Discovery Report

Black-Ottauquechee Watershed, HUC 01080106
West Watershed, HUC 01080107
Middle Connecticut Watershed, HUC 01080201
Miller Watershed, HUC 01080202

Cheshire County, Grafton County, Hillsborough County,
Merrimack County, Sullivan County

New Hampshire

Report Number 01

08/31/2017

Project Area Community List

County Name	Community Name	County Name	Community Name
Cheshire	Town of Alstead	Grafton	Town of Enfield
Cheshire	Town of Chesterfield	Grafton	Town of Grafton
Cheshire	Town of Dublin	Grafton	Town of Hanover
Cheshire	Town of Fitzwilliam	Grafton	City of Lebanon
Cheshire	Town of Gilsum	Grafton	Town of Lyme
Cheshire	Town of Harrisville	Grafton	Town of Orange
Cheshire	Town of Hinsdale	Hillsborough	Town of New Ipswich
Cheshire	Town of Jaffrey	Merrimack	Town of Newbury
Cheshire	City of Keene	Merrimack	Town of New London
Cheshire	Town of Marlborough	Merrimack	Town of Sutton
Cheshire	Town of Marlow	Sullivan	Town of Acworth
Cheshire	Town of Nelson	Sullivan	Town of Charlestown
Cheshire	Town of Richmond	Sullivan	City of Claremont
Cheshire	Town of Rindge	Sullivan	Town of Cornish
Cheshire	Town of Roxbury	Sullivan	Town of Croydon
Cheshire	Town of Stoddard	Sullivan	Town of Goshen
Cheshire	Town of Sullivan	Sullivan	Town of Grantham
Cheshire	Town of Surry	Sullivan	Town of Langdon
Cheshire	Town of Swanzey	Sullivan	Town of Lempster
Cheshire	Town of Troy	Sullivan	Town of Newport
Cheshire	Town of Walpole	Sullivan	Town of Plainfield
Cheshire	Town of Westmoreland	Sullivan	Town of Springfield
Cheshire	Town of Winchester	Sullivan	Town of Sunapee
Grafton	Town of Canaan	Sullivan	Town of Unity
Grafton	Town of Dorchester	Sullivan	Town of Washington

Table of Contents

I.   General Information

The Risk MAP Discovery process is intended to determine whether resources exist to improve current floodplain mapping and to develop products that will aid in identifying community flood risk. Through various stakeholder activities at the state and local levels, FEMA is able to identify available resources that can be utilized in developing a FEMA watershed(s) study. This Discovery project focuses on selected communities in four watersheds within Cheshire, Grafton, Hillsborough, Merrimack and Sullivan Counties, New Hampshire.

- Black-Ottauquechee Watershed HUC 01080106, all or part of the following subject communities: Acworth, Canaan, Charlestown, Claremont, Cornish, Croydon, Dorchester, Enfield, Goshen, Grafton, Grantham, Hanover, Langdon, Lebanon, Lempster, Lyme, New London, Newbury, Newport, Orange, Plainfield, Springfield, Sunapee, Sutton, and Unity.

- West Watershed HUC 01080107, all or part of the following subject communities: Acworth, Alstead, Charlestown, Chesterfield, Hinsdale, Keene, Langdon, Lempster, Marlow, Surry, Unity, Walpole and Westmoreland.

- Middle Connecticut Watershed HUC 01080201, all or part of the following subject communities: Alstead, Chesterfield, Dublin, Fitzwilliam, Gilsum, Goshen, Harrisville, Hinsdale, Jaffrey, Keene, Lempster, Marlborough, Marlow, Nelson, Newbury, Richmond, Roxbury, Stoddard, Sullivan, Surry, Swanzey, Troy, Walpole, Washington, Winchester and Westmoreland.

- Miller Watershed HUC 01080202, all or part of the following subject communities: Fitzwilliam, Jaffrey, New Ipswich, Richmond, Rindge and Troy.

The total project study area for the 50 communities is 1,361 square miles. According to the 2010 Census, the population within the study area is 170,908.

