

CIAMTIS

U.S. DOT Region 3 University Transportation Center

Planning for the Inevitable: Readying DOTs for Disaster Debris Management

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| 16. Abstract Hurricanes, tornadoes, floods, and other natural disasters result in significant debris, which impedes mobility and presents a challenge to state and local transportation agencies for the removal of debris and inspecting and repairing roads and bridges that are damaged. Debris management involves understanding regulations versus guidance, reimbursement policies, the nature of waste streams, procedures for managing different types of wastes, possible disposal sites, and contracting and procurement. The challenges are: (1) What do local agencies need to know? (2) What do local agencies already know? (3) What resources are available? (4) What are best practices? Both the Federal Emergency Management Agency (FEMA) and the Environmental Protection Agency (EPA) provide guidelines and tools for debris planning and management. Developing a debris management plan and following the plan during a declared disaster is critical to ensure reimbursement of expenditures through FEMA's Public Assistance Program. To assist these planning efforts, FEMA offers training courses focused on debris management and planning. Past actions suggest there is a lack of robust attendance at these trainings and problems with funding. This outreach project explored current debris management activities in each state in Region 3, identified training needs, and developed and delivered a training webinar on developing debris management plans. The webinar materials include other resources and are available for use by others. Our survey of practitioners throughout the region suggests that there are opportunities to offer other training topics or more advanced training on plan development, there is some value in repeating the training, and there is a potential audience for an in-person session that complements FEMA's existing offerings. | | | | | |
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CHAPTER 1

Introduction

BACKGROUND

Hurricanes, tornadoes, floods, and other natural disasters result in significant debris. The debris in the roadway not only impedes mobility in general but presents a challenge to state and local transportation agencies, who are responsible for both the removal of debris from the roads but also inspecting and then, if necessary, closing and repairing roads and bridges that are damaged. These disasters are known to take place in Region 3. In the last three years alone, there have been 16 Major Disaster Declarations within Region 3 (FEMA, 2020). All of these declarations represent debris-generating events. For example, floods in West Virginia in 2017 resulted in over \$20 million in expenditures on debris removal from streets, sidewalks, and other public property (West Virginia, 2017). The Delaware Department of Transportation had to remove 75,000 yd³ of sand from Route 1 following Hurricane Sandy. The road was closed for 5 days. In general, debris management and removal is estimated to represent one third of the costs of disaster recovery (Fetter & Rakes, 2012). In order to better manage these endeavors, research suggests local governments benefit from developing disaster debris management plans in advance (Crowley, 2017) (Crowley & Flachsbart, 2018).



FEMA Region 3 and Virginia Department of Emergency Management personnel conduct preliminary damage assessments following a tornado that hit the town of Lynchburg, Virginia in April 2018.

Photo by Will Powell - Sep 23, 2019 - Location: Lynchburg, VA

Both the Federal Emergency Management Agency (FEMA) and the Environmental Protection Agency (EPA) provide guidelines and tools for debris planning and management. Developing a debris

management plan and following the plan during a declared disaster is critical to ensure reimbursement of expenditures through FEMA’s Public Assistance Program. The FEMA guidance is documented in the following: Public Assistance and Debris Management Guide (July 2007) (FEMA, 2007); Public Assistance and Policy Guide (April 2018) (FEMA, 2018); and Public Assistance Alternative Procedures Pilot Program Guide for Debris Removal (v 7) (FEMA, 2019). EPA provides: Planning for Natural Disaster Debris (No. 530- K- 08001) (US EPA, 2008); and Incident Waste Decision Support Tool (I-WASTE) (US EPA, 2013).

FEMA has illustrated the importance of pre-event debris management planning through recent policy implementation. Public Assistance Alternative Procedures Pilot Program (v 7) (June 2019) (FEMA, 2019) was established in 2013 and renewed in 2019 to award additional funding to communities with a FEMA-approved debris management plan prior to the debris-generating event.

To assist these planning efforts, FEMA offers training courses focused on debris management and planning. Figure 1 provides the description of the FEMA class (offered in different formats). Past actions suggest there is a lack of robust attendance at these trainings and problems with funding ((Dewberry, 2013) Appendix F, page 16). A team member participated in the FEMA training “Planning for Disaster Debris Management” (MGT 460). Notes and observations are provided in Appendix A.

How the federal guidance and regulations translate into practice varies from state to state and local jurisdiction to local jurisdiction. A preliminary review of some plans for each state in Region 3 reveals a wide range of content and experiences, as summarized in Table 1. This table underscores the diversity of documentation currently available and the challenges local government units face in addressing debris management to support infrastructure recovery after a disaster.

G202 Debris Management, or E202 Debris Management Planning for State, Local and Tribal Officials This course provides an overview of issues and recommended actions necessary to plan for, respond to, and recover from a major debris-generating event with emphasis on state, tribal, and local responsibilities. Developed from a pre-disaster planning perspective, the course includes debris staff organizations, compliance with laws and regulations, contracting procedures, debris management site selection, volume reduction methods, recycling, special debris situations, and supplementary assistance. Selection Criteria: Tribal, local, and state emergency management personnel, including public works and waste management staffs, who are responsible for planning and/or implementing debris removal and disposal actions.

Figure 1 FEMA training: Debris Management

Table 1 Examples of plans and guidance in the states in Region 3

| State | Status of State Plan and Examples of Other Plans |
|---------------|--|
| Delaware | Plan is currently in draft form; Emergency operations plans for Newark (City of Newark, Delaware, n.d.) and New Castle County Plan (New Castle County, Delaware, 2015). |
| DC | Attachment to Emergency Operations Plan referring to debris management. |
| Maryland | State Guidelines (Maryland Emergency Management Agency, 2018); plan for St Marys County (St Marys County, n.d.); Howard County lacks a debris management plan, Emergency Management Strategic Plan stresses planning, not specifically debris planning. |
| Pennsylvania | Pennsylvania Emergency Management Agency makes mention of debris in its emergency operations plan (Pennsylvania Emergency Management Agency, 2019); Clarion County plan (Clarion County, Pennsylