_Studies\_Ln, 201190100001 would be an appropriate assignment where 20119 is the

county FIPS code, 01 is the table identification code for S\_Studies\_Ln, and 00001 is the counter value for the first record in S\_Studies\_Ln for Meade County, Kansas. For tables following the standard scheme and variations thereof, the length of the key is expected to be 12. Tables such as Point\_of\_Contact allow for variations of the scheme. For example, a state-level POC record might substitute the 2-digit state FIPS followed by three zeros for the 5-digit county FIPS. The only tables within the CNMS data model which do not follow the standard primary key scheme are the County\_QC\_Status and County\_Coastal\_Status tables, for which CO\_FIPS is the primary key by virtue of its inherent uniqueness.

### 3.2 S\_Studies\_Ln Feature Class (Polyline)

The S\_Studies\_Ln feature class resides in the CNMS Inventory feature dataset. Each feature within S\_Studies\_Ln is meant to fully encompass the physical extent, upstream and downstream, of a reach that is regulated by an SFHA under the National Flood Insurance Program (NFIP). Records representing unmapped reaches and bodies of water may optionally be present in this feature class, provided that they have been ASSESSED for new study prioritization.

The database contains polylines for most reaches representing SFHAs, but not all. Issues which may have prohibited the accurate representation of all SFHAs from FEMA's mapped inventory could include: cases where the stream centerlines used to populate the inventory meander in and out of the SFHAs; or where a study is currently underway and digital data does not exist. The first case can occur when several stream centerline sources were leveraged to represent SFHA polygons studied in flood insurance studies. In this instance, one could optionally replace the existing stream centerlines in the CNMS inventory with better quality polyline data. In the second case, the digital data should overlay stream networks to extract the reaches that are regulated by SFHA extents when they become available.

This should not be the case in areas where FIRM data were used to populate CNMS Study Records. It is only anticipated that such inconsistencies with stream centerline representation of SFHAs exist in unmodernized areas and areas where certain early CNMS pilots were conducted. It should be the goal of each user to contribute to the inventory by identifying shortcomings in the CNMS Inventory (particularly in unmodernized areas), providing updates as available, and maintaining the inventory accordingly.

Polyline geometry in the CNMS Studies feature dataset is the result of compilation from various sources and it is intended that augmentations and improvements to line work geometry be an ongoing process. The goal is to have every flood hazard study that is part of FEMA's mapped inventory represented accurately within CNMS – the better the line feature quality, the more accurately the CNMS inventory will be able to inform NVUE reporting. Inventory polylines should be continuous through an SFHA of the same study type (e.g., Zone AE) for individual flooding sources, but split at county or watershed breaks, or within the same SFHA where one study stops and another starts including LOMR extents. Polylines within S\_Studies\_Ln may also be split at community boundaries. In cases where a watershed or a political boundary may cause a

study to be divided into several reaches (each an individual feature), all reaches may be related to one another and linked to external data by using the 'STUDY\_ID' field.

New polylines should be included in the Inventory when an SFHA does not currently have a line representing the entire extent of its flood hazard. Sources of stream centerlines entering the inventory are varied and will be the responsibility of the user to determine. Sources for stream centerlines for riverine flooding sources in order of preference include: 'S\_Profil\_Basln' or 'S\_Wtr\_Ln' from: FIRM Database studies; NHD High, Medium, Low resolution; and heads-up digitization of a representative line for the SFHA.

Unlike riverine flooding sources, lakes and ponds that are part of FEMA's mapped SFHA inventory are often disconnected from stream centerlines and are two dimensional, making linear representations of these areas a challenge. Ignoring lakes and ponds altogether would underestimate the representative miles used for NVUE percentage calculations while including the entire shoreline of these areas would overestimate the representative miles used. If the stream centerline sources identified above for riverine flooding sources have line work passing through the lakes or ponds, those may be used to represent these flooding sources (this includes center line digitization). If none of the datasets has line work usable as described above, to the appropriate manner in which to address these flooding sources is to then store the actual polyline representing the lake or pond shore in the CNMS Inventory and to then set the LINE\_TYPE field to a value other than 'RIVERINE', such as 'LAKE OR POND'. These shoreline miles will be halved when assessing the mileage for the SFHA study for NVUE calculations.

The S\_Studies\_Ln feature class is also used to indicate Floodplain Boundary Standard (FBS) compliance for current studies. Studies that meet the standard will have a value of 'YES' in the FBS\_CMLPNT field. This value is updated upon Preliminary issuance with information typically received from the Regional Support Centers.

Sections 3.2.1 – 3.2.4 outlines the updates needed for the S\_Studies\_Ln table at various Risk MAP phases.

**Table 1: S\_Studies\_Ln (Table ID Code: 01)**

Field	Description
<b>REACH_ID</b>	Primary key for table. Assigned by table creator.
Type of data expected	As the Primary key for this table this field must exist as a unique identifier for each individual record.
Potential source to obtain	A programmatic approach that prefixes five record counting digits with the 5-digit County FIPS code and a 2-digit feature class ID will produce a number like 201190100001 (20119 is the county FIPS code, 01 is the feature class ID for S_Studies_Ln and 00001 represent record counting digits) for the first record in S_Studies_Ln for Meade County, Kansas. No repeat counting digits should be used within the same county.
Anticipated use for attribute	Unique identification of each individual CNMS record.
<b>STUDY_ID</b>	Internal key used to establish relationship between reaches.
Type of data expected	This field will be a 12-digit string.
Potential source to obtain	The value in this field will typically represent the existing REACH_ID of a single reach amongst a group of related reaches.

## CNMS Technical Reference

Field	Description
Anticipated use for attribute	Key field used to link multiple reaches which represent segments of the same study. This field can also be used to link multiple reaches to external supporting data which is common among them. The expected relationship between this field and individual S_Studies_Ln features in one to many, with a single STUDY_ID being represented by one or more features.
<b>CO_FIPS</b>	Federal Information Processing Standard code
Type of data expected	5-digit Federal Information Processing Standard code which uniquely identifies state and counties, or the equivalent. The first two digits are the FIPS state code and the last three are the county code within the state or possession.
Potential source to obtain	Countywide FIRM or FIS; U.S Department of Commerce, Bureau of the Census, Geography Division is the maintenance agency. Many departments within the U.S. government maintain references back to this standard. Including the EPA: <a href="http://www.epa.gov/enviro/html/codes/state.html">http://www.epa.gov/enviro/html/codes/state.html</a>
Anticipated use for attribute	Establishes a unique identifier for determining the state and/or county within which the data resides.
<b>CID</b>	Community Identification Number
Type of data expected	A unique 5- or 6-digit number assigned to each community by FEMA and used for identity in computer databases; it is shown on the FIS, FIRM, and in the Q3 Flood Data files. The first two digits of the number are always the State FIPS code.
Potential source to obtain	FEMA is the source. The CID is obtainable from multiple sources; Community Information System, Flood Insurance Studies, FIRM panels, FIRM indexes.
Anticipated use for attribute	Catalog and referencing
<b>WATER_NAME</b>	Name of flooding source
Type of data expected	Water feature name (ex. Mississippi River, Lake Superior, Pacific Ocean)
Potential source to obtain	The name of the flooding source should come from the FIS, FIRM, FIRM DB, or source stream network, and should be given that order of importance. The FIS lists profiles in alphabetical order in the table of contents and usually discusses them in other FIS sections in that same order. Section 1.2 should list all of these streams and the dates they were studied. Section 2.1 should also list all the streams studied by detailed methods, and should also list all the streams studied by approximate methods. Note that the FIRM Database should not be the sole source of information that is used to evaluate stream reaches. Often times there are graphic features or annotation on the PDF map panel that will help identify a stream reach.
Anticipated use for attribute	This attribute provides a geographic place name reference.
<b>WATER_NA_1</b>	Alternate name of flooding source
Type of data expected	Water feature name (ex. Mississippi River, Lake Superior, Pacific Ocean)
Potential source to obtain	If an alternative name of a flooding source is identified from the sources identified for the 'WATER_NAME' field, which will be stored here. Any other indications of an alternate name will also be captured in this field.
Anticipated use for attribute	This attribute provides a geographic place name reference.
<b>FLD_ZONE</b>	Zone type of the SFHA the polyline represents (ex. Zone AE, Zone A)
Type of data expected	Entry from domain lookup table D_ZONE

## CNMS Technical Reference

Field	Description
Potential source to obtain	Flood zones depicted in the FIRM and/or FIRM Database of the NFIP
Anticipated use for attribute	Query into the characteristics of the inventory: type of study, Validation Status, mileage
<b>VALIDATION_STATUS</b>	This attribute establishes the latest evaluation condition of a flooding source centerline in relation to the criteria set forth in the <u>CNMS Technical Reference</u> , any procedure memorandums, or previous work.
Type of data expected	Entry from domain lookup table D_VALID_CAT
Potential source to obtain	Current entry; or user assessed entry based on evaluation of criteria set forth in the <u>CNMS Technical Reference</u> , any procedure memorandums, or previous work.
Anticipated use for attribute	Used to categorize the Inventory for the purposes of planning, study selection, tracking and reporting.
<b>STATUS_TYPE</b>	This attribute establishes the sub-categories for each of the Validation Status classes of a flooding source centerline in relation to the criteria set forth in the <u>CNMS Technical Reference</u> , any procedure memorandums, or previous work.
Type of data expected	Entry from domain lookup table D_STATUS_TYPE
Potential source to obtain	Current entry; or user assessed entry based on evaluation of criteria set forth in the <u>CNMS Technical Reference</u> , any procedure memorandums, or previous work.
Anticipated use for attribute	Used to further define the Validation Status type to categorize the Inventory for the purposes of planning, study selection, tracking and reporting.
<b>MILES</b>	An attribute of the calculated miles of the data record entry.
Type of data expected	A number corresponding to the length of the inventory polyline segment
Potential source to obtain	In feature class format, and if projection is in feet or meters permanent length field of feature class can be used to populate this field by applying the appropriate conversion to miles. Otherwise, make a field calculation using field calculator and convert to miles. Be sure to understand the units the projection is in and how it will influence any resulting calculations. The CNMS FGDB is provided in the NAD 1983 Geographic Coordinate System, at the Regional level, the length of the polyline segments can be calculated in local or State projections. During National data consolidation and analysis, the projection will be standardized across all Regions and mileage recalculated to a National standard.
Anticipated use for attribute	Quantifies the CNMS Inventory in stream miles for reporting (ex. NVUE, quarterly reports).
<b>SOURCE</b>	Source of polyline segment represented in the inventory.
Type of data expected	Entry from domain lookup table D_SOURCE
Potential source to obtain	User sourced dataset used for the polyline entry (ex. NFHL, RFHL, FIRM Database, NHD).
Anticipated use for attribute	Verify source of polyline used, and also determine whether it could be updated to a more accurate polyline feature if one becomes available.
<b>STATUS_DATE</b>	Date when CNMS stream reach validation is completed or a validation assessment of the stream reach has been made. UNVERIFIED records will have the date the CNMS evaluation triggered the UNVERIFIED status. If an unverified study becomes VALID, the date of the status change is recorded.
Type of data expected	Calendar date (ex. 01/01/10)
Potential source to obtain	Calendar

## CNMS Technical Reference

Field	Description
Anticipated use for attribute	Determine the most recent analysis and condition of the polyline. Will track and maintain the currency of the inventory, to insure all requirements are being adhered to according to mandates set forth within the NFIP.
<b>FY_FUNDED</b>	Attribute of the most recent effective FEMA fiscal year funding applied to the stream reach engineering at the time of study (ex. Watershed, county).
Type of data expected	Entry from domain lookup table D_FY_FUNDED
Potential source to obtain	MIP case numbers (as they are associated with fiscal year first funded), RSC Management
Anticipated use for attribute	Determine the latest FEMA funding year for the underlying SFHA engineering study.
<b>REASON</b>	Attribute allows for user input of detailed description of considerations or special circumstances when determining attributes VALIDATION_STATUS, SOURCE, or any pertinent information in the data creation process.
Type of data expected	Preferably user defined template “canned” descriptors of their data entry process and considerations.
Potential source to obtain	Criteria evaluated and considered in the bulk validation of CNMS Study Records, ancillary information presented by the regions or other parties, data used that is not readily available, etc.
Anticipated use for attribute	Attribute will document more details about the underlying considerations of other attributes contained in the CNMS database. This will serve as a first stop when questions arise about the attribution contained in the database without going back to the criteria, check sheets, or intermediate datasets. By choosing to use template “canned” entries, query of such entries will be streamlined. A useful example might be the need to query a specific consideration that based on current business rules is attributed a certain way, but based on new information might need to be queried and reattributed a different way.
<b>HUC8_KEY</b>	8-digit Hydrologic Unit Code (HUC) representing the smallest watersheds known as hydrologic cataloging units. This can be obtained by overlaying the HUC spatial files with the polyline information to determine which cataloging unit the polyline resides in.
Type of data expected	8-digit Hydrologic Unit Code
Potential source to obtain	Originator: United States Geological Survey (USGS): <a href="http://nhd.usgs.gov/data.html">http://nhd.usgs.gov/data.html</a> ; or EPA surf your watershed: <a href="http://cfpub.epa.gov/surf/locate/index.cfm">http://cfpub.epa.gov/surf/locate/index.cfm</a>
Anticipated use for attribute	Provides an attribute to determine what HUC 8 sub-basin the polyline resides in.
<b>STUDY_TYPE</b>	Study type of the SFHA represented by the reach based on the current effective FIS text.
Type of data expected	Entry from domain lookup table D_STUDY_TYPE
Potential source to obtain	FIS Text, Study Manager Input, etc...
Anticipated use for attribute	Query into the characteristics of the inventory: type of study, Validation Status, mileage.
<b>LINE_TYPE</b>	Attribute provides description of flooding source line type as being Riverine, Lake, Pond, Playa, Pondering, or Other.
Type of data expected	Entry from domain lookup table D_LINE_TYPE
Potential source to obtain	Current entry or user assessed entry based on line geometry source.

Field	Description
Anticipated use for attribute	Attribute will allow for the identification of non-riverine flooding sources which do not fit well with the linear riverine model for calculating NVUE mileage. This attribute is to be used to equate the level of effort associated with each of line type relative to the level of effort associated with Riverine studies.
<b>FBS_CMLNT</b>	Is the flood plain represented by this feature FBS Compliant? (NO/YES/UNKNOWN)
Type of data expected	This is a YES/NO field based upon domain lookup table D_ELEMENT.
Potential source to obtain	Regional Support Centers and /or TSDN
Anticipated use for attribute	Tracking FBS compliance across the National Inventory
<b>FBS_CHKDT</b>	Date when the current value within the FBS_CMLNT field was populated.
Type of data expected	Calendar date (ex. 01/01/10)
Potential source to obtain	Calendar
Anticipated use for attribute	Tracks attribution of latest FBS compliance value.
<b>FBS_CTYP</b>	FBS compliance check type – bulk attributed at county level or attributed individually.
Type of data expected	This field will hold a user selected value from domain table D_FBS_CTYP.
Potential source to obtain	Entered by user when FBS_CMLNTY field is populated, based upon check type.
Anticipated use for attribute	Indicator of the type of FBS check performed for this reach.
<b>DUPLICATE</b>	Is there a second line representing an SFHA across a political boundary, for a second study on the same extent of the reach (CATEGORY 1, CATEGORY 2, or CATEGORY 3)?

Field	Description
Type of data expected	<p>Where a stream defines a county boundary, and there are two SFHA studies on the same reach of the stream, there will be two lines representing the same reach. One line will be set to 'CATEGORY 1' and the other line for the same reach extent will be set to 'CATEGORY 2'. All other streams on the interior of county boundaries, and for which only one study exists for that stream along a county boundary, will have the value set to "CATEGORY 3" by default. An exception to this is that two lines are to always be shown at Regional boundaries, even when the same study is used for both entities.</p> <p>Ideally, the line set to 'CATEGORY 1' will be the one with a better Validation Status and a more detailed study out of the two that represent two studies performed on the same reach. This way, while considering stream miles for a watershed based scoping, the better study could be hidden by a query, and the mapping needs will become more apparent. The hierarchy for determining the 'better' of the two studies is defined as follows and the bullets are organized in decreasing order, meaning the criteria in the first bullet supersedes ones below it for defining a better study.</p> <p style="padding-left: 40px;">Legend: '&gt;' = 'better than'</p> <ul style="list-style-type: none"> <li>• Detailed study &gt; Approximates (<i>regardless of Validation Status or study type</i>)</li> <li>• 'Valid' study &gt; 'Unknown' study &gt; UNVERIFIED study (<i>assuming both studies in question are detailed or both are approximate</i>) <ul style="list-style-type: none"> <li>• Redelineated &gt; Digital Conversion &gt; Non-digital (<i>assuming level of detail and Validation Status is the same for the 2 studies in question</i>)</li> <li>• Study date or number of failed elements can be used to further differentiate between two of the same study types. (<i>Newer studies are better. Lesser elements failing is better. Secondary elements failing is better than critical ones</i>)</li> </ul> </li> </ul>
Potential source to obtain	While completing this field, one must check the same stream on the neighboring county to see if there is a second study for the same reach extent.
Anticipated use for attribute	<p>Provides input that helps determine double lines representing the same stream when two studies have been conducted for that stream on either landward side. This situation occurs when community boundaries are defined by a stream and each community performs independent studies to map the SFHA on either side of the county boundary.</p> <p>If the stream segment with a better Validation Status and a more detailed study, is set to 'CATEGORY 1,' while considering stream miles for a watershed based scoping, the better study can be hidden by a query, and the mapping needs will become more apparent.</p>
<b>POC_ID</b>	Foreign key to join to 'Point_of_Contact' table. ID for Point of Contact.
Type of data expected	This field, if populated, should have a matching record in the 'Point_of_Contact' table.
Potential source to obtain	Establishing the relationship of 'S_Studies_Ln' records and 'Point_of_Contact' records is user controlled.
Anticipated use for attribute	This field is used to establish a database relationship with records in the 'Point_of_Contact' table. The supporting idea is to relate record ownership information to specific CNMS records.
<b>DATE_RQST</b>	The date a study is determined to be unverified.

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Field	Description
Type of data expected	This field is of the type date. Data should be entered in MM/DD/YYYY format.
Potential source to obtain	The user should enter the date for which the CNMS record was entered in the database.
Anticipated use for attribute	Resource and tracking are the anticipated uses of dates.
<b>DATE_EFFECT</b>	Date of effective analysis
Type of data expected	This date field will be used to document when the effective study was produced because there can be much time between when the study was created and when it went effective. Age of maps does not adequately reflect the age of the analysis as a study can be published on multiple effective maps without change. At times, the date that the analysis <i>first</i> went effective is sufficient as well, especially when supporting data is sparse. Data should be entered in the MM/DD/YYYY format.
Potential source to obtain	The date of effective analysis for a detailed study is usually included in Section 1.2 in the FEMA Insurance Study (FIS) text.
Anticipated use for attribute	This date will be evaluated for age of analysis of the effective study.
<b>HYDRO_MDL</b>	Hydrologic model used for the effective study.
Type of data expected	In this domain based field the user should choose the name of the hydrologic model used and version, as appropriate.
Potential source to obtain	There are two references in which one expects to find this information. One is in the reference section of the Flood Insurance Study (FIS) text and the second is the Technical Support Data Notebook (TSDN) for the study. A complete domain list of Hydrologic Models recognized by FEMA can be accessed on FEMA's Mapping Information Platform (MIP) or FEMA's website.
Anticipated use for attribute	Reference and evaluation
<b>HYDRA_MDL</b>	Hydraulic model used for the effective study.
Type of data expected	In this domain based field the user should choose the name of the hydraulic model used and version, as appropriate.
Potential source to obtain	There are two references in which one expects to find this information. One is in the reference section of the Flood Insurance Study (FIS) text and the second is the Technical Support Data Notebook (TSDN) for the study. A complete domain list of Hydraulic Models recognized by FEMA can be accessed on FEMA's Mapping Information Platform (MIP) and FEMA's website.
Anticipated use for attribute	Reference and evaluation
<b>HODIGFMT</b>	Is the effective study's hydrologic model in digital format (NO/YES/UNKNOWN)?
Type of data expected	Yes or no is expected to indicate whether the data are digital or not.
Potential source to obtain	User evaluation of the data format.
Anticipated use for attribute	Evaluation of the data relative to the expected effort associated with use of the data.
<b>HADIGFMT</b>	Is the effective study's hydraulic model in digital format (NO/YES/UNKNOWN)?
Type of data expected	Yes or no is expected to indicate whether the data are digital or not.
Potential source to obtain	User evaluation of the data format.
Anticipated use for attribute	Evaluation of the data relative to the expected effort associated with use of the data.
<b>HO_RUNMOD</b>	Can the effective study's Hydrologic digital model be run (NO/YES/UNKNOWN)?
Type of data expected	Yes or no is expected to indicate whether the data can be run in a model.

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Field	Description
Potential source to obtain	User evaluation of the data format.
Anticipated use for attribute	Evaluation of the data relative to the expected effort associated with use of the data.
<b>HA_RUNMOD</b>	Can the effective study's Hydraulic digital model be run (NO/YES/UNKNOWN)?
Type of data expected	Yes or no is expected to indicate whether the data can be run in a model.
Potential source to obtain	User evaluation of the data format.
Anticipated use for attribute	Evaluation of the data relative to the expected effort associated with use of the data.
<b>C1_GAGE</b>	Critical Element 1, Change in gage record. Major change in gage record since effective analysis that includes major flood events (NO/YES/UNKNOWN)? NOTE: Users may indicate change in rainfall record or other climatologic data in this field if gage data is not available but other precipitation indicators are available.
Type of data expected	This YES/NO field is to capture whether or not a major change in gage records has been observed since the effective analysis was completed.
Potential source to obtain	Investigate the existence of gages along the reach. Record all gages near or on the stream reach AND gages listed in the FIS.
Anticipated use for attribute	This Critical Element field is a trigger for indication of an identified deficiency, and subsequent assignment of UNVERIFIED Validation Status to the record.
<b>C2_DISCH</b>	Critical Element 2, Change in Discharge. Updated and effective peak discharges differ significantly based on confidence limits criteria in FEMA's <i>Guidelines and Standards for Flood Risk Analysis and Mapping</i> (NO/YES/UNKNOWN)?
Type of data expected	This YES/NO field is to capture whether or not updated and effective peak discharges differ significantly based on FEMA's current confidence limits criteria since the effective analysis was completed.
Potential source to obtain	Look at the years of record for each gage. The FIS may tell you how many years of record were used in the model. Gage data are measured, compiled and served via web access by the USGS. The gage Esri shapefile will tell you if there are continuous and updated years of record available. Determine if 100-yr discharge obtained by running PeakFQ at effective date is still within 68% confidence interval of the Bullet 17B 100-yr estimate using updated gage data and PeakFQ. If not, Critical Element is set to 'YES'.
Anticipated use for attribute	This Critical Element field is a trigger for indication of an identified deficiency, and subsequent assignment of UNVERIFIED Validation Status to the record.
<b>C3_MODEL</b>	Critical Element 3, Model methodology. Model methodology no longer appropriate based on <i>Guidelines and Standards for Flood Risk Analysis and Mapping</i> (i.e. one-dimensional vs. two-dimensional modeling; Coastal Guidelines) (NO/YES/UNKNOWN)?
Type of data expected	This YES/NO field is to capture whether or not the model methodology used to produce the effective analysis still meet current guidelines and specifications.
Potential source to obtain	Research and general knowledge to be provided by engineering staff.
Anticipated use for attribute	This Critical Element field is a trigger for indication of an identified deficiency, and subsequent assignment of UNVERIFIED Validation Status to the record.

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Field	Description
<b>C4_FCSTR</b>	Critical Element 4, Hydraulic Change. Addition/removal of a major flood control structure (i.e., certified levee or seawall, reservoir with more than 50 acre-ft storage per square mile) (NO/YES/UNKNOWN)?
Type of data expected	This YES/NO field is to capture whether or not there have been major flood control structures added or removed since the effective analysis was completed.
Potential source to obtain	The originator of the CNMS record should have professional knowledge of this situation.
Anticipated use for attribute	This Critical Element field is a trigger for indication of an identified deficiency, and subsequent assignment of UNVERIFIED Validation Status to the record.
<b>C5_CHANN</b>	Critical Element 5, Channel Reconfiguration. Current channel reconfiguration outside effective SFHA (NO/YES/UNKNOWN)?
Type of data expected	This YES/NO field is to capture whether or not any channel reconfiguration outside the effective special flood hazard area (SFHA) have been observed since the effective analysis was completed.
Potential source to obtain	NAIP or DOQQ imagery can be used to determine if the mapped SFHAs do not match the channel configurations on the aerial. If they do not match, record a YES. If you record a YES be sure you can go back and state with confidence that the SFHAs do not match information on the aerial. NOTE: when stating YES, you are saying that the floodplains on the map are no longer valid.
Anticipated use for attribute	This Critical Element field is a trigger for indication of an identified deficiency, and subsequent assignment of UNVERIFIED Validation Status to the record.
<b>C6_HSTR</b>	Critical Element 6, Hydraulic Change 2. 5 or more new or removed hydraulic structures (bridge/culvert) that impact BFES (NO/YES/UNKNOWN)?
Type of data expected	This YES/NO field is to capture whether or not 5 or more new or removed hydraulic structures (bridge/culvert) that impact base flood elevations (BFES) have been observed since the effective analysis was completed. Consider any combination of new and removed of 5 or more structures (i.e. 3 new and 3 removed). This should not be used to supersede the Letter of Map Revision process.
Potential source to obtain	The originator of the CNMS record should have professional knowledge of this situation.
Anticipated use for attribute	This Critical Element field is a trigger for indication of an identified deficiency, and subsequent assignment of UNVERIFIED Validation Status to the record.
<b>C7_SCOUR</b>	Critical Element 7, Channel Area Change. Significant channel fill or scour (NO/YES/UNKNOWN)?
Type of data expected	This YES/NO field is to capture whether or not significant channel fill or scour has been observed since the effective analysis was completed.
Potential source to obtain	The originator of the CNMS record should have professional knowledge of this situation.
Anticipated use for attribute	This Critical Element field is a trigger for indication of an identified deficiency, and subsequent assignment of UNVERIFIED Validation Status to the record.
<b>S1_REGEQ</b>	Secondary Element 1, Regression Equation. Use of rural regression equations in urbanized areas (NO/YES/UNKNOWN)?
Type of data expected	This YES/NO field is to capture whether or not a regression equation intended for rural use was used in an urbanized area.

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Field	Description
Potential source to obtain	An existing study will indicate the use of a regression equation and provide information on the area for which the model was run. This field could indicate the incorrect use of a regression equation intended for rural areas in urban areas or could capture that urban sprawl has overtaken a once rural area for which a rural regression equation model has been run.
Anticipated use for attribute	Any combination of 4 or more Secondary Elements establishes a CNMS record as UNVERIFIED.
<b>S2_REPLO</b>	Secondary Element 2, Repetitive Loss. Repetitive losses outside the SFHA (NO/YES/UNKNOWN)?
Type of data expected	This YES/NO field is to capture whether or not repetitive loss claims have been filed for properties outside the SFHA.
Potential source to obtain	If there are repetitive loss points close to your reach and outside the SFHA, record a YES.
Anticipated use for attribute	Any combination of 4 or more Secondary Elements establishes a CNMS record as UNVERIFIED.
<b>S3_IMPAR</b>	Secondary Element 3, 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.) (NO/YES/UNKNOWN)?
Type of data expected	This YES/NO field is to capture whether or not there is a significant increase in impervious surface in the sub-basin since the effective study.
Potential source to obtain	Taking advantage of remote sensing land use classification data, or change detection analyses are potential sources for this field.
Anticipated use for attribute	Any combination of 4 or more Secondary Elements establishes a CNMS record as UNVERIFIED.
<b>S4_HSTR</b>	Secondary Element 4, Hydraulic Structure. More than 1 and less than 5 new or removed hydraulic structures (bridge/culvert) impacting BFEs (NO/YES/UNKNOWN)?
Type of data expected	This YES/NO field is to capture whether or not there have been 1 to 4 new and/or removed hydraulic structures that impact BFEs since the effective study. This should not be used to supersede the Letter of Map Revision process.
Potential source to obtain	The originator of the CNMS record should have professional knowledge of this situation.
Anticipated use for attribute	Any combination of 4 or more Secondary Elements establishes a CNMS record as UNVERIFIED.
<b>S5_CHIMP</b>	Secondary Element 5, Channel Improvements. Channel improvements / Shoreline changes (NO/YES/UNKNOWN)?
Type of data expected	This YES/NO field is to capture whether or not there have been any channel improvement or shoreline changing projects since the effective study. This should not be used to supersede the Letter of Map Revision process.
Potential source to obtain	The originator of the CNMS record should have professional knowledge of this situation but one might check the local public works department for available supporting documentation.
Anticipated use for attribute	Any combination of 4 or more Secondary Elements establishes a CNMS record as UNVERIFIED.
<b>S6_TOPO</b>	Secondary Element 6, Topography Data. Availability of better topography/bathymetry (NO/YES/UNKNOWN)?
Type of data expected	This YES/NO field is to capture whether or not there are new topographic data meeting FEMA minimum standards available since the effective study.

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Field	Description
Potential source to obtain	Look into all the resources available to determine if newer and/or more accurate topographic data are available for the reach and record a yes if you find updated topography (this will ultimately be based on whether or not new topographic data meet FEMA's minimum standards and are better than what was used for the effective study. The investigation of 'YES's' should be performed with an engineer or manager).
Anticipated use for attribute	Any combination of 4 or more Secondary Elements establishes a CNMS record as UNVERIFIED.
<b>S7_VEGLU</b>	Secondary Element 7, Vegetation or Land Use. Changes to vegetation or land use (NO/YES/UNKNOWN)?
Type of data expected	This YES/NO field is to capture whether or not there are significant changes in land use or vegetation since the effective study. This does NOT include urban change.
Potential source to obtain	Look at the NAIP (streaming) and other sources available to you to determine if the area has experienced changes to vegetation or land use.
Anticipated use for attribute	Any combination of 4 or more Secondary Elements establishes a CNMS record as UNVERIFIED.
<b>S8_DUNE</b>	<i>Note: As of the May 2015 version of the <u>CNMS Technical Reference</u>, this field removed from S_Studies_Ln. This check will be captured in coastal framework of CNMS.</i>
<b>S9_HWMS</b>	Secondary Element 9, High Water Mark. Significant storms with High Water Marks (NO/YES/UNKNOWN).
Type of data expected	This YES/NO field is to capture whether or not there is recent storm surge high water mark data now available following the effective study.
Potential source to obtain	The originator of the CNMS record should have professional knowledge of this situation. One might reference an after action report following a recent high water event.
Anticipated use for attribute	Any combination of 4 or more Secondary Elements establishes a CNMS record as UNVERIFIED.
<b>S10_REGEQ</b>	Secondary Element 10, Regression Equation. New regression equations available (NO/YES/UNKNOWN)?
Type of data expected	The originator of the CNMS record should have professional knowledge of this situation. This information may come to light following the release of a new study that includes a new regression model.
Potential source to obtain	Research and general knowledge to be provided by engineering staff.
Anticipated use for attribute	Any combination of 4 or more Secondary Elements establishes a CNMS record as UNVERIFIED.
<b>CE_TOTAL</b>	Total number of critical elements
Type of data expected	A number equivalent to the sum of the number of Critical Elements equaling 'YES' from above.
Potential source to obtain	User is to provide the sum of Critical Elements.
Anticipated use for attribute	Determination of 'VALIDATED' vs. UNVERIFIED; UNVERIFIED is CE_Total > 0
<b>SE_TOTAL</b>	Total number of secondary elements.
Type of data expected	A number equivalent to the sum of the number of Secondary Elements equaling 'YES' from above.
Potential source to obtain	User is to provide the sum of Secondary Elements.
Anticipated use for attribute	Determination of 'VALIDATED' vs. UNVERIFIED; UNVERIFIED is SE_Total >= 4.
<b>A1_TOPO</b>	Zone A Initial Assessment Check A1. Significant Topography Update Check.