An overview map of the project study area described above can be seen in Figure 1 below.
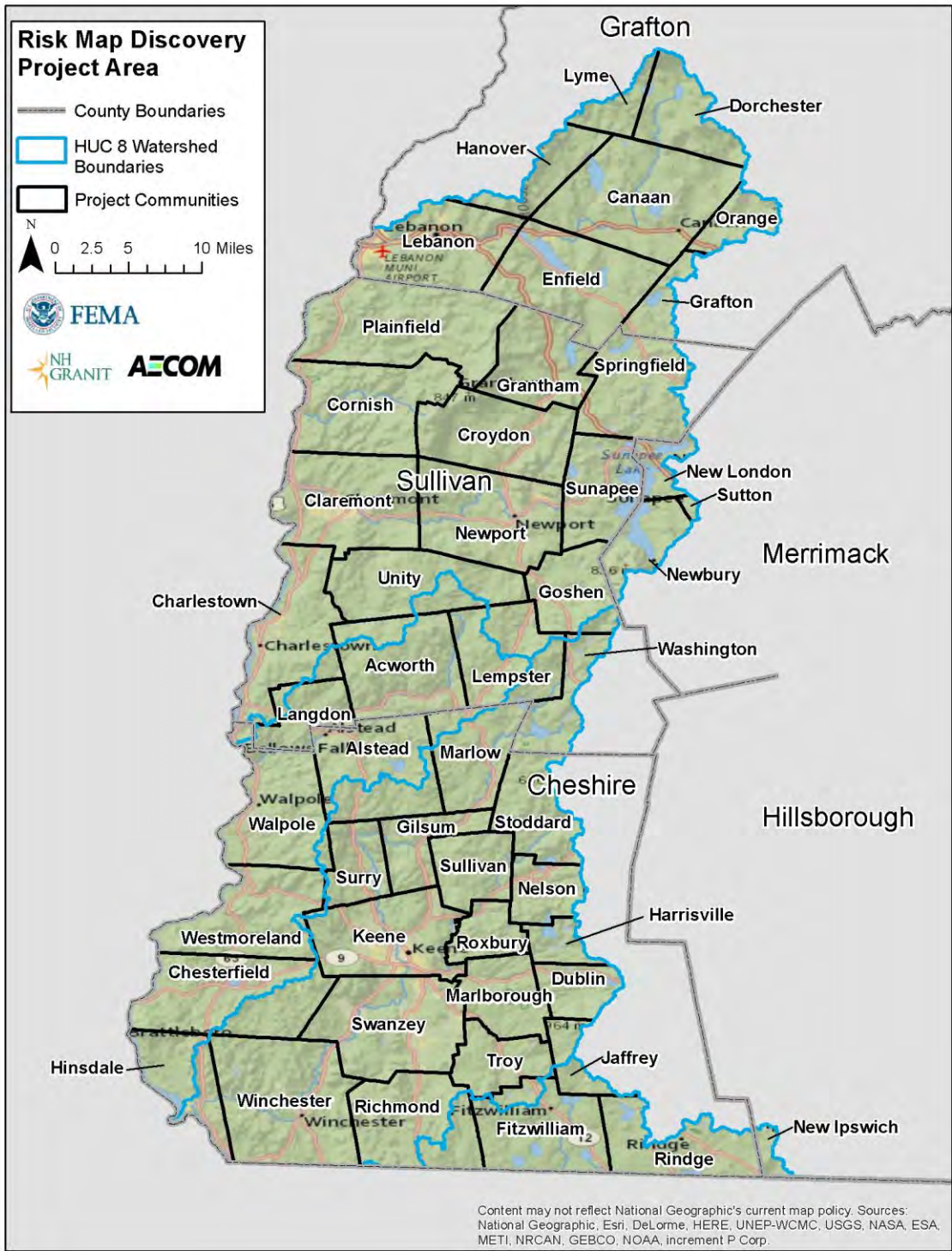
Figure 1: Discovery Area Map

II.   Watershed Stakeholder Coordination

An important aspect of the Discovery process was to collect data regarding local knowledge and concerns from community officials through a data questionnaire and meetings. The meetings provided community officials with information about the Discovery process, reviewed previously collected data and information, and allowed the capture of community officials' knowledge of potential problem areas.

The project team worked with New Hampshire's National Flood Insurance Program (NFIP) Coordinator to compile the project stakeholder contact list. The list consisted of the local project contact for each of the communities within the four watersheds, as well as additional regional, state and federal stakeholders. The stakeholder contact list was verified through web based research, with follow up phone calls to each community as required. The stakeholder contact lists developed for this project are included as Excel spreadsheets in Appendix 1.

Each community contact was sent a mailing which included a letter describing the Discovery process, an invitation to attend a Discovery meeting (see Section IV 'Discovery Meeting' for further details), a Discovery data questionnaire and the Discovery Map. The letters sent to each subject community are included in PDF format as Appendix 2 of this report; the data questionnaire is included in PDF format as Appendix 3.

III. Data Analysis

The data collected during this Discovery process are summarized in the section below. The data are presented in two sections: the first representing data that can be utilized in future Flood Risk products and the second representing data that likely will not contribute to Flood Risk products directly, but may aid in the development of said products (prioritizing areas of study and/or providing further insight/background to the study area).

i. Data That Can Be Used for Flood Risk Products

Data acquired for use in developing Flood Risk products and/or for potential use in any future regulatory mapping projects are outlined below:

Topographic Data

- 2.5–foot resolution Digital Elevation Model (DEM) from the 2015 Connecticut River Watershed LiDAR Project, and the 1-meter resolution DEM from the 2015 New England CMGP Sandy LiDAR Project. USGS 1/3rd Arc-second DEMs (10 m resolution) were used along the periphery of the study area in Vermont and Massachusetts to ensure that there was a buffer in the terrain processing.

Aerial Photography

- 2015 High Resolution (1 foot) Orthoimages for New Hampshire, U.S. Geological Survey, 2015.

Effective FIS/FIRM data, FIRM Panel Index, and Political Boundaries

- Extracted from FEMA effective Digital Flood Insurance Rate Map Databases for Cheshire (2006), Grafton (2008), Hillsborough (2009), Merrimack (2010) and Sullivan (2006) Counties.

Surface Water Features and Watershed Boundaries

- National Hydrography Dataset, U. S. Geological Survey, 2016.

Roads and Bridges

- NHDOT GIS Database, NHDOT Bureau of Planning & Community Assistance, 2016.

Dams

- Dam Inventory, NH Department of Environmental Services, 2015.

Automated Engineering

Automated Engineering (AE) is a process utilized to determine the validity of the effective Zone A floodplain mapping. As cited previously, a 2.5-foot resolution Digital Elevation Model (DEM), derived from the Connecticut River Watershed LiDAR data set, was used as the topographic source for the majority of this study area, while additional data from New England CMPG Sandy LiDAR and USGS were used to achieve extended watershed coverage. The Zone A boundaries generated by the Automated Engineering analysis (where the LiDAR derived DEMs were used as the topographic source) should be able to be leveraged for future, regulatory floodplain mapping of this area.

As there were three topographic data sources for this study area, a seamless Triangular Irregular Network (TIN) was created for the analysis. This new composite surface was used to support the subsequent Automated Engineering tasks.

The first AE task was to perform both a hydrologic and hydraulic analysis to support the mapping of the 1-percent annual chance flood hazard areas (Zone A boundaries). These analyses included the calculation of flood discharges based on regression equations and stream gage data (where available), basin delineation, determination of drainage areas, and the initial cross section layout. These cross sections were subject to a thorough QA/QC process to ensure the accuracy of the resulting flood hazard delineations.

The final task in the AE process was to perform a validation of the current Zone A boundaries displayed in FEMA's effective Flood Insurance Rate Maps (FIRMs). A modified version of FEMA's Floodplain Boundary Standard (FBS) certification process was used to compare the accuracy of the current effective Zone A boundaries to the AE reaches. Of the 687.5 miles of CNMS Zone A Inventory within this project footprint, there were 534.2 miles of reaches evaluated through using the AE process. Of this total, 531.2 miles failed the comparison check. The CNMS Inventory of Zone A studies were updated to "Unverified/To Be Studied" for these reaches. There were 3 miles of streams that passed the comparison check and were categorized as "Valid/NVUE Compliant" in the CNMS Inventory. The remaining 153 miles of CNMS Zone A Inventory were not evaluated through the AE process because the effective Zone A's are not available in a digital format. These studies went through the typical assessment process in CNMS.

ii.   Other Data and Information

The following sections provide an overview of each community's floodplain management program as of the date of this publication.

a.   Hazard Mitigation Plans (HMP)

Each community within the project area has prepared a Hazard Mitigation Plan (HMP). The HMP is required to be updated every five years. It documents the community's resources, identifies hazards, determines natural hazard risks and losses, and develops mitigation goals. The HMPs can help determine how to implement and monitor

strategies to meet the respective community's goals. The current hazard mitigation plan status for all communities in this Discovery project area is summarized in Table 1 below.

Table 1: Hazard Mitigation Plan Status

County	Community	Status (3/2017)	Expiration Date
Cheshire	Alstead	Approved	7/29/2017
	Chesterfield	Approved	6/23/2021
	Dublin	Approved	9/29/2021
	Fitzwilliam	Approved	7/12/2017
	Gilsum	Expired	12/13/2016
	Harrisville	Expired	11/21/2010
	Hinsdale	Approved	1/6/2021
	Jaffrey	Approved	8/24/2020
	Keene	Approved	8/1/2018
	Marlborough	Approved	8/8/2018
	Marlow	Approved	6/23/2021
	Nelson	Approved	8/21/2018
	Richmond	Approved	6/23/2021
	Rindge	Approved	8/21/2018
	Roxbury	Approved	4/29/2017
	Stoddard	Approved	8/21/2018
	Sullivan	Approved	9/8/2021
	Surry	Approved	9/8/2021
	Swanzey	Approved	5/23/2021
	Troy	Approved	6/2/18
	Walpole	Approved	2/11/2021
	Westmoreland	Approved	12/14/2021
	Winchester	Expired	1/30/17
Grafton	Canaan	Expired	6/8/2016
	Dorchester	Approved	2/11/2021
	Enfield	Approved	8/16/2020
	Grafton	No Plan	
	Hanover	Approved	8/10/2020
	Lebanon	Approved	11/30/2021

