



Discovery Report

Contoocook Watershed, HUC-8 01070003

Cheshire, Hillsborough, Merrimack, and Sullivan Counties, New Hampshire

Communities listed inside cover

Report Number 01

02/24/2020



FEMA

Project Area Community List

Community Name
State of New Hampshire
Cheshire County, NH
Town of Dublin, NH
Town of Harrisville, NH
Town of Jaffrey, NH
Town of Nelson, NH
Town of Rindge, NH
Town of Stoddard, NH
Hillsborough County, NH
Town of Antrim, NH
Town of Bennington, NH
Town of Deering, NH
Town of Greenfield, NH
Town of Hancock, NH
Town of Hillsborough, NH
Town of New Ipswich, NH
Town of Peterborough, NH
Town of Sharon, NH
Town of Temple, NH
Town of Weare, NH
Town of Windsor, NH

Community Name
State of New Hampshire <i>continued</i>
Merrimack County, NH
Town of Andover, NH
Town of Boscawren, NH
Town of Bradford, NH
City of Concord, NH
Town of Danbury, NH
Town of Henniker, NH
Town of Hill, NH
Town of Hopkinton, NH
Town of New London, NH
Town of Newbury, NH
Town of Salisbury, NH
Town of Sutton, NH
Town of Warner, NH
Town of Webster, NH
Town of Wilmot, NH
Sullivan County, NH
Town of Springfield, NH
Town of Washington, NH

Table of Contents

I.	Discovery Overview	1
II.	General Information	2
III.	Watershed Community and Stakeholder Coordination	5
IV.	Discovery Meeting.....	6
V.	Data Collection.....	8
VI.	Next Step: Prioritization of Study Areas.....	122
VII.	Close.....	155
VIII.	Literature Cited	166
IX.	Appendices	177

Acronym List

AEP	Annual Exceedance Probability
BFE	Base Flood Elevation
BLE	Base Level Engineering
CID	Community Identification number
CNMS	Coordinated Needs Management Strategy
CRS	Community Rating System
DFIRM	Digital Flood Insurance Rate Map
°F	Degrees Fahrenheit
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
FOA	First Order Approximation
GIS	Geographic Information Systems
HEC-RAS	Hydrologic Engineering Center's River Analysis System
LFD	Letter of Final Determination
LiDAR	Light Detection and Ranging
LOMC	Letter of Map Change
MAP	Mapping, Assessment and Planning
NFIP	National Flood Insurance Program
NHD	National Hydrography Dataset
NLD	National Levee Database
NRCS	Natural Resources Conservation Service
SOMA	Summary of Map Actions
USGS	United States Geological Survey

Preface

Through Risk Mapping Assessment and Planning, or Risk MAP, the Federal Emergency Management Agency (FEMA) is collaborating with States, Tribes, and local stakeholders to help make communities safer and stronger by working with them to identify real hazards, actions that can reduce their impact, and available resources and solutions. This report captures the first step in this process—Discovery.

During the Discovery phase, FEMA and the collaborators work to gather community knowledge, apply the best scientific modeling, and begin to look at where the safety of residents and security of communities may be at risk. This report can be used as the community moves forward in identifying and taking risk reducing actions, and FEMA will continue to coordinate and communicate with the Contoocook Watershed communities to identify potential partnership opportunities in the process of building resilience.

This Discovery Report documents the data that has been collected, as well as information on community needs and priorities obtained as a part of Discovery Meetings. It includes a summary of the findings of the first step of the Discovery process, including flood mapping options.

I. Discovery Overview

The Discovery process, which identifies the priorities and areas of concern for communities within a watershed, helps FEMA and the communities better understand the projects that may help reduce their risk from natural disasters. Through the Discovery process, FEMA can determine which areas of a watershed may be funded for further flood risk identification and assessment. These can be big decisions for a community, and the Discovery process helps to ensure that FEMA works in a collaborative manner, taking into consideration the information collected from local communities.

During Discovery, FEMA and the State reach out to local communities to:

- Gather information about local flood hazards and risk
- Document needs related to flood hazard mapping and the National Flood Insurance Program (NFIP)
- Involve multidisciplinary staff from within communities to participate and assist in the identification and mitigation of risk

The result of the Discovery process is the data and community knowledge captured in this Discovery Report, which was used in the Risk MAP project scope of work.

II. General Information

General Watershed Information

The Contoocook HUC8 Watershed covers approximately 489,000 acres (764 square miles) and drains the southwest corner of New Hampshire. Much of the watershed area is forested (81%) with a large portion of this land being conserved. There are a few large centers of population around Concord, Jaffrey, and Hillsborough, NH. The topography within the watershed is generally hilly with multiple mountain ranges including the Buswell Ridges in the north and the Wapack Range to the south (New Hampshire Department of Environmental Services, 2010). The watershed has a mean elevation of 1,025 feet NAVD88, a maximum elevation of 3,168 feet NAVD88, and a mean slope of 7.95 degrees. The Contoocook Watershed drains 764 square miles through major rivers, which include Contoocook River, Blackwater River, Warner River, and Lane River. The Contoocook Watershed is located at a centroid latitude of 43 degrees. The typical climate is an average winter temperature of 31 degrees Fahrenheit (°F), and an average summer temperature of 79°F, and an average annual precipitation total of 47.49 inches (U.S. Climate Data, 2019).