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Field	Description
Type of data expected	This YES/NO field is to capture whether or not a topographic data source is available that is significantly better than what was used for the effective Zone A modeling and mapping.
Potential source to obtain	A new topographic data source for the study area of the effective Zone A must be available that meets or exceeds the requirements for vertical accuracy described in Program Standard 43.
Anticipated use for attribute	A determination of YES for this initial assessment would trigger an FOA data comparison; if no FOA data is available then the validation status may be changed to UNVERIFIED.
<b>A2_HYDRO</b>	Zone A Initial Assessment Check A2. Significant Hydrology Change Check.
Type of data expected	This YES/NO field is to capture whether or not new regression equations have become available for the effective study that would significantly affect the flow.
Potential source to obtain	Availability of new regression equations can be checked with the USGS. Determination of significance must be made by professional judgment of an engineer.
Anticipated use for attribute	A determination of YES for this initial assessment would trigger an FOA data comparison; if no FOA data is available then the validation status may be changed to UNVERIFIED.
<b>A3_IMPAR</b>	Zone A Initial Assessment Check A3. Significant Development Check (NUCI Analysis).
Type of data expected	This YES/NO field is to capture whether or not there has been significant development in the watershed since the effective analysis.
Potential source to obtain	National Urban Change Indicator (NUCI) and National Land Cover Data (NLCD)
Anticipated use for attribute	A determination of YES for this initial assessment would trigger an FOA data comparison; if no FOA data is available then the validation status may be changed to UNVERIFIED.
<b>A4_TECH</b>	Zone A check A4. Check of studies backed by technical data.
Type of data expected	For studies that do not fail one or more initial Zone A assessment checks, this YES/NO field determines if the effective study is supported by modeling or sound engineering judgment and all regulatory products are in agreement.
Potential source to obtain	FEMA Engineering Library
Anticipated use for attribute	If the effective Zone A study passes all initial assessment checks but is not supported by modeling, or if the original engineering method used is unsupported or undocumented, the FOA comparison should be performed. Alternatively, if FOA data are unavailable and the effective Zone A study passes all initial assessment checks but is not supported by modeling, or if the original engineering method used is unsupported or undocumented, then the study may be categorized as "Unverified" in the CNMS inventory.
<b>A5_FOAPASS</b>	Comparison of First Order Approximation (FOA) and effective Zone A study.
Type of data expected	This YES/NO field is to record whether or not the effective study passes (YES) or fails (NO) an FOA comparison.
Potential source to obtain	FOA data including cross sections attributed with +/-1%WSEL, Effective Zone A boundary, or FOA topographic data.

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Field	Description
Anticipated use for attribute	When all other initial Zone A validation checks have been conducted, approximate studies may need to be compared to FOA results to determine their validation status. Studies that pass the FOA comparison may be categorized as VALID and those that do not pass categorized as UNVERIFIED.
<b>COMMENT</b>	Additional comments.
Type of data expected	Additional analyst comments.
Potential source to obtain	User comments.
Anticipated use for attribute	Though the field cannot be domain enforced, it will sometimes include information pertaining to Validation decisions, or LOMR incorporation effects.
<b>BS_ZONE</b>	Zone type of the SFHA represented by the reach currently being studied based on scoping data, or the preliminary FIS text.
Type of data expected	Entry from domain lookup table D_ZONE.
Potential source to obtain	Flood zones depicted in scoping data or the Preliminary FIRM and/or FIRM Database of the NFIP.
Anticipated use for attribute	Stores the flood zone type of a study currently in progress.
<b>BS_STDYTYP</b>	Study type of the SFHA represented by the reach currently being studied based on scoping data, or the preliminary FIS text.
Type of data expected	Entry from domain lookup table D_STUDY_TYPE.
Potential source to obtain	Scoping data, Preliminary FIS, Study Manager.
Anticipated use for attribute	Stores the study type of a study currently in progress.
<b>BS_HYDRO_M</b>	Hydrologic model used for creating the SFHA represented by the reach currently being studied based on scoping data or the preliminary FIS text.
Type of data expected	In this domain based field the user should choose the name of the hydrologic model used and version, as appropriate.
Potential source to obtain	Scoping data, Preliminary FIS, Study Manager.
Anticipated use for attribute	Stores the study type of a study currently in progress.
<b>BS_HYDRA_M</b>	Hydrologic model used for creating the SFHA represented by the reach currently being studied based on scoping data or the preliminary FIS text.
Type of data expected	In this domain based field the user should choose the name of the hydraulic model used and version, as appropriate.
Potential source to obtain	Scoping data, Preliminary FIS, Study Manager.
Anticipated use for attribute	Stores the study type of a study currently in progress.
<b>BS_FY_FUND</b>	When relevant - attribute of the most recent non-effective FEMA fiscal year funding applied to the stream reach engineering at the time of study (ex. Watershed, county).
Type of data expected	Entry from domain lookup table D_FY_FUNDED
Potential source to obtain	Scoping data, Preliminary FIS, Study Manager.
Anticipated use for attribute	FY projections and trend identification.
<b>PRELM_DATE</b>	Expected Preliminary issuance date for reaches representing areas being actively studied.
Type of data expected	Calendar date (ex. 01/01/10)
Potential source to obtain	MIP, other pending guidance.
Anticipated use for attribute	Stores the expected Preliminary Date of a study currently in progress.
<b>LFD_DATE</b>	Expected Letter of Final Determination issuance date for reaches representing areas being actively studied.
Type of data expected	Calendar date (ex. 01/01/10)
Potential source to obtain	MIP, other pending guidance

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Field	Description
Anticipated use for attribute	Stores the expected Letter of Final Determination Date of a study currently in progress.
<b>EC1_UDEF</b>	User Defined Critical Element 1
Type of data expected	This YES/NO field is to capture the results of additional Region Specific validation processes which have been deemed Critical.
Potential source to obtain	Dependent upon Element definition.
Anticipated use for attribute	This Critical Element field is a trigger for indication of an identified deficiency, and subsequent assignment of UNVERIFIED Validation Status to the record. In counties which have been identified as utilizing the Extra Elements, EC1_UDEF failure will result in an UNVERIFIED Validation Status assignment.
<b>EC2_UDEF</b>	User Defined Critical Element 2
Type of data expected	This YES/NO field is to capture the results of additional Region Specific validation processes which have been deemed Critical.
Potential source to obtain	Dependent upon Element definition.
Anticipated use for attribute	This Critical Element field is a trigger for indication of an identified deficiency, and subsequent assignment of UNVERIFIED Validation Status to the record. In counties which have been identified as utilizing the Extra Elements, EC2_UDEF failure will result in an UNVERIFIED Validation Status assignment.
<b>ES1_UDEF</b>	User Defined Secondary Element 1
Type of data expected	This YES/NO field is to capture the results of additional Region Specific validation processes which have been deemed Secondary.
Potential source to obtain	Dependent upon Element definition.
Anticipated use for attribute	Any combination of 4 or more Secondary Elements establishes a CNMS record as UNVERIFIED. In counties which have been identified as utilizing the Extra Elements, ES1_UDEF will contribute to the Secondary Element count.
<b>ES2_UDEF</b>	User Defined Secondary Element 2
Type of data expected	This YES/NO field is to capture the results of additional Region Specific validation processes which have been deemed Secondary.
Potential source to obtain	Dependent upon Element definition.
Anticipated use for attribute	Any combination of 4 or more Secondary Elements establishes a CNMS record as UNVERIFIED. In counties which have been identified as utilizing the Extra Elements, ES2_UDEF will contribute to the Secondary Element count.
<b>ES3_UDEF</b>	User Defined Secondary Element 3
Type of data expected	This YES/NO field is to capture the results of additional Region Specific validation processes which have been deemed Secondary.
Potential source to obtain	Dependent upon Element definition.
Anticipated use for attribute	Any combination of 4 or more Secondary Elements establishes a CNMS record as UNVERIFIED. In counties which have been identified as utilizing the Extra Elements, ES3_UDEF will contribute to the Secondary Element count.
<b>ES4_UDEF</b>	User Defined Secondary Element 4
Type of data expected	This YES/NO field is to capture the results of additional Region Specific validation processes which have been deemed Secondary.
Potential source to obtain	Dependent upon Element definition.
Anticipated use for attribute	Any combination of 4 or more Secondary Elements establishes a CNMS record as UNVERIFIED. In counties which have been identified as utilizing the Extra Elements, ES4_UDEF will contribute to the Secondary Element count.

<b>Field</b>	<b>Description</b>
<b>E_ELEMDATE</b>	The date on which the User Defined Element values were populated.
Type of data expected	Calendar date (ex. 01/01/10)
Potential source to obtain	User is to provide the date on which the E Elements were evaluated.
Anticipated use for attribute	The date on which the User Defined Elements were populated.

### 3.2.1 S\_Studies\_Ln Discovery and Scoping Phase Updates

In instances where study mileage has been scoped and funded, but not yet tied to specific reaches, no updates to S\_Studies\_Ln are needed. In such a scenario, updates to the County\_Status table will however be required. Such documentation of funded miles in the County\_Status table should be limited to one quarter. Following this duration, the appropriate funded study reaches must be identified in S\_Studies\_Ln.

When project scope has been funded and specific study reaches have been identified, the following fields within S\_Studies\_Ln will need to be updated as indicated. It is assumed that any fields not listed here should be updated by the user if more accurate data are available. If the exact Preliminary and LFD dates are unknown or can only be estimated to the nearest calendar year or fiscal quarter, an exact calendar date (e.g., 01/01/14) must still be entered. In these situations, a suggested approach is to use the first calendar date of the closest estimated month.

**Table 2: S\_Studies\_Ln Discovery and Scoping Phase Updates**

<b>Field</b>	<b>Discovery and Scoping Phase Updates</b>
REACH_ID	Update Reach_ID any time on affected features any time a Reach is split, or added to the Inventory.
STUDY_ID	Update Study_ID to reflect intended cardinality. Often with new studies, it will be appropriate to simply set STUDY_ID equal to the Reach_ID.
STATUS_TYPE	Shall be updated to 'BEING STUDIED' for all scoped Reaches.
MILES	Recalculate for any Reaches where geometry has been modified.
STATUS_DATE	Set the STATUS_DATE to the current date, which should be the date the other fields were reassigned as well.
POC_ID	Set the POC_ID to reflect the most current editing entity.
DATE_RQST	Set the DATE_RQST to the current date, which should be the date that the STATUS_TYPE was set to 'BEINGSTUDIED'.
BS_ZONE	Select the appropriate flood zone type for the ongoing study.
BS_STDYTYP	Select the appropriate study type for the ongoing study.
BS_HYDRO_M	Select the appropriate hydrologic model type being used for the ongoing study.

<b>Field</b>	<b>Discovery and Scoping Phase Updates</b>
BS_HYDRA_M	Select the appropriate hydraulic model type being used for the ongoing study.
BS_FY_FUND	Select the appropriate value for fiscal year funded for the ongoing study.
PRELM_DATE	Update with accurate Preliminary issuance date estimate.
LFD_DATE	Update with accurate LFD issuance date estimate.

### 3.2.2 S\_Studies\_Ln FIRM Production Phase Update

Throughout the production phase, it is important that the PRELM\_DATE and LFD\_DATE fields be kept current. If the exact dates for these fields is unknown or can only be estimated to the nearest calendar year or fiscal quarter, an exact calendar date (e.g., 01/01/14) must still be entered. In these situations, a suggested approach is to use the first calendar date of the closest estimated month. Should a study scope of work be altered in any way, S\_Studies\_Ln shall be updated to represent the updated scope using the guidelines in 3.2.1. Additionally, it is also imperative that de-scoped studies resume appropriate VALIDATION\_STATUS and STATUS\_TYPE values as follows.

**Table 3: S\_Studies\_Ln FIRM Production Phase Update**

<b>Validation status - Status Type (Active Study Values)</b>	<b>Validation status - Status Type (De-Scoped Values)</b>
ASSESSED - BEING STUDIED	ASSESSED - TO BE STUDIED
UNKNOWN - BEING STUDIED	UNKNOWN - TO BE ASSESSED
VALID - BEING STUDIED	VALID - NVUE COMPLIANT
UNVERIFIED - BEING STUDIED	UNVERIFIED - TO BE STUDIED

### 3.2.3 S\_Studies\_Ln Preliminary Issuance Phase Update

At Preliminary issuance, all fields attributed through Discovery and Scoping Phase Updates should be checked for accuracy and updated as appropriate. Additionally, where line work in the Preliminary FIRM Database is preferable to (using guidelines established in Section 2.2.5) or of higher quality than line work currently in S\_Studies\_Ln, the line work in the feature class should be updated, paying strict attention to attribute inheritance within the new line features.

**Table 4: S\_Studies\_Ln Preliminary Issuance Phase Updates**

<b>Field</b>	<b>Preliminary Issuance Phase Updates</b>
FBS_CMPLNT	Update to indicate FBS compliance of Preliminary studies.
FBS_CHKDT	Update with date new FBS_CMPLNT value populated.

<b>Field</b>	<b>Preliminary Issuance Phase Updates</b>
FBS_CTYPE	Update to reflect FBS compliance check type.
PRELM_DATE	Update with actual Preliminary issuance date.
LFD_DATE	Update with accurate LFD issuance date estimate.

After Preliminary issuance, should it be discovered that the scope of work completed differed in any way from that represented in the polylines; S\_Studies\_Ln shall be updated to represent the correct scope. Additionally, it is also imperative that de-scoped studies resume appropriate VALIDATION\_STATUS and STATUS\_TYPE values as defined in Section 3.2.2.

### 3.2.4 S\_Studies\_Ln LFD Issuance Phase Update

At LFD issuance, values from the fields populated for scoping and preliminary data will be migrated into the corresponding primary study fields.

After LFD issuance, should it be discovered that scope of work completed differed in any way from that represented in the line work, S\_Studies\_Ln shall be updated to represent the correct scope. Additionally, it is also imperative that de-scoped studies resume appropriate VALIDATION\_STATUS and STATUS\_TYPE values as defined in 3.2.2.

**Table 5: S\_Studies\_Ln LFD Phase Updates**

<b>Field</b>	<b>LFD Phase Updates</b>
FLD_ZONE	This field should inherit the value stored in BS_ZONE.
VALIDATION_STATUS	For Reaches representing New or Updated studies, this field shall be set to VALID., otherwise this field shall be set to UNKNOWN.
STATUS_TYPE	For Reaches representing New or Updated studies, this field shall be set to 'NVUE COMPLIANT', otherwise this field shall be set to 'TO BE ASSESSED'.
MILES	Recalculate for any Re.aches where geometry has been modified.
STATUS_DATE	Set the STATUS_DATE to the current date, which should be the date the other fields were reassigned as well.
FY_FUNDED	This field should inherit the value stored in BS_FY_FUNDED.
STUDY_TYPE	This field should inherit the value stored in BS_SDTYTYP.
POC_ID	Set the POC_ID to reflect the most current editing entity.
DATE_RQST	This field should be cleared.
DATE_EFFCT	This field should be updated to represent the date the H&H was completed for the Reach.

Field	LFD Phase Updates
HYDRO_MDL	This field should inherit the value stored in BS_HYDRO_M.
HYDRA_MDL	This field should inherit the value stored in BS_HYDRA_M.
HODIGFMT	This field should be updated to indicate whether or not the Hydro model of the new study is in digital format.
HADIGFMT	This field should be updated to indicate whether or not the Hydra model of the new study is in digital format.
HO_RUNMOD	This field should be updated to indicate whether or not the Hydro model, if in digital format, can be run.
HA_RUNMOD	This field should be updated to indicate whether or not the Hydra model, if in digital format, can be run.
C1 through C7	If the Reach represents a New or Updated study, this field should be cleared.
S1 through S10	If the Reach represents a New or Updated study, this field should be cleared.
CE_TOTAL	If the Reach represents a New or Updated study, this field should be cleared.
SE_TOTAL	If the Reach represents a New or Updated study, this field should be cleared.
A1 through A5	If the Reach represents a New or Updated study, these fields should be cleared.
BS_ZONE	After this value has been migrated to the corresponding effective study field, this field should be cleared.
BS_STDYTYP	After this value has been migrated to the corresponding effective study field, this field should be cleared.
BS_HYDRO_M	After this value has been migrated to the corresponding effective study field, this field should be cleared.
BS_HYDRA_M	After this value has been migrated to the corresponding effective study field, this field should be cleared.
BS_FY_FUND	After this value has been migrated to the corresponding effective study field, this field should be cleared.
PRELM_DATE	This field should be cleared.
LFD_DATE	This field should be cleared.
EC1_UDEF and EC2_UDEF	If the Reach represents a New or Updated study, this field should be cleared.

<b>Field</b>	<b>LFD Phase Updates</b>
ES1_UDEF through ES4_UDEF	If the Reach represents a New or Updated study, this field should be cleared.
E_ELEMDATE	If the Reach represents a New or Updated study, this field should be cleared.

### 3.3 S\_Studies\_Ar Feature Class (Polygon)

The S\_Studies\_Ar feature class existed in earlier versions of the CNMS data model within the CNMS Studies feature dataset. As of version 5.0 of the CNMS data model, the attributes of this polygon feature class had been moved to the S\_Studies\_Ln feature class, and all resulting field redundancies removed, thus eliminating the requirement for maintaining 'S\_Studies\_Ar' within the CNMS database. All validation assessment and evaluation is now performed directly on the lines within S\_Studies\_Ln. FEMA Regions have the option of maintaining the original 'S\_Studies\_Ar' feature class within their local CNMS FGDB, however the national version of CNMS will no longer maintain 'S\_Studies\_Ar', and it is not a required component of submittals for National roll-up.

### 3.4 S\_Requests Feature Classes (Point/Polygon)

The S\_Requests\_Ar and S\_Request\_Pt feature classes reside in the CNMS Requests feature dataset within the CNMS FGDB, and are designed to store details concerning update requests from stakeholders. Both feature classes possess the same table structure for data capture and storage, the only schematic difference between them being the name of the primary key fields. For S\_Requests\_Ar the primary key field is SRA\_ID, and for the S\_Requests\_Pt the primary key field is SRP\_ID.

In order to populate the database with either of these record types, a user needs to determine if the community request is better stored as a point or polygon feature. This will vary depending on the specific request type, and the characteristics of the area being identified. Effort should be made to ensure the database populated to the fullest extent practicable, using the comment field to include any additional information that may prove valuable in the future when this request is further analyzed.

**Table 6: S\_Requests\_Ar/Pt (Table ID Code: 03/04)**

<b>Field</b>	<b>Description</b>
<b>SRA_ID / SRP_ID</b>	Primary key for tables. Assigned by table creator.
Type of data expected	As the Primary key for this table this field must exist as a unique identifier for each individual record.
Potential source to obtain	A programmatic approach that prefixes five record counting digits with the 5-digit County FIPS code and a 2-digit feature class ID produces a number like 201190300001 (20119 is the county FIPS code, 03 is the feature class ID for 'S_Requests_Ar' and 00001 represent record counting digits) for the first record in 'S_Requests_Ar' for Meade County, Kansas. No repeat counting digits should be used within the same county.
Anticipated use for attribute	Unique identification of each individual CNMS record.

Field	Description
<b>REACH_ID</b>	Foreign key to join to the primary key REACH_ID of S_Studies_Ln in the CNMS data model.
Type of data expected	A 12-digit key from the corresponding stream centerline in the S_Studies_Ln feature class that is nearest to the 'S_Requests' feature when there is a 1-1 or many-1 mapping between the polygon in this feature class and features in 'S_Studies_Ln.' For polygons in 'S_Requests_Ar,' this field may be left blank when many stream centerlines from S_Studies_Ln lie within a single polygon in this feature class, i.e. when the mapping is 1- many or many-many.
Potential source to obtain	REACH_ID field in the S_Studies_Ln feature class.
Anticipated use for attribute	Catalog and referencing; foreign key to primary key of S_Studies_Ln
<b>WTR_NM</b>	Name of flooding source.
Type of data expected	Water feature name (ex. Mississippi River, Lake Superior, Pacific Ocean)
Potential source to obtain	The name of the flooding source should come from the FIS, FIRM and FIRM DB, and should be given that order of importance. The FIS lists profiles in alphabetical order in the table of contents and usually discusses them in other FIS sections in that same order. Section 1.2 should list all of these streams and the dates they were studied. Section 2.1 should also list all the streams studied by detailed methods, and should also list all the streams studied by approximate methods. Note that the FIRM Database should not be the sole source of information that is used to evaluate stream reaches. Often times there are graphic features or annotation on the PDF map panel that will help identify a stream reach.
Anticipated use for attribute	This attribute provides a geographic place name reference.
<b>POC_ID</b>	Foreign key to join to 'Point_of_Contact' table. ID for 'Point of Contact'.
Type of data expected	This field, if populated, should have a matching record in the 'Point_of_Contact' table.
Potential source to obtain	Establishing the relationship of 'S_Requests_Ar' records and 'Point_of_Contact' records is user controlled.
Anticipated use for attribute	This field is used to establish a database "join" with records in the 'Point_of_Contact' table. The supporting idea is to relate record ownership information to specific CNMS records.
<b>RQST_CAT</b>	Distinction between Cartographic and Flood Data requests.
Type of data expected	The predefined acceptable values are to be selected from the 'D_RQST_CAT' domain list.
Potential source to obtain	User selected based upon the circumstances of the request.
Anticipated use for attribute	Catalog and reference
<b>RQST_LVL</b>	Level of analysis requested.
Type of data expected	The predefined acceptable values are to be selected from the 'D_RQST_LVL' domain list.
Potential source to obtain	User selected based upon the circumstances of the request.
Anticipated use for attribute	Catalog and reference
<b>MTHOD_TYPE</b>	Type of method used.
Type of data expected	The predefined acceptable values are to be selected from the 'D_MTHOD_TYPE' domain list.

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Field	Description
Potential source to obtain	User selected based upon the circumstances of the request.
Anticipated use for attribute	Study background information gathering.
<b>DATE_RQST</b>	Date request is made.
Type of data expected	This field is of the type date. Date should be entered in MM/DD/YYYY format.
Potential source to obtain	The user should enter the date for which the CNMS record was entered in the database.
Anticipated use for attribute	Resource and tracking are the anticipated uses of dates.
<b>DATE_RESOL</b>	Date request is resolved.
Type of data expected	This field is of the type date. Date should be entered in MM/DD/YYYY format.
Potential source to obtain	Regional Support Center or relevant Study Managers. Date should represent the date of effective analysis for the study of the associated reach which addressed the Request.
Anticipated use for attribute	Resource and tracking are the anticipated uses of dates.
<b>CARTO_RQST</b>	Type of cartographic change requested.
Type of data expected	It is expected that a single CNMS Request record will be either cartographic or flood data related. If the 'RQST_CAT' is CARTOGRAPHIC in nature, this field will be populated with predefined acceptable values selected from the 'D_CARTO_RQST' domain list. Populating this field with cartographic information implies that the 'FDATA_RQST' field remains unpopulated.
Potential source to obtain	This information is expected to come from the originator of the CNMS Request record.
Anticipated use for attribute	Catalog and reference
<b>FDATA_RQST</b>	Type of flood data change requested.
Type of data expected	It is expected that a single CNMS Request record will be either flood data or cartographic related. If the 'RQST_CAT' is FLOOD DATA in nature, this field will be populated with predefined acceptable values selected from the 'D_FDATA_RQST' domain list. Populating this field with flood data information implies that the 'CARTO_RQST' field remains unpopulated.
Potential source to obtain	This information is expected to come from the originator of the CNMS Request record.
Anticipated use for attribute	Catalog and reference
<b>RESOL_STATUS</b>	Current request status pursuant to FEMA record review of the requested action or subsequent resolution.
Type of data expected	Entry from domain lookup table D_RESOL_STATUS.
Potential source to obtain	This information is expected to come from the reviewer of the CNMS Request record at a FEMA Regional or HQ level.
Anticipated use for attribute	Resource and tracking
<b>COMMENT</b>	Additional comments
<b>PRIORITY</b>	Priority of Request (HIGH, MED, LOW). Cartographic requests should not be prioritized as HIGH.

Field	Description
Type of data expected	Entry from domain lookup table.
Potential source to obtain	This information is expected to come from the originator of the CNMS Request record.
Anticipated use for attribute	Resource and tracking
<b>DATE_REVIEW</b>	Date FEMA has reviewed incoming request and authorized its inclusion in the database.
Type of data expected	This field is of the type date. Date should be entered in MM/DD/YYYY format.
Potential source to obtain	This information is expected to come from the reviewer of the CNMS Request record at a FEMA Regional or HQ level.
Anticipated use for attribute	Resource and tracking
<b>CDS_ID</b>	Unique identifier for Customer and Data Services Contractor (CDS) application system tracking.
Type of data expected	Text field size 12 – unique ID only created by CDS application.
Potential source to obtain	CDS application will populate this field automatically and should not be edited or populated by any other means.
Anticipated use for attribute	CDS Application system request record tracking.

### 3.5 S\_Unmapped\_Ln (PolyLine)

The S\_UnMapped\_Ln feature class within the CNMS Inventory feature dataset contains line work representing flooding sources that have not been included in the FEMA inventory of studied streams in the CNMS Study Records which have not been ASSESSED for new study prioritization. This line work is provided to assist CNMS users in performing scoping calculations, and to serve as an additional source from which to pull line work for population of new studies within S\_Studies\_Ln. Preferable line sources for such population are detailed above in the description of the S\_Studies\_Ln feature class.

**Table 7: S\_Unmapped\_Ln (Table ID Code: 07)**

Field	Description
<b>UML_ID</b>	Primary key for table. Assigned by table creator.
Type of data expected	As the Primary key for this table this field must exist as a unique identifier for each individual record.
Potential source to obtain	A programmatic approach that prefixes five record counting digits with the 5-digit County FIPS code and a 2-digit feature class ID produces a number like 201190700001 (20119 is the county FIPS code, 07 is the feature class ID for 'S_UnMapped_Ln' and 00001 represent record counting digits) for the first record in 'S_UnMapped_Ln for Meade County, Kansas. No repeat counting digits should be used within the same county.
Anticipated use for attribute	Unique identification of each individual CNMS record.
<b>CO_FIPS</b>	Federal Information Processing Standard code for the county.
Type of data expected	5-digit Federal Information Processing Standard code which uniquely identifies state and counties, or the equivalent. The first two digits are the FIPS state code and the last three are the county code within the state or possession.

Field	Description
Potential source to obtain	Countywide FIRM or FIS; U.S Department of Commerce, Bureau of the Census, Geography Division is the maintenance agency. Many departments within the U.S. government maintain references back to this standard, including the EPA: <a href="http://www.epa.gov/enviro/html/codes/state.html">www.epa.gov/enviro/html/codes/state.html</a>
Anticipated use for attribute	Establishes a unique identifier for determining what state and/or county the data resides in.
<b>CID</b>	Community Identification Number
Type of data expected	A unique 6-digit number assigned to each community by FEMA and used for identity in computer databases; it is shown on the FIS, FIRM, and in the Q3 Flood Data files. The first two digits of the number are always the State FIPS code.
Potential source to obtain	FEMA is the source. The CID is obtainable from multiple sources; Community Information System, Flood Insurance Studies, FIRM panels, FIRM indexes.
Anticipated use for attribute	Catalog and referencing
<b>HUC8_KEY</b>	8-digit Hydrologic Unit Code (HUC) representing the smallest watersheds known as hydrologic cataloging units. This can be obtained by overlaying the HUC spatial files with the polyline information to determine which cataloging unit the polyline resides in.
Type of data expected	8-digit Hydrologic Unit Code
Potential source to obtain	Originator: United States Geological Survey (USGS): <a href="http://nhd.usgs.gov/data.html">http://nhd.usgs.gov/data.html</a> ; or EPA surf your watershed: <a href="http://cfpub.epa.gov/surf/locate/index.cfm">http://cfpub.epa.gov/surf/locate/index.cfm</a>
Anticipated use for attribute	Provides an attribute to determine what HUC 8 sub-basin the polyline resides in.
<b>MILES</b>	An attribute of the calculated miles of the data record entry.
Type of data expected	A number corresponding to the length of the inventory polyline segment.
Potential source to obtain	In feature class format, and if projection is in feet or meters permanent length field of feature class can be used to populate this field by applying the appropriate conversion to miles. Otherwise, make a field calculation using field calculator and convert to miles. Be sure to understand the units the projection is in and how it will influence any resulting calculations. The CNMS FGDB is provided in the NAD 1983 Geographic Coordinate System, at the Regional level, the length of the polyline segments can be calculated in local or State projections. During National data consolidation and analysis, the projection will be standardized across all Regions and mileage recalculated to a National standard.

### 3.6 Specific\_Needs\_Info (Table)

The 'Specific\_Needs\_Info' table includes general information that will be associated, via the 'CNMS\_ID' attribute, with every record that is entered into the CNMS database if applicable. The nature of the information stored in the 'Specific\_Needs\_Info' table is intended to capture CNMS record background information.

**Table 8: Specific\_Needs\_Info (Table ID Code: 06)**

Field	Description
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## CNMS Technical Reference

Field	Description
<b>CNMS_ID</b>	Primary key for table. Assigned by record creator or user. Imported from corresponding record in 'S_Studies_Ar,' 'S_Requests_Ar' and 'S_Requests_Pt'.
Type of data expected	As the Primary key for this table this field must exist as a unique identifier for each individual record.
Potential source to obtain	Imported from corresponding record in 'S_Studies_Ar', 'S_Requests_Ar' and 'S_Requests_Pt'.
Anticipated use for attribute	Unique identification of each individual CNMS record.
<b>COST_SHARE</b>	Is there cost share (NO/YES/UNKNOWN)?
Type of data expected	A yes or no is expected to indicate whether or not a there is available cost share.
Potential source to obtain	FEMA and the Local sponsor should each have record of any cost share related to this CNMS record. Specific agreements are not required at this juncture.
Anticipated use for attribute	This information will document where FEMA can leverage its resources by incorporating local data into a study.
<b>DISASTER</b>	Associated disaster number, either federally or state declared.
Type of data expected	An example of an associated disaster number excerpt from a FEMA disaster announcement: <i>Major Disaster Declaration number 1823 declared on Feb 17, 2009</i> . If the disaster number is a State one only, it should be documented in the comments section. Federal disaster designations should be the primary information in this field.
Potential source to obtain	FEMA or State
Anticipated use for attribute	This is typically an historical reference to a disaster event.
<b>MITIG_PLAN</b>	Is there a mitigation plan identifying the need (NO/YES/UNKNOWN)?
Type of data expected	A yes or no is expected to indicate whether or not reference to this CNMS record is included in a formal mitigation plan. If yes, please identify the specific mitigation plan document in the comment field. Additionally, document whether the plan is a State, local, or Tribal Mitigation plan and whether it is a standard or enhanced plan.
Potential source to obtain	Mitigation Plan documents
Anticipated use for attribute	It is anticipated that this attribute will be used as a reference in study background research.
<b>RSK_ASSESS</b>	Is there a risk assessment other than the 2010 Annualized Loss Estimate (NO/YES/UNKNOWN)?
Type of data expected	A yes or no is expected to indicate whether or not reference to this CNMS record is included in a formal risk assessment document. If YES, then please complete entries for fields RSK_COMMENT, RSK_DATE, and RSK_MITIG.
Potential source to obtain	The local FEMA Region or local community might have information regarding risk assessments that may be associated with this record.
Anticipated use for attribute	It is anticipated that this attribute will be used as a reference in study background research.