County	Community	Status (3/2017)	Expiration Date
	Lyme	Expired	10/13/2016
	Orange	Approved	12/20/2021
Hillsborough	New Ipswich	Approved	8/8/2018
Merrimack	New London	Approved	2/3/2018
	Newbury	Approved	5/15/2017
	Sutton	Approved	3/9/2019
Sullivan	Acworth	Approved	3/31/2018
	Charlestown	Approved	6/24/2020
	Claremont	Approved	10/30/2021
	Cornish	Approved	11/03/2021
	Croydon	No Plan	Not Available
	Goshen	Approved	1/5/2021
	Grantham	Approved	12/3/2020
	Langdon	Approved	8/12/2017
	Lempster	Approved	5/28/2020
	Newport	Approved	3/10/2021
	Plainfield	Approved	8/18/2019
	Springfield	Approved	5/7/2018
	Sunapee	Approved	1/21/2021
	Unity	Approved	10/6/2019
	Washington	Approved	3/3/2021

b.   Community Rating System (CRS)

CRS is a voluntary program, in which communities can engage in floodplain management activities that exceed the minimum requirements) in order to earn discounted flood insurance premium rates. Currently, the communities of Keene, Marlborough and Winchester are participating in the program. CRS was discussed at the Discovery meetings and additional communities were encouraged to participate.

c.   NFIP Policies and Claims

An examination of the current number of flood insurance policies and past claims is a good indicator of the level of flood risk for a community. Compiling this information can also serve as an incentive for communities to consider joining the CRS program. The NFIP policies and claims data within the project communities are summarized in Table 2

below. In reviewing the data, the communities of Lebanon and Claremont could benefit greatly from participating in the CRS program given the large number of policies in place.

Table 2: NFIP Policy and Claims

County	Community	Total No. of Policies	Total Premiums	Total Insurance in Force	Number of Closed Paid Losses	$ of Closed Paid Losses
Cheshire	Alstead	12	$11,859.00	$2,485,000.00	8	$346,638.13
	Chesterfield	13	$12,435.00	$2,733,000.00	5	$31,231.32
	Dublin	3	$1,245.00	$1,050,000.00	0	$0.00
	Fitzwilliam	6	$12,205.00	$1,309,500.00	2	$6,038.00
	Gilsum	7	$6,514.00	$1,184,600.00	6	$62,544.00
	Harrisville	1	$244.00	$70,000.00	0	$0.00
	Hinsdale	21	$32,998.00	$4,650,500.00	1	$200,000.00
	Jaffrey	12	$14,259.00	$2,265,600.00	0	$0.00
	Keene	307	$514,443.00	$70,401,100.00	120	$5,370,563.00
	Marlborough	16	$46,361.00	$4,274,900.00	0	$0.00
	Marlow	7	$39,449.00	$2,102,300.00	4	$128,514.00
	Nelson	Not Participating				
	Richmond	Not Participating				
	Rindge	23	$29,942.00	$4,919,100.00	0	$0.00
	Roxbury	Participating No Data				
	Stoddard	5	$4,092.00	$1,096,000.00	0	$0.00
	Sullivan	Participating No Data				
	Surry	1	$823.00	$78,200.00	1	$8,511.00
	Swanzey	10	$6,189.00	$1,565,800.00	0	$0.00
	Troy	1	$640.00	$52,000.00	0	$0.00
	Walpole	10	$3,948.00	$3,185,000.00	0	$0.00
	Westmoreland	5	$4,749.00	$1,049,700.00	2	$74,742.00
	Winchester	40	$41,261.00	$5,861,400.00	9	$37,689.00
Grafton	Canaan	27	$26,307.00	$4,217,100.00	12	$99,489.00
	Dorchester	Participating No Data				
	Enfield	34	$31,433.00	$5,946,100.00	1	$29,503.00
	Grafton	Not Participating				