There are 38 communities in four counties and one state that are within the study area in the Contoocook Watershed. Three of these communities (Dunbarton, NH, Frankestown, NH, and Goshen, NH) have small areas within the Contoocook Watershed and no flooding sources from the Contoocook Watershed. These communities were not included in the Discovery Process and are not referenced in this report. Refer to the report's inside cover for the Project Area Community List for the communities included in the Discovery Process. According to the 2010 census (U.S. Census, 2010), the watershed has a total population of 101,566 with an average population density of 85.53 people per square mile in the watershed. Many of the communities and flooding sources in the Contoocook Watershed have not received new or updated detailed studies since the original town-wide Flood Insurance Studies due to the low population density of the study area.

FEMA's Discovery effort in the Contoocook Watershed study area involves data collection, cursory analysis, and community outreach for the purpose of prioritizing work for new engineering analysis (surveying, hydrology, and hydraulics) and floodplain mapping within a limited financial budget.

CNMS Overview

The NFIP Reform Act of 1994 requires FEMA to assess each participating community's flood hazard information on a regular basis. The Coordinated Needs Management Strategy, or CNMS, provides a way for FEMA to track and inventory flood study needs, by community, in a spatial format. Through completing annual State business plans and 5-year map needs assessments, and validating its effective flood risk studies, FEMA is able to maintain a record of stakeholder mapping needs for reference during Discovery, project scoping, and project kickoff. The most recent CNMS validation of effective Zones AE in FEMA Region 1 (New England) was completed in October 2016.

CNMS can show watershed stakeholders where flood hazard information exists that has been "verified" by looking at factors such as the amount of development and physical and hydrological changes in the drainage. Flood mapping needs indicated by CNMS will be verified and adjusted based on input received during the Discovery process, as documented in this report.

Based on previous studies, the rivers and streams within the Contoocook Watershed are currently mapped as Zones A (approximate), AE (detailed study) and X. According to CNMS (FEMA, 2016), portions of large rivers and most small rivers totaling 335 miles are currently mapped as Zone A with approximate levels of detail in available flooding information. Approximately 150 stream miles have had detailed studies completed and are mapped as Zone AE.

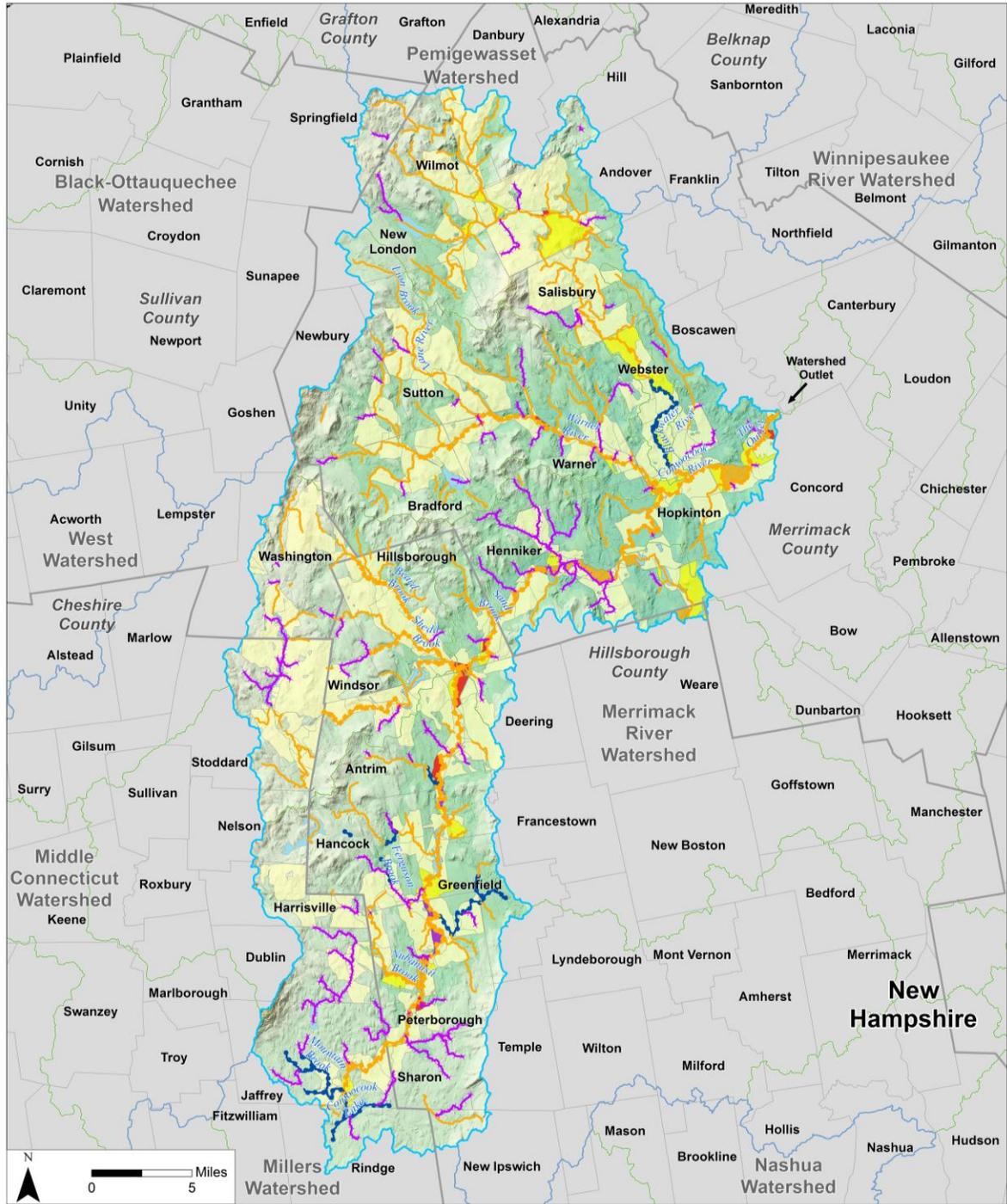
Table 1 summarizes the results of the validation status obtained from the CNMS.