## CNMS Technical Reference

Field	Description
<b>RSK_COMMENT</b>	Details on the type of Risk Assessment other than the 2010 Annualized Loss Estimate if answer to RSK_ASSESS was 'YES'.
Type of data expected	Document name and description of the Risk Assessment performed.
Potential source to obtain	The same source that helped determine the answer 'YES' to RSK_ASSESS.
Anticipated use for attribute	It is anticipated that this attribute will be used as a reference in study background research.
<b>RSK_DATE</b>	Date that the Risk Assessment identified in RSK_COMMENT if answer to RSK_ASSESS was 'YES'.
Type of data expected	This field is of the type date. Date should be entered in MM/DD/YYYY format.
Potential source to obtain	The same source that helped determine the answer 'YES' to RSK_ASSESS.
Anticipated use for attribute	It is anticipated that this attribute will be used as a reference in study background research.
<b>RSK_MITIG</b>	Has the Risk Assessment identified in RSK_COMMENT been included as part of the current adopted hazard mitigation plan (NO/YES/UNKNOWN)?
Type of data expected	This field is to be filled only Estimate if answer to RSK_ASSESS was 'YES'. NO/YES/UNKNOWN based on reading the current adopted Hazard Mitigation Plan, and looking for the inclusion of the risk assessment identified through RSK_ASSESS and RSK_COMMENT in the Hazard Mitigation Plan.
Potential source to obtain	The same source that helped determine the answer 'YES' to RSK_ASSESS.
Anticipated use for attribute	It is anticipated that this attribute will be used as a reference in study background research.
<b>HAZUS</b>	Is there an enhanced HAZUS (Level 2 or 3) run on the stream (NO/YES/UNKNOWN).
Type of data expected	A yes or no is expected to indicate whether or not loss estimation has been generated for this study using the Flood Tool within HAZUS-MH. If YES, please identify the location of any specific HAZUS related outputs in the comment field.
Potential source to obtain	The FEMA Region, State or community government, or HAZUS User's Group are three potential sources for obtaining this information.
Anticipated use for attribute	It is anticipated that this attribute will be used as a reference in study background research.
<b>HAZUS_LVL</b>	Level of HAZUS run (System default is 'Level 1' for Contiguous United States).
Type of data expected	There are three levels of HAZUS modeling runs: Level 1 is the basic level using HAZUS provided data (FEMA has already run the HAZUS Level 1 modeling for the nation); Level 2 is a run incorporating detailed and updated building stock data; and Level 3 is the most detailed and user controlled. The type of data expected are indications of whether Levels 2 and 3 have been run.

Field	Description
Potential source to obtain	The organization or individual responsible for initiating the HAZUS study are the most probable sources for obtaining information related to the level at which a HAZUS run was developed.
Anticipated use for attribute	It is anticipated that this attribute will be used as a reference in study background research.
<b>COMMENT</b>	Additional comments

### 3.7 County\_QC\_Status (Table)

The 'County\_QC\_Status' table provides a mechanism to track self-certification when using the CNMS FGDB QC Tool described in Appendix H. In earlier versions of the CNMS schema this table was also used to track other county-level data that is no longer required. This table may still be leveraged for county-level QC tracking purposes.

**Table 9: County\_QC\_Status Table**

Field	Description
<b>CO_FIPS</b>	Federal Information Processing Standard code for the county.
Type of data expected	5-digit Federal Information Processing Standard code which uniquely identifies state and counties, or the equivalent. The first two digits are the FIPS state code and the last three are the county code within the state or possession.
Potential source to obtain	Countywide FIRM or FIS; U.S Department of Commerce, Bureau of the Census, Geography Division is the maintenance agency. Many departments within the U.S. government maintain references back to this standard. Including the EPA: <a href="http://www.epa.gov/enviro/html/codes/state.html">http://www.epa.gov/enviro/html/codes/state.html</a>
Anticipated use for attribute	Establishes a unique identifier for determining what state and/or county the data resides in.
<b>CO_NAME</b>	The name of the County represented by this record.
Type of data expected	Text string
Potential source to obtain	User input
Anticipated use for attribute	Reference field. Users are sometimes more comfortable using common names for geographies rather than referring to them by CO_FIPS.
<b>CERT_DATE</b>	Date which the county successfully passed through the CNMS QC Tool.
Type of data expected	Calendar date (ex. 01/01/10)
Potential source to obtain	This field will be populated by the CNMS QC Tool.
Anticipated use for attribute	This field will track the most recent data a given county has passed through the automated QC process.
<b>CERT_ID</b>	POC for entity passing the county through the CNMS QC Tool.
Type of data expected	Existing Point_of_Contact table value.

<b>Field</b>	<b>Description</b>
Potential source to obtain	This field will be populated by the CNMS QC Tool.
Anticipated use for attribute	This field will track the POC_ID for the most recent entity to pass the county through the automated QC process.

**3.8 Point\_of\_Contact (Table)**

**Table 10: Point of Contact (Table ID Code: 05)**

<b>Field</b>	<b>Description</b>
<b>POC_ID</b>	Primary key for table. Assigned by record creator or user.
Type of data expected	As the Primary key for this table this field must exist as a unique identifier for each individual record.
Potential source to obtain	A programmatic approach that prefixes 5 record counting digits with the 5-digit County FIPS code followed by the table ID 05 produces a number like 201190500001 (20119 is the county FIPS code, 05 is a table ID to separate from 'CNMS_IDs' used on the 4 FCs, and 00001 represents record counting digits) for the first POC record in Meade County, Kansas. Unique identifier obtained from National CNMS viewing solution.
Anticipated use for attribute	Unique identification of each individual CNMS POC record.
<b>POC_NAME</b>	Given name of the point of contact knowledgeable of CNMS record
Type of data expected	Free text entry of point of contact's name.
Potential source to obtain	Presumably a person connected to the identification of a CNMS record.
Anticipated use for attribute	Information is used to identify the name of the POC for each CNMS data entry.
<b>POC_TITLE</b>	Any title associated with the point of contract.
Type of data expected	Free text entry of the position held by the POC at his/her organization
Potential source to obtain	Normally, this information should be readily available to the person making the CNMS entry. Otherwise, it can be looked up on government websites (if POC works for public agency) or corporate websites (if POC works for private sector).
Anticipated use for attribute	This information can be used to identify the position of the POC within an organization. Should the POC move on to a new position, this information can be used to identify the appropriate new POC for a CNMS data entry.
<b>POC_DESCRIPTION</b>	Information regarding the role and responsibilities of the point of contact.
Type of data expected	Free text entry of the job functions of a POC.
Potential source to obtain	Normally, this information should be readily available to the person making the CNMS entry. Otherwise, it can be looked up on government websites (if POC works for public agency) or corporate websites (if POC works for private sector).

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Field	Description
Anticipated use for attribute	This field provides additional information about the job functions of a POC as they relate to the CNMS project need/request.
<b>ORG_NAME</b>	The name of the owner, or managing government agency, of the subject item.
Type of data expected	Free text entry of the name of the organization.
Potential source to obtain	Normally, this information should be readily available to the person making the CNMS entry. Otherwise, it can be looked up on government websites (if POC works for public agency) or corporate websites (if POC works for private sector).
Anticipated use for attribute	Information can be used for correspondence with the POC.
<b>ORG_TYPE</b>	A code that represents a kind of organization.
Type of data expected	The predefined acceptable values are to be selected from the 'D_Org_Type' domain list.
Potential source to obtain	Normally, this information should be readily available to the person making the CNMS entry. Otherwise, it can be looked up on government websites (if POC works for public agency) or corporate websites (if POC works for private sector).
Anticipated use for attribute	Information can be used to determine the source of the CNMS need/request (e.g. initiated by public agency vs. private sector, etc.).
<b>BUSINESS_PHONE</b>	The business telephone number of the contact person.
Type of data expected	Free text entry of 10-digit phone number.
Potential source to obtain	Information can be obtained from government websites (if POC works for public agency) or corporate websites (if POC works for private sector).
Anticipated use for attribute	Correspondence and communications with the POC regarding the CNMS entry.
<b>MOBILE_PHONE</b>	The cellular phone number of the contact person.
Type of data expected	Free text entry of 10-digit phone number.
Potential source to obtain	Information can be obtained from government websites (if POC works for public agency) or corporate websites (if POC works for private sector).
Anticipated use for attribute	Correspondence and communications with the POC regarding the CNMS entry.
<b>FAX_PHONE</b>	The fax number of the contact person.
Type of data expected	Free text entry of 10-digit fax number.
Potential source to obtain	Information can be obtained from government websites (if POC works for public agency) or corporate websites (if POC works for private sector).
Anticipated use for attribute	Correspondence and communications with the POC regarding the CNMS entry.
<b>ADDRESS_1</b>	The first line of the point of contact's address.

## CNMS Technical Reference

Field	Description
Type of data expected	Free text entry of POC's address.
Potential source to obtain	Information can be obtained from government websites (if POC works for public agency) or corporate websites (if POC works for private sector).
Anticipated use for attribute	Correspondence and communications with the POC regarding the CNMS entry.
<b>ADDRESS_2</b>	The second line of the point of contact's address.
Type of data expected	Free text entry of POC's address, if applicable.
Potential source to obtain	Information can be obtained from government websites (if POC works for public agency) or corporate websites (if POC works for private sector).
Anticipated use for attribute	Correspondence and communications with the POC regarding the CNMS entry.
<b>CITY_NAME</b>	The city or town in which the contact person's address is located
Type of data expected	Free text entry of city name in which organization resides.
Potential source to obtain	Information can be obtained from government websites (if POC works for public agency) or corporate websites (if POC works for private sector).
Anticipated use for attribute	Correspondence and communications with the POC regarding the CNMS entry.
<b>STATE</b>	The name of the State in which the contact person's address is located.
Type of data expected	Free text entry of state name in which organization resides.
Potential source to obtain	Information can be obtained from government websites (if POC works for public agency) or corporate websites (if POC works for private sector).
Anticipated use for attribute	Correspondence and communications with the POC regarding the CNMS entry.
<b>ZIP_CODE</b>	The Zip Code of the contact person's address.
Type of data expected	Free text entry of 5- or 9-digit zip code for the organization.
Potential source to obtain	Information can be obtained from government websites (if POC works for public agency) or corporate websites (if POC works for private sector).
Anticipated use for attribute	Correspondence and communications with the POC regarding the CNMS entry.
<b>COUNTY</b>	The county name.
Type of data expected	Free text entry of county name in which organization resides.
Potential source to obtain	Information can be obtained from government websites (if POC works for public agency) or corporate websites (if POC works for private sector).
Anticipated use for attribute	Correspondence and communications with the POC regarding the CNMS entry.

<b>Field</b>	<b>Description</b>
<b>EMAIL_ADDRESS</b>	Electronic mail address.
Type of data expected	Free text entry of standard email address of POC.
Potential source to obtain	Information can be obtained from government websites (if POC works for public agency) or corporate websites (if POC works for private sector).
Anticipated use for attribute	Correspondence and communications with the POC regarding the CNMS entry.
<b>COMMENT</b>	Additional comments.

### 3.9 S\_Coastal\_Ln Feature Class (Polyline)

The S\_Coastal\_Ln feature class resides in the CNMS Inventory feature dataset. Each feature within S\_Coastal\_Ln is meant to fully encompass the physical extent of a coastal reach that is regulated by an SFHA under the National Flood Insurance Program (NFIP). The sole line source used in the S\_Coastal\_Ln feature class is the NOAA OCS shoreline data set. This data set provides the single representation of the national coastline for purposes of the CNMS Inventory.

Each coastal reach within the S\_Coastal\_Ln feature class contains a unique CREACH\_ID value; this is analogous to the unique REACH\_ID values within S\_Studies\_Ln for riverine features. While a coastal study may involve various hazard analysis methods, identification of the fact that the analysis was performed as a single coastal study is served by the CSTUDY\_ID attribute. A single coastal study may be composed of multiple coastal reaches, each having unique CREACH\_ID values and a single CSTUDY\_ID value. This is similar to the relationship between REACH\_ID and STUDY\_ID for riverine features.

With the release of this May 2015 version of the CNMS schema, the S\_Coastal\_Ln feature class has been populated to reflect ongoing studies funded during Risk MAP (or just prior, as is the case for a handful of counties). These studies represent FEMA’s commitment to update studies for the entire populated coastline during Risk MAP. Funding during Risk MAP resulted in all coastal line work within a populated county being set to VALID, as a bulk decision, with attributes of the ongoing study stored in the ‘BEING STUDIED’ (i.e. BS\_XXX) fields.

Sections 3.9.1 – 3.9.4 outlines the updates required for the S\_Coastal\_Ln feature at various Risk MAP phases.

**Table 11: S\_Coastal\_Ln (Table ID Code: 08)**

<b>Field</b>	<b>Description</b>
<b>CREACH_ID</b>	Primary key for table. Assigned by table creator.
Type of data expected	As the Primary key for this table this field must exist as a unique identifier for each individual record.

## CNMS Technical Reference

Field	Description
Potential source to obtain	A programmatic approach that prefixes five record counting digits with the 5-digit County FIPS code and a 2-digit feature class ID will produce a number like 330150800001 (33015 is the county FIPS code, 08 is the feature class ID for S_Coastal_Ln and 00001 represent record counting digits) for the first record in S_Coastal_Ln for Rockingham County, New Hampshire. No repeat counting digits should be used within the same county.
Anticipated use for attribute	Unique identification of each individual CNMS record.
<b>CSTUDY_ID</b>	Internal key used to establish relationship between coastal reaches.
Type of data expected	This field will be a 12-digit string.
Potential source to obtain	The value in this field will typically represent the existing CREACH_ID of a single reach amongst a group of related reaches.
Anticipated use for attribute	Key field used to link multiple reaches which represent segments of the same study. This field can also be used to link multiple reaches to external supporting data which is common among them. The expected relationship between this field and individual S_Coastal_Ln features is one to many, with a single CSTUDY_ID being represented by one or more features.
<b>CO_FIPS</b>	Federal Information Processing Standard code.
Type of data expected	5-digit Federal Information Processing Standard code which uniquely identifies state and counties, or the equivalent. The first two digits are the FIPS state code and the last three are the county code within the state or possession.
Potential source to obtain	Countywide FIRM or FIS; U.S Department of Commerce, Bureau of the Census, Geography Division is the maintenance agency. Many departments within the U.S. government maintain references back to this standard. Including the EPA: <a href="http://www.epa.gov/enviro/html/codes/state.html">http://www.epa.gov/enviro/html/codes/state.html</a>
Anticipated use for attribute	Establishes a unique identifier for determining what state and/or county the data resides in.
<b>CID</b>	Community Identification Number.
Type of data expected	A unique 5- or 6-digit number assigned to each community by FEMA and used for identity in computer databases; it is shown on the FIS, FIRM, and in the Q3 Flood Data files. The first two digits of the number are always the State FIPS code.
Potential source to obtain	FEMA is the source. The CID is obtainable from multiple sources; Community Information System, Flood Insurance Studies, FIRM panels, FIRM indexes.
Anticipated use for attribute	Catalog and referencing.
<b>CVALIDATION</b>	Coastal validation status. This attribute establishes the latest evaluation condition of a coastal reach in relation to the criteria set forth in the <i>CNMS Technical Reference</i> , any procedure memorandums, or previous work.
Type of data expected	Entry from domain lookup table D_VALID_CAT.
Potential source to obtain	Current entry; or user assessed entry based on evaluation of criteria set forth in the <i>CNMS Technical Reference</i> , any procedure memorandums, or previous work.
Anticipated use for attribute	Used to categorize the Inventory for the purposes of planning, study selection, tracking and reporting.

## CNMS Technical Reference

Field	Description
<b>CSTAT_TYPE</b>	Coastal validation status type. This attribute establishes the sub-categories for each of the Validation Status classes of a coastal flooding source in relation to the criteria set forth in the <i>CNMS Technical Reference</i> , any procedure memorandums, or previous work.
Type of data expected	Entry from domain lookup table D_STATUS_TYPE.
Potential source to obtain	Current entry; or user assessed entry based on evaluation of criteria set forth in the <i>CNMS Technical Reference</i> , any procedure memorandums, or previous work.
Anticipated use for attribute	Used to further define the Validation Status type to categorize the Inventory for the purposes of planning, study selection, tracking and reporting.
<b>MILES</b>	An attribute of the calculated miles of the data record entry.
Type of data expected	A number corresponding to the length of the inventory polyline segment.
Potential source to obtain	In feature class format, and if projection is in feet or meters permanent length field of feature class can be used to populate this field by applying the appropriate conversion to miles. Otherwise, make a field calculation using field calculator and convert to miles. Be sure to understand the units the projection is in and how it will influence any resulting calculations. The CNMS FGDB is provided in the NAD 1983 Geographic Coordinate System, at the Regional level, the length of the polyline segments can be calculated in local or State projections. During National data consolidation and analysis, the projection will be standardized across all Regions and mileage recalculated to a National standard.
Anticipated use for attribute	Quantifies the CNMS Inventory in coastal miles for reporting (ex. NVUE, quarterly reports).
<b>SOURCE</b>	Source of polyline segment represented in the inventory.
Type of data expected	Entry from domain lookup table D_SOURCE.
Potential source to obtain	NOAA OCS shoreline data set.
Anticipated use for attribute	Verify and document source of coastal linework used.
<b>STATUS_DATE</b>	Date when CNMS coastal reach validation is completed or a validation assessment of the coastal reach has been made. UNVERIFIED records will have the date the CNMS evaluation triggered the UNVERIFIED status. If an unverified study becomes VALID, the date of the status change is recorded.
Type of data expected	Calendar date (ex. 01/01/10)
Potential source to obtain	Calendar
Anticipated use for attribute	Determine the most recent analysis and condition of the polyline. Will track and maintain the currency of the inventory, to insure all requirements are being adhered to according to mandates set forth within the NFIP.
<b>FY_FUNDED</b>	Attribute of the most recent effective FEMA fiscal year funding applied to the coastal reach engineering at the time of study (ex. Watershed, county).
Type of data expected	Entry from domain lookup table D_FY_FUNDED.
Potential source to obtain	MIP case numbers (as they are associated with fiscal year first funded), RSC Management.

## CNMS Technical Reference

Field	Description
Anticipated use for attribute	Determine the latest FEMA funding year for the underlying SFHA engineering study.
<b>REASON</b>	Attribute allows for user input of detailed description of considerations or special circumstances when determining attributes VALIDATION_STATUS, SOURCE, or any pertinent information in the data creation process.
Type of data expected	Preferably user defined template “canned” descriptors of their data entry process and considerations.
Potential source to obtain	Criteria evaluated and considered in the bulk validation of CNMS Study Records, ancillary information presented by the regions or other parties, data used that is not readily available, etc.
Anticipated use for attribute	Attribute will document more details about the underlying considerations of other attributes contained in the CNMS database. This will serve as a first stop when questions arise about the attribution contained in the database without going back to the criteria, check sheets, or intermediate datasets. By choosing to use template “canned” entries, query of such entries will be streamlined. A useful example might be the need to query a specific consideration that based on current business rules is attributed a certain way, but based on new information might need to be queried and reattributed a different way.
<b>HUC8_KEY</b>	8-digit Hydrologic Unit Code (HUC) representing the smallest watersheds known as hydrologic cataloging units. This can be obtained by overlaying the HUC spatial files with the polyline information to determine which cataloging unit the polyline resides in.
Type of data expected	8-digit Hydrologic Unit Code.
Potential source to obtain	Originator: United States Geological Survey (USGS): <a href="http://nhd.usgs.gov/data.html">http://nhd.usgs.gov/data.html</a> ; or EPA surf your watershed: <a href="http://cfpub.epa.gov/surf/locate/index.cfm">http://cfpub.epa.gov/surf/locate/index.cfm</a>
Anticipated use for attribute	Provides an attribute to determine what HUC 8 sub-basin the polyline resides in.
<b>STUDY_TYPE</b>	Study type of the SFHA represented by the reach based on the current effective FIS text.
Type of data expected	Entry from domain lookup table D_STUDY_TYPE.
Potential source to obtain	FIS Text, Study Manager Input etc.
Anticipated use for attribute	Query into the characteristics of the inventory: type of study, Validation Status, mileage.
<b>FBS_CMLNT</b>	Is the flood plain represented by this feature FBS Compliant (NO/YES/UNKNOWN)?
Type of data expected	This is a YES/NO field based upon domain lookup table D_ELEMENT.
Potential source to obtain	Regional Support Centers and / or TSDN .
Anticipated use for attribute	Tracking FBS compliance across the National Inventory.
<b>FBS_CHKDT</b>	Date when the current value within the FBS_CMLNT field was populated.
Type of data expected	Calendar date (ex. 01/01/10)
Potential source to obtain	Calendar
Anticipated use for attribute	Tracks attribution of latest FBS compliance value.
<b>FBS_CTYP</b>	FBS compliance check type – bulk attributed at county level or attributed individually.
Type of data expected	This field will hold a user selected value from domain table D_FBS_CTYP.
Potential source to obtain	Entered by user when FBS_CMLNTY field is populated, based upon check type.

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Field	Description
Anticipated use for attribute	Indicator of the type of FBS check performed for this reach.
<b>POC_ID</b>	Foreign key to join to 'Point_of_Contact' table. ID for Point of Contact.
Type of data expected	This field, if populated, should have a matching record in the 'Point_of_Contact' table.
Potential source to obtain	Establishing the relationship of 'S_Coastal_Ln' records and 'Point_of_Contact' records is user controlled.
Anticipated use for attribute	This field is used to establish a database relationship with records in the 'Point_of_Contact' table. The supporting idea is to relate record ownership information to specific CNMS records.
<b>DATE_RQST</b>	The date a study is determined to be unverified.
Type of data expected	This field is of the type date. Data should be entered in MM/DD/YYYY format.
Potential source to obtain	The user should enter the date for which the CNMS record was entered in the database.
Anticipated use for attribute	Resource and tracking are the anticipated uses of dates.
<b>DATE_EFFECT</b>	Date of effective analysis.
Type of data expected	This date field will be used to document when the effective study was produced because there can be much time between when the study was created and when it went effective. Age of maps does not adequately reflect the age of the analysis as a study can be published on multiple effective maps without change. At times, the date that the analysis <i>first</i> went effective is sufficient as well, especially when supporting data is sparse. Data should be entered in the MM/DD/YYYY format.
Potential source to obtain	The date of effective analysis for a detailed study is usually included in Section 1.2 in the FEMA Insurance Study (FIS) text.
Anticipated use for attribute	This date will be evaluated for age of analysis of the effective study.
<b>SURGE_MDL</b>	Surge/Stillwater method used for the effective study.
Type of data expected	In this domain based field the user should choose the name of the surge model used and version, as appropriate.
Potential source to obtain	Flood Insurance Study (FIS) text or Technical Data Notebook (TSDN) for the study.
Anticipated use for attribute	Reference and evaluation.
<b>SURGE_STAT</b>	Surge statistical method used for the effective study.
Type of data expected	In this domain based field the user should choose the name of the surge statistical method used and version, as appropriate.
Potential source to obtain	Flood Insurance Study (FIS) text or Technical Data Notebook (TSDN) for the study.
Anticipated use for attribute	Reference and evaluation.
<b>SURGE2DW</b>	Indicates if the surge model is coupled with 2-D wave analysis for the effective study.
Type of data expected	In this domain based field the user should choose how the surge model is coupled with the 2-D wave analysis (tightly or loosely coupled, or not coupled at all).
Potential source to obtain	Flood Insurance Study (FIS) text or Technical Data Notebook (TSDN) for the study.
Anticipated use for attribute	Reference and evaluation.
<b>SETUP METH</b>	When a 2-D model is not run, setup method used for the effective study.
Type of data expected	In this domain based field the user should choose the name of the setup method used as appropriate.
Potential source to obtain	Flood Insurance Study (FIS) text or Technical Data Notebook (TSDN) for the study.
Anticipated use for attribute	Reference and evaluation.

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Field	Description
<b>RUNUP_MDL</b>	Runup model used for the effective study.
Type of data expected	In this domain based field the user should choose the name of the runup model used, as appropriate.
Potential source to obtain	Flood Insurance Study (FIS) text or Technical Data Notebook (TSDN) for the study.
Anticipated use for attribute	Reference and evaluation.
<b>EROS_METH</b>	Erosion method used for the effective study.
Type of data expected	In this domain based field the user should choose the name of the erosion method used, as appropriate.
Potential source to obtain	Flood Insurance Study (FIS) text or Technical Data Notebook (TSDN) for the study.
Anticipated use for attribute	Reference and evaluation.
<b>OVWAVE_MDL</b>	Overland wave model used for the effective study.
Type of data expected	In this domain based field the user should choose the name of the overland wave model used, as appropriate.
Potential source to obtain	Flood Insurance Study (FIS) text or Technical Data Notebook (TSDN) for the study.
Anticipated use for attribute	Reference and evaluation.
<b>WAVE_MDL</b>	Wave model used for the effective study.
Type of data expected	In this domain based field the user should choose the name of the wave model used, as appropriate.
Potential source to obtain	Flood Insurance Study (FIS) text or Technical Data Notebook (TSDN) for the study.
Anticipated use for attribute	Reference and evaluation.
<b>C_CX</b>	<i>Coastal Critical Elements – number and definitions of critical elements for coastal studies are currently under development as of the May 2015 version of the CNMS Technical Reference.</i>
<b>C_SX</b>	<i>Coastal Secondary Elements – number and definitions of secondary elements for coastal studies are currently under development.</i>
<b>CE_TOTAL</b>	Total number of critical elements.
Type of data expected	A number equivalent to the sum of the number of Critical Elements equaling 'YES' from above.
Potential source to obtain	User is to provide the sum of Critical Elements.
Anticipated use for attribute	Determination of VALIDATED vs. UNVERIFIED; UNVERIFIED is CE_Total > TBD.
<b>SE_TOTAL</b>	Total number of secondary elements.
Type of data expected	A number equivalent to the sum of the number of Secondary Elements equaling 'YES' from above.
Potential source to obtain	User is to provide the sum of Secondary Elements.
Anticipated use for attribute	Determination of VALIDATED vs. UNVERIFIED; UNVERIFIED is SE_Total >= TBD.
<b>COMMENT</b>	Additional comments.
Type of data expected	Additional analyst comments.
Potential source to obtain	User comments.
Anticipated use for attribute	Though the field cannot be domain enforced, it will sometimes include information pertaining to Validation decisions, or LOMR incorporation effects.
<b>BS_SRGMODL</b>	Surge model of the ongoing study.
Type of data expected	In this domain based field the user should choose the name of the surge model used and version, as appropriate.
Potential source to obtain	Scoping data, Preliminary FIS, Study Manager.
Anticipated use for attribute	Reference and evaluation.

Field	Description
<b>BS_SRSTAT</b>	Surge statistical method of the ongoing study.
Type of data expected	In this domain based field the user should choose the name of the surge statistical method used and version, as appropriate.
Potential source to obtain	Scoping data, Preliminary FIS, Study Manager.
Anticipated use for attribute	Reference and evaluation.
<b>BS_SR2DW</b>	Indicates whether the surge model is coupled with 2-D wave analysis for the ongoing study.
Type of data expected	In this domain based field the user should choose how the surge model is coupled with the 2-D wave analysis (tightly or loosely coupled, or not coupled at all).
Potential source to obtain	Scoping data, Preliminary FIS, Study Manager.
Anticipated use for attribute	Reference and evaluation.
<b>BS_SUPMETH</b>	When a 2-D model is not run, setup method of the ongoing study.
Type of data expected	In this domain based field the user should choose the name of the setup method used as appropriate.
Potential source to obtain	Scoping data, Preliminary FIS, Study Manager.
Anticipated use for attribute	Reference and evaluation.
<b>BS_RUPMODL</b>	Runup model of the ongoing study.
Type of data expected	In this domain based field the user should choose the name of the runup model used, as appropriate.
Potential source to obtain	Scoping data, Preliminary FIS, Study Manager.
Anticipated use for attribute	Reference and evaluation.
<b>BS_ERSMETH</b>	Erosion method of the ongoing study.
Type of data expected	In this domain based field the user should choose the name of the erosion method used, as appropriate.
Potential source to obtain	Scoping data, Preliminary FIS, Study Manager.
Anticipated use for attribute	Reference and evaluation.
<b>BS_OVLDMDL</b>	Overland wave model of the ongoing study.
Type of data expected	In this domain based field the user should choose the name of the overland wave model used, as appropriate.
Potential source to obtain	Scoping data, Preliminary FIS, Study Manager.
Anticipated use for attribute	Reference and evaluation.
<b>BS_WVMDL</b>	Wave model of the ongoing study.
Type of data expected	In this domain based field the user should choose the name of the wave model used, as appropriate.
Potential source to obtain	Scoping data, Preliminary FIS, Study Manager.
Anticipated use for attribute	Reference and evaluation.
<b>BS_FY_FUND</b>	When relevant - Attribute of the most recent non-effective FEMA fiscal year funding applied to the stream reach engineering at the time of study (ex. Watershed, county).
Type of data expected	Entry from domain lookup table D_FY_FUNDED.
Potential source to obtain	Scoping data, Preliminary FIS, Study Manager.
Anticipated use for attribute	FY projections and trend identification.
<b>PRELM_DATE</b>	Expected Preliminary issuance date for reaches representing areas being actively studied.
Type of data expected	Calendar date (ex. 01/01/10)
Potential source to obtain	MIP, other pending guidance.
Anticipated use for attribute	Stores the expected Preliminary Date of a study currently in progress.
<b>LFD_DATE</b>	Expected Letter of Final Determination issuance date for reaches representing areas being actively studied.
Type of data expected	Calendar date (ex. 01/01/10)

## CNMS Technical Reference

Field	Description
Potential source to obtain	MIP, other pending guidance.
Anticipated use for attribute	Stores the expected Letter of Final Determination Date of a study currently in progress.
<b>EC1_UDEF</b>	User Defined Critical Element 1
Type of data expected	This YES/NO field is to capture the results of additional Region Specific validation processes which have been deemed Critical.
Potential source to obtain	Dependent upon Element definition.
Anticipated use for attribute	This Critical Element field is a trigger for indication of an identified deficiency, and subsequent assignment of UNVERIFIED Validation Status to the record. In counties which have been identified as utilizing the Extra Elements, EC1_UDEF failure will result in an UNVERIFIED Validation Status assignment.
<b>EC2_UDEF</b>	User Defined Critical Element 2
Type of data expected	This YES/NO field is to capture the results of additional Region Specific validation processes which have been deemed Critical.
Potential source to obtain	Dependent upon Element definition.
Anticipated use for attribute	This Critical Element field is a trigger for indication of an identified deficiency, and subsequent assignment of UNVERIFIED Validation Status to the record. In counties which have been identified as utilizing the Extra Elements, EC2_UDEF failure will result in an UNVERIFIED Validation Status assignment.
<b>ES1_UDEF</b>	User Defined Secondary Element 1
Type of data expected	This YES/NO field is to capture the results of additional Region Specific validation processes which have been deemed Secondary.
Potential source to obtain	Dependent upon Element definition.
Anticipated use for attribute	Any combination of 4 or more Secondary Elements establishes a CNMS record as UNVERIFIED. In counties which have been identified as utilizing the Extra Elements, ES1_UDEF will contribute to the Secondary Element count.
<b>ES2_UDEF</b>	User Defined Secondary Element 2
Type of data expected	This YES/NO field is to capture the results of additional Region Specific validation processes which have been deemed Secondary.
Potential source to obtain	Dependent upon Element definition.
Anticipated use for attribute	Any combination of 4 or more Secondary Elements establishes a CNMS record as UNVERIFIED. In counties which have been identified as utilizing the Extra Elements, ES2_UDEF will contribute to the Secondary Element count.
<b>ES3_UDEF</b>	User Defined Secondary Element 3
Type of data expected	This YES/NO field is to capture the results of additional Region Specific validation processes which have been deemed Secondary.
Potential source to obtain	Dependent upon Element definition.
Anticipated use for attribute	Any combination of 4 or more Secondary Elements establishes a CNMS record as UNVERIFIED. In counties which have been identified as utilizing the Extra Elements, ES3_UDEF will contribute to the Secondary Element count.
<b>ES4_UDEF</b>	User Defined Secondary Element 4
Type of data expected	This YES/NO field is to capture the results of additional Region Specific validation processes which have been deemed Secondary.
Potential source to obtain	Dependent upon Element definition.