County	Community	Total No. of Policies	Total Premiums	Total Insurance in Force	Number of Closed Paid Losses	$ of Closed Paid Losses
	Hanover	26	$21,333.00	$7,054,200.00	2	$6,642.00
	Lebanon	123	$229,836.00	$36,973,100.00	20	$1,179,084.00
	Lyme	10	$12,762.00	$2,524,800.00	1	$302.00
	Orange	Not Participating				
Hillsborough	New Ipswich	8	$4,607.00	$1,977,000.00	3	$955.00
Merrimack	New London	14	$10,466.00	$3,872,000.00	1	$13,502.00
	Newbury	19	$13,340.00	$5,062,000.00	0	$0.00
	Sutton	3	$1,196.00	$596,000.00	2	$11,773.00
Sullivan	Acworth	6	$4,542.00	$847,000.00	0	$0.00
	Charlestown	5	$5,070.00	$1,010,600.00	1	$30,052.00
	Claremont	59	$134,814.00	$17,525,800.00	17	$109,592.00
	Cornish	14	$11,337.00	$2,416,200.00	0	$0.00
	Croydon	Suspended				
	Goshen	3	$2,884.00	$552,600.00	1	$16,916.00
	Grantham	12	$17,232.00	$2,167,600.00	2	$7,009.00
	Langdon	Participating No Data				
	Lempster	Not Participating				
	Newport	13	$20,487.00	$4,156,900.00	4	$130,853.00
	Plainfield	9	$12,522.00	$1,958,800.00	1	$45,800.00
	Springfield	1	$351.00	$280,000.00	0	$0.00
	Sunapee	25	$26,151.00	$5,458,200.00	3	$43,247.00
	Unity	3	$2,115.00	$190,000.00	0	$0.00
	Washington	14	$9,753.00	$3,855,000.00	2	$9,328.00

*Data Retrieved on 2/24/17 from https://portal.fema.gov/famsVuWeb/home

d. Regulatory Mapping (Effective FIS/FIRM Data)

The development of regulatory mapping products (Flood Insurance Studies and Flood Insurance Rate Maps) has undergone a shift in focus from a county-based approach, as with FEMA's previous Map Modernization Program, to a watershed-based concept under the current Risk Mapping, Planning and Assessment (MAP) program. Under Risk MAP, the watershed was identified as a high priority area for regulatory mapping updates.

The effective FIS and DFIRM data for the counties in this study were developed under the aforementioned Map Modernization Program with the following effective dates: Cheshire - May 2006, Grafton – February 2008, Hillsborough – August 2009, Merrimack - April 2010, and Sullivan – May 2006.

e. Data Questionnaire Results

Data Questionnaires were issued to each community within the project area in order to solicit knowledge regarding known flooding issues and to help identify potential future flood mapping priorities. Community responses to the Data Questionnaires, as well as input from other local resources (e.g. NH Office of Energy and Planning and NH Department of Transportation) are summarized below in Table 3. This feedback, in conjunction with the analysis of the Coordinated Needs Management Strategy (CNMS) and Letters of Map Change (LOMC) data, is utilized in the recommendations for future regulatory floodplain mapping.

Table 3: Known Flooding/Mapping Issues Identified in Community Data Questionnaire

Communities	Data Questionnaire Results – Desired Study Areas
Cheshire County	
Town of Alstead	Reported transportation projects & rapid growth along Warren Brook/Cold River. Lake Warren to westernmost point (6 miles).
City of Keene	Reported clustered LOMA's, 100yr flooding outside mapped SFHA, transportation projects & rapid growth along Beaver Brook (Confluence with Branch River to George Street (2.1 miles)), Ashuelot River (Corporate boundary to Rt. 101 (1.2 miles) and Rt. 9 to ½ mile North of Court Street (1.8 miles)), Ash Swamp (Corporate boundary to Wilson Pond (3 miles)), Black Brook (Wilson Pond to Wyman Rd. (2.6 miles)), & Tannery Brook/Tax Ditches (Confluence with Ashuelot to Rt. 9/10/12). Profile issues on Ashuelot River at Keene.
Town of Sullivan	Reported 100yr flooding outside the mapped SFHA on Otter Brook (From Rt. 9 at the Roxbury Town Line to Jct. of Otter and Spaulding Brook on Valley Road (1.6 miles)), Spaulding Brook (from Cross and Valley Rd Intersection to Jct. of Otter and Spaulding Brook on Valley Road (1.1 miles)), and Ferry Brook & Unnamed Brook (Price Rd and Ferry Brook Rd. (1 mile)).
Town of Surry	Reported 100yr flooding outside of mapped SFHA & stream bed remediation along Merriam Brook (West from Route 12A (0.5 miles)).