Table 1. CNMS Validation Status (Distance in stream miles)

	Total
AE Valid	35
AE Unverified	115
A Valid	1
A Unverified	335
Unmapped	155
Total	641

Figure 1 shows the current CNMS overview of flood study needs within the Contoocook Watershed.

Figure 1. CNMS Overview of Flood Study Needs



MAP SYMBOLOLOGY

- Watershed Boundary
- HUC10 Watershed Boundary
- Neighboring Watersheds
- Water Bodies
- Communities
- State Boundary
- County Boundary
- Valid Study Lines
- Unverified AE Study Lines
- Unverified A Study Lines
- Unmapped Study Lines

- Average Annualized Loss**
- Very Low
 - Low
 - Medium
 - High
 - Very High

WATERSHED LOCATOR



**NATIONAL FLOOD INSURANCE PROGRAM
Discovery Map**

CONTOOCCOOK WATERSHED

Total Stream Miles:	641 Miles
AE Valid:	35 Miles
AE Unverified:	115 Miles
A Valid:	1 Mile
A Unverified:	335 Miles
Unmapped:	155 Miles
Population:	101,566



HUC-8 Code
01870003
Release Date
12/11/2018

III. Watershed Community and Stakeholder Coordination

As part of the Discovery process, FEMA reached out to community officials and stakeholders. These stakeholders represent organizations, such as government agencies and other associations that are involved with the Contoocook Watershed. Stakeholders included representatives of community emergency officials (emergency management and fire departments), community land use departments, selectmen, and conservation commission representatives. In addition to representatives of the 35 communities within the Contoocook Watershed, the State of New Hampshire was identified as a stakeholder. A list of community and stakeholder contacts was prepared and kept current throughout the Discovery process.

Several community contacts were elected officials whose terms may have expired during the Discovery process. Up-to-date contact information was maintained via telephone conversations, so that information reached the proper community officials and stakeholder contacts. See **Appendix A** for the most current list of community and stakeholder contacts at the time of this report. The list of communities is shown on the inside cover at the front of this report.

The communities and stakeholders were contacted by letter, email, and telephone in the first and second weeks of November 2018 and were invited to participate in data collection questionnaires to be conducted at the Discovery Meetings held on December 12, 2018.

Data collection questionnaires were available as an attachment via email and as a hardcopy paper form available at the meeting. Community maps were also available for annotation by community representatives. Of the 35 communities within the watershed, nine furnished data applicable to Discovery. The remaining 26 communities provided no response. Meetings were held in Contoocook, New Hampshire and Peterborough, New Hampshire on December 12, 2018. The attendance list, as well as information presented during the meeting (PowerPoint presentation), are included in **Appendix B**.

IV. Discovery Meeting

To communicate the Discovery process and include the expertise of key local stakeholders, Discovery Meetings for the Contoocook Watershed were held at the Hopkinton Fire Station at 9 Pine Street, Contoocook, New Hampshire, and at the Peterborough Town Hall at 1 Grove Street, Peterborough, New Hampshire, on December 12, 2018. Fifteen of the 35 invited communities were represented at these meetings. Five additional organizations/stakeholders who were not initially invited to the Discovery Meeting also attended. Those stakeholders included the National Weather Service, New Hampshire DOT, Homeland Security & Emergency Management, New Hampshire Office of Strategic Initiatives and Central New Hampshire Regional Planning Commission. See **Appendix B** for each meeting's attendance sheet.