<b>Field</b>	<b>Description</b>
Anticipated use for attribute	Any combination of 4 or more Secondary Elements establishes a CNMS record as UNVERIFIED. In counties which have been identified as utilizing the Extra Elements, ES4_UDEF will contribute to the Secondary Element count.
<b>E_ELEMDATE</b>	The date on which the User Defined Element values were populated.
Type of data expected	Calendar date (ex. 01/01/10)
Potential source to obtain	User is to provide the date on which the E Elements were evaluated.
Anticipated use for attribute	The date on which the User Defined Elements were populated.

### 3.9.1 S\_Coastal\_Ln Discovery and Scoping Phase Updates

In instances where study mileage has been scoped and funded, but not yet tied to specific coastal reaches, no updates to S\_Coastal\_Ln are needed. When project scope has been funded and specific reaches have been identified, the following fields within S\_Coastal\_Ln will need to be updated as indicated. It is assumed that any fields not listed here should be updated by the user if more accurate data is available.

**Table 12: S\_Coastal\_Ln Discovery and Scoping Phase Updates**

<b>Field</b>	<b>Discovery and Scoping Phase Updates</b>
CREACH_ID	Update CREACH_ID any time on affected features or any time a Reach is split.
CSTUDY_ID	Update CSTUDY_ID to reflect intended cardinality. Often with new studies, it will be appropriate to simply set CSTUDY_ID equal to the CREACH_ID.
STATUS_TYPE	Shall be updated to 'BEING STUDIED' for all scoped Reaches.
MILES	Recalculate for any Reaches where geometry has been modified.
STATUS_DATE	Set the STATUS_DATE to the current date, which should be the date the other fields were reassigned as well.
POC_ID	Set the POC_ID to reflect the most current editing entity.
DATE_RQST	Set the DATE_RQST to the current date, which should be the date that the STATUS_TYPE was set to 'BEINGSTUDIED'.
BS_SRGMODL	Select the appropriate surge model of the ongoing study.
BS_SRGSTAT	Select the appropriate surge statistical method of the ongoing study.
BS_SRG2DW	Select if surge model is coupled with 2-D wave analysis for the ongoing study.
BS_SUPMETH	Select setup method of the ongoing study.
BS_RUPMODL	Select runup model of the ongoing study.
BS_ERSMETH	Select erosion method of the ongoing study.
BS_OVLDMDL	Select overland wave model of the ongoing study.
BS_WVMDL	Select wave model of the ongoing study.

<b>Field</b>	<b>Discovery and Scoping Phase Updates</b>
BS_FY_FUND	Select the appropriate value for fiscal year funded for the ongoing study.
PRELM_DATE	Update with accurate Preliminary issuance date estimate.
LFD_DATE	Update with accurate LFD issuance date estimate.

**3.9.2 S\_Coastal\_Ln FIRM Production Phase Update**

Throughout the production phase, it is important that the PRELM\_DATE and LFD\_DATE fields be kept current. Should scope of work be altered in any way, S\_Coastal\_Ln shall be updated to represent the updated scope, using the guidelines in 3.9.1. Additionally, it is also imperative that de-scoped studies resume appropriate VALIDATION\_STATUS and STATUS\_TYPE values as follows.

**Table 13: S\_Coastal\_Ln FIRM Production Phase Update**

<b>Validation status - Status Type (Active Study Values)</b>	<b>Validation status - Status Type (De-Scoped Values)</b>
ASSESSED - BEING STUDIED	ASSESSED - TO BE STUDIED
UNKNOWN - BEING STUDIED	UNKNOWN - TO BE ASSESSED
VALID - BEING STUDIED	VALID - NVUE COMPLIANT
UNVERIFIED - BEING STUDIED	UNVERIFIED - TO BE STUDIED

**3.9.3 S\_Coastal\_Ln Preliminary Issuance Phase Update**

At Preliminary issuance, all fields attributed through Discovery and Scoping Phase Updates should be checked for accuracy and updated as appropriate.

In situations where new regulatory products were not created for portions of a county as a result of the restudy, features in S\_Coastal\_Ln should be split to differentiate between coastline where new regulatory products were issued as a result of the restudy and where they were not. Any data in the 'BEING STUDIED' fields will be cleared for any lines representing coast where new regulatory products were not issued, and additional research will be conducted to populate the standard attribute fields of these lines based on the effective study. The VALID bulk decision will remain even for such stretches of coast.

**Table 14: S\_Coastal\_Ln Preliminary Issuance Phase Updates**

<b>Field</b>	<b>Preliminary Issuance Phase Updates</b>
FBS_CMLNT	Update to indicate FBS compliance of Preliminary studies.
FBS_CHKDT	Update with date new FBS_CMLNT value populated.
FBS_CTYPE	Update to reflect FBS compliance check type.
PRELM_DATE	Update with actual Preliminary issuance date.

Field	Preliminary Issuance Phase Updates
LFD_DATE	Update with accurate LFD issuance date estimate.

After Preliminary issuance, should it be discovered that scope of work had differed in any way from that represented in the polylines; S\_Coastal\_Ln attributes shall be updated to represent the correct scope. Additionally, it is also imperative that de-scoped studies resume appropriate VALIDATION\_STATUS and STATUS\_TYPE values as defined in Section 3.9.2.

### 3.9.4 S\_Coastal\_Ln LFD Issuance Phase Update

At LFD issuance, values from the 'BEING STUDIED' fields populated for scoping and preliminary data will be migrated into the corresponding primary study fields.

After LFD issuance, should it be discovered that scope of work had differed in any way from that represented in the linework, S\_Studies\_Ln shall be updated to represent the correct scope. Additionally, it is also imperative that de-scoped studies resume appropriate VALIDATION\_STATUS and STATUS\_TYPE values as defined in 3.9.2

**Table 15: S\_Coastal\_LN LFD Phase Updates**

Field	LFD Phase Updates
CVALIDATION	For Reaches representing New or Updated studies, this field shall be set to VALID, otherwise this field shall be set to UNKNOWN.
CSTAT_TYPE	For Reaches representing New or Updated studies, this field shall be set to 'NVUE COMPLIANT', otherwise this field shall be set to 'TO BE ASSESSED'.
MILES	Recalculate for any Reaches where geometry has been modified.
STATUS_DATE	Set the STATUS_DATE to the current date, which should be the date the other fields were reassigned as well.
FY_FUNDED	This field should inherit the value stored in BS_FY_FUNDED.
POC_ID	Set the POC_ID to reflect the most current editing entity.
DATE_RQST	This field should be cleared.
DATE_EFFECT	This field should be updated to represent the date the analysis was completed for the Reach.
SURGE_MDL	This field should inherit the value stored in BS_SRGMODL.
SURGE_STAT	This field should inherit the value stored in BS_SRGMODL.
SURGE2DW	This field should inherit the value stored in BS_SRG2DW.
SETUP_METH	This field should inherit the value stored in BS_SUPMETH.

Field	LFD Phase Updates
RUNUP_MDL	This field should inherit the value stored in BS_ERSMETH.
EROS_METH	This field should inherit the value stored in BS_ERSMETH.
OVWAVE_MDL	This field should inherit the value stored in BS_OVLDMDL.
WAVE_MDL	This field should inherit the value stored in BS_WVMDL.
CE_TOTAL	If the Reach represents a New or Updated study, the values in this field should be cleared.
SE_TOTAL	If the Reach represents a New or Updated study, this field should be cleared.
BS_SRGMODL	After this value has been migrated to the corresponding effective study field, this field should be cleared.
BS_SRGMODL	After this value has been migrated to the corresponding effective study field, this field should be cleared.
BS_SRG2DW	After this value has been migrated to the corresponding effective study field, this field should be cleared.
BS_SUPMETH	After this value has been migrated to the corresponding effective study field, this field should be cleared.
BS_RUPMODL	After this value has been migrated to the corresponding effective study field, this field should be cleared.
BS_ERSMETH	After this value has been migrated to the corresponding effective study field, this field should be cleared.
BS_OVLDMDL	After this value has been migrated to the corresponding effective study field, this field should be cleared.
BS_WVMDL	After this value has been migrated to the corresponding effective study field, this field should be cleared.
BS_FY_FUND	After this value has been migrated to the corresponding effective study field, this field should be cleared.
PRELM_DATE	This field should be cleared.
LFD_DATE	This field should be cleared.

**3.10 County\_Coastal\_Status (Table)**

Data populated in the 'County\_Coastal\_Status' table is meant to provide a snapshot of RiskMAP funded restudy attributes. While some fields in this table may be updated during the life of the restudy projects, individual records are meant to largely remain static once populated. This allows users to recognize areas of coastline where key decision points led to the production of regulatory products from RiskMAP funding. While the County\_Coastal\_Status

table provides for county level tracking of coastal studies, often times a coastal study effort may involve multiple counties. The 'RM\_Coastal\_Studies' table facilitates the tracking of these multi-county efforts and is linked to the County\_Coastal\_Status table through the key field "RMSTUDY\_ID". Sections 3.10.1 – 3.10.4 outlines the updates needed for the County\_Coastal\_Status table at various Risk MAP phases.

**Table 16: County\_Coastal\_Status**

Field	Description
<b>RMSTUDY_ID</b>	Foreign key to join to the primary key RMSTUDY_ID of the RM_Coastal_Studies table.
Type of data expected	9-digit unique code established in the RM_Coastal_Studies table.
Potential source to obtain	RMSTUDY_ID in the RM_Coastal_Studies table.
Anticipated use for attribute	Catalog and referencing; foreign key to primary key of RM_Coastal_Studies table.
<b>CO_FIPS</b>	Federal Information Processing Standard code for the county.
Type of data expected	5-digit Federal Information Processing Standard code which uniquely identifies state and counties, or the equivalent. The first two digits are the FIPS state code and the last three are the county code within the state or possession.
Potential source to obtain	Countywide FIRM or FIS; U.S Department of Commerce, Bureau of the Census, Geography Division is the maintenance agency. Many departments within the U.S. government maintain references back to this standard. Including the EPA: <a href="http://www.epa.gov/enviro/html/codes/state.html">http://www.epa.gov/enviro/html/codes/state.html</a>
Anticipated use for attribute	Establishes a unique identifier for determining what state and/or county the data resides in.
<b>CSTUDY_ID</b>	Foreign key to join to the key field CSTUDY_ID of S_Coastal_Ln feature class.
Type of data expected	This field will be a 12-digit string.
Potential source to obtain	CSTUDY_ID in the S_Coastal_Ln feature class.
Anticipated use for attribute	Catalog and referencing; foreign key field used to link multiple coastal reaches representing segments of the same study.
<b>POP_COAST</b>	This YES/NO field indicates whether coastal study is part of populated coast.
Type of data expected	A value from the list D_ELEMENT.
Potential source to obtain	FEMA Coastal Study Tracker Tool
Anticipated use for attribute	Catalog and referencing
<b>CTRACK_PCT</b>	Percentage of FEMA Coastal Study Miles for national populated coast.
Type of data expected	A number corresponding to the percentage of coastal study miles for the populated coast.
Potential source to obtain	Coastal Study Tracker
Anticipated use for attribute	Coastal NVUE tracking
<b>SURGE_MDL</b>	Surge model used for the effective study.
Type of data expected	In this domain based field the user should choose the name of the surge model used and version, as appropriate.
Potential source to obtain	Flood Insurance Study (FIS) text or Technical Data Notebook (TSDN) for the study.
Anticipated use for attribute	Reference and evaluation.
<b>SURGE_STAT</b>	Surge statistical method used for the effective study.
Type of data expected	In this domain based field the user should choose the name of the surge statistical method used and version, as appropriate.

Field	Description
Potential source to obtain	Flood Insurance Study (FIS) text or Technical Data Notebook (TSDN) for the study.
Anticipated use for attribute	Reference and evaluation.
<b>SURGE2DW</b>	Indicates if the surge model is coupled with 2-D wave analysis for the effective study.
Type of data expected	In this domain based field the user should choose how the surge model is coupled with the 2-D wave analysis (tightly or loosely coupled, or not coupled at all).
Potential source to obtain	Flood Insurance Study (FIS) text or Technical Data Notebook (TSDN) for the study.
Anticipated use for attribute	Reference and evaluation.
<b>SETUP_METH</b>	When a 2-D model is not run, setup method used for the effective study.
Type of data expected	In this domain based field the user should choose the name of the setup method used as appropriate.
Potential source to obtain	Flood Insurance Study (FIS) text or Technical Data Notebook (TSDN) for the study.
Anticipated use for attribute	Reference and evaluation.
<b>RUNUP_MDL</b>	Runup model used for the effective study.
Type of data expected	In this domain based field the user should choose the name of the runup model used, as appropriate.
Potential source to obtain	Flood Insurance Study (FIS) text or Technical Data Notebook (TSDN) for the study.
Anticipated use for attribute	Reference and evaluation.
<b>EROS_METH</b>	Erosion method used for the effective study.
Type of data expected	In this domain based field the user should choose the name of the erosion method used, as appropriate.
Potential source to obtain	Flood Insurance Study (FIS) text or Technical Data Notebook (TSDN) for the study.
Anticipated use for attribute	Reference and evaluation.
<b>OVWAVE_MDL</b>	Overland wave model used for the effective study.
Type of data expected	In this domain based field the user should choose the name of the overland wave model used, as appropriate.
Potential source to obtain	Flood Insurance Study (FIS) text or Technical Data Notebook (TSDN) for the study.
Anticipated use for attribute	Reference and evaluation.
<b>WAVE_MDL</b>	Wave model used for the effective study.
Type of data expected	In this domain based field the user should choose the name of the wave model used, as appropriate.
Potential source to obtain	Flood Insurance Study (FIS) text or Technical Data Notebook (TSDN) for the study.
Anticipated use for attribute	Reference and evaluation.
<b>REG_PRODS</b>	Will new regulatory products be created as a result of the study.
Type of data expected	A value from the domain list D_ELEMENT.
Potential source to obtain	RSC or Study Manager.

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Field	Description
Anticipated use for attribute	Reference and tracking.
<b>FUL_FUNDED</b>	Field to track if the study has been fully funded (yes/no).
Type of data expected	A value from the domain list D_ELEMENT.
Potential source to obtain	RSC or Study Manager.
Anticipated use for attribute	Reference and tracking.
<b>FY_FUNDED</b>	The fiscal year when the coastal study was or will be initiated.
Type of data expected	A value from the domain list D_FY_FUNDED
Potential source to obtain	RSC or Study Manager.
Anticipated use for attribute	Reference and Tracking.
<b>PRELIM_DATE</b>	The expected or actual date preliminary maps will be issued.
Type of data expected	Calendar date (ex. 01/01/14). Even if exact calendar date is not yet known, an actual calendar date still must be entered using best estimation.
Potential source to obtain	MIP, RSC or Study Manager.
Anticipated use for attribute	Tracking the expected preliminary date of a study currently in progress.
<b>LFD_DATE</b>	The expected or actual date of the Letter of Final Determination (LFD) for the study.
Type of data expected	Calendar date (ex. 01/01/14). Even if exact calendar date is not yet known, an actual calendar date still must be entered using best estimation.
Potential source to obtain	MIP, RSC or Study Manager.
Anticipated use for attribute	Tracking the expected LFD date of a study currently in progress.
<b>POC_ID</b>	Foreign key to join to 'Point_of_Contact' table. ID for point of contact.
Type of data expected	This field, if populated, must have a matching record in the 'Point_of_Contact' table.
Potential source to obtain	Establishing the relationship of 'County_Coastal_Status' records and 'Point_of_Contact' records is user controlled.
Anticipated use for attribute	This field is used to establish a database relationship with records in the 'Point_of_Contact' table. The supporting idea is to relate record ownership information to specific CNMS records.
<b>COMMENT</b>	Field to store additional comments.
Type of data expected	Text field (255 characters maximum).
Potential source to obtain	CNMS user.
Anticipated use for attribute	Place holder for additional comments regarding the study.

**Table 17: RM\_Coastal\_Studies (Table ID Coe: 09)**

<b>Field</b>	<b>Description</b>
<b>RMSTUDY_ID</b>	Primary Key for the table.
Type of data expected	As the primary key for the table, this field must exist as a unique identifier for each individual record. A programmatic approach the prefixes five record counting digits with the 2-digit Region code and a 2-digit table code produces a number like 010900001 (01 is the Region code, 09 is the table code, and 00001 represent record counting digits) for the first multi-county coastal study in Region 1.
Potential source to obtain	Assigned by record creator or user.
Anticipated use for attribute	Provides unique identification of multi-county study efforts and linking of individual county records in the County_Coastal_Studies table that are part of a larger multi-county coastal study effort.
<b>RMSTUDY_NM</b>	Name or description of the multi-county coastal study.
Type of data expected	Text field
Potential source to obtain	RSC or Study Manager.
Anticipated use for attribute	Provides ability to query multi-county coastal study efforts.
<b>COMMENT</b>	Additional comments

### 3.10.1 County\_Coastal\_Status/ RM\_Coastal\_Studies Discovery and Scoping Phase Updates

In instances where study mileage has been scoped and funded, ongoing study characteristics should be correctly depicted in these tables.

**Table 18: County\_Coastal\_Status / RM\_Coastal\_Studies Discovery and Scoping Phase Updates**

<b>Field</b>	<b>Discovery and Scoping Phase Updates</b>
RMSTUDY_ID	Update this field in both the RM_Coastal_Studies table and County_Coastal_Status table to establish relationship for multi-county coastal studies.
RMSTUDY_NM	For multi-county coastal studies, update this field in the RM_Coastal_Studies table.
CSTUDY_ID	Update CSTUDY_ID any time on affected features any time a coastal reach is split.
POP_COAST	Update to indicate whether study is part of populated coast.
CTRACK_PCT	Update to indicate percentage of FEMA coastal study miles for national populated coast.
SRG_MODL	Select the appropriate surge model of the ongoing study.
SRG_STAT	Select the appropriate surge statistical method of the ongoing study.
SRG2DW	Select if surge model is coupled with 2-D wave analysis for the ongoing study.
SETUPP_METH	Select setup method of the ongoing study.

Field	Discovery and Scoping Phase Updates
RUNUP_MDL	Select runup model of the ongoing study.
EROS_METH	Select erosion method of the ongoing study.
OVWAVE_MDL	Select overland wave model of the ongoing study.
WAVE_MDL	Select wave model of the ongoing study.
REG_PRODS	Select the appropriate value for fiscal year funded for the ongoing study.
FUL_FUNDED	Indicate whether or not study has been fully funded.
FY_FUNDED	Update the fiscal year when the coastal study was or will be initiated.
PRELM_DATE	Update with accurate Preliminary issuance date estimate.
LFD_DATE	Update with accurate LFD issuance date estimate.
POC_ID	Set the POC_ID to reflect the most current editing entity.
COMMENT	Enter any pertinent comments regarding the study at the county or multi-county level.

### 3.10.2 County\_Coastal\_Status/ RM\_Coastal\_Studies FIRM Production Phase Updates

Throughout the production phase, it is important that the PRELM\_DATE and LFD\_DATE fields be kept current. If the exact dates for these fields is unknown or can only be estimated to the nearest calendar year or fiscal quarter, an exact calendar date (e.g., 01/01/14) must still be entered. In these situations, a suggested approach is to use the first calendar date of the closest estimated month.

**Table 19: County\_Coastal\_Status / RM\_Coastal\_Studies FIRM Production Phase Updates**

Field	FIRM Production Phase Updates
PRELM_DATE	Update with accurate Preliminary issuance date estimate.
LFD_DATE	Update with accurate LFD issuance date estimate.

### 3.10.3 County\_Coastal\_Status/ RM\_Coastal\_Studies Preliminary Issuance Phase Updates

At Preliminary issuance, all fields attributed through Discovery and Scoping Phase Updates should be checked for accuracy and updated as appropriate.

**Table 20: County\_Coastal\_Status / RM\_Coastal\_Studies Preliminary Issuance Phase Updates**

Field	Preliminary Issuance Phase Updates
PRELM_DATE	Update with actual Preliminary issuance date.
LFD_DATE	Update with accurate LFD issuance date estimate.

**3.10.4 County\_Coastal\_Status/ RM\_Coastal\_Studies LFD Issuance Phase Updates**

At LFD issuance, all fields should be checked for accuracy and updated as appropriate.

**Table 21: County\_Coastal\_Status / RM\_Coastal\_Studies LFD Phase Updates**

Field	LFD Phase Updates
PRELM_DATE	Update with actual Preliminary issuance date.
LFD_DATE	Update with actual LFD issuance date.

## Appendix A. Validation Checklists

The central purpose of the Validation Checklists (Tables A.3 and A.4) are to outline the information that must be captured to document a condition assessment as being a VALID or UNVERIFIED flood study. Any UNVERIFIED flood study, or the existence of a CNMS Request Record, will warrant a review for inclusion in the map production planning process. For existing floodplain studies, this review will be triggered when the minimum number of critical or secondary change characteristics has been determined to mark the study as having an UNVERIFIED Validation Status.

Just as the individual physical, climatological, and engineering (PCE) change characteristics to be considered when evaluating a flood study differ between coastal and riverine flood studies, so does the threshold for number of critical and secondary changes required for a study to be determined VALID or UNVERIFIED. Table A.1 indicates the number of critical and secondary elements for riverine and coastal studies to trigger an UNVERIFIED status.

**Table\_ApxA 1**

**Table A.1: Critical and Secondary Change Element Thresholds**

**Threshold for UNVERIFIED Status**

Study Type	Critical Elements		Secondary Elements
<b>Riverine – Detailed Studies</b> (and other non-coastal flood sources)	1	or	4
<b>Riverine – Approximate Studies</b>	1*		NA
<b>Coastal</b>	X**	or	X**

*\*All Zone A assessments (A1-A5) are critical elements.*

*\*\*Number of critical and secondary elements for Coastal studies is under development as of the May 2015 version of the CNMS Technical Reference*

While the thresholds in Table A.1 provide a minimum standard, flexibility is allowed in cases where severe secondary change conditions exist. In these situations, secondary change conditions can be elevated and considered critical when risk to life-safety and/or building stock dictates. The decision to elevate a secondary change condition to critical is subjective and the responsibility for doing so rests solely with those making decisions on map update investments. Section 3.2, “S\_Studies\_Ln Feature Class”, and Section 3.9, “S\_Coastal\_Ln Feature Class”, outline how user defined critical and secondary elements can be defined for capturing non-standard issue types. Such user defined elements should be leveraged with permission from the respective FEMA Regional Office.

In summary:

- A floodplain study is assigned a VALID Validation Status if zero critical and fewer than the minimum number of secondary change conditions shown in Table A.1 have been flagged.
- A floodplain study is assigned the UNVERIFIED Validation Status if it has at least one critical change condition flagged, or if a number of secondary change conditions equal to or greater than the minimum number shown in Table A.1 have been flagged.
- When a CNMS study record is checked out for evaluation, or when a CNMS evaluation is planned or in queue, the Validation Status is set to UNKNOWN.
- If a detailed evaluation based on the Validation Checklist does not lead to a definitive determination of the validity, the UNKNOWN Validation Status is applied to the study.
- If there is a need for re-visiting the validation process as a result of statutory requirements or availability of new data, the Validation Status for all affected studies will be toggled to UNKNOWN. This review process is also triggered 5 years after the initial determination of the Validation Status when the evaluation is considered outdated. Such studies are queued up for a CNMS evaluation based on current conditions.
- If a flooding source centerline in an unmapped area is considered for a new study, a Validation Status of ASSESSED is assigned to indicate that the stream has been assessed for a new study. The outcome of such consideration may be that resources are allocated in the current or future FY, or that the request for new study has been deferred.

The flow chart diagram included in Appendix E is a graphical overview of the study flow process including decision trees that result in one of the four Validation Status classifications. Within the CNMS data model, each of these four Validation Status classes is further categorized by different Status Types. Status Types are tracked using the STATUS\_TYPE field in the CNMS data model. Table A.2 summarizes the different Status Types for each of the four possible Validation Status scenarios. Each possible Validation Status and Status Type is further described below.

### **UNKNOWN Validation Status**

CNMS Study Records are initially given the Validation Status of UNKNOWN and status type of TO BE ASSESSED when the FEMA Regional Office has not yet evaluated the CNMS Study Record to provide input on either deferring or performing a CNMS evaluation. A BEING ASSESSED status type is assigned when Regional allocation to fund CNMS evaluation is established. The UNKNOWN Validation Status may also have a DEFERRED status type where

the validity remains unknown after an evaluation or the Region has determined the study to be low priority and CNMS evaluation is deferred. The option to defer an assessment for 5 years must be held to a minimum and requires discussion with FEMA Headquarters during each FY production planning process.

### **UNVERIFIED Validation Status**

CNMS Study Records categorized as UNVERIFIED may have one of two status types depending upon whether resources can be allocated for a restudy in the current or future fiscal year. UNVERIFIED studies currently being studied or that has been allocated funding for the current fiscal year are given the status type BEING STUDIED. UNVERIFIED studies that need to be addressed and are planned for a future FY will have the status type as TO BE STUDIED.

### **VALID Validation Status**

CNMS Study Records are categorized as VALID when a new or updated study is performed, or stream/coastline reach level validation was completed, and the study validation checklist flags zero critical and less than the minimum number of secondary elements shown in Table A.1. These records will have the status type NVUE COMPLIANT and be monitored for re-evaluation every five years. All newly studied or restudied flood sources classified as VALID will be reclassified as UNKNOWN with a Status Type of TO BE ASSESSED after five years.

### **ASSESSED Validation Status**

The ASSESSED Validation Status is for unmapped flood sources that have been added into the CNMS Inventory. The status type assigned to these flood sources depends upon if or when funding will be allocated by FEMA to conduct a study. Unmapped flood sources that are currently being studied or planned for the current FY will be assigned BEING STUDIED status type. Unmapped flood sources with studies planned for a future FY will be assigned a status type of TO BE STUDIED. Finally, unmapped flood sources that the Region determines should not be studied will be assigned the status type DEFERRED.

The Validation Checklist presents detailed definitions for the critical elements and secondary elements, and is intended to be used as a tool to assist in gathering information necessary to determine the Validation Status. Information gathered while using the Validation Checklist below to evaluate flooding sources and associated studies will translate into a CNMS Study Record entry in the S\_Studies\_Ln or S\_Coastal\_Ln feature class. Feature attribution policies for riverine and coastal studies are identified in Sections 3.2 and 3.9, respectively. Other methods, not represented in the validation checklist, may be available and necessary to complete study validation and not all data and intelligence gathered for any validation exercise will find a place in the S\_Studies\_Ln or S\_Coastal\_Ln feature class. To aid record keeping, a sample template of a Validation Process Documentation Checksheet with an example CNMS Study Record is available electronically with this document. Appendix B lays out minimum requirements for Validation Process Documentation that must be consulted over and above the use of the Validation Checklists. The abovementioned template is only one way to document methodologies used to make validation decisions. Other methods may be used to track decisions made, but must contain the fields suggested in the template at the least.

Some examples of conditions that users might identify and enter into CNMS, after passing them through the validation checklist, include the following:

- Flood zones that have been affected by development since the date of the effective FIRM
- Inadequate flood hazard engineering data in areas with planned development/anticipated growth (i.e., areas that currently reflect approximate flood hazard analyses yet have been slated for upgraded analyses given flood hazard data validation efforts)
- Study reaches requiring restudy because the methodologies used do not produce results that comply with quality standards.

**Table A.2: Validation Status Type Descriptions**

Validation status	Status Type	Description
<b>UNKNOWN</b>	TO BE ASSESSED	Requires Regional input to either defer or perform a CNMS stream/coastline reach level validation.
	BEING ASSESSED	Studies currently being assessed per CNMS stream/coastline reach level validation described in this document.
	DEFERRED	Areas that will not be evaluated per CNMS stream/coastline reach level validation. Typically low risk areas. These reaches will be reconsidered in five years.
	BEING STUDIED	Studies that are currently being studied or have been allocated funding for the current FY captured during the Discovery process.
<b>UNVERIFIED</b>	TO BE STUDIED	Studies that need to be studied and are planned for a future FY.
	BEING STUDIED	Studies are currently being studied or have been allocated funding for the current FY captured during the Discovery process.
<b>VALID</b>	NVUE COMPLIANT	New study performed or study passes stream/coastline reach level validation.

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Validation status	Status Type	Description
	BEING STUDIED	Studies that are currently underway or have been allocated funding for the current FY captured during the Discovery process.
<b>ASSESSED</b>	TO BE STUDIED	Unmapped flood sources prioritized to be mapped with an SFHA.
	BEING STUDIED	Unmapped flood sources that are currently being studied or have been allocated funding for the current FY.
	DEFERRED	Unmapped flood sources investigated to be mapped with an SFHA, but analysis resulted in low priority study.