Communities	Data Questionnaire Results – Desired Study Areas
Town of Swanzey	Redelineation of the Ashuelot River (entire corridor within Swanzey (8 miles)), Reported removal of Homestead Woolen Mills Dam in 2010 which could impact floodplain delineations along Ashuelot River & South Branch of the Ashuelot River (upper reaches with its confluence with Ashuelot River). Properties outside of SFHA have experienced flooding along South Branch of the Ashuelot River (East end of Causeway Rd). Dam removal in 2016 along California Brook (at its intersection with Rt. 10 (Ice Pond)). Regular flooding along Bailey Brook outside of SFHA (500 feet).
Grafton County	
Town of Canaan	Reported 100yr mapping outside of SFHA, repetitive losses, transportation projects & rapid growth in areas along Indian River (From 729 Rt. 118 to Brist Mill Hill Bridge (6 miles)), Orange Brook (Jct. of Otter and Spaulding Brook on Valley Road (1 mile)), confluence Indian River/Mascoma River/Moose Brook From Potato Bridge on Indian River upstream 3679 feet. From Potato Bridge downstream to confluence with Mascoma River 4026 feet. From confluence of Mascoma and Indian River downstream to confluence with Moose Brook and Indian River-Mascoma River 2665 feet.(2 miles), & Mascoma River From the intersection of US Rt. 4, Goose Pond Road and Mascoma River upstream 2989 feet (0.6 miles, threatening a mobile home park).
Town of Enfield	Detailed study on Lovejoy Brook (Moose Mountain Rd to Mascoma River (4 miles)). Detailed study on Baltic Mills Dam (Dam to corporate boundary (2 miles)). Reported transportation projects & rapid growth along Lovejoy Brook & Baltic Mills Dam. Detailed study on Mascoma Lake (shoreland on the southeast portion of the Lake (4 miles)). Detailed study on Crystal Lake (shoreland on the northwest and southern portion of the Lake (3 miles)). Detailed study on Spectacle Pond (privately owned Shoreland on the eastern section of Spectacle Pond (2 miles)). Clustered LOMA's along Mascoma Lake, Crystal Lake & Spectacle Pond.
City of Lebanon	Redelineation on the Mascoma River (crossing from I-89 Exit 19 to crossing on I-89 Exit 17). Reported clustered LOMA's, 100yr flooding outside mapped SFHA & area of rapid growth on Dulac Street along Mascoma River. Concerns with LOMA areas being incorrect and streambed elevation on profile. Mislabeled Streets.
Sullivan County	
Town of Charlestown	Ox Brook has clustered LOMA's and mapped floodplain does not correspond with stream it is associated with. Clay Brook and Benware Brook mapping is inaccurate. The mapped floodplain does not correspond with stream it is associated with.
Town of Grantham	Desire studies on Skinner Brook (New Aldrich Rd to Sawyer Brook (2miles)), Sawyer Brook (Yankee Barn Road to Bog Brook (1 mile)), and North Branch Sugar River (Rt. 10 Bridge to Croydon Town Line (3 miles)). New recreation fields have been developed along North Branch Sugar River.

Communities	Data Questionnaire Results – Desired Study Areas
City of Claremont	Reported flooding concerns along Sugar River (Beauregard Village Area (1 mile)), Sugar River/Grandy Brook Washington/Roberts Hill to Washington/Winter (2.6 miles)), Unnamed Brook/Bible Hill Road (Vicinity of 25 Bible Hill Road (0.4 miles)).Clustered LOMA's transportation projects, rapid growth & issues with Grandy Brook Culvert at Washington Street along Sugar River/Grandy Brook. Transportation projects & clustered LOMA's along Unnamed Brook in the Girard Ave area. Repeated wash outs, minor flooding & transportation projects along Unnamed Brook, Bible Hill Road. Critical infrastructure affecting access to reservoir as well as transportation projects along Whitewater Brook.

f.   Coordinated Needs Management Strategy (CNMS)

FEMA's CNMS database is a spatial database which measures the viability of currently effective studies, and is used to store and prioritize flood mapping needs.

Table 4 provides a summary of stream miles for all reaches in the CNMS database within this Discovery study area by county, flood zone type, and validation status. The majority of the stream miles within this study, 900 miles out of a total of 1,057 miles, have a validation status of "Unverified." The "Unverified" validation status is assigned to those reaches that have not passed the Critical and Secondary Element checks as part of the validation checklist and may either be assigned resources for restudy in a future fiscal year or are currently being restudied.

Table 4: Summary of CNMS Stream Miles

County	Flood Zone	Unknown Stream Miles	Unverified Stream Miles	Valid Stream Miles	Total Stream Miles
Cheshire	Zone A	0	274.27	0	274.27
Cheshire	Zone AE	0	84.34	54.49	138.83
Grafton	Zone A	0	104.11	0	104.11
Grafton	Zone AE	0	64.49	25.94	90.43
Hillsborough	Zone A	16.59	7.63	0	24.22
Hillsborough	Zone AE	0	0	6.53	6.53
Merrimack	Zone A	0	61.45	0	61.45
Merrimack	Zone AE	0	16.22	0	16.22
Sullivan	Zone A	0	223.7	0	223.7
Sullivan	Zone AE	0	63.5	54	117.5
Total		16.59	899.71	140.96	1,057.26

Table 5 provides a listing of Zone AE reaches whose validation status is listed as "Unverified". This status indicates that at least one critical element and/or at least four

secondary elements have failed for that reach. The reaches are listed alphabetically by county, then by reach name. A full description of the codes listed in Table 5 (e.g. C1, C2, S1, S2) is included in Excel Spreadsheet format as Appendix 5 of this report.

Table 5: CNMS Analysis of Unverified Zone AE Reaches

County	Number of Critical Elements Failing	Number of Secondary Elements Failing	Reach	Miles	Elements Failing (see Appendix 5)
Cheshire	3	1	Ashuelot River	35.1	C1, C2, C6, S2
Cheshire	1	1	Ash Swamp Brook	2.9	C1, S4
Cheshire	1	0	Branch River	2.5	C1
Cheshire	1	1	Cold River	1.3	C1, S9
Cheshire	1	0	Connecticut River	32.2	C1
Cheshire	2	0	Otter Brook	2.6	C1, C2
Cheshire	1	1	Pauchaug Brook	0.9	C5, S10
Cheshire	1	1	Rixford Brook	1.5	C5, S10
Grafton	1	0	Connecticut River	15.7	C2
Grafton	1	2	Hewes Brook	3.8	C5, S4, S9
Grafton	1	0	Indian River	11.9	C6
Grafton	2	1	Mascoma River	25.2	C2, C5, S4
Grafton	1	1	Mink Brook	7	C1, S9
Grafton	1	1	Monahan Brook	0.8	C1, S9
Sullivan	1	1	Connecticut River	39.4	C1, S2
Sullivan	2	1	Sugar River	24	C2, C5, S4

g.   Letter of Map Change (LOMC)

Another useful resource that aids in identifying where current flood mapping inaccuracies may exist is the inventory of LOMCs. A high number of LOMCs for a particular flooding source is typically an indicator of mapping inaccuracies. To examine where these inaccuracies may exist, a LOMC point shapefile was acquired from FEMA (accessed 1/4/17) and all points located within the study area of this project were found to be valid. The results presented below in Table 6 represent those flooding sources with 5 or more LOMCs on record. LOMCs with unknown/unnamed flooding sources, or where "local flooding" was cited as the flooding source, are not represented in this table. The

flooding sources listed in Table 6 should be strongly considered for future floodplain remapping/redelineation.

Table 6: Prioritization of Flooding Sources on Number of LOMCs

Flooding Source	Community Name(s)	Number of Valid LOMCs
Mascoma River	Canaan, Enfield & Lebanon	62
Mascoma Lake	Enfield & Lebanon	60
Ashuelot River	Gilsum, Hinsdale, Keene, Marlow, Surry, Swanzey, Washington & Winchester	49
Sunapee Lake	New London & Sunapee	40
Sugar River	Claremont & Newport	34
Connecticut River	Charlestown, Chesterfield, Claremont, Cornish & Lebanon	15
North Branch Millers River	New Ipswich & Rindge	12
Crystal Lake Brook	Enfield	12
Beaver Brook	Gilsum & Keene	12
Johnson Brook	Newbury	11
Ash Swamp	Keene & Swanzey	10
South Branch Ashuelot River	Swanzey & Troy	8
Stocker Pond	Grantham & Springfield	7
Gulf Brook	Enfield	6
Indian River	Canaan	5
Redwater Brook	Claremont	5
Warren Brook	Alstead	5
Little Sugar River	Charlestown & Unity	5
Dodge Brook	Newport	5

h.   Recommendations

The ideal solution for resolving mapping inaccuracies is to complete a new detailed study (e.g. conducting a field survey along the entirety of any given flooding source); however, this approach is expensive and requires resources that are currently unavailable. The next best option for improving flood mapping inaccuracies is performing a redelineation study, where previous detailed studies are updated with newer, more accurate topographic data. Table 7 represents the areas recommended for updated regulatory mapping (development of new FIRM products). These recommendations are

based on analyses of all data and results described in previous sections, as well as the size and feasibility of funding project areas.