Identical information was presented at each Discovery Meeting. The community and stakeholder representatives were first introduced to their local FEMA Region I contacts, State partners, and Compass, FEMA's consultant team. The information provided during the meeting included an overview of Risk MAP, a description of the outreach that will occur over the course of the study, the scope of work for the Contoocook Watershed project, and the status of each community's mitigation plan. The communities were informed of the best available data including the following:

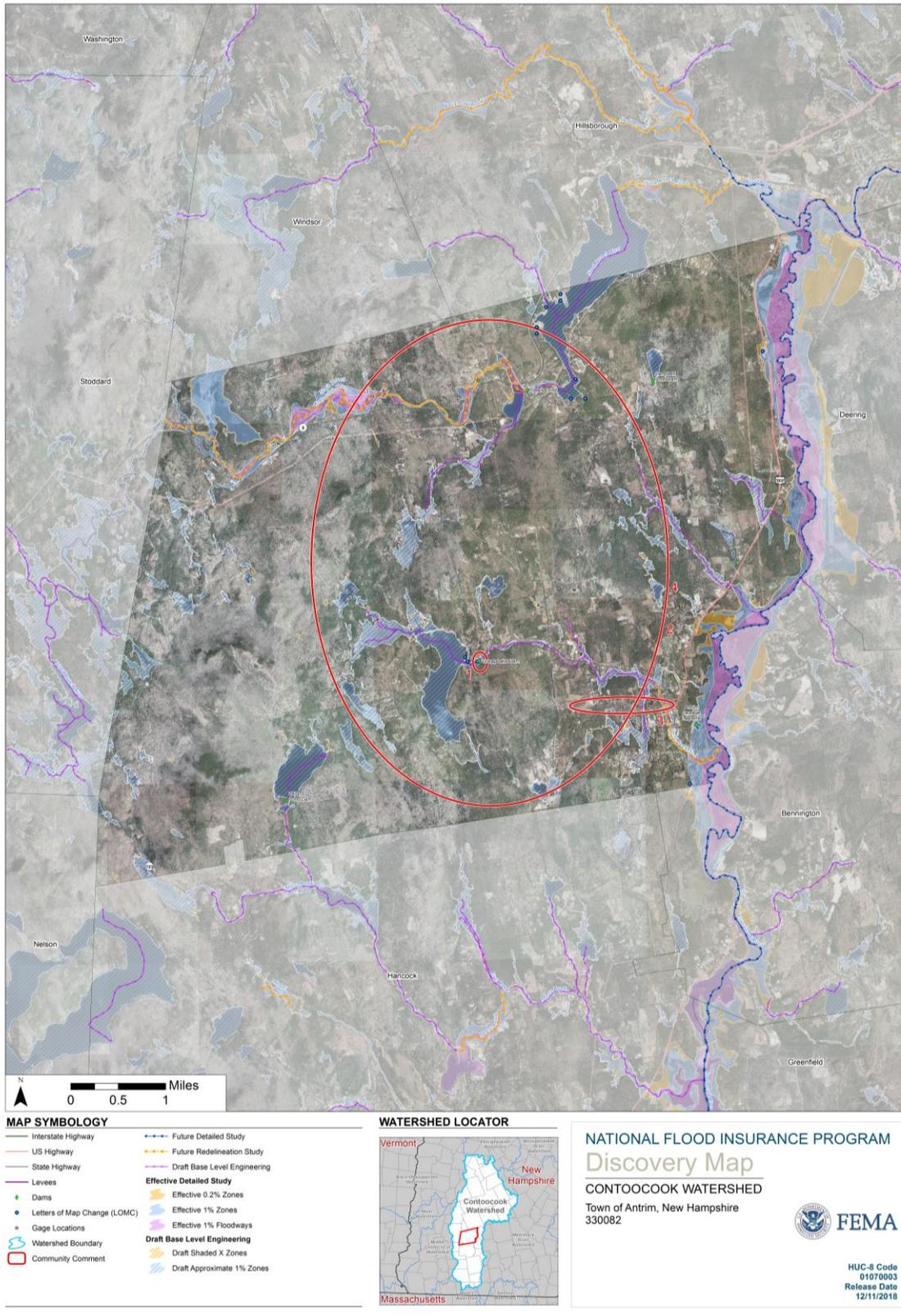
- LiDAR (Light Detection and Ranging) elevation data
- U.S. Geological Survey (USGS) data for peakflows
- Orthophotography data
- Natural Resources Conservation Service (NRCS) Dam Rehabilitation Program data
- USGS Streamgage data
- Existing Digital Flood Insurance Rate Maps (DFIRMs)

To help the attendees understand the components of the potential flood hazard study for this watershed, the presenters described the three different levels of study that may be used. Each level of study has a different methodology. These methodologies are summarized in Section VI – Next Step: Prioritization of Study Area, which discusses the scope of the Contoocook Watershed study. To further illustrate these study types, each community was given a map showing the preliminary study designations for the streams in their municipality. **Figure 2** shows the map for the Town of Antrim, New Hampshire as an example.