Table A.3: Riverine Validation Checklist for Detailed Studies

<b>RIVERINE VALIDATION CHECKLIST FOR DETAILED STUDIES</b>
<b>Background Information</b>
Name of Flooding Source:
Date of Effective Analysis:
<ul style="list-style-type: none"> <li>Determine from effective FIS the most recent date engineering for a flood hazard was updated. This is the date of the underlying engineering of the effective FIRM.</li> </ul>
Hydrologic Model Used:
<ul style="list-style-type: none"> <li>Determine from effective FIS or other source the model (or method) used in the effective engineering.</li> </ul>
Hydraulic Model Used and version (if applicable):
<ul style="list-style-type: none"> <li>Determine from effective FIS or other source model (or method) used in the effective engineering.</li> </ul>
Are the models in digital format? If so, can you run the model?
<ul style="list-style-type: none"> <li>Determine whether the models are in digital format, and if they can be run.</li> <li>It is suggested that the location of the model be recorded with a description of the amount of effort it will take to prepare the model for a run.</li> </ul>
<b>Changes in Physical, Climate, and Engineering Methodologies since Date of Effective Analysis</b>
<b>CRITICAL ELEMENTS</b>
(C1) Major change in gage record since effective analysis that includes major flood events
<ul style="list-style-type: none"> <li>Determine if USGS gage is on stream.</li> <li>If yes, record the gage Site No. and Site Name from the gages shapefile (add record in external table joined to CNMS database via REACH_ID as necessary).</li> <li>Determine if a major flood event has occurred since the effective analysis. If yes, this Critical Element set to "YES" and you don't have to further evaluate gage records.</li> </ul>
(C2) Updated and effective peak discharges differ significantly based on confidence limits criteria in FEMA's G&S
<ul style="list-style-type: none"> <li>Determine if USGS gage is on stream.</li> <li>If yes, record the gage Site No. and Site Name from the gages shapefile (add record in external table joined to CNMS database via REACH_ID as necessary).</li> <li>Compare years of record from effective FIS to years of record now available.</li> <li>If newer records are available for gage, record the gage Site No. and Site Name as above.</li> <li>Determine if 100-yr discharge obtained by running PeakFQ at effective date is still within 68% confidence interval of the Bulletin 17B 100-yr estimate using updated gage data and PeakFQ. If not, Critical Element is set to "YES".</li> </ul>
(C3) Model methodology no longer appropriate based on Guidelines and Specifications (i.e. one-dimensional vs. two-dimensional modeling; Coastal Guidelines)
<ul style="list-style-type: none"> <li>This element scrutinizes underlying model methods, rather than modeling software or versions of software.</li> <li>If effective model methodology is found inappropriate based upon G&amp;S, Critical Element is set to "YES".</li> </ul>
(C4) Addition/removal of a major flood control structure
<ul style="list-style-type: none"> <li>Determine if dam or reservoir, has been added or removed since the effective analysis.</li> <li>Determine if new/removed levee or seawall, has occurred since the effective analysis.</li> <li>Determine if levee or seawall's current accreditation status is reflected in the effective analysis.</li> </ul>
(C5) Current channel reconfiguration outside effective SFHA
<ul style="list-style-type: none"> <li>Compare extents of effective SFHA with channel as shown on latest available aerial imagery.</li> <li>If channel reconfiguration has occurred, Critical Element is set to "YES".                             <ul style="list-style-type: none"> <li>Some instances of channel outside of SFHA may be minor natural occurrences, and categorized as requests for mapping updates.</li> </ul> </li> </ul>
(C6) Five or more new or removed hydraulic structures (bridge/culvert) that impact BFEs
<ul style="list-style-type: none"> <li>Compare effective mapping and profile to latest available imagery and GIS data.</li> <li>If five or more new or removed hydraulic structures exist along reach, Critical Element is set to "YES".</li> </ul>
(C7) Significant channel fill or scour
<ul style="list-style-type: none"> <li>If hydraulically significant fill or scour occurs along stream reach, Critical Element is set to "YES".</li> </ul>
<b>SECONDARY ELEMENTS</b>
(S1) Use of rural regression equations in urbanized areas
<ul style="list-style-type: none"> <li>Determine if rural regression equations were used in an urbanized basin, or if land use has changed from rural to urban since the effective analysis.</li> </ul>
(S2) Repetitive losses outside the SFHA
<ul style="list-style-type: none"> <li>If repetitive loss data is available/accessible, overlay Repetitive Loss spatial dataset with SFHA.</li> <li>If there are any structures outside of the SFHA for that reach, then you have Repetitive Loss outside of SFHA.                             <ul style="list-style-type: none"> <li>Instances of repetitive losses caused by local drainage issues, rather than the subject flooding source should not be considered.</li> </ul> </li> </ul>
(S3) 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.)
<ul style="list-style-type: none"> <li>Determine increase of impervious area that has occurred since the effective analysis.</li> <li>If impervious area has increased by 50% or more, Secondary Element is set to "YES".                             <ul style="list-style-type: none"> <li>Consider also meeting minimum impervious threshold to fail element. Consult State's regression equations.</li> </ul> </li> </ul>
(S4) One to four new or removed hydraulic structure (bridge/culvert) that impact BFEs
<ul style="list-style-type: none"> <li>Compare effective mapping and profile to latest available imagery and GIS data.                             <ul style="list-style-type: none"> <li>If one to four new or removed hydraulic structures exist along reach, Secondary Element is set to "YES".</li> </ul> </li> </ul>
(S5) Channel improvements / Shoreline changes
<ul style="list-style-type: none"> <li>Isolated to channel improvements only; shoreline assessed through coastal CNMS.</li> <li>Determine whether channel improvements have occurred since the effective analysis. This can consist of straightening, rerouting, concrete lining, rip-rap.</li> </ul>
(S6) Availability of better topography/bathymetry
<ul style="list-style-type: none"> <li>Determine if topo with better resolution and/or being newer than topo used for study exists.</li> <li>When assessing for redelineated streams, account for topo used during redelineation.</li> </ul>
(S7) Changes to vegetation or land use
<ul style="list-style-type: none"> <li>Determine whether significant vegetation or land use changes have occurred in the drainage area since the effective analysis.</li> <li>Possible sources include USGS NLCD datasets and any datasets showing large scale landuse changes.</li> </ul>
(S9) Significant storms with High Water Marks
<ul style="list-style-type: none"> <li>Determine if HWMs have been recorded on flooding source since the effective analysis.</li> </ul>
(S10) New regression equations
<ul style="list-style-type: none"> <li>If regression equations were used in the effective analysis and new equations now exist, set the Secondary Element to "YES".</li> </ul>

## Appendix B. Validation Process Documentation

Validation process documentation is necessary to ensure that the flooding source being evaluated has a record of the criteria evaluated, and the data used in the evaluation of those criteria. Summaries of the background information used to evaluate the criteria should be submitted as part of the CNMS data roll-up sent to the FEMA regional offices. These summaries will be referred to if FEMA ever has questions about the validity of methods used to evaluate criteria. Either in the format of the Validation Checklist, or in the format suggested in the sample template provided electronically with this user guide, the user should maintain current and accurate records that explicitly describe how the criteria were evaluated along with a list of the source and location of the data used in that evaluation. Source data should be documented outlining originator, location (URL, local drives), digital availability, and whether it can be shared or distributed. Data that has been processed such that it cannot be recreated in a reasonable amount of time from source data, or was manipulated once obtained from source, should be stored by its creator.

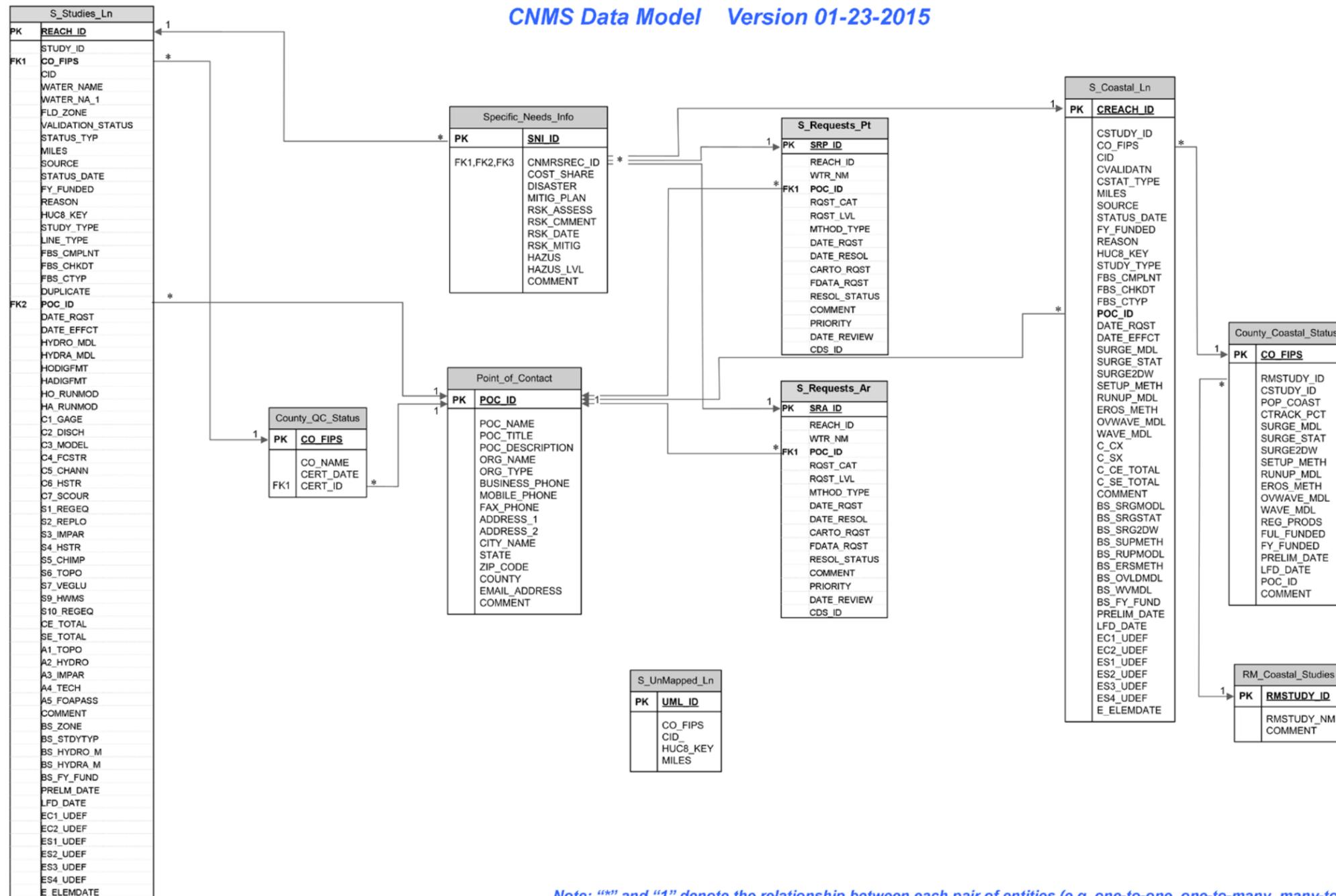
The need of the user to maintain records is important as the deliverable is subject to scrutiny. The first query under any scrutiny will be on the Validation Checklist entries used for the flooding source. This will be a summary level document that could be retrieved from Regional Offices and answer most, if not all, questions in regards to the decisions that went into the evaluation of the flooding source and its criteria. In extreme circumstances, a second query will be to provide either the unmodified source data evaluated, or the modified data in cases where the source data was manipulated.

To aid in record keeping in a searchable format and linked to the CNMS Database, a sample template of a 'Validation Process Documentation Checksheet' with an example CNMS Study Record is provided as a template to accompany this document. The template is only one way to document methodologies used to make validation decisions. Other methods, including making customized Validation Checklists for each study reach evaluated, may be used to track decisions made. However, these alternate methods must track the information suggested in the template at the least.

*Electronic attachment to Appendix B:*

*CNMS\_Sample\_Riverine\_Validation\_Process\_Documentation\_Checksheet\_V1.0.xls*

Appendix C. CNMS Data Model



## Appendix D. CNMS Data Dictionary

### S\_Studies\_Ln Feature Class (polyline)

Table D.1: S\_Studies\_Ln

Field	Type	Length	Required	Domain Table	Description
REACH_ID	Text	12	Yes		Primary key for table, assigned by table creator
STUDY_ID	Text	12	No		
CO_FIPS	Text	12	Yes		Federal Information Processing Standard code (FIPS code)
CID	Text	12	Yes		FEMA Community ID
WATER_NAME	Text	50	No		Name of flooding source
WATER_NA_1	Text	50	No		Alternate name of flooding source
FLD_ZONE	Text	50	Yes	D_ZONE	SFHA type the polyline represents (ex. ZONE AE, ZONE A)
VALIDATION_STATUS	Text	50	Yes	D_VALID_CAT	This attribute establishes the latest evaluation condition of a flooding source centerline in relation to the criteria set forth in the <i>CNMS Technical Reference</i> , any procedure memorandums, or previous work.
STATUS_TYPE	Text	100	Yes	D_STATUS_TYPE	This attribute establishes the sub-categories for each of the Validation Status classes of a flooding source centerline in relation to the criteria set forth in the <i>CNMS Technical Reference</i> , any procedure memorandums, or previous work.
MILES	number (double)	8	Yes		An attribute of the calculated miles of the data record entry
SOURCE	Text	100	Yes	D_SOURCE	Source of polyline segment represented in the inventory

## CNMS Technical Reference

Field	Type	Length	Required	Domain Table	Description
STATUS_DATE	Date	8	Yes		Date when CNMS stream reach validation is completed or a validation assessment of the stream reach has been made. UNVERIFIED records will have the date the CNMS evaluation triggered the UNVERIFIED status. If an unverified study becomes VALID, the date of the status change is recorded.
FY_FUNDED	Text	25	Yes for studies in progress for which a Preliminary FIRM has not been issued and if retrievable from MIP Case Number or RSC Management.	D_FY_FUNDED	Attribute of the most recent FEMA fiscal year funding applied to the stream reach (ex. watershed, county)
REASON	Text	255			Attribute allows for user input of detailed description of considerations or special circumstances when determining attributes VALIDATION_STATUS, SOURCE, or any pertinent information in the data creation process.
HUC8_KEY	number (double)	8	Yes		8-digit Hydrologic Unit Code (HUC) representing the smallest watersheds known as hydrologic cataloging units. This can be obtained by overlaying the HUC spatial files with the polyline information to determine which cataloging unit the polyline resides in.
STUDY_TYPE	Text	40	Yes	D_STUDY_TYPE	Study type of the SFHA represented by the polygon based on the current effective, preliminary, or draft FIS text.
FBS_CMPLNT	Short		Yes	D_ELEMENT	Indicator of FBS compliance for the floodplain represented by the line feature
FBS_CHKDT	Date		Yes		Date the FBS_CMPLNT field value was most recently populated
FBS_CTYP	Text	50	Yes	D_FBS_CTYPE	FBS Compliance Check Type
LINE_TYPE	Text	40	Yes	D_LINE_TYPE	Attribute provides description of flooding source line type as being RIVERINE, LAKE, POND, PLAYA, PONDING, or OTHER.

## CNMS Technical Reference

Field	Type	Length	Required	Domain Table	Description
DUPLICATE	Text	20	Yes if stream reach has 2 lines representing 2 different studies for the same reach extent.	D_DUPLICATE	Is there a second line representing an SFHA across a political boundary, for a second study on the same extent of the reach? (CATEGORY 1, CATEGORY 2, or CATEGORY 3)
POC_ID	Text	20	Yes if POC table is populated for associated record		Foreign key to join to Point_of_Contact table. ID for Point of Contact.
DATE_RQST	Date		Yes if Validation_Status is set to UNVERIFIED		Date request is made
DATE_EFFCT	Date		Yes		Date of effective analysis
HYDRO_MDL	Text	100	Yes (if applicable)		Hydrologic model used
HYDRA_MDL	Text	100	Yes (if applicable)		Hydraulic model used
HODIGFMT	Short		Yes if HODIGFMT = 'YES'	D_ELEMENT	Is the Hydrologic model in digital format? (NO/YES/UNKNOWN)
HADIGFMT	Short		Yes if HADIGFMT = 'YES'	D_ELEMENT	Is the Hydraulic model in digital format? (NO/YES/UNKNOWN)
HO_RUNMOD	Short		Yes if HO_RUNMOD = 'YES'	D_ELEMENT	Can the Hydrologic digital model be run? (NO/YES/UNKNOWN)
HA_RUNMOD	Short		Yes if HA_RUNMOD = 'YES'	D_ELEMENT	Can the Hydraulic digital model be run? (NO/YES/UNKNOWN)
C1_GAGE	Short		Yes	D_ELEMENT	Critical Element 1, Change in gage record. Major change in gage record since effective analysis that includes major flood events? (NO/YES/UNKNOWN)
C2_DISCH	Short		Yes	D_ELEMENT	Critical Element 2, Change in Discharge. Updated and effective peak discharges differ significantly based on confidence limits criteria in FEMA's G&S? (NO/YES/UNKNOWN)

## CNMS Technical Reference

Field	Type	Length	Required	Domain Table	Description
C3_MODEL	Short		Yes	D_ELEMENT	Critical Element 3, Model methodology. Model methodology no longer appropriate based on Guidelines and Specifications (i.e. one-dimensional vs. two-dimensional modeling; Coastal Guidelines)? (NO/YES/UNKNOWN)
C4_FCSTR	Short		Yes	D_ELEMENT	Critical Element 4, Hydraulic Change. Addition/removal of a major flood control structure (i.e., certified levee or seawall, reservoir with more than 50 acre-ft storage per square mile)? (NO/YES/UNKNOWN)
C5_CHANN	Short		Yes	D_ELEMENT	Critical Element 5, Channel Reconfiguration. Current channel reconfiguration outside effective SFHA? (NO/YES/UNKNOWN)
C6_HSTR	Short		Yes	D_ELEMENT	Critical Element 6, Hydraulic Change 2.5 or more new or removed hydraulic structures (bridge/culvert) that impact BFEs? (NO/YES/UNKNOWN)
C7_SCOUR	Short		Yes	D_ELEMENT	Critical Element 7, Channel Area Change. Significant channel fill or scour? (NO/YES/UNKNOWN)
S1_REGEQ	Short		Yes	D_ELEMENT	Secondary Element 1, Regression Equation. Use of rural regression equations in urbanized areas? (NO/YES/UNKNOWN)
S2_REPLO	Short		Yes	D_ELEMENT	Secondary Element 2, Repetitive Loss. Repetitive losses outside the SFHA? (NO/YES/UNKNOWN)
S3_IMPAR	Short		Yes	D_ELEMENT	Secondary Element 3, 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.)? (NO/YES/UNKNOWN)

## CNMS Technical Reference

Field	Type	Length	Required	Domain Table	Description
S4_HSTR	Short		Yes	D_ELEMENT	Secondary Element 4, Hydraulic Structure. More than 1 and less than 5 new or removed hydraulic structures (bridge/culvert) impacting BFEs? (NO/YES/UNKNOWN)
S5_CHIMP	Short		Yes	D_ELEMENT	Secondary Element 5, Channel Improvements. Channel improvements / Shoreline changes? (NO/YES/UNKNOWN)
S6_TOPO	Short		Yes	D_ELEMENT	Secondary Element 6, Topography Data. Availability of better topography/bathymetry? (NO/YES/UNKNOWN)
S7_VEGLU	Short		Yes	D_ELEMENT	Secondary Element 7, Vegetation or Land Use. Changes to vegetation or land use? (NO/YES/UNKNOWN)
S9_HWMS	Short		Yes	D_ELEMENT	Secondary Element 9, High Water Mark. Significant storms with High Water Marks. (YES/NO/UNKNOWN)
S10_REGEQ	Short		Yes	D_ELEMENT	Secondary Element 10, Regression Equation. New Regression Equations Available? (NO/YES/UNKNOWN)
CE_TOTAL	Short		Yes		Total number of failed critical elements
SE_TOTAL	Short		Yes		Total number of failed secondary elements
A1_TOPO	Short		Yes	D_ELEMENT	Zone A Initial Assessment A1 (YES/NO)
A2_HYDRO	Short		Yes	D_ELEMENT	Zone A Initial Assessment A2 (YES/NO)
A3_IMPAR	Short		Yes	D_ELEMENT	Zone A Initial Assessment A3 (YES/NO)
A4_TECH	Short		Yes	D_ELEMENT	Zone A check A4 – studies backed by technical data (YES/NO)
A5_FOAPSS	Short		No	D_ELEMENT	Zone A FOA comparison pass/fail (YES/NO)
COMMENT	Text	255	No		Additional comments
BS_ZONE	Text	60	Yes, if reach represents the extents of an ongoing funded study	D_ZONE	Zone type of the SFHA represented by the reach currently being studied based on scoping data, or the preliminary FIS text.

## CNMS Technical Reference

Field	Type	Length	Required	Domain Table	Description
BS_STDYTYP	Text	255	Yes, if reach represents the extents of an ongoing funded study	D_STUDY_TYP E	Study type of the SFHA represented by the reach currently being studied based on scoping data, or the preliminary FIS text.
BS_HYDRO_M	Text	100	No	D_HYDRO	Hydrologic model used for creating the SFHA represented by the reach currently being studied based on scoping data or the preliminary FIS text.
BS_HYDRA_M	Text	100	No	D_HYDRA	Hydraulic model used for creating the SFHA represented by the reach currently being studied based on scoping data or the preliminary FIS text.
BS_FY_FUND	Text	4	Yes, if reach represents the extents of an ongoing funded study	D_FY_FUNDED	When relevant - Attribute of the most recent non-effective FEMA fiscal year funding applied to the stream reach engineering at the time of study (ex. Watershed, county)
PRELM_DATE	Date		Yes, if reach represents the extents of an ongoing funded study		Expected Preliminary issuance date for reaches representing areas being actively studied.
LFD_DATE	Date		Yes, if reach represents the extents of an ongoing funded study		Expected Letter of Final Determination issuance date for reaches representing areas being actively studied.
EC1_UDEF	Short		No	D_ELEMENT	User Defined Critical Element 1
EC2_UDEF	Short		No	D_ELEMENT	User Defined Critical Element 2
ES1_UDEF	Short		No	D_ELEMENT	User Defined Secondary Element 1
ES2_UDEF	Short		No	D_ELEMENT	User Defined Secondary Element 2
ES3_UDEF	Short		No	D_ELEMENT	User Defined Secondary Element 3
ES4_UDEF	Short		No	D_ELEMENT	User Defined Secondary Element 4
E_ELEMDATE	Date		Yes, if the E Elements are non <NULL>		The date on which the User Defined Element values were populated

**S\_Coastal\_Ln Feature Class (polyline)**

**Table D.2: S\_Coastal\_Ln**

Field	Type	Length	Required	Domain Table	Description
CREACH_ID	Text	12	Yes		Primary key for table, assigned by table creator
CSTUDY_ID	Text	12	Yes		Internal key used to establish relationship between coastal reaches
CO_FIPS	Text	12	Yes		Federal Information Processing Standard code (FIPS code)
CID	Text	12	Yes		FEMA Community ID
CVALIDATION	Text	50	Yes	D_VALID_CAT	Coastal Validation Status
CSTAT_TYPE	Text	100	Yes	D_STATUS_TYPE	Coastal Status Type
MILES	number (double)	8	Yes		Calculated miles of record
SOURCE	Text	100	Yes	D_SOURCE	Source of polyline segment represented in the inventory
STATUS_DATE	Date	8	Yes		Date when CNMS coastal reach validation is completed or a validation assessment of the coastal reach has been made.
FY_FUNDED	Text	25	Yes for studies in progress for which a Preliminary FIRM has not been issued and if retrievable from MIP Case Number or RSC Management.	D_FY_FUNDED	Attribute of the most recent FEMA fiscal year funding applied to the coastal reach
REASON	Text	255	No		Attribute allows for user input of detailed description of considerations or special circumstances when determining attributes VALIDATION_STATUS, SOURCE, or any pertinent information in the data creation process.
HUC8_KEY	number (double)	8	Yes		8-digit Hydrologic Unit Code (HUC) representing the smallest watersheds known as hydrologic cataloging units. This can be obtained by overlaying the HUC spatial files with the polyline information to determine which cataloging unit the polyline resides in.
STUDY_TYPE	Text	40	Yes	D_STUDY_TYPE	Study type of the SFHA represented by the polygon based on the current effective, preliminary, or draft FIS text.
FBS_COMPLNT	Short		Yes	D_ELEMENT	Indicator of FBS compliance for the floodplain represented by the line feature
FBS_CHKDT	Date		Yes		Date the FBS_CMLPNT field value was most recently populated
FBS_CTYP	Text	50	Yes	D_FBS_CTYPE	FBS Compliance Check Type

## CNMS Technical Reference

Field	Type	Length	Required	Domain Table	Description
POC_ID	Text	20	Yes if POC table is populated for associated record		Foreign key to join to Point_of_Contact table. ID for Point of Contact.
DATE_RQST	Date		Yes if Validation_Status is set to UNVERIFIED		Date request is made
DATE_EFFCT	Date		Yes		Date of effective analysis
SURGE_MDL	Text	200	No	D_SURGEMDL	Surge model used for the effective study.
SURGE_STAT	Text	200	No	D_SURGESTAT	Surge statistical method used for the effective study.
SURGE2DW	Text	20	No	D_SURGE2DW	Indicates if the surge model is coupled with 2-D wave analysis for the effective study.
SETUP_METH	Text	200	No	D_SETUPMETH	When a 2-D model is not run, setup method used for the effective study.
RUNUP_MDL	Text	200	No	D_RUNUPMDL	Runup model used for the effective study.
EROS_METH	Text	200	No	D_EROSMETH	Erosion method used for the effective study.
OVWAVE_MDL	Text	200	No	D_OVWVMDL	Overland wave model used for the effective study.
WAVE_MDL	Text	200	No	D_WVDL	Wave model used for the effective study.
C_CX	Short		Yes	D_ELEMENT	<i>Coastal Critical Elements – number and definitions of critical elements for coastal studies are currently under development as of the May 2015 version of the <a href="#">CNMS Technical Reference</a>.</i>
C_SX	Short		Yes	D_ELEMENT	<i>Coastal Secondary Elements – number and definitions of secondary elements for coastal studies are currently under development as of the May 2015 version of the <a href="#">CNMS Technical Reference</a>.</i>
CE_TOTAL	Short		Yes		Total number of failed critical elements.
SE_TOTAL	Short		Yes		Total number of failed secondary elements.
COMMENT	Text	255	No		Additional comments.
BS_SRGMODL	Text	200	No	D_SURGEMDL	Surge model of the ongoing study.
BS_SRGSTAT	Text	200	No	D_SURGESTAT	Surge statistical method of the ongoing study.
BS_SRG2DW	Text	20	No	D_SURGE2DW	Indicates whether the surge model is coupled with 2-D wave analysis for the ongoing study.
BS_SUPMETH	Text	200	No	D_SETUPMETH	When a 2-D model is not run, setup method of the ongoing study.

Field	Type	Length	Required	Domain Table	Description
BS_RUPMODL	Text	200	No	D_RUNUPMDL	Runup model of the ongoing study.
BS_ERSMETH	Text	200	No	D_EROSMETH	Erosion method of the ongoing study.
BS_OVLDMDL	Text	200	No	D_OVVMDL	Overland wave model of the ongoing study.
BS_WVMDL	Text	200	No	D_WVDL	Wave model of the ongoing study.
BS_FY_FUND	Text		Yes		When relevant - Attribute of the most recent non-effective FEMA fiscal year funding applied to the stream reach engineering at the time of study (ex. Watershed, county)
PRELM_DATE	Date		Yes, if reach represents the extents of an ongoing funded study		Expected Preliminary issuance date for reaches representing areas being actively studied.
LFD_DATE	Date		Yes, if reach represents the extents of an ongoing funded study		Expected Letter of Final Determination issuance date for reaches representing areas being actively studied.
EC1_UDEF	Short		No	D_ELEMENT	User Defined Critical Element 1
EC2_UDEF	Short		No	D_ELEMENT	User Defined Critical Element 2
ES1_UDEF	Short		No	D_ELEMENT	User Defined Secondary Element 1
ES2_UDEF	Short		No	D_ELEMENT	User Defined Secondary Element 2
ES3_UDEF	Short		No	D_ELEMENT	User Defined Secondary Element 3
ES4_UDEF	Short		No	D_ELEMENT	User Defined Secondary Element 4
E_ELEMDATE	Date		Yes, if the E Elements are non <NULL>		The date on which the User Defined Element values were populated

**‘S\_Requests’ Feature Classes (Point/Polygon)**

**Table D.3: S\_Requests**

Field	Type	Length	Required	Domain Table	Description
SRA_ID / SRP_ID	Text	12	Yes		Primary key for table, assigned by table creator
REACH_ID	Text	12	Yes, if there is a 1-1 or 1-many relationship between S_Studies_Ln and S_Requests feature (s)		Foreign key for table. Primary Key for S_Studies_Ln.
WTR_NM	Text	100	Yes		Name of flooding source

Field	Type	Length	Required	Domain Table	Description
POC_ID	Text	20	Yes		Foreign key to join to Point_of_Contact table. ID for Point of Contact.
RQST_CAT		30	Yes	D_RQST_CAT	Distinction between Cartographic and Flood Data requests
RQST_LVL	Text	30	Yes	D_RQST_LVL	Level of analysis requested
MTHOD_TYPE	Text	20	Yes	D_MTHOD_TYPE	Type of method requested to make FIRM improvement
DATE_RQST	Date		Yes		Date request is made
DATE_RESOL	Date		Yes		Date request is resolved
CARTO_RQST	Text	50	Yes if RQST_CAT is CARTOGRAPHIC	D_CARTO_RQST	Type of cartographic change requested
FDATA_RQST	Text	50	Yes if RQST_CAT is FLOOD DATA	D_FDATA_RQST	Type of flood data change requested
RESOL_STATUS	Text	50	No	D_RESOL_STATUS	Current resolution status for the requested action
COMMENT	Text	255	No		Description of request
PRIORITY	Text	20	Yes	D_PRIORITY	Priority of request from originator of CNMS Request record.
DATE_REVIEW	Date		No		Date FEMA has reviewed incoming request and authorized its inclusion in the database
CDS_ID	Text	12	Yes		CDS application unique identifier – to be populated by CDS system automatically for tracking purposes.

## 'S\_UnMapped\_Ln' Feature Class (polyline)

**Table D.4: S\_Unmapped\_Ln**

Field	Type	Length	Required	Domain Table	Description
UML_ID	Text	12	Yes		Primary key for table, assigned by table creator
CO_FIPS	Text	12	Yes		Federal Information Processing Standard code (FIPS code)
CID	Text	12	No		Community Identification Number
HUC8_KEY	number (double)	8	Yes		8-digit Hydrologic Unit Code (HUC) representing the smallest watersheds known as hydrologic cataloging units. This can be obtained by overlaying the HUC spatial files with the polyline information to determine which cataloging unit the polyline resides in.

Field	Type	Length	Required	Domain Table	Description
MILES	number (double)	8	Yes		An attribute of the calculated miles of the data record entry

## Specific\_Needs\_Info Business Table

**Table D.5: Specific\_Needs\_Info**

Field	Type	Length	Required	Domain Table	Description
SNI_ID	Text	12	Yes		Primary key for table, assigned by table creator
CNMSREC_ID	Text	12	Yes		Key field used to relate Specific_Needs_Info record to a record in another table
COST_SHARE	Short		No	D_ELEMENT	Is there cost share? (NO/YES/UNKNOWN)
DISASTER	Text	50	No		Associated disaster number
MITIG_PLAN	Short		No	D_ELEMENT	Is there a mitigation plan identifying need? (NO/YES/UNKNOWN)
RSK_ASSESS	Short		No	D_ELEMENT	Is there a risk assessment other than the 2010 Annualized Loss Estimate? (NO/YES/UNKNOWN)
RSK_COMMENT	Text	255	Yes if RSK_ASSESS is 'Yes'		Details on the type of Risk Assessment other than the 2010 Annualized Loss Estimate if answer to RSK_ASSESS was 'YES'.
RSK_DATE	Date		Yes if RSK_ASSESS is 'Yes'		Date that the Risk Assessment identified in RSK_COMMENT if answer to RSK_ASSESS was 'YES'.
RSK_MITIG	Short		Yes if RSK_ASSESS is 'Yes'	D_ELEMENT	Has the Risk Assessment identified in RSK_COMMENT been included as part of the current adopted hazard mitigation plan? (NO/YES/UNKNOWN). This field is to be filled only Estimate if answer to RSK_ASSESS was 'YES'.
HAZUS	Short		No	D_ELEMENT	Is there a HAZUS run on the stream (YES/NO/UNKNOWN)
HAZUS_LVL	Text	20	No	D_HAZUS_Lvl	Level of HAZUS run
COMMENT	Text	255	No		Additional comment

**County\_QC\_Status Business Table**

**Table D.6: County\_QC\_Status**

Field	Type	Length	Required	Domain Table	Description
CO_FIPS	Text	12	Yes		Federal Information Processing Standard code for the county. This also serves as the primary key for this table.
CO_NAME	Text	50	Yes		The name of the County represented by this record
CERT_DATE	Date		No		Date which the county successfully passed through the CNMS QC Tool
CERT_ID	Text	20	No		POC for entity passing the county through the CNMS QC Tool

**County\_Coastal\_Status Business Table**

**Table D.7: County\_Coastal\_Status**

Field	Type	Length	Required	Domain Table	Description
RMSTUDY_ID	Text	9	Yes		Foreign key to join to the primary key RMSTUDY_ID of the RM_Coastal_Studies table
CO_FIPS	Text	12	Yes		Federal Information Processing Standard code for the county
CSTUDY_ID	Text	12	Yes		Foreign key to join to the key field CSTUDY_ID of S_Coastal_Ln feature class
POP_COAST	Short		Yes	D_ELEMENT	This YES/NO field indicates whether coastal study is part of populated coast.
CTRACK_PCT	Double		Yes		Percentage of FEMA Coastal Study Miles for national populated coast.
SURGE_MDL	Text	200	No	D_SURGEMDL	Surge model or method used to develop water levels for the effective study.
SURGE_STAT	Text	200	No	D_SURGESTAT	Surge statistical method used for the effective study.
SURGE2DW	Text	20	No	D_SURGE2DW	Indicates if the surge model is coupled with 2-D wave analysis for the effective study.
SETUP_METH	Text	200	No	D_SETUPMETH	When a 2-D model is not run, setup method used for the effective study.
RUNUP_MDL	Text	200	No	D_RUNUPMDL	Runup model used for the effective study.
EROS_METH	Text	200	No	D_EROSMETH	Erosion method used for the effective study.
OVWAVE_MDL	Text	200	No	D_OVWVMDL	Overland wave model used for the effective study.
WAVE_MDL	Text	200	No	D_WVDL	Wave model used for the effective study.
REG_PRODS	Short		No	D_ELEMENT	Will new regulatory products be created as a result of the study.

Field	Type	Length	Required	Domain Table	Description
FUL_FUNDED	Short		No	D_ELEMENT	Field to track if the study has been fully funded (yes/no).
FY_FUNDED	Text		Yes		The fiscal year when the coastal study was or will be initiated.
PRELIM_DATE	Date		Yes		The expected or actual date preliminary maps will be issued.
LFD_DATE	Date		Yes		The expected or actual date of the Letter of Final Determination (LFD) for the study.
POC_ID	Text	20	Yes if POC table is populated for associated record		Foreign key to join to 'Point_of_Contact' table. ID for point of contact.
COMMENT	Text	255	No		Field to store additional comments.

## RM\_Coastal\_Studies Business Table

**Table D.8: RM\_Coastal\_Studies**

Field	Type	Length	Required	Domain Table	Description
RMSTUDY_ID	Text	9	Yes		Primary Key for table.
RMSTUDY_NM	Text	255	Yes		Name or description of multi-county coastal study.
COMMENT	Text	255	No		Additional comments.

## Point\_of\_Contact Business Table

**Table D.9: Point\_of\_Contact**

Field	Type	Length	Required	Domain Table	Description
POC_ID	Text	20	Yes		Primary key for table. A unique, user defined identifier for each record or instance of an entity.
POC_NAME	Text	50	Yes		The name of the point of contact
POC_TITLE	Text	20	Yes		Any title associated with the point of contract
POC_DESCRIPTION	Text	60	Yes		Information regarding the role and responsibilities of the point of contact
ORG_NAME	Text	50	Yes		The name of the owner, or managing government agency, of the subject item
ORG_TYPE	Text	50	Yes	D_ORG_TYPE	A code that represents a kind of organization
BUSINESS_PHONE	Text	20	Yes		The business telephone number of the contact person
MOBILE_PHONE	Text	20	No		The cellular phone number of the contact person

Field	Type	Length	Required	Domain Table	Description
FAX_PHONE	Text	20	No		The fax number of the contact person
ADDRESS_1	Text	75	Yes		The first line of the point of contact's address
ADDRESS_2	Text	75	No		The second line of the point of contact's address
CITY_NAME	Text	75	Yes		The city or town in which the contact person's address is located
STATE	Text	50	Yes	D_STATE	The name of the State in which the contact person's address is located
ZIP_CODE	Text	10	Yes		The Zip Code of the contact person's address
COUNTY	Text	100	Yes		The county name
EMAIL_ADDRESS	Text	50	Yes		Electronic mail address
COMMENT	Text	255	No		A description or other unique information concerning the subject item

## Domain Tables

The following tables list the acceptable domain values for the CNMS database. Tables containing coded values will display two columns, with the coded value on the left and the corresponding description on the right. Tables where coded values are equal to their corresponding description will display only a single column with the appropriate code/description text.

<b>D_CARTO_RQST</b>
BASE MAP UPDATE
FLOOD HAZARD FEATURE SYMBOLIZATION AND NOTES
INDEX PANEL ERRORS
MAP BODY (PANEL) ERRORS
MAP COLLAR ISSUES

<b>D_COSTATUS</b>
MODERNIZED
PARTIALLY MODERNIZED
UNMODERNIZED

<b>D_DUPLICATE</b>
--------------------

<b>D_DUPLICATE</b>
CATEGORY 1
CATEGORY 2
CATEGORY 3

<b>Coded Value</b>	<b>D_ELEMENT</b>
10	NO
11	YES
12	UNKNOWN

<b>D_FBS_CTYP</b>
COUNTY - BULK ATTRIBUTION
INDIVIDUAL REACH ATTRIBUTION

<b>D_FDATA_RQST</b>
ANY LABELING OUTSIDE COUNTY BOUNDARY
BFE ERRORS
CBRS BOUNDARY ERRORS
CHANGES TO HYDRAULIC CONDITION
CHANGES TO HYDROLOGIC CONDITION
COASTAL GUTTER ERRORS
COMMUNITY MODEL OR DATA
CROSS SECTION ERRORS
FLOODPLAIN DELINEATION ERRORS
FLOODWAY DELINEATION ERRORS
HIGH WATER FROM RECENT FLOOD
IMPACTED STRUCTURES
LEVEE ISSUE
LIMIT OF STUDY ERRORS
OTHER
POPULATION CHANGE OR GROWTH IN FLOODPLAIN
SFHA LABELLING ERRORS

<b>Coded Value</b>	<b>D_FY_FUNDED</b>
FY03	FISCAL YEAR 2003 FUNDED
FY04	FISCAL YEAR 2004 FUNDED
FY05	FISCAL YEAR 2005 FUNDED
FY06	FISCAL YEAR 2006 FUNDED
FY07	FISCAL YEAR 2007 FUNDED
FY08	FISCAL YEAR 2008 FUNDED
FY09	FISCAL YEAR 2009 FUNDED
FY10	FISCAL YEAR 2010 FUNDED
FY11	FISCAL YEAR 2011 FUNDED
FY12	FISCAL YEAR 2012 FUNDED
FY13	FISCAL YEAR 2013 FUNDED
FY14	FISCAL YEAR 2014 FUNDED
FY15	FISCAL YEAR 2015 FUNDED
FY16	FISCAL YEAR 2016 FUNDED
FY17	FISCAL YEAR 2017 FUNDED
FY18	FISCAL YEAR 2018 FUNDED
FY19	FISCAL YEAR 2019 FUNDED
FY20	FISCAL YEAR 2020 FUNDED
FY21	FISCAL YEAR 2021 FUNDED
FY22	FISCAL YEAR 2022 FUNDED
FY23	FISCAL YEAR 2023 FUNDED
FY24	FISCAL YEAR 2024 FUNDED
FY25	FISCAL YEAR 2025 FUNDED
FY26	FISCAL YEAR 2026 FUNDED
FY27	FISCAL YEAR 2027 FUNDED

<b>Coded Value</b>	<b>D_FY_FUNDED</b>
FY28	FISCAL YEAR 2028 FUNDED
FY29	FISCAL YEAR 2029 FUNDED
FY30	FISCAL YEAR 2030 FUNDED
PRE	PRE-MAPMOD FUNDED

<b>D_HAZUS_Lvl</b>
LEVEL 1
LEVEL 2
LEVEL 3

<b>D_HYDRA</b>
ADVANCED ICPR
ADVANCED ICPR 2.20 (OCTOBER 2000)
ADVANCED ICPR 3.02 (NOVEMBER 2002)
B-292
B-MAN NORMAL DEPTH ANALYSIS PROGRAM
CHAN FOR WINDOWS 2.03 (1997)
CRITICAL DEPTH METHOD
CULVERT ANALYSIS
CULVERT MASTER
CULVERT MASTER 2.0 (SEPTEMBER 2002)
DAMBRK
DEPTH FREQUENCY METHOD
DEPTH-DISCHARGE RATING CURVE
DHM
DHM 21 (AUGUST 1987)
DHM 34 (AUGUST 1987)
DWOPER
E431
FAN
FEQ

D_HYDRA
FEQ 8.92 (1997)
FEQ 8.92 (1999)
FEQ 9.98 (2005)
FEQUTL
FEQUTL 4.68 (1997)
FEQUTL 4.68 (1999)
FEQUTL 5.46 (2005)
FESWMS 2DH
FESWMS 2DH 1.1 (JUNE 1995)
FLDWAV
FLDWAV (NOVEMBER 1998)
FLDWY
FLDWY (MAY 1989)
FLO-2D
FLO-2D 2003.6
FLO-2D 2004.10
FLO-2D 2006.1
FLO-2D 2007.06
FLO-2D V.2000.11 (DECEMBER 2000)
GAGE ANALYSIS
GLWRM
HCSWMM
HCSWMM 4.31B (AUGUST 2000)
HEC-2
HEC-2 (1983)
HEC-2 4.6.2 (MAY 1991)
HEC-GEORAS
HEC-RAS
HEC-RAS 2.2 (SEPTEMBER 1998)
HEC-RAS 3.0.1
HEC-RAS 3.1.1
HEC-RAS 3.1.3
HEC-RAS 4.0

<b>D_HYDRA</b>
HIGHWATER MARKS
HISTORICAL FLOOD DATA
HY8
HY8 4.1
HY8 6.0
ICPR
J-635
LAKE ROUTING ANALYSIS
LRD-1
MIKE 11
MIKE 11 HD (2002 D)
MIKE 11 HD (2004)
MIKE 11 HD (JUNE 1999)
MIKE FLOOD HD
MIKE FLOOD HD (2002 D)
MIKE FLOOD HD (2004)
MIKE FLOOD HD (2009)
NETWORK
NETWORK (JUNE 2002)
NORMAL DEPTH
OTHER
PONDPACK
PONDPACK V 8 (MAY 2002)
PSUPRO
QUICK
QUICK-2 1.0
QUICK-2 2.0
S2DMM
S2DMM (FEBRUARY 2005)
SFD
SHEET 2D 9 (JULY 2000)
SHEET 2D9
SLOPE-AREA METHOD

D_HYDRA
STORMCAD
STORMCAD V 4 (JUNE 2002)
SWMM
SWMM 4.30 (MAY 1994)
SWMM 4.31 (JANUARY 1997)
SWMM 5 V 5.0.005 (MAY 2005)
TABS-RMA2
TABS-RMA2 V.4.3 (OCTOBER 1996)
TABS-RMA4
TABS-RMA4 V.4.5 (JULY 2000)
UNET
UNET 4.0 (APRIL 2001)
UNKNOWN
WSP-2
WSPGW
WSPGW 12.96 (OCTOBER 2000)
WSPRO
WSPRO (JUNE 1988)
XPSTORM
XPSTORM 10.0 (MAY 2006)
XP-SWMM
XP-SWMM 8.52

D_HYDRO
2POND
AHYMO 97
AHYMO 97 (AUGUST 1997)
API
BULLETIN 15
BULLETIN 17
BULLETIN 17A
BULLETIN 17B
CUHPF/PC

D_HYDRO
CUHPF/PC (MAY 1996)
CUHPF/PC (MAY 2002)
DBRM
DBRM 3.0 (1993)
DEPTH FREQUENCY METHOD
DISCHARGE VERSUS DRAINAGE AREA RELATIONS
DR3M
DR3M (OCTOBER 1993)
FAN
GAGE ANALYSIS
HEC-1
HEC-1 4.0.1
HEC-1 4.1
HEC-FFA
HEC-FFA 3.1
HEC-FFA-REGRESSION EQUATIONS
HEC-HMS
HEC-HMS 1.1
HEC-HMS 2.0
HEC-HMS 2.0.3
HEC-HMS 2.1.1
HEC-HMS 2.1.2
HEC-HMS 2.1.3
HEC-IFH
HEC-IFH 1.03
HEC-IFH 1.04
HEC-IFH 2.0
HEC-IFH 2.01
HIGHWATER; SLOPE AREA METHOD
HSPF
HSPF 10.10
HSPF 10.11
HSPF 11.0

<b>D_HYDRO</b>
HYMO
ICPR
LAKE ROUTING ANALYSIS
LOG-PEARSON TYPE III ANALYSIS
MIKE 11 RR
MIKE 11 RR (2002 D)
MIKE 11 RR (2004)
MIKE 11 RR (JUNE 1999)
MIKE 11 UHM
MIKE 11 UHM (2002 D)
MIKE 11 UHM (2004)
MIKE 11 UHM (JUNE 1999)
MODIFIED PULS ROUTING TECHNIQUES
OTHER
PEAKFQ
PEAKFQ 2.4 (APRIL 1998)
PEAKFQ 2.5
PEAKFQ 3.0
PEAKFQ 4.0
PEAKFQ-REGRESSION EQUATIONS
PONDPACK
PONDPACK V 8 (MAY 2002)
PRECIP
PRMS
PRMS 2.1 (JANUARY 1996)
RATIONAL METHOD
REGRESSION EQUATIONS
REGULATED FREQUENCY CURVES
S2DMM
SNYDER METHOD
SOIL CONSERVATION SERVICE NATIONAL ENGINEERING HANDBOOK
SQUARE ROOT OF THE DRAINAGE AREA METHOD

D_HYDRO
STATISTICAL METHODS IN HYDROLOGY
SWMM
SWMM (RUNOFF) 4.30 (MAY 1994)
SWMM (RUNOFF) 4.31 (JANUARY 1997)
SWMM 5 V 5.0.005 (MAY 2005)
TR-20
TR-20 (FEBRUARY 1992)
TR-20 WIN 1.00.002 (JANUARY 2005)
TR-55
TR-55 (JUNE 1986)
TWO STATION STATISTICAL METHOD
UNET
UNKNOWN
VEN TE CHOW û B462
WIN TR-55 1.0.08 (JANUARY 2005)
WRC
XPSTORM
XPSTORM 10.0 (MAY 2006)
XP-SWMM
XP-SWMM 8.52

D_LINE_TYPE
COASTAL
LAKE OR POND
OTHER
PLAYA
PONDING
RIVERINE

D_MTHOD_TYPE
NEW
REDELINEATION

**D\_MTHOD\_TYPE**

UPDATED

**D\_ORG\_TYPE**

FEMA

FLOOD CONTROL DISTRICT

HOME OWNER

IRRIGATION DISTRICT

LEVEE DISTRICT

NON-FEMA FEDERAL AGENCY

OTHER

PRIVATE SECTOR

RECLAMATION DISTRICT

US CITY GOVERNMENT

US COUNTY GOVERNMENT

US STATE GOVERNMENT

WATER AGENCY

**D\_PRELIM\_QTR**

Q1FY10

Q2FY10

Q3FY10

Q4FY10

Q1FY11

Q2FY11

Q3FY11

Q4FY11

Q1FY12

Q2FY12

Q3FY12

Q4FY12

Q1FY13

Q2FY13

D_PRELIM_QTR
Q3FY13
Q4FY13
Q1FY14
Q2FY14
Q3FY14
Q4FY14
Q1FY15
Q2FY15
Q3FY15
Q4FY15
Q1FY16
Q2FY16
Q3FY16
Q4FY16
Q1FY17
Q2FY17
Q3FY17
Q4FY17
Q1FY18
Q2FY18
Q3FY18
Q4FY18
Q1FY19
Q2FY19
Q3FY19
Q4FY19
Q1FY20
Q2FY20
Q3FY20
Q4FY20
Q1FY21
Q2FY21
Q3FY21

<b>D_PRELIM_QTR</b>
Q4FY21
Q1FY22
Q2FY22
Q3FY22
Q4FY22
Q1FY23
Q2FY23
Q3FY23
Q4FY23
Q1FY24
Q2FY24
Q3FY24
Q4FY24
Q1FY25
Q2FY25
Q3FY25
Q4FY25
Q1FY26
Q2FY26
Q3FY26
Q4FY26
Q1FY27
Q2FY27
Q3FY27
Q4FY27
Q1FY28
Q2FY28
Q3FY28
Q4FY28
Q1FY29
Q2FY29
Q3FY29
Q4FY29

D_PRELIM_QTR
Q1FY30
Q2FY30
Q3FY30
Q4FY30

D_PRIORITY
HIGH
LOW
MEDIUM

Coded Value	D_REGION
I	REGION I
II	REGION II
III	REGION III
IV	REGION IV
V	REGION V
VI	REGION VI
VII	REGION VII
VIII	REGION VIII
IX	REGION IX
X	REGION X

D_RESOL_STAT
DEFERRED
NO
UNKNOWN
YES

D_RQST_CAT
CARTOGRAPHIC
FLOOD DATA

<b>D_RQST_LVL</b>
APPROXIMATE
DETAILED WITH FLOODWAY
DETAILED WITHOUT FLOODWAY
LIMITED DETAIL
N/A

<b>Coded Value</b>	<b>D_SOURCE</b>
DFIRM	COUNTY DFIRM DATABASE
DFIRM_PRELIM	COUNTY DFIRM DATABASE ACQUIRED DURING STUDY PERIOD
DIGITIZED	DIGITIZED
NFHL	NATIONAL FLOOD HAZARD LAYER
NHD-HIGH	NATIONAL HYDROGRAPHY DATASET HIGH RESOLUTION
NHD-LOW	NATIONAL HYDROGRAPHY DATASET LOW RESOLUTION
NHD-MED	NATIONAL HYDROGRAPHY DATASET MEDIUM RESOLUTION
RFHL	REGIONAL FLOOD HAZARD LAYER

<b>D_STATE</b>
ALABAMA
ALASKA
ARIZONA
ARKANSAS
CALIFORNIA
COLORADO
CONNECTICUT
DELAWARE
DISTRICT OF COLUMBIA
FLORIDA
GEORGIA
HAWAII
IDAHO
ILLINOIS

D_STATE
INDIANA
IOWA
KANSAS
KENTUCKY
LOUISIANA
MAINE
MARYLAND
MASSACHUSETTS
MICHIGAN
MINNESOTA
MISSISSIPPI
MISSOURI
MONTANA
NEBRASKA
NEVADA
NEW HAMPSHIRE
NEW JERSEY
NEW MEXICO
NEW YORK
NORTH CAROLINA
NORTH DAKOTA
OHIO
OKLAHOMA
OREGON
PENNSYLVANIA
RHODE ISLAND
SOUTH CAROLINA
SOUTH DAKOTA
TENNESSEE
TEXAS
UTAH
VERMONT
VIRGINIA

D_STATE
WASHINGTON
WEST VIRGINIA
WISCONSIN
WYOMING

D_STATUS_TYPE
BEING ASSESSED
BEING STUDIED
DEFERRED
NVUE COMPLIANT
TO BE ASSESSED
TO BE STUDIED

D_STUDY_TYPE
DIGITAL APPROXIMATE
DIGITAL CONVERSION APPROXIMATE
DIGITAL CONVERSION DETAILED
DIGITAL DETAILED
NEW APPROXIMATE
NEW DETAILED
NON-DIGITAL APPROXIMATE
NON-DIGITAL DETAILED
REDELINEATED
UNMAPPED
UPDATED APPROXIMATE
UPDATED DETAILED

D_VALID_CAT
ASSESSED
UNKNOWN
UNVERIFIED
VALID

<b>D_ZONE</b>
0.2 PCT ANNUAL CHANCE FLOOD HAZARD
0.2 PCT ANNUAL CHANCE FLOOD HAZARD CONTAINED IN CHANNEL
1 PCT ANNUAL CHANCE FLOOD HAZARD CONTAINED IN CHANNEL
1 PCT FUTURE CONDITIONS
A
A99
AE
AH
AO
AR
AREA NOT INCLUDED
D
OPEN WATER
V
VE
X
X PROTECTED BY LEVEE

<b>D_EROSMETH</b>
1080 SF
1100 SF
540 SF
540SF
CSHORE
MLWP
KREIBEL-DEAN
MK&A (KOMAR)
MULTIPLE METHODS USED

<b>D_OVWMDL</b>
WHAFIS

D_RUNUPMDL
SPM/CEM
RUNUP 2.0
ACES
TAW
CSHORE
DIM
STOCKTON
MULTIPLE METHODS USED

D_SETUPMETH
DIM
STWAVE
SWAN
UNSWAN
SPM
CSHORE
MULTIPLE METHODS USED

D_SURGE2DW
TIGHTLY COUPLED
LOOSELY COUPLED
NOT COUPLED

D_SURGEMDL
ADCIRC
MIKE 21
FEMA SURGE
SLOSH
TIDE GAGE
DELFT
TSUNAMI

## D\_SURGEMDL

HINDCAST

MULTIPLE METHODS USED

## D\_SURGESTAT

JPM-OS

JPM-OS & EST

EST

GAGE ANALYSIS

MULTIPLE METHODS USED

## D\_WVMDL

SWAN

STWAVE

MIKE21

RCPWAVE

WAM

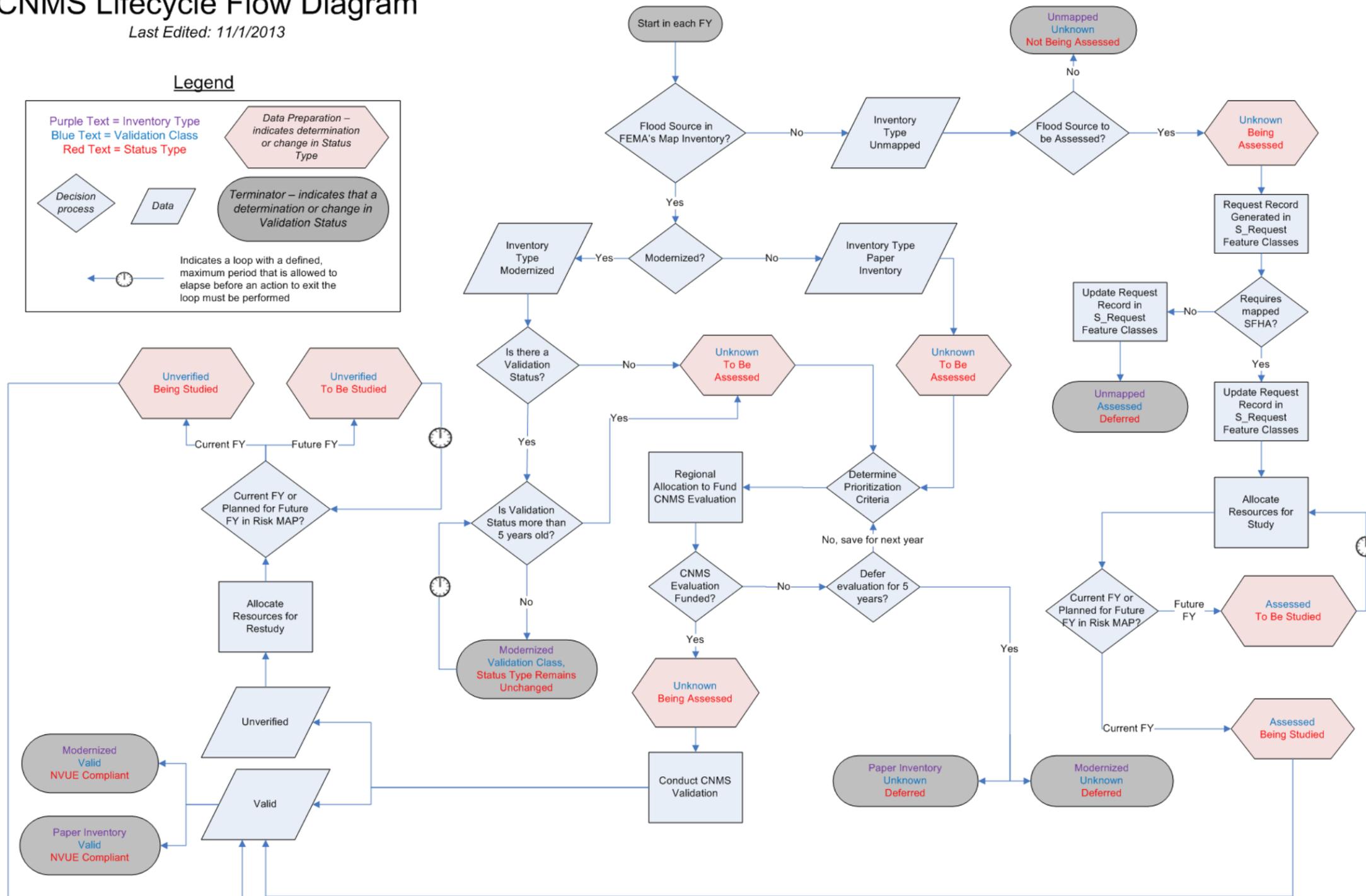
OTHER

MULTIPLE METHODS USED

Appendix E. CNMS Lifecycle Flow Diagram

CNMS Lifecycle Flow Diagram

Last Edited: 11/1/2013



## Appendix F. NVUE Reporting Guidance

### F.1 Introduction

FEMA Standard #9 states that CNMS is the sole authority for reporting flood map update needs. CNMS is also the reporting mechanism for the NVUE metric. Per Standard #13, reporting of NVUE must take place quarterly. NVUE reporting should be on a schedule that is aligned with the Joint Program Review (JPR) and Status of Studies reporting processes. The Region (with support from the RSC) will be responsible for compiling all CNMS data at the regional level to facilitate reporting of NVUE statistics. Each Regional CNMS database will be submitted for national roll-up on the last business day of each quarter and also dated and archived at the Region. Following the national-roll-up of the Regional CNMS FGDBs, the national NVUE table is generated within 10 business days after the end of each quarter, culminating in a report to the FEMA Headquarters Program Area C Lead. This report will summarize NVUE statistics for each State in the Region, along with the Region as a whole, including a breakdown by Validation Status and status type for Modernized, and Paper Inventories, as well as for unmapped areas. The NVUE metric will be reported as both “NVUE Attained” and “NVUE Initiated”. Any NVUE metric based planning will assume completion and finalization of all stream miles that are classified in CNMS as BEING STUDIED - barring any changes in scope, appeals or protests at a project level prior to LFD issuance, NVUE Attained + Initiated represents the final state of the NVUE metric once all ongoing studies are issued preliminary. The NVUE Initiated metric and associated attributes in the S\_Studies\_Ln feature class will support the ability to forecast the attainment rate of NVUE.

Prior to FY11, a single NVUE metric was being reported which was the ratio of all New, Validated, Updated Engineering Study miles divided by the sum total of all miles in FEMA’s Mapped SFHA inventory. A New or Updated study is considered NVUE complaint, and thus included in calculations of NVUE attained, after the issuance of the Preliminary FIRM. The National NVUE table generated each quarter, reports NVUE mileages and percentages at a state, regional and national level. It also provides the ability to distinguish between FEMA’s Modernized, Unmodernized and Unmapped stream reach inventory. Since the beginning of FY 11, 2 NVUE metrics are reported – NVUE Attained and NVUE Attained + Initiated. NVUE Attained is described above. NVUE Initiated miles are those New or Updated Study stream reaches which have been funded for new/updated engineering, but have not yet been issued as part of a Preliminary FIRM. While a mechanism exists in CNMS to capture these ‘Initiated’ miles, due to the retroactive updates needed for pre-FY11 studies, the CNMS FGDBs do not hold all NVUE Initiated miles. While the Regional CNMS FGDBs are being updated to store all ongoing studies, the best available source of all NVUE Initiated miles, along with their Preliminary issuance date, is available in the Risk MAP Project Planning and Purchasing Portal (P4). The Risk MAP Project Planning and Purchasing Portal is currently leveraged to calculate NVUE Initiated miles per FEMA Region and their anticipated attainment FY Quarter. This data is then included in the National NVUE table distributed to a wide audience to provide NVUE projections into the future.

The sections below describe the steps taken to complete NVUE calculations in the most appropriate manner possible. However, it should be noted that due to the inherent transient nature of the CNMS FGDBs and the policy and guidance as it surrounds this metric, all calculations for reporting purposes

should be run through the FEMA HQ’s CNMS Development team. There are several nuances in geospatial data processing, capturing which are beyond the scope of this document.

## F.2 Understanding the Data Attributes Necessary for NVUE calculations

The fields discussed below are all necessary for NVUE Calculation and mileage classification into bins when reporting and the National NVUE Table. The primary ‘bins’ into which study mileages get sorted are represented by the different allowed Validation Status and Status Type combinations as listed below. Within these categories, studies can typically be based on Detailed or Approximate engineering methods. Further classification includes Modernized (digital) or UnModernized (paper) Inventories.

### Allowed VALIDATION\_STATUS – STATUS\_TYPE Combinations

- VALID – NVUE COMPLIANT (can contain detailed or approximate miles, but not unmapped miles)
- VALID – BEING STUDIED
- UNKNOWN – BEING ASSESSED
- UNKNOWN – TO BE ASSESSED
- UNKNOWN – DEFERRED
- UNKNOWN – BEING STUDIED
- UNVERIFIED – TO BE STUDIED
- UNVERIFIED – BEING STUDIED
- ASSESSED – TO BE STUDIED\*
- ASSESSED – BEING STUDIED\*
- ASSESSED – DEFERRED\*

*\*Note: These Validation Status and Status Type combinations are possible only for Unmapped Streams that do not have mapped SFHAs in FEMA inventory.*

### FIPS

FIPS is the 5-digit County code which indicates the county in which the study reach lies. The first two digits of the FIPS code are the State FIPS, and when combined with a separate state lookup table this field can also inform the Region number of the study. This number defines the levels at which NVUE is reported when a political boundary based reporting is desired.

### FLD\_ZONE

FLD\_ZONE is used to differentiate between Detailed and Approximate Studies. While the domain range allows for more values than are currently in use, it has been standard practice when rolling up NVUE thus far to remove any X, V, or VE records from consideration (as in, they do not get a detailed or approximate assignment and contribute 0 to NVUE), leaving just A, AE, AO, AH. At this point, where FLD\_ZONE = "A", the study is considered approximate, and where FLD\_ZONE <> "A" the study is considered detailed. At this point in time the Inventory is entirely Riverine – how coastal miles should be handled has not yet been decided, hence the discount of the V and VE FLD\_ZONE value records. Studies with FLD\_ZONE = "X" are unmapped streams which do not get factored in to the numerator or denominator when calculating NVUE since they are not studied as yet. An exception to the zone based exclusion is applied when records have a Status Type of BEING STUDIED, and are past their projected Preliminary FIRM issuance dates. In such cases, the BS\_ZONE is instead used in the determination of Detailed or Approximate.

### VALIDATION STATUS

See above for brief description on bins, and sub bins, as well as description of legal combinations of Validation Status and Status Type attributes for a CNMS Study Record to count towards the NVUE Calculation. Only 'VALID – NVUE COMPLIANT' miles, and those with a 'BEING STUDIED' Status Type which are past their projected Preliminary FIRM issuance dates are counted in the numerator when calculating NVUE. When calculating NVUE Attained + Initiated miles, "UNVERIFIED – BEING STUDIED" study miles that have not yet been issued Preliminary are also included in the numerator, unless the county's corresponding County\_Status table REPIN\_CNMS field value is 'No'. As of the date of this document, NVUE Initiated Miles are calculated using the Risk MAP Project Planning and Purchasing Portal (P4). All mapped miles of all VALIDATION STATUS and STATUS TYPE combinations within the 92% KPI1 footprint are counted for calculating the NVUE denominator (Note: all ASSESSED miles are omitted from the denominator, as they represent unmapped reaches).

### MILES

Miles are calculated in the North America Albers Equal Area Conic projection. Miles are used to calculate NVUE percentages for a given political entity or watershed. Miles are counted 1:1 as calculated except in instances where specific business rules apply such as those described in the LINE\_TYPE field discussion below and discussed in Section 3.2 of this document.

### STUDY\_TYPE

This field is used to determine whether a study is modernized or unmodernized (paper inventory). This field was a late addition to the schema and so may not be populated consistently for some regions. Due to the bulk methodology used to represent the unmodernized inventory in CNMS it is possible to use this field for separating the unmodernized inventory. Simply put, if the field value equals "Non-Digital Approximate", or "Non-Digital Detailed", then the study is unmodernized. If not, the study is considered Modernized (even when the field is <Null>). An exception is applied when records have a Status Type of BEING STUDIED, and are past their projected Preliminary FIRM issuance dates. In such cases, the BS\_STDY\_TYP field is instead used in the determination of Modernized and UnModernized.

## LINE\_TYPE

The LINE\_TYPE field is used to communicate the type of study representation the line work is showing. In some cases line work exists, which depict still water flooding, or lakes / ponds. In these instances, 1 linear mile of study in the inventory does not represent the same required effort to study as 1 linear mile of true riverine study. To correct this, the business rule was established which says that any feature with LINE\_TYPE = LAKE OR POND, PONDING, or PLAYA will have its MILES halved before they are added to either the numerator or denominator when calculating NVUE or reporting mileage break downs. This rule applies no matter what level of rollup is being performed.

## HUC8\_KEY (only needed when rolling up at a watershed level)

The HUC8\_KEY displays the HUC8 level watershed into which the study reach drains. NVUE can be rolled up at this level rather than political boundary, but it requires further application of business rules as described in the DUPLICATE field entry.

## DUPLICATE (only when rolling up at a watershed level)

The DUPLICATE field has been populated based on a series of business rules put in place to prevent over counting of mileage in scenarios where studies form the boundary between multiple political entities. This approach has allowed mileage calculation to remain accurate while still retaining information related to the side of the study in each entity (if they differ). Simply put, when rolling up at a watershed level, the mileage for all records where DUPLICATE = 1 = YES is counted as zero. Handling the DUPLICATE field is complex, but necessary to ensure appropriate documentation and tracking for streams that define political boundaries. While assessing watersheds post-discovery, it might be necessary to handle the duplicate field differently. Further details on the attribute types possible under this field are outlined in Section 3.2 of this document.

## STATUS\_TYPE

See VALIDATION\_STATUS entry above, as these two fields work together to form the bins into which study miles are separated in the National NVUE Table.

## F.3 NVUE CALCULATION

For the NVUE Numerator, when reporting at a political boundary level, NVUE calculation is as simple as halving all modernized mileages where the LINE\_TYPE is of an appropriate value (see above), summing this result with the remaining modernized mileage in that entity and then dividing the total by the associated total mileage in the entity's 92% KPI1 footprint. Starting Fall 2011, the NVUE denominator was defined as the sum total of all mapped miles in FEMA's SFHA inventory that fall within the geospatial footprint defined by all counties and communities part of the KPI1 Map Mod metric, at the time it attained 92% (9/30/2011). Since the CNMS FGDBs are constantly evolving within and outside the 92% KPI1 footprint, the NVUE denominator is calculated each quarter using the latest CNMS FGDBs and the fixed KPI1 footprint extent defined as of 9/30/2011. As previously mentioned, any coastal or unmapped miles within the Inventory do not get counted towards the NVUE numerator or the denominator. FEMA is reviewing the process for Coastal Study inclusion in CNMS as most of the

Nation's coastline is being currently revised. As of the date of issuance of this guidance, no coastal or coastally influenced studies are represented within the CNMS Inventory or the NVUE Metric.

## Appendix G. LOMA (MT-1) & LOMR (MT-2) Integration in CNMS

### G.1 Identifying Mapping Needs/Requests Because of LOMC Processing

When processing MT-1 and MT-2 case files, occasionally issues are identified that could affect data stored in CNMS. In order to capture these issues appropriately, the LOMC Analysts should complete request records in CNMS, or update CNMS study records when secondary or critical issues are identified as outlined in the validation checklist (Appendix A). To submit CNMS requests, the LOMC group will use the request function of the National CNMS Web Portal (<http://cnms.riskmapcds.com/Main.aspx>). Requests will be submitted from information identified during either a MT-1 or MT-2 review. Typical requests anticipated include the following:

- *Improvement/Change to flooding source identified during the LOMA process:* If there has been a change, FEMA may deny the request and require that a LOMR be submitted. Many times the homeowner will not follow up with a LOMR. In cases where homeowners do not follow up with a LOMR the improvement area/need could be lost and therefore should be recorded in CNMS.
- *More extensive updated hydrology is submitted:* Where new hydrology is developed, it is common for only the main channel to be updated. This floodway specific practice ignores that hydrology is produced, and is readily available, for broader areas. As long as the hydrology data meet the minimum DCS, the full extent of these data can be utilized.
- *Existing-conditions-modeling developed during the CLOMR stage:* During the CLOMR review, an applicant is required to submit existing-conditions data. In cases where a CLOMR is not followed up by a LOMR, it is possible this new data could be lost and therefore should be recorded in CNMS.
- *BFE Determination:* If an applicant submits a complete study to determine a BFE in an Approximate A Zone SFHA, these data could potentially be used to update a Zone A study to a limited-detail study or higher.

### G.2 Updating the CNMS Inventory for Approved LOMRs

Approved LOMRs may include new or revised analysis potentially changing the Validation Status or other attributes of the study that are stored in CNMS. In order to maintain an accurate database, no less frequent than once a quarter, the CNMS should be updated to reflect approved LOMRs. Regional CNMS teams will obtain an extract from the rFHL (Regional Flood Hazard Layer). The extract will include the rFHL clipped to the S\_LOMR layer for all LOMRs that were added to the rFHL that past quarter. The regional CNMS lead will use the rFHL data with the LOMR Determination Document to determine appropriate updates to CNMS.

When documenting presence of a LOMR in the S\_Studies\_Ln feature class (especially important when a FLD\_ZONE changes based on the LOMR), recording the LOMR case number in the 'REASON' field is suggested. The LOMRs encountered can be classified into the following two categories:

#### Type 1

LOMRs representing newly studied or completely restudied (typically with updates to both hydrology and hydraulics) streams or portions of streams using new or updated engineering shall be "broken out" from the remainder of the stream. These areas will receive their own STUDY\_ID and REACH\_ID, These are then treated as a separate study and are subject to the guidelines outlined in the Validation Checklist (Appendix A) and Section 3.2.

### **Type 2**

LOMRs that updated only a portion of an existing study, typically to update mapping, topo, or hydraulics fall into the Type 2 category. These stream reaches are not to be broken out from existing studied stream reaches. They do not receive their own STUDY\_ID or \_REACH\_ID. It is important to remember that if this LOMR was issued due to a new hydraulic structure, channel, or other hydraulic feature, then that structure / channel or other hydraulic feature should not count against Elements C6 / S4 in S\_Studies\_Ln, as a LOMR has been processed to account for its affects, though it should still be documented appropriately.

## Appendix H. CNMS Quality Management Plan (QMP)

### H.1 Introduction

The data in the Regional CNMS File geodatabases (FGDBs) are continually updated by multiple stakeholders. In addition, the evolution of the Risk MAP program needs, warrant changes to CNMS Schema to accommodate the capture of additional study attributes through bulk geoprocessing, or on a case by case basis.

In order to ensure that the data attributes in the CNMS FGDBs are appropriately populated for consistent reporting of NVUE and SFHA study status, FEMA has established the requirement to utilize the CNMS FGDB QC Tool for Quality Assurance and Quality Control. This QC tool has the following features that benefit CNMS-related operations:

- Helps ensure timely and successful reporting of NVUE after each quarterly roll-up of the Regional CNMS FGDBs
- Can be used as a standalone tool within the existing infrastructure of various CNMS Stakeholders.
- Uses a self-certification model to document compliance and to note any exceptions requested
- Supports ArcGIS 10.0 and ArcGIS 10.1
- Has an easy to use UI that presents issues found by the QC tool to the user for incorporation and documentation
- Has a phased implementation that accommodates the incorporation of the multiple phases of schema changes to the Regional CNMS FGDBs

Proper incorporation of the CNMS FGDB QC Tool into the CNMS Update and Maintenance workflow is necessary to ensure usefulness of the CNMS FGDBs to support Risk MAP program needs.

The following sections outline 1) the targeted user groups who will interact with the CNMS FGDB QC Tool and their intended workflows, 2) the attribute quality verification criteria applied by the CNMS FGDB QC Tool, and 3) a User's Guide for operation of the CNMS FGDB QC Tool.

### H.2 Workflow and User Interface

This appendix outlines the workflow envisioned for a targeted list of user types, and key features of the UI of the CNMS FGDB QC Tool.

#### **User Groups**

As outlined in the introduction to this document, multiple stakeholders are expected to update the CNMS FGDBs locally prior to Regional and National roll-up of the database.

The following profile is assumed for users that will be using the CNMS FGDB QC Tool:

- has a knowledge of CNMS Policies and Procedures and is well versed with the CNMS Technical Reference
- is a CNMS liaison representing a FEMA Regional Office, RSC, PTS, or CTP responsible of making updates to the CNMS FGDB per project scopes and operating procedures

### **Data Inputs**

Due to multiple stakeholder involvement, self-certification and exceptions need to be documented at source. The CNMS FGDB QC Tool supports data submissions spanning various geography types. It accepts single or multiple counties' data, watershed-level data, and an entire Region CNMS FGDB. The CNMS FGDB used with the QC Tool should be in the schema that is reflected in the current CNMS Technical Reference. The list of checks seen in Section H.3 applies to the most recent version of the CNMS data model.

The User Interface (UI) for the CNMS FGDB QC Tool outlined in the section below, will prompt the user to identify the type of geography that the QC check is being applied for. By accepting inputs at various geographic resolutions, the tool can also be used to check quality at any phase of the database roll-up - locally at the production centers, or during quarterly Regional/National Roll-up. CNMS database updates warranted by Map Production, Discovery efforts, Preliminary FIRM Issuance, LFD issuance and Post-production activities can then be reviewed for quality on a smaller scale prior to reintegration into the Regional CNMS FGDB.

### **User Interface and Platform**

The CNMS FGDB QC Tool can be installed on desktops by users with administrative rights to the workstation, and operated independent of a license. The CNMS FGDB QC Tool functions within the Esri ArcGIS 10.0 and 10.1 environment only at this time, however, only some components of the CNMS FGDB QC Tool are platform dependent.

The UI itself is integrated with ArcGIS to work within an ArcMap session and can read out of an Esri FGDB in software versions 10 and 10.1. Upon launching the UI, the user will be prompted to select from options to 'Validate a Single or Multiple Counties/Watersheds' and 'Validate Entire Region', and will then be asked for an FGDB file location. The tool will then auto-populate a list of the counties included in the FGDB, or will continue without a message, respectively, depending on the option first selected.

The tool will perform a series of checks as defined in the table seen in Section H.3., and will prompt the user for input in several ways. First, the user will be shown results of any certain checks which are not considered critical. Fixes to these issues may be made by looking into features associated with these secondary issues. The user will be required to provide brief documentation for any exceptions for secondary issues that will not be addressed prior to self-certifying and advancing the CNMS FGDB to the next roll-up. Second, values deemed to violate schema, and/or quality rules, and/or suspected to cause issues in the quarterly roll-up of the Regional CNMS FGDBs will be flagged and documented in a table with records associated with CNMS FGDB feature primary keys. This table of records may be used to associate with the appropriate CNMS feature class to identify and correct issues. The table of

records with results of the QC check will contain fields that classify the type of issue found during the automated check, along with possible suggestions for eliminating the issue for each record.

After addressing the errors listed in the QC check output table, the CNMS FGDB should be resubmitted for a run through the UI described above iteratively, until a validation check passes without any critical issues remaining unaddressed. Any secondary issues that have an associated request for exception with a reason noted within the table of records for the QC issues found, will be allowed in the FGDB that will be advanced for the next stage in the roll-up. At this point, the CNMS FGDB submission is considered to be self-certified and contact details of the user is collected for the self-certification and for entry in the Points\_of\_Contact table of the CNMS FGDB.

When the next roll-up happens at the State- or Regional- level, if the table of records resulting from running the QC tool is carried forward, notes of exceptions will be retained so that subsequent teams rolling the database up, do not have to re-document the request for exception. Users should note that exceptions are linked to REACH\_ID values, and so in order for them to be carried forward, those values would need to be retained on the line work as appropriate.

### H.3 Quality Control Criteria

This Section outlines the types of checks that will be performed. In addition to several logical consistency requirements, the quality checks queries have been defined based on the *CNMS Technical Reference* in collaboration with the 3-PTS CNMS Development Team and FEMA Headquarters.

#### **Validation Categories**

S – This category represents checks against schematic values, such as domain adherence.

Q – This category represents quality issues in the Inventory based on logic checks and combinations of field values.

#### **Additional Checks to be Implemented in the Future**

The Beta3 Version of the CNMS FGDV QC Tool was distributed in January 2015 and will be first utilized in the FY15– Q2 Quarterly Roll-up. Future versions of the tool will have the capability to compare stream mileage data in the CNMS County Status table (described in section 3.7), with mileage calculations based on the most recent CNMS FGDB submission for roll-up. Mileage fluctuations above a certain threshold (to be determined prior to the update of the QC Tool) and outside of those established thresholds will be flagged. The user would then be required to provide a comment on the cause for the fluctuation, though these checks will not disallow the submittal or self-certification. Likewise, mileage and validation status changes expected based on the County FIRM Study status may be checked against the Inventory, again requiring user comment should unexpected values be encountered. These checks will serve the purpose of documenting the cause of mileage and mileage type shifts that may occur within the National Inventory. Should stakeholders inquire as to the reason behind such shifts we will be able to reproduce calculations alongside specific cause.

#### **CNMS S Studies Ln Checks Table**

**Table H.1: CNMS S\_Studies\_Ln Checks**

Parameter / Attribute	Allow Nulls	Validity	Validation Category	Note	Critical / Secondary
REACH_ID	No	Must be 12 characters in length	S		Critical
		The first five characters must match with the associated FIPS field value.	S		Critical
		The two characters following the FIPS must be '01'.	S		Critical
		Each Reach_ID must be unique.	S		Critical
STUDY_ID	Yes	If populated (non-null), Must be 12 characters in length	S		Secondary
CO_FIPS	No	Five Character Length Enforcement	S		Critical
CID	No		S		Critical
WATER_NAME	YES	None	S		N/A
WATER_NA_1	YES	None	S		N/A
FLD_ZONE	No	D_ZONE Domain Value	S		Critical
		Zone A + Detailed STUDY_TYPE is Not Permissible.	Q		Critical
		Records with UnMapped FLD_ZONE Values Should only be allowed to have 'ASSESSED' Validation Status.	Q	Unmapped type means FLD_ZONE = 'X', 'D', 'AREA NOT INCLUDED'	Critical
FLD_ZONE		Non-SFHA FLD_ZONE values with are still Mapped values can only be 'UNKNOWN'	Q	This includes '1 PCT FUTURE CONDITIONS', '0.2 PCT ANNUAL CHANCE FLOOD HAZARD', '0.2 PCT ANNUAL CHANCE FLOOD HAZARD CONTAINED IN CHANNEL', 'X PROTECTED BY LEVEE'	Critical

Parameter / Attribute	Allow Nulls	Validity	Validation Category	Note	Critical / Secondary
		Coastal Flood Zones Not Allowed	Q	Records with FLD_ZONE = 'V' or 'VE' Should not exist in this feature class	Critical
		Zone A/AE/AH/AO/AR Streams Cannot Have 'ASSESSED' Validation Status.	Q		Critical
VALIDATION_STATUS	No	D_VALID_CAT Domain	S		Critical
		Validation Status – Status Type Combination Must Pass Check Against List of Acceptable Combinations	Q	Acceptable Combinations Defined in <i>CNMS Technical Reference</i>	Critical
		Non-SFHA FLD_ZONE Values should prohibit records from being called VALID. Other rules apply.	Q	This includes '1 PCT FUTURE CONDITIONS', '0.2 PCT ANNUAL CHANCE FLOOD HAZARD', '0.2 PCT ANNUAL CHANCE FLOOD HAZARD CONTAINED IN CHANNEL', 'AREA NOT INCLUDED', 'D', 'X PROTECTED BY LEVEE', 'X', and 'OPEN WATER'	Critical
STATUS_TYP	No	D_Status_Type Domain	S		Critical
		IF STATUS_TYPE is 'DEFERRED', there should not be a future date value in PRELM_DATE	Q		Secondary
		If PRELM_DATE is a future date, STATUS_TYP should be 'BEING STUDIED'	Q		Secondary
MILES	No	Should be greater than zero and not null.	Q		Critical
SOURCE	No	D_SOURCE domain	S		Critical
STATUS_DATE	No	Should be In Expected Data Format (Date)	S		Critical

## CNMS Technical Reference

Parameter / Attribute	Allow Nulls	Validity	Validation Category	Note	Critical / Secondary
STATUS_DATE	No	Should be a real date	Q	Date should be realistic: Year should be greater than or equal to 1950 AND less than or equal to 2050	Critical
FY_FUNDED	Yes	D_FY_FUNDED domain	S		Critical
REASON	Yes	Special Characters Check	S	Will Check for Presence of Special Characters Which May Cause Future Interoperability Issues, But Will Not Cause Validation Failure.	Secondary
HUC8_KEY	No	Must be 8 Characters in Length	Q		Critical
		Must Be an Existing HUC	Q		Critical
STUDY_TYPE	No	D_STUDY_TYPE domain	S		Critical
		STUDY_TYPE must be set to 'NON-DIGITAL DETAILED' 'NON-DIGITAL APPROXIMATE', OR 'UNMAPPED' for All Studies in Counties Identified as UnModernized within the County Status Tracker	Q	Lookup with County_Status table.(D_CO_STAT US domain)	Secondary
FBS_CMLNT	No	D_ELEMENT domain	S		Critical – Not Yet Active
FBS_CHKDT	No	Should be In Expected Data Format (Date)	S		Critical - Not Yet Active
FBS_CHKDT	No	Should be a real date	Q	Date should be realistic: Year should be greater than or equal to 1950 AND less than or equal to 2050	Critical - Not Yet Active

## CNMS Technical Reference

Parameter / Attribute	Allow Nulls	Validity	Validation Category	Note	Critical / Secondary
FBS_CTYP	No	D_FBS_CTYPE domain	S		Critical - Not Yet Active
LINE_TYPE	No	D_LINE_TYPE Domain	S		Critical
		Value of 'COASTAL' should not exist within this feature class			Critical
DUPLICATE	No	D_DUPLICATE Domain	S		Critical
POC_ID	Yes	If not NULL, Should Contain an Existing POC_ID from POC_ID Table	S		Secondary
DATE_RQST	Yes	Should be In Expected Data Format (Date)			Critical
		If Study is "UNVERIFIED – TO BE STUDIED", This Field Should be Populated	Q		Critical
DATE_EFFECT	Yes	Should be In Expected Data Format (Date)	S	Date should be realistic: Year should be greater than or equal to 1950 AND less than or equal to 2050	Critical
HYDRO_MDL	No, if FLD_Z ONE = AE/AO /AH/AR	D_HYDRO Domain	S		Critical
HYDRA_MDL	No, if FLD_Z ONE = AE/AO /AH/AR	D_HYDRA Domain	S		Critical
HODIGFMT	No, if FLD_Z ONE = AE/AO /AH/AR	D_ELEMENT Domain	S	Check Against D_ELEMENT Domain	Critical

## CNMS Technical Reference

Parameter / Attribute	Allow Nulls	Validity	Validation Category	Note	Critical / Secondary
HADIGFMT	No, if FLD_Z ONE = AE/AO /AH/AR	D_ELEMENT Domain	S	Check Against D_ELEMENT Domain	Critical
HO_RUNMOD	No, if FLD_Z ONE = AE/AO /AH/AR	D_ELEMENT Domain	S	Check Against D_ELEMENT Domain	Critical
HA_RUNMOD	No, if FLD_Z ONE = AE/AO /AH/AR	D_ELEMENT Domain	S	Check Against D_ELEMENT Domain	Critical
C1 to C7, S1 to S7, S9, S10	No	D_ELEMENT Domain	S	Check Against D_ELEMENT Domain	Critical
CE_TOTAL	No	The Value Should Accurately Reflect the Number of Failed Critical Elements	Q		Critical
		Cross Check with County_Status Table	Q	If the associated county entry on the County_Status table has a USE_E_ELEM field value of 'YES', then the EXTRA Element failure totals should be included in the CE and SE totals.	Critical
SE_TOTAL	No	The Value Should Accurately Reflect the Number of Failed Secondary Elements	Q		Critical
		Cross Check with County_Status Table		If the associated county entry on the County_Status table has a USE_E_ELEM field value of 'YES', then the EXTRA Element failure totals should be included in the CE and SE totals.	Critical
		D_ELEMENT Domain	S	Check Against D_ELEMENT Domain	Critical

Parameter / Attribute	Allow Nulls	Validity	Validation Category	Note	Critical / Secondary
		Special Characters Check	S	Will Check for Presence of Special Characters Which May Cause Future Interoperability Issues, But Will Not Cause Validation Failure.	Secondary
		D_Zone Domain	S		Critical
		Check if STATUS_TYPE = 'BEING STUDIED' and PRELM_DATE is a past date	Q	This field MUST be populated in this instance.	Critical
		Check if STATUS_TYPE = 'BEING STUDIED' and PRELM_DATE is a future date	Q	This field should be populated in this instance.	Secondary
		BS_ZONE should not be an UnMapped Zone Type if BS_STDYTYP does not equal 'UNMAPPED'	Q	Unmapped type means FLD_ZONE = 'X', 'D', 'AREA NOT INCLUDED'	Critical
		D_STUDY_TYPE Domain	S		Critical
		Check if STATUS_TYPE = 'BEING STUDIED' and PRELM_DATE is a past date	Q	This field MUST be populated in this instance.	Critical
		Check if STATUS_TYPE = 'BEING STUDIED' and PRELM_DATE is a future date	Q	This field should be populated in this instance.	Secondary
		If FLD_ZONE is an UnMapped type OR STUDY_TYPE is 'UNMAPPED' then BS_STDYTYPE cannot be set to 'REDELINEATED', 'DIGITAL CONVERSION DETAILED', or 'DIGITAL CONVERSION APPROXIMATE'	Q	Unmapped type means FLD_ZONE = 'X', 'D', 'AREA NOT INCLUDED'	Critical

## CNMS Technical Reference

Parameter / Attribute	Allow Nulls	Validity	Validation Category	Note	Critical / Secondary
		D_HYDRO Domain	S		Critical
		D_HYDRA Domain	S		Critical
		D_FY_FUNDED Domain	S		Critical
		Check if STATUS_TYPE = 'BEING STUDIED'	Q	If the STATUS_TYP value is 'BEING STUDIED', this field should be populated.	Secondary
		Should be In Expected Data Format (Date)	S		Critical
		Should be a real date	Q	Date should be realistic: Year should be greater than or equal to 1950 AND less than or equal to 2050	Critical
		Check if STATUS_TYPE = 'BEING STUDIED'	Q	If the STATUS_TYP value is 'BEING STUDIED', the PRELM_DATE field must be populated.	Critical
		Should be In Expected Data Format (Date)	S		Critical
		If populated, Should be a real date	Q	Date should be realistic: Year should be greater than or equal to 1950 AND less than or equal to 2050	Critical
		Check if STATUS_TYPE = 'BEING STUDIED' Should be later than PRELM_DATE	Q	If the STATUS_TYP value is 'BEING STUDIED', the LFD_DATE field should be populated.	Secondary
		D_ELEMENT Domain	S		Critical
		D_ELEMENT Domain	S		Critical

Parameter / Attribute	Allow Nulls	Validity	Validation Category	Note	Critical / Secondary
		Should be In Expected Data Format (Date)	S		Critical
		Should be a real date	Q	Date should be realistic: Year should be greater than or equal to 1950 AND less than or equal to 2050	Critical

**CNMS S Requests Ar and S Requests Pt Checks Table**

**Table H.2: CNMS S\_Requests\_Ar/Pt Checks**

Parameter / Attribute	Allow Nulls	Validity	Validation Category	Note	Critical / Secondary
SRA_ID	No	Must be 12 characters in length	S		Critical
		The two characters following the FIPS must be '03'.	S		Critical
		Each SRA_ID must be unique.	S		Critical
SRP_ID	No	Must be 12 characters in length	S		Critical
		The two characters following the FIPS must be '04'.	S		Critical
		Each SRP_ID must be unique.	S		Critical
REACH_ID	Yes	Must be 12 characters in length	S		Critical
		If this Field is Populated, the Associated REACH_ID Should be Present in S_Studies_Ln	S	Recognizing that REACH_ID's May Disappear from the Inventory Through Normal Maintenance Practices, This Check Will Not Cause Validation Failure, but Will Show Up in the Data Validation Output	Secondary

Parameter / Attribute	Allow Nulls	Validity	Validation Category	Note	Critical / Secondary
WATER_NAME	Yes	None	S		N/A
POC_ID	Yes	If not NULL, Should Contain an Existing POC_ID from POC_ID Table	S		Secondary
RQST_CAT	No	D_RQST_CAT Domain	S		Critical
RQST_LVL	Yes	D_RQST_LVL Domain	S		Critical
MTHOD_TYPE	Yes	D_MTHOD_TYPE Domain	S		Critical
DATE_RQST	No	Should be In Expected Data Format (Date)	S		Critical
DATE_RESOL	Yes	Should be In Expected Data Format (Date)	S		Critical
		Value Must Represent Later Date in Time Than DATE_RQST	S		Secondary
CARTO_RQST	No if RQST_CAT = 'CARTOGRAPHIC'	D_CARTO_RQST Domain	S		Critical
FDATA_RQST	No, if RQST_CAT = 'FLOOD DATA'	D_FDATA_RQST Domain	S		Critical
RESOL_STATU S	Yes	D_RESOL_STAT Domain	S		Critical
COMMENT	Yes	Special Characters Check	S	Will Check for Presence of Special Characters Which May Cause Future Interoperability Issues, But Will Not Cause Validation Failure.	Secondary
PRIORITY	Yes	D_PRIORITY Domain	S		Critical
DATE_REVIEW	Yes	Should be In Expected Data Format (Date)	S		Critical

Parameter / Attribute	Allow Nulls	Validity	Validation Category	Note	Critical / Secondary
DATE_REVIEW	Yes	Value Must Represent Later Date in Time Than DATE_RQST	S		Critical
CDS_ID	Yes	If populated (non-null), Must be 12 characters in length	S		Secondary

**CNMS S UnMapped Ln Table**

**Table H.3: CNMS Unmapped\_Ln Checks**

Parameter / Attribute	Allow Nulls	Validity	Validation Category	Note	Critical / Secondary
UML_ID	No	Must be 12 characters in length	S		Critical
		The two characters following the FIPS must be '07'.	S		Critical
		Each UML_ID must be unique.	S		Critical
CO_FIPS	No	Five Character Length Enforcement	S		Critical
CID	No	None	S		Critical
HUC8_KEY	No	Must be 8 Characters in Length	S		Critical
		Must Be an Existing HUC	Q		Critical
MILES	No	Should be greater than zero and not null.	Q		Critical

**CNMS County\_QC\_Status Table**

**Table H.4: CNMS County\_QC\_Status Checks**

Parameter / Attribute	Allow Nulls	Validity	Validation Category	Note	Critical / Secondary
CO_FIPS	No	Five Character Length Enforcement	S		Critical
CO_NAME	No	Must Not be NULL	Q		Critical
CERT_DATE	Yes	Should be In Expected Data Format (Date)	S	This is populated by the QC Tool	N/A
CERT_ID	Yes	Should be 12 characters in length	S	This is populated by the QC Tool	N/A
		Should match a POC_ID value in the Point_of_Contact Table	Q	This is populated by the QC Tool	N/A

**CNMS Point\_of\_Contact Table**

**Table H.5: CNMS Point\_of\_Contact Checks**

Parameter / Attribute	Allow Nulls	Validity	Validation Category	Note	Critical / Secondary
POC_ID	No	Must be 12 characters in length	S		Critical
		The two characters following the FIPS must be '05'.	S		Critical
		Each POC_ID must be unique.	S		Critical
POC_NAME	No	None			N/A
POC_TITLE	Yes	None			N/A
POC_DESCRIPTION	No	None			N/A
ORG_NAME	No	None			N/A
ORG_TYPE	No	D_ORG_TYPE Domain	S		N/A
BUSINESS_PHONE	Yes	None			N/A
MOBILE_PHONE	Yes	None			N/A

Parameter / Attribute	Allow Nulls	Validity	Validation Category	Note	Critical / Secondary
FAX_PHONE	Yes	None			N/A
ADDRESS_1	Yes	None			N/A
ADDRESS_2	Yes	None			N/A
CITY_NAME	Yes	None			N/A
STATE	Yes	D_State Domain	S	Note that this may be left blank as well	Critical
ZIP_CODE	Yes	None			N/A
COUNTY	Yes	None			N/A
EMAIL_ADDRESS	Yes	None			N/A
COMMENT	Yes	None			N/A

**CNMS Specific Needs Info Table**

**Table H.6: CNMS Specific\_Needs\_Info Checks**

Parameter / Attribute	Allow Nulls	Validity	Validation Category	Note	Critical / Secondary
SNI_ID	No	Must be 12 characters in length	S		Critical
		The two characters following the FIPS must be '06'.	S		Critical
		Each SNI_ID must be unique.	S		Critical

Parameter / Attribute	Allow Nulls	Validity	Validation Category	Note	Critical / Secondary
CNMSREC_ID	No	Must be 12 characters in length	S		Critical
		The two characters following the FIPS must be in the domain {01, 02, 04}	Q		Critical
COST_SHARE	Yes	D_ELEMENT Domain	S		Critical
DISASTER	Yes	None			N/A
MITIG_PLAN	Yes	D_ELEMENT Domain	S		Critical
RSK_ASSESS	Yes	D_ELEMENT Domain	S		Critical
RSK_COMMENT	Yes	None			N/A
RSK_DATE	Yes	Should be In Expected Data Format (Date)	Q		Critical
RSK_MITIG	Yes	D_ELEMENT Domain	S		Critical
HAZUS	Yes	D_ELEMENT Domain	S		Critical
HAZUS_LVL	Yes	D_HAZUS_Lvl	S		Critical
COMMENT	Yes	None			N/A

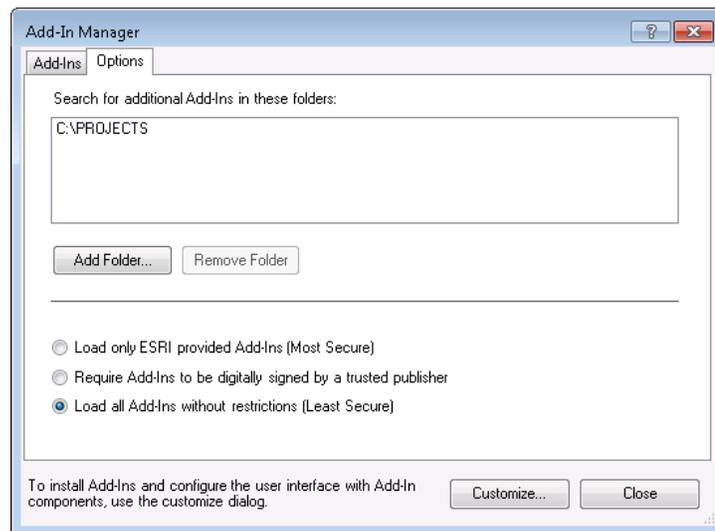
## H.4 User’s Guide: CNMS FGDB QC Tool – Beta2 Version

### **Note on Arc GIS Version:**

This tool is currently configured to work with ArcMap versions 10.0 and 10.1 only. Installation of the AddIn for 10.2 will result in an error message on startup.

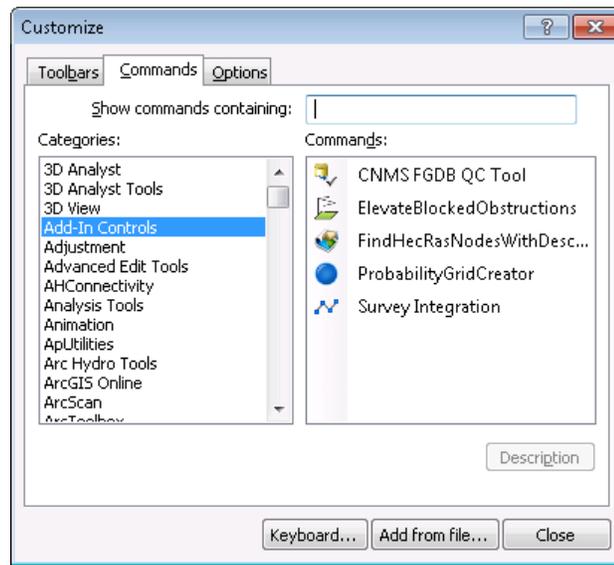
## **How to Install and Access the Tool:**

1. At this point, the CNMS FGDB QC Tool installation file is not available for download directly from the web. Instead, obtain a copy of the “CNMS\_QC\_Tool\_Arc10.esriAddIn” or “CNMS\_QC\_Tool\_Arc10\_1.esriAddIn” file from your FEMA Regional Support Center and copy to a folder on your computer where you have write access.
2. Open an ArcMap document. Click on Customize-Add-In Manager and go to the Options tab. Click on ‘Add Folder’ and browse to the folder where you placed your add-in file. In the screenshot below, the add-in file has been placed in the “C:\PROJECTS” folder.



**Figure H.1: Add-In Manager**

3. Click Customize on the Add-In Manager dialog. In the Customize dialog, click on the Commands tab. Select the “Add-in controls” under the categories. You can also reach the Customize dialog by clicking on ‘Customize-Customize Mode’ on the main ArcMap menu. The commands pane lists all the add-ins available.



**Figure H.2: Add-In Controls**

4. Drag and drop “CNMS FGDB QC Tool” into the ArcMap toolbar area. Alternatively, you can also create a new custom toolbar and drop the item into the new toolbar.

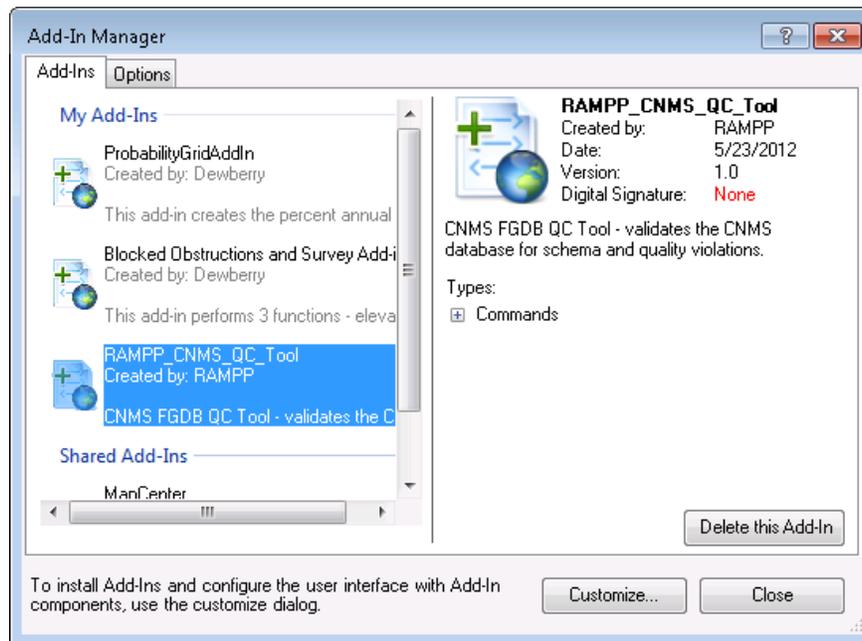
Note: The user does not need to be an administrator to install and use this tool.

**How to Uninstall/Update Previous Add-in:**

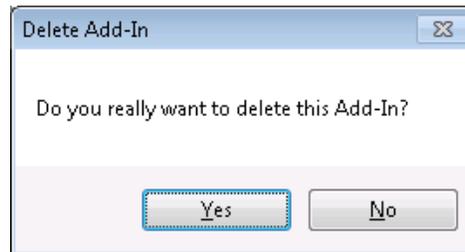
Add-ins can be updated by simply replacing the add-in file in the folder where the old add-in file resides. Close any open ArcMap MXDs before replacing the add-in file.

Alternatively, you can completely uninstall the add-in and re-install by using the steps outlined below.

1. In ArcMap, go to Customize-Addin Manager.
2. Click on the ‘RAMPP\_CNMS\_QC\_Tool’ add-in.
3. Click on the ‘Delete this add-in’ button. Confirm by clicking ‘Yes’ on the ensuing confirmation dialog.



**Figure H.3: Delete Add-In**

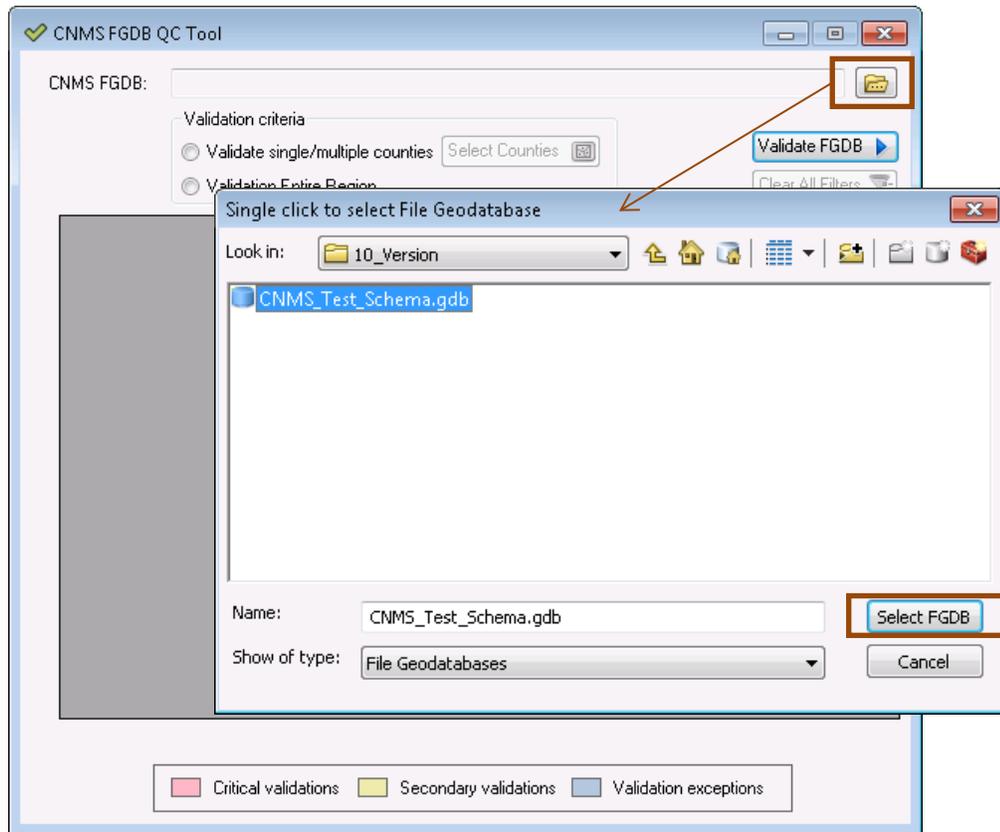


**Figure H.4: Delete Add-In**

4. Follow the procedure outlined in the “How to Install and Access the Tool” section of this document to re-install the add-in.

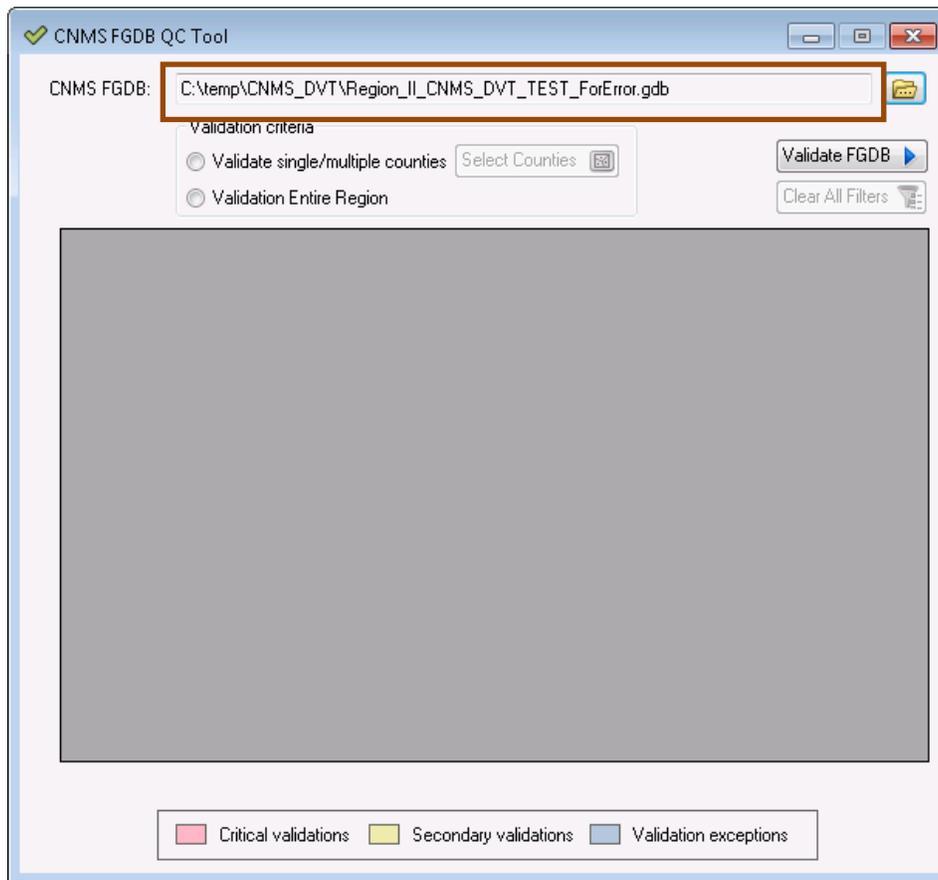
**Intended FGDB QC Workflow:**

1. Start the CNMS FGDB QC Tool by clicking on the icon previously added to either an existing or custom toolbar
2. Select an Esri FGDB (conforming to CNMS schema dated 1/26/2015) using the Select FGDB dialog.



**Figure H.5: Select FGDB**

The selected FGDB is listed on the user interface as shown below:



**Figure H.6: FGDB Selected**

3. Choose to either validate a selection of counties within the selected FGDB or to validate the entire selected FGDB. Validating a selection of counties allows the user to selection using the “Select Counties” button.

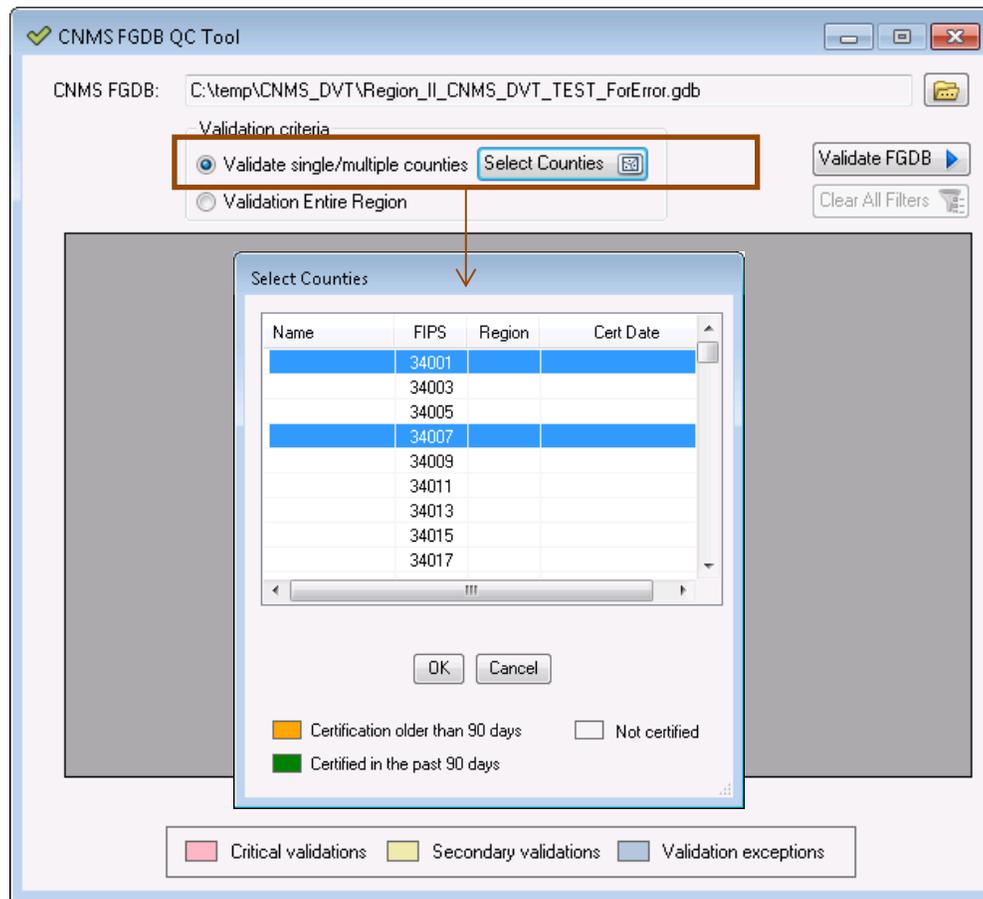


Figure H.7: Select Counties

4. Click on the “Validate FGDB” button to perform a QC check on the selected CNMS FGDB. The grid will be populated with any issues identified within the area selected for QC. Issues are categorized as either Critical or Secondary. Critical issues must be addressed before the FGDB is submitted as complete. The tool allows the addition and documentation of validation exceptions for Secondary issues only.
5. The context-menu available on the grid allows the following actions:
  - a. Zoom to the selected record on the map. The selection occurs based on the Reach\_ID field for S\_Studies\_Ln, SRA\_ID field for S\_Requests\_Ar and SRP\_ID field for S\_Requests\_Pt. If there are no unique ID fields, the OID field is used. (Right click – Zoom to Selection)
  - b. Add a validation exception (Right click – Mark as exception)
  - c. Edit an existing validation exception (Right click – Edit exception)
  - d. Delete an existing validation exception (Right click – Delete exception)

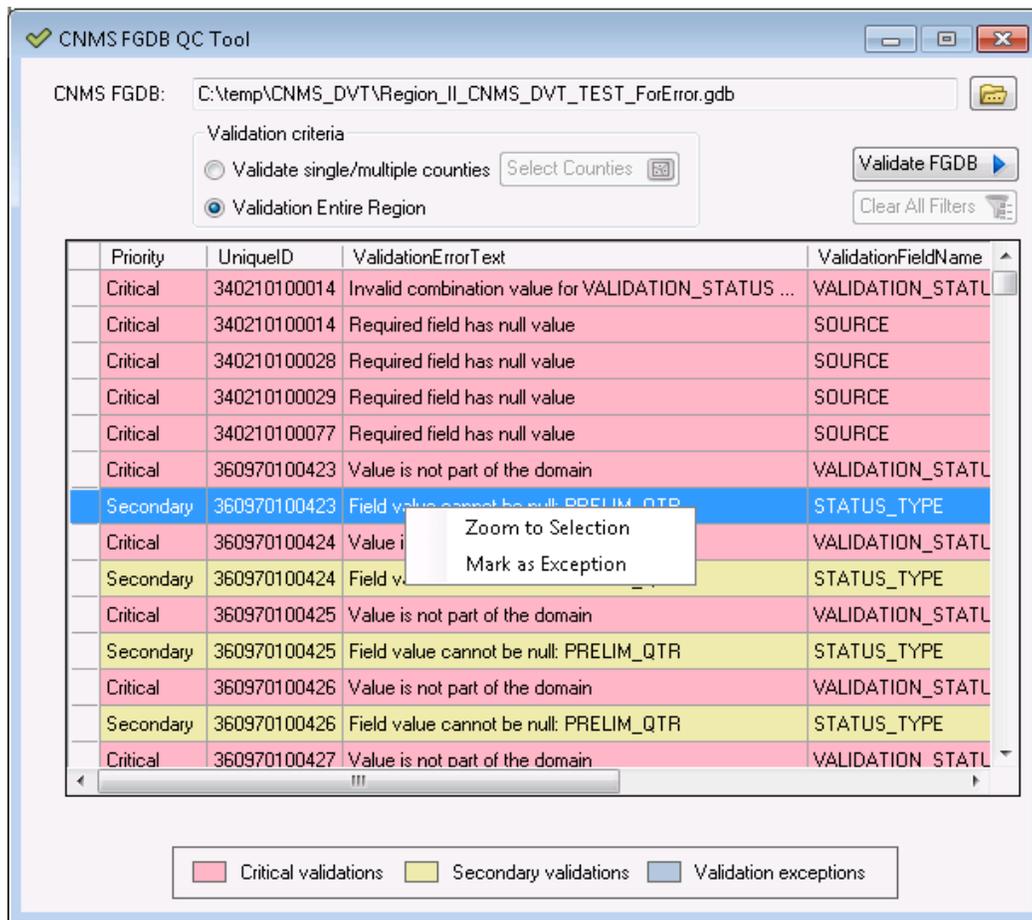


Figure H.8: Zoom to Error

Note that color coding is used to differentiate Critical vs. Secondary issues.

6. **Adding exceptions:** When a record is marked as an exception, the tool will bring up an input dialog where exception comments can be documented. This information will be stored in the database. Within the user interface, the color of the affected record will change to cyan indicating the existence of exception documentation.

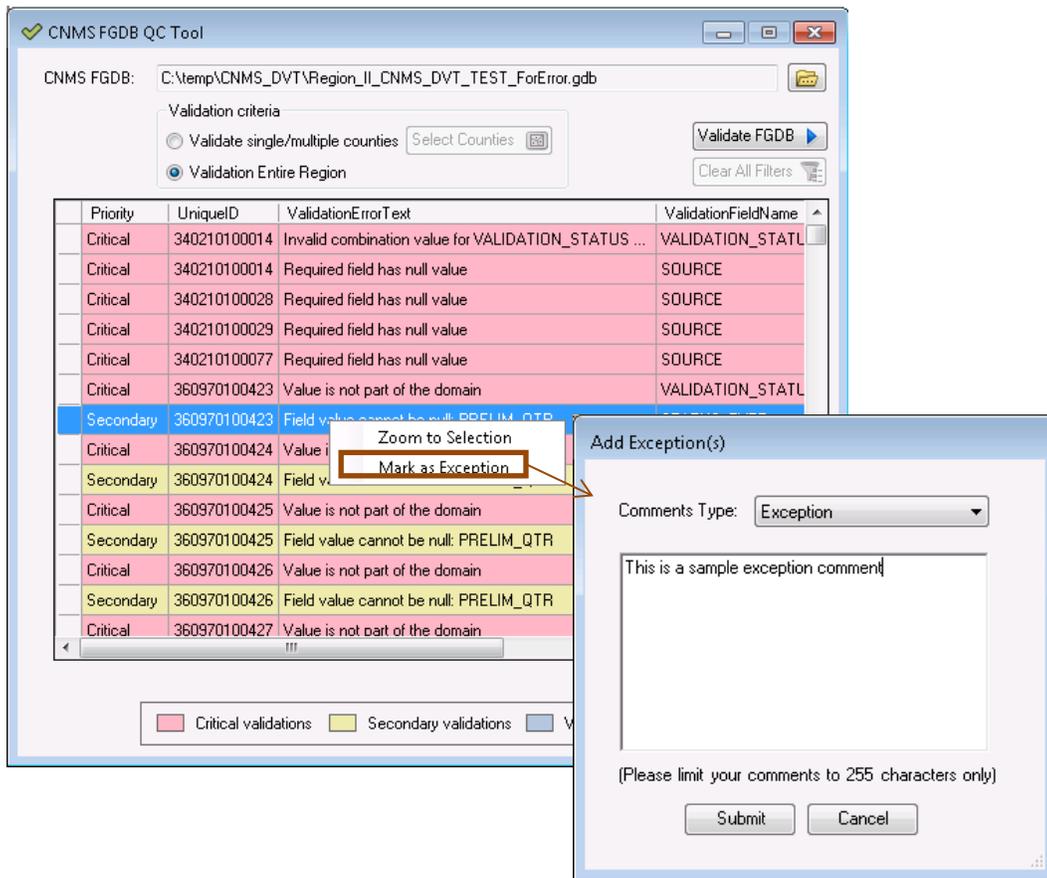
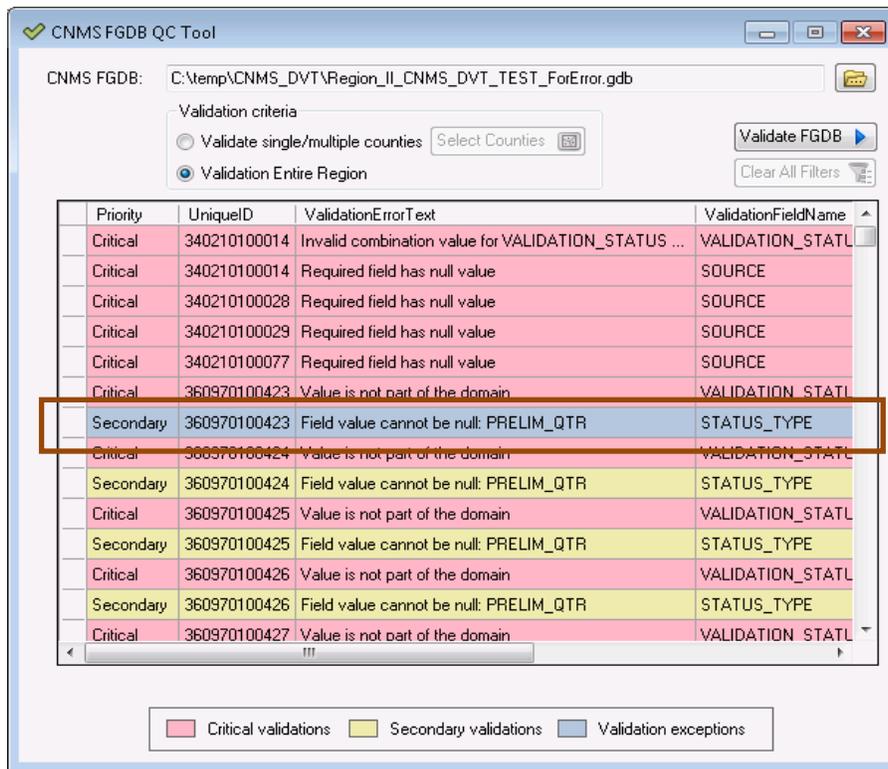
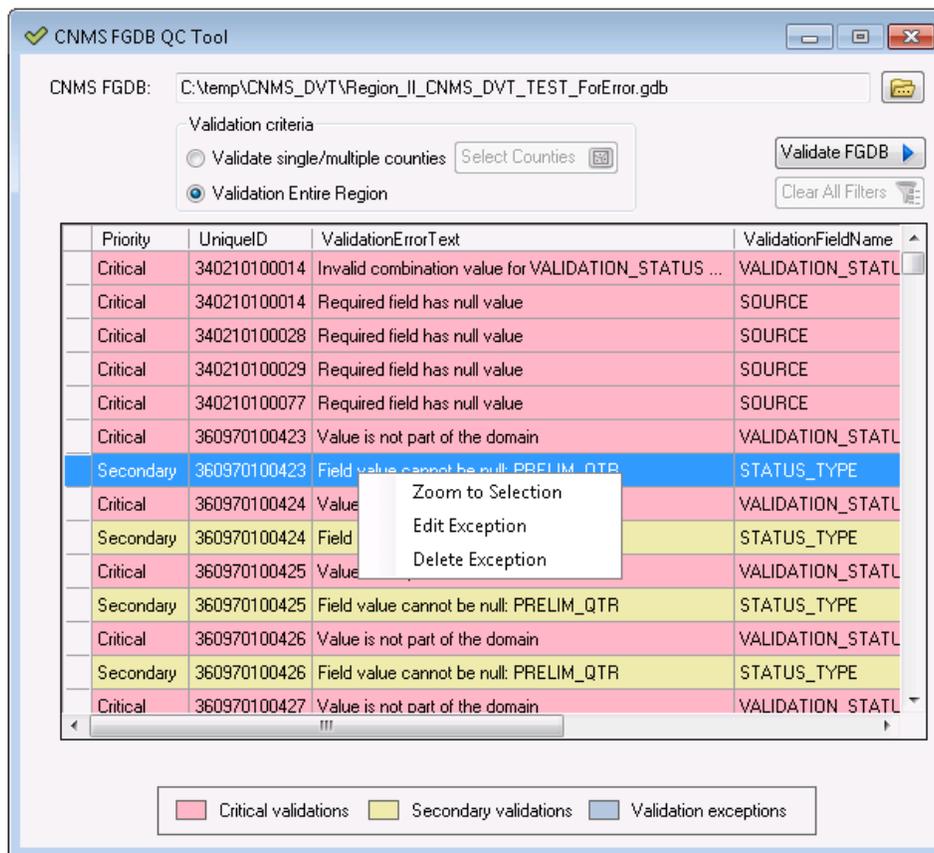


Figure H.9: Mark as Exception



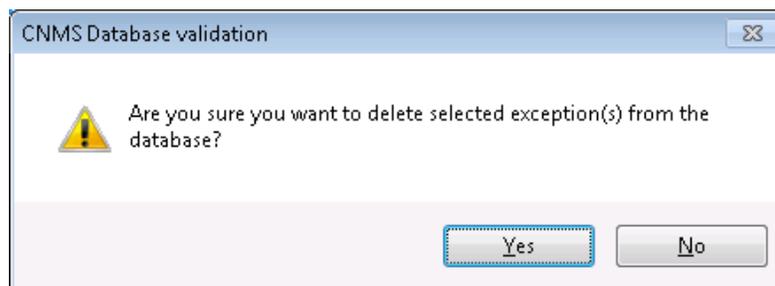
**Figure H.10: Exception Entered**

- Editing and deleting exceptions:** Clicking on an existing exception provides additional options to edit and/or delete exceptions.



**Figure H.11: Edit Exception**

Selecting 'Edit Exception' brings up the input dialog allowing comments to be altered. This feature can also be used as to overwrite existing comments. Deleting an exception brings up a confirmation dialog (as shown below). Upon confirmation, the exception documentation is permanently deleted from the database.



**Figure H.12: Delete Exception**

8. Click on the "Validate FGDB" button after every round of changes until all issues have been addressed. A success message will appear at the end of the validation process. Validation is complete only when:
  - a. All Critical validation items have been addressed.

- b. All Secondary validation items have been addressed or marked as exceptions with user documentation.

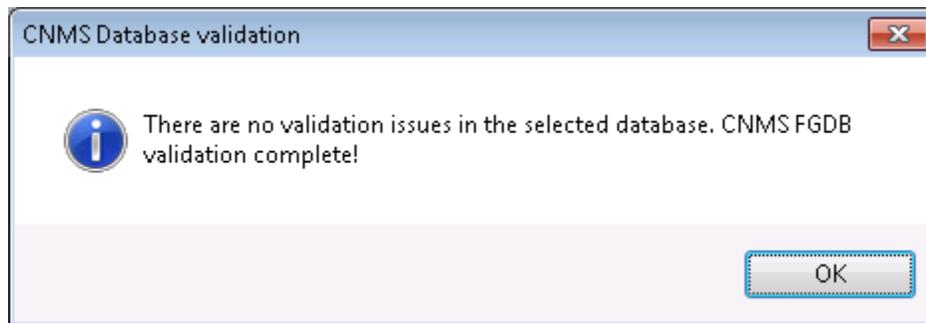


Figure H.13: Validation Complete

**Additional CNMS FGDB QC Tool Features:**

The grid allows filtering and sorting of the data in a familiar manner.

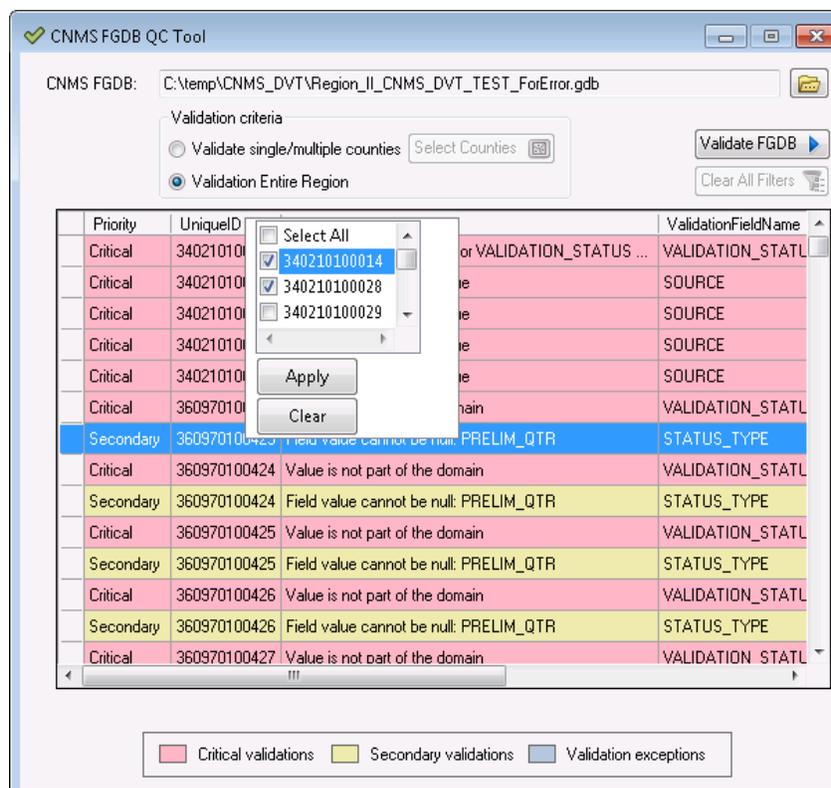
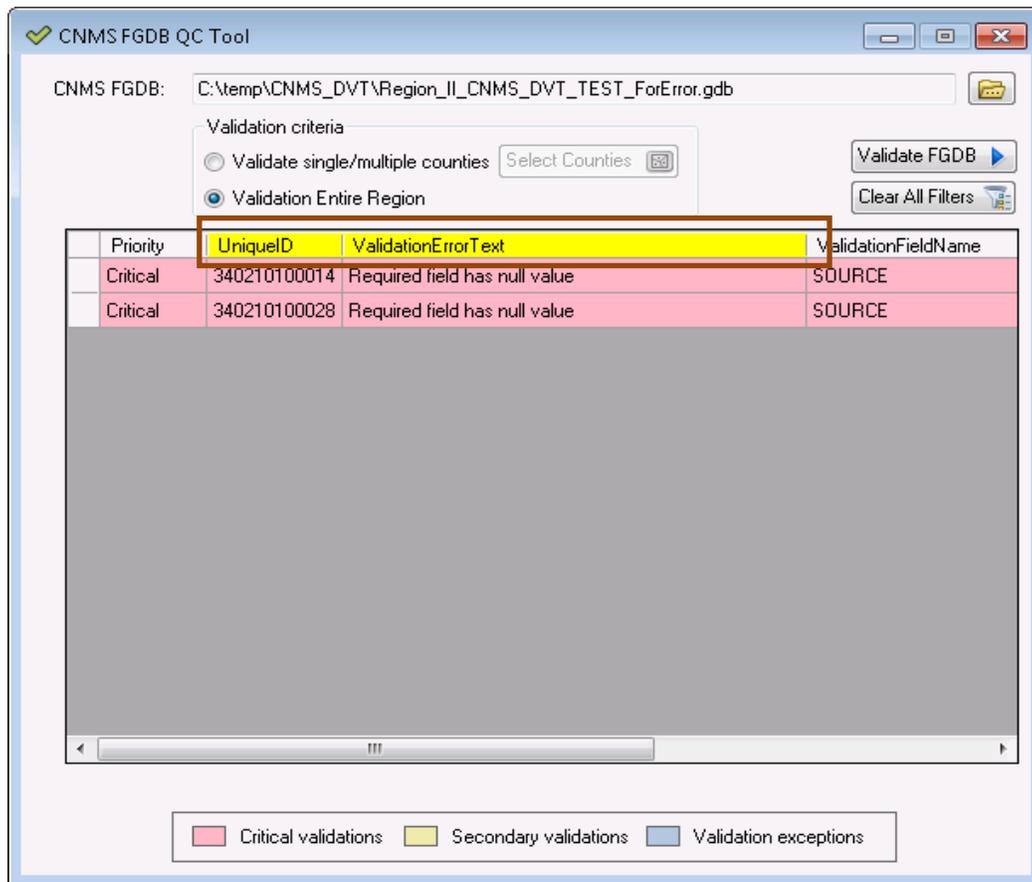


Figure H.14: CNMS FGDB QC Tool Filtering

Filtered columns are highlighted in yellow. The “Clear All Filters” button will clear all current filter criteria.



**Figure H.15: CNMS FGDB QC Tool Sorting**

The grid also allows sorting by clicking on the column headers.