Table 7: Proposed Zone AE Reaches for Remapping

Flooding Source	Study Type	Study Length (Miles)	Number of Structures	Number of Cross Sections
Ash Swamp Brook	Detailed	2.9	12	0
Ashuelot River	Detailed	34.8	53	16
Beaver Brook	Redelineation	3	0	0
Black Brook*	Detailed	3.2	6	0
Blow-me-down Brook	Redelineation	7.5	0	0
Branch River	Detailed	2.5	4	1
Butternut Brook	Redelineation	1.1	0	0
Canaan Street Lake	Redelineation	1.3	0	0
Cold River	Detailed	1.3	2	1
Connecticut River	Detailed	74.6	17	64
Eastman Pond	Redelineation	1.8	0	0
Goose Pond Brook	Redelineation	2.8	0	0
Grandy Brook	Redelineation	0.6	0	0
Hewes Brook*	Detailed	3.8	7	3
Indian River	Detailed	11.8	22	4
Knox River	Redelineation	2.1	0	0
Little Sugar River	Redelineation	1.1	0	0
Lovejoy Brook	Redelineation	0.8	0	0
Mascoma Lake	Redelineation	5.0	0	0
Mascoma River	Detailed	25.3	54	14
Mink Brook*	Detailed	7	10	3
Minnewawa Brook	Redelineation	3.0	0	0
Mirey Brook	Redelineation	2.1	0	0
Monahan Brook*	Detailed	0.8	3	0
North Branch Millers River	Redelineation	5.7	0	0
North Branch Sugar River	Redelineation	10.8	0	0
Otter Brook	Detailed	2.5	1	3
Otter Pond	Redelineation	1.4	0	0
Ox Brook	Redelineation	2.7	0	0
Pauchaug Brook	Detailed	0.9	2	0
Redwater Brook	Redelineation	1.7	0	0
Rixford Brook	Detailed	1.4	2	0
Roaring Brook	Redelineation	1.4	0	0
Robbins Brook	Redelineation	1.5	0	0
Sawyer Brook	Redelineation	1.4	0	0
Skinner Brook	Redelineation	0.7	0	0
Snow Brook	Redelineation	1.7	0	0
South Branch Ashuelot River	Redelineation	12.8	0	0

Flooding Source	Study Type	Study Length (Miles)	Number of Structures	Number of Cross Sections
South Branch Sugar River	Redelineation	5.9	0	0
Sprague Brook	Redelineation	1.1	0	0
Spring Farm Brook	Redelineation	1.2	0	0
Stocker Brook	Redelineation	1.9	0	0
Stocker Pond	Redelineation	0.7	0	0
Stocker Pond Outlet Channel	Redelineation	0.8	0	0
Sugar River	Redelineation	0.2	0	0
Sugar River	Detailed	24	44	13
Sunapee Lake	Redelineation	5.2	0	0
Trask Brook	Redelineation	2.6	0	0
Unnamed Tributary	Redelineation	0.4	0	0
Wheelock Brook	Redelineation	0.7	0	0

*Community Requested Studies

IV. Discovery Meeting

The Discovery Meetings for the Lower and Middle Connecticut River Watersheds took place on Thursday, March 9, 2017. The two meetings were held in different locations in order to permit stakeholders from the 50 communities within the project area to attend. The first meeting was held at 10:00 AM at Whitcomb Hall in the Town of Swanzey, while the second meeting was held at Claremont Bank Community Center at 2:00 PM in the City of Claremont. The purpose of each meeting was to inform community officials about the upcoming project, to initiate discussions regarding community flood risk, and to gather local input and data pertaining to known flooding issues. The project team facilitating the meetings included the following: the Federal Emergency Management Agency (FEMA), NH GRANIT at the University of New Hampshire, the New Hampshire Office of Energy and Planning (NH OEP), and AECOM. The meeting agenda and presentation have been included in PDF format as Appendix 6 of this report and the list of meeting participants has also been included in PDF format as Appendix 7.

To coordinate this effort, approximately one month prior to their respective Discovery meetings, letters were mailed to all community contacts (listed in Appendix 1). In addition to the letters, a mailing was sent to each community's floodplain administrator and contained the following: a data questionnaire, a Preliminary Discovery Map, and a CD containing digital versions of the documents.

The goal of the data questionnaire was to gather information regarding known flooding issues or mapping problems, and to identify data and/or reports that would improve the current mapping within each community (e.g. better topography, more up-to-date base mapping, hazard mitigation efforts, etc.). The Discovery Map was a 24x36 format map covering the extent of the Discovery project area (see Appendix 4). The map displayed a base map, hydrologic features, community and watershed boundaries, the effective

special flood hazard area mapping, and point locations for National Flood Insurance Program (NFIP) claims data. Communities were encouraged to physically mark their areas of concern on the maps, and submit the information for incorporation into the Discovery project's results as well as consideration towards future flood risk and regulatory flood mapping projects.

V.   Appendices

Appendix 1 – Discovery Community Contact List

Appendix 2 – Letters to Communities

Appendix 3 – Discovery Data Questionnaire

Appendix 4 – Discovery Map

Appendix 5 – Coordinated Needs Management Strategy (CNMS) Documentation

Appendix 6 – Discovery Meeting Agenda and Presentation

Appendix 7 – Discovery Meeting Participants