The community representatives in attendance received a Discovery Map to review and indicate their areas of interest. This information was discussed in detail during the Discovery Meeting. Communities were encouraged to participate in the outreach meetings that would take place throughout the life of the Risk MAP study and to communicate with FEMA and their local officials, as enhanced communication is one of the primary goals of Risk MAP.

A question and answer session followed the presentation, and attendees broke into groups to review and discuss any areas of interest they wanted to flag for potential study. See **Appendix C** for the Discovery Meeting synopses.

Figure 2. Sample Areas of Interest for Potential Study (Antrim, NH)



V. Data Collection

Introduction

Data collected by Compass for the Discovery Meeting planning process, both during and after completion of the Discovery Meetings are summarized below. Data are broken into two categories: (1) data that can be used for flood risk projects and (2) other data. Other data include data that provide information that assists in the selection during Discovery of high priority reaches for study in a potential Flood Risk Project, but that are likely not useful to the analysis in any other way.

Data That Can Be Used for Flood Risk Projects

Information Provided by Communities

Nine of the 35 communities provided data and/or information during the Discovery process. This was received in several different formats: paper and digital copies of the Discovery Map with written notes, emails, memorandums, verbal feedback, and completed online questionnaires. Details regarding these receipts are provided in **Appendix D**. Information gathered as of January 25, 2019, was included in this report.

Annotated Maps

The comments and areas of concern collected from the communities at the two Discovery Meetings and other feedback mechanisms were digitized and categorized. There were 8 areas of development or other concern recorded, 38 areas with flooding issues, seven comments indicating the availability of a community model or data, and 15 areas where hydraulic or hydrologic changes have occurred (such as bridge replacements or significantly developed areas).

Of the 87 comments logged, 15 were for the Contoocook River, from multiple communities in New Hampshire. The comments for the Contoocook River included flooding issues, availability of community models or data, and hydraulic changes. 25 comments were for the Lane River and 12 were for Lion Brook, provided by the Town of Sutton in their questionnaire response. The comments for the Lane River and Lion brook included areas of development, flooding issues, availability of community model or data, and hydraulic changes.

All comments will be entered into the CNMS database as requests that will be tracked and updated as new studies are initiated or additional information becomes available.

Community Profiles

Each community profile (a one-sheet document with information about the community) included the following: Community Identification Number (CID); NFIP status; current map date; NFIP regulation level (based on its flood map); number of Letters of Map Change (LOMCs); participation in the NFIP Community Rating System (CRS); dates of Community Assistance Contacts and Community Assistance Visits; demographics and industry information according to the U.S. Census; presidentially declared disasters; NFIP policy data; levees and flood-control structures; environmentally sensitive, Tribal, and coastal areas; and hazard mitigation plans and grants. See **Appendix E** for Hazard Mitigation Plan status and **Appendix F** for the community profiles.

Letters of Map Change (LOMCs)

Many of the existing Letters of Map Change (LOMC) in the Contoocook Watershed are clustered near rivers, reservoirs and lakes throughout the watershed including; 87 along the Contoocook River in communities such as Concord, Webster and Hopkinton, 19 along the Warner River in communities such as Warner, Sutton and Bradford, 14 along Sand Brook in Hillsborough, Antrim and Peterborough. LOMCs are also located around Pleasant Lake in New London, New Hampshire and Lake Massasecum in Bradford, New Hampshire, and Powder Mill Pond in Hancock, New Hampshire. This correlates to the comments received from the communities, which indicate that there are flooding and development concerns near these bodies of water, as well as requests for new or updated detailed studies.

If a study is initiated in a community, all LOMCs in the study area will be assessed, and communities will be informed if the LOMCs are anticipated to remain in effect or be superseded, first by the Preliminary Summary of Map Actions (SOMA) at a study's preliminary release, and then by the Final SOMA, when the Letter of Final Determination (LFD) is issued. When a new study becomes effective, the communities receive a Revalidation Letter that officially indicates which LOMCs are still effective.

Levee Information

The U.S. Army Corps of Engineers' National Levee Database (NLD) indicates that there are no levees in the Contoocook Watershed. Other flood-control structures exist within the Contoocook Watershed, including 85 mapped dams. These levees and dams may be assessed in more detail if it is determined that the associated flood sources require further study or restudy.

Topographic Data

Light Detection and Ranging (LiDAR) elevation data are available for the entire Contoocook Watershed study area and were used in First Order Approximation (FOA) (described in the Base Level Engineering section below). The Connecticut River Watershed Bare Earth DEM, New Hampshire GRANIT Geographic Information System (GIS) Clearinghouse is the source for the LiDAR data for the Contoocook Watershed area in New Hampshire which was collected in 2016. A mosaicked LiDAR dataset for the entire watershed was created and will be available for floodplain mapping and analysis in a Flood Risk Project.

Basemap Data

Transportation, hydrography, and political boundary features shown on the Discovery and Community Information Maps were obtained from the online state GIS depot for New Hampshire (<http://www.granit.unh.edu/data/downloadfreedata/category/databycategory.html>). The hydrography features are sourced from the USGS's National Hydrography Dataset (NHD). All basemap features will be useful in the Flood Insurance Rate Map (FIRM) database for a potential flood risk project.

Base Level Engineering

Base Level Engineering (BLE) is a FEMA initiative that involves performing an approximate engineering analysis and updated floodplain mapping for all Zone A in the Contoocook Watershed. Discovery Maps shared with Contoocook Watershed communities at the Discovery Meetings showed the Zone A that were developed using BLE. Current results include water surfaces for the 10, 4, 2, 1, and 0.2 percent Annual Exceedance Probability (AEP) floods for all analyzed reaches.

The results of the analysis and mapping is being used in the ongoing Contoocook Watershed study which has been funded through regulatory mapping (e.g., FIRM panels) and Preliminary issuance. In addition to the regulatory products, the water surfaces and depth grids can be used directly in nonregulatory products to assist with planning. Water surfaces can also be used in the validation of LOMCs that FEMA receives regarding properties that are mapped in Zone A. Currently, it is difficult to determine if a property or structure is actually above the flood level because no numerical water surface is available for Zone A. With the creation of these new water surfaces, a numerical value for the flood height will be available for comparison with the property and structure elevations to determine the validity of LOMCs.

Other Data and Information

Effective Flood Insurance Study/Flood Insurance Rate Map Data

Hydrology

Effective discharges were obtained from the Cheshire County, New Hampshire (All Jurisdictions) (Federal Emergency Management Agency 2006a), Hillsborough County, New Hampshire (All Jurisdictions) (Federal Emergency Management Agency 2009), Merrimack County, New Hampshire (All Jurisdictions) (Federal Emergency Management Agency 2010), and Sullivan County, New Hampshire (All Jurisdictions) (Federal Emergency Management Agency 2006b). Generally, effective flows were determined using either regional regression equations, previous studies, or gage analysis. Although the county-wide Flood Insurance Study (FIS) reports are dated from 2006 to 2010, the effective flows reported were calculated from earlier studies between 1972 to 1985.

Hydraulics

The most notable flooding events for the study reaches in the watershed were floods in March 1936 and September 1938. These two floods were the result of typical flooding conditions caused by either rapid snowmelt for the former or hurricane-type storms for the latter (Federal Emergency Management Agency 2009). Other notable flooding events occurred in April 2004, May 2006, and April 2007. Some of the largest peak discharges were recorded at gages along the Contoocook River (01082000 at Peterborough and 01085000 near Henniker) in April 2004 and 2007, and in May 2006 at gage 01086000 (Warner River at Davisville).

National Flood Insurance Program Claims Data

FEMA furnished a dataset of all claims made against the NFIP since its inception in the 1970s until December 31, 2015. In the 33 communities touching the Contoocook Watershed study area, the data pull returned 200 NFIP claims in that period, totaling \$2,101,609 with an average reimbursement of \$10,208.05 per claim filed.

Often, a successful NFIP claim occurs when a property is flooded that, according to the effective FIRM, is at risk of flooding during the base flood. (The exceptions are claims against “discount” policies for properties that are located outside the Special Flood Hazard Area. The percentage of claims in this category could not be ascertained with the data provided, but is assumed to be small.) Therefore, NFIP claims data cannot be used to draw any conclusions for Discovery about reaches that may be high priorities for restudy because of outdated hydrology, hydraulics, topography, or structure inventories. However, high concentrations of NFIP claims (especially expensive ones) may draw attention to hotspots where population, structure inventories, and flood hazard are all unusually high, highlighting the highest-priority opportunities for mitigation.

NFIP claims hotspots were determined by a point density analysis calculating the cumulative dollar value of claims within a one-kilometer radius. Note that this analysis does not take the timing of claims into account, so mitigation efforts may have already been undertaken on some or all of these reaches in response to flood events early in the history of the NFIP.

Reach Selection

By synthesizing the results of all analyses presented above, as well as study age, map age, and risk (how many structures and people are in the effective floodplain), a final list of reaches was selected for updated engineering and mapping. **Appendix G** includes figures showing areas of interest for potential study as identified by communities, a community feedback table with numbered comments corresponding to those figures, and a list of the 101 miles of prioritized streams that will be studied in the Contoocook Watershed.

VI. Next Step: Prioritization of Study Areas

As discussed during the Discovery Meeting, three levels of study may be used during the study of the Contoocook Watershed: (1) detailed study, (2) approximate study/base level engineering, and (3) redelineation. **Figure 3** shows the type of studies that will be conducted on the streams within the Contoocook Watershed.

Each level of study uses a different methodology, as summarized below:

(1) Riverine Zone AE (Detailed Study)

- Most detailed and most expensive riverine study
- Structures and cross-sections are field surveyed
- Streamgauge data or regression equations used for hydrology, and Hydrologic Engineering Center's River Analysis System (HEC-RAS) modeling used for hydraulics
- Flood way data table and flood profiles are included in the FIS
- Mapping:
 - *Base Flood Elevations (BFEs), appeal eligible*
 - *Cross sections*
 - *Flood way*
 - *1 percent annual exceedance probability (100-year flood) floodplain*
 - *0.2 percent annual exceedance probability (500-year flood) floodplain*

(2) Riverine Zone A (Base Level Engineering)

- Hydrologic and hydraulic modeling analysis based on new terrain data
- Streamgauge data or regression equations used for hydrology, and HEC-RAS modeling used for hydraulics
- No field survey
- Cross-sectional values derived from new LiDAR terrain data
- Mapping: Approximate delineation for the 1-percent annual-chance event, no BFEs
- Also available: Delineations and analysis grids for 0.2-, 2-, 4-, 10-, and 1-percent \pm annual-chance events

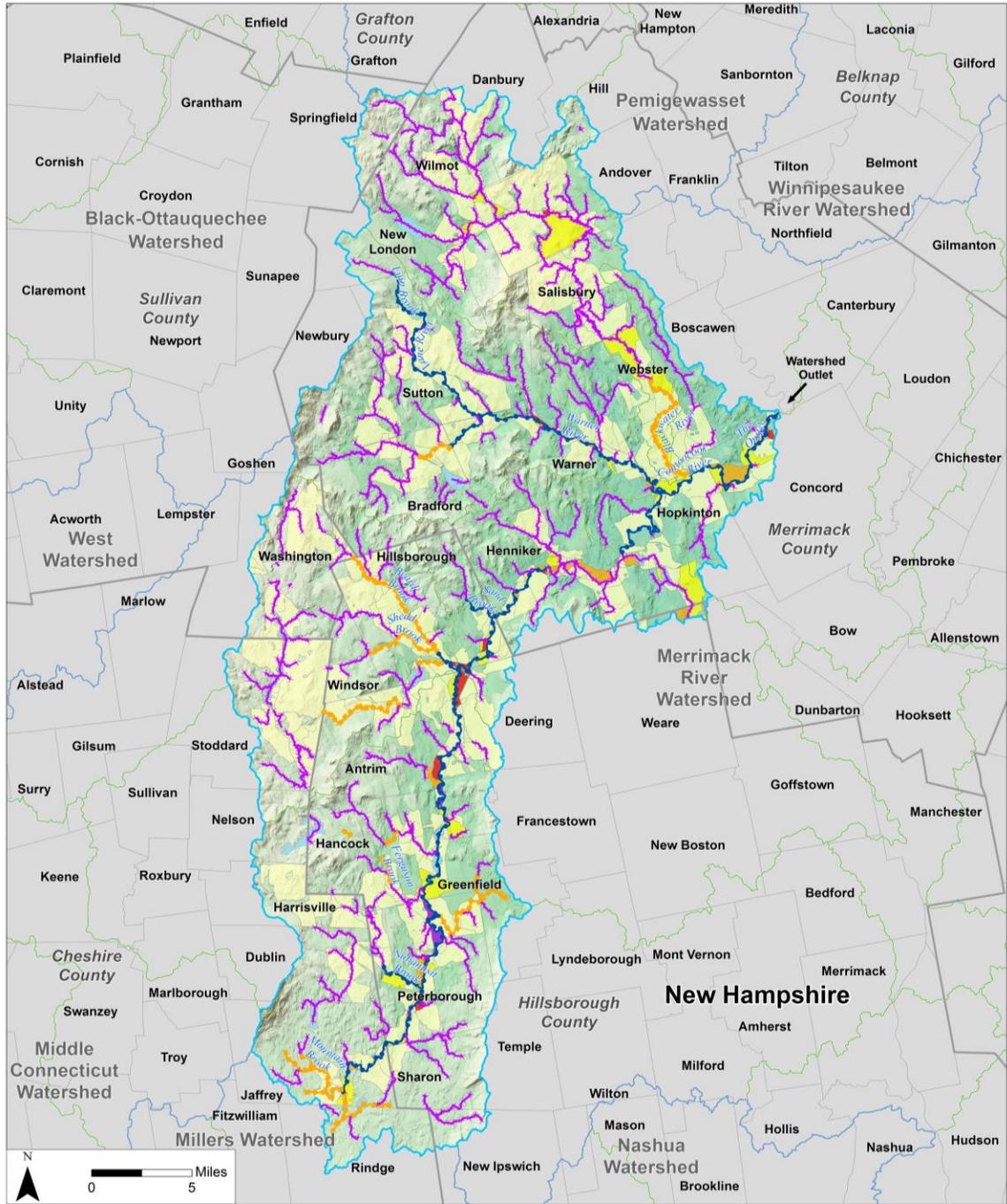
(3) Redelineation (Zone AE)

- No new engineering analysis

- Acceptable when effective BFEs are considered accurate
- Effective elevation data are transferred to new LiDAR terrain data to create new floodplain delineations for a FIRM
- FIS data: same as effective study

FEMA Region I used the information provided by communities—as shared in this Discovery Report—to help determine priority areas for study in the next phase of the Risk MAP process. The final selection and prioritization of areas for new study depended on the funds that Congress allocates to Region I for this purpose. Additionally, individual communities may choose to conduct their own studies of priority areas and/or take mitigation actions, and provide that information to FEMA Region I for consideration as part of the updated maps the communities may receive in the future.

Figure 3. Discovery Map, Contoocook Watershed



MAP SYMBOLOLOGY

- | | |
|------------------------------|-------------------------|
| Watershed Boundary | Average Annualized Loss |
| HUC10 Watershed Boundary | Very Low |
| Neighboring Watersheds | Low |
| Water Bodies | Medium |
| Communities | High |
| State Boundary | Very High |
| County Boundary | |
| Future Detailed Study | |
| Future Redelineation Study | |
| Draft Base Level Engineering | |

WATERSHED LOCATOR



NATIONAL FLOOD INSURANCE PROGRAM

Discovery Map

CONTOOCCOOK WATERSHED

Total Stream Miles: 641 Miles
 Future Detailed Study (AE): 101 Miles
 Future Redelineation Study (AE): 61 Miles
 Future Base Level Engineering (A): 479 Miles

Population: 101,566



HUC-8 Code
 01070003
 Release Date
 12/11/2018

VII. Close

Local officials in the Contoocook Watershed communities were willing participants in the Discovery process and were open to learning more about how they can begin to develop resiliency to flood, storm, and manmade hazard events. They identified areas for map updates and areas in which they could use additional technical support from FEMA.

Using the input from the Discovery Meeting, the project team finalized the Discovery Report and Map. From this information, FEMA Region I has developed a scope of work and budget for the Contoocook Watershed Risk MAP project. The Region assessed the mapping needs in the Contoocook Watershed against the mapping needs across the entire Region before selecting and initiating this Risk MAP project. Project selection is contingent upon the level of funding FEMA Region I receives, which varies yearly. FEMA Region I will communicate with the communities about project selections, when appropriate.

If the mapping needs have changed since the information was provided during Discovery, or if the need for a new project is identified after the publication of the Discovery Report, the affected community is responsible for providing updates to the Region. Additionally, if a community has the capacity to provide leveraged data or contribute funding toward the completion of a Risk MAP project, FEMA Region I took that information into consideration when prioritizing its projects.

With the completion of the Discovery process for the Contoocook Watershed project, the project will move into the next phase which includes the following Risk MAP project workflow:

- Data development procedures, which includes engineering-related activities, such as hydrologic and hydraulic analyses, floodplain mapping, and risk assessments
- Development of Preliminary FIRMs, which will be distributed to the communities upon completion of the revisions
- Post-Preliminary processing tasks, which include initiating the appeal and comment period, community ordinance updates, and distributing the effective FIRM products
- Outreach meetings and community engagement for the entire project life cycle
- Mitigation planning support for the entire project

VIII. Literature Cited

New Hampshire Department of Environmental Services. "New Hampshire Statewide Total Maximum Daily Load (TMDL) for Bacteria Impaired Waters." September 2010.

<https://www.des.nh.gov/organization/divisions/water/wmb/tmdl/documents/appx-f-contoocook.pdf>

U.S. Climate Data. Accessed February 27, 2019.

<https://www.usclimatedata.com/climate/jaffrey/new-hampshire/united-states/usnh0344>

Federal Emergency Management Agency. 2006a. "Flood Insurance Study, Cheshire County, New Hampshire (All Jurisdictions)." May 23, 2006.

Federal Emergency Management Agency. 2009. "Flood Insurance Study, Hillsborough County (All Jurisdictions), New Hampshire." September 2009.

Federal Emergency Management Agency. 2010. "Flood Insurance Study, Merrimack County (All Jurisdictions), New Hampshire." April 19, 2010.

Federal Emergency Management Agency. 2006b. "Flood Insurance Study, Sullivan County, New Hampshire (All Jurisdictions)." May 23, 2006.

IX. Appendices

Appendix A: Watershed Community and Stakeholder Outreach

- I. Stakeholder Database
- II. Sample Letters
- III. Sample Email
- IV. Sample Post-Meeting Emails
- V. Questionnaire Form

Appendix B: Discovery Meeting Materials

- I. Presentation
- II. Meeting Attendees

Appendix C: Meeting Synopses

Appendix D: Community Feedback

- I. Community Completed Questionnaires

Appendix E: Hazard Mitigation Plan Status

- I. Hazard Mitigation Plan Status

Appendix F: Community Profiles

Appendix G: Areas of Interest for Potential Study

- I. Community Feedback Maps
- II. Community Feedback Table
- III. Stream Prioritization Table

Appendix A

Watershed Community and Stakeholder Outreach

Appendix B

Discovery Meeting Materials

Appendix C

Meeting Synopses

Appendix D

Community Feedback

Appendix E

Hazard Mitigation Plan Status

Appendix F

Community Profiles

Appendix G

Areas of Interest for Potential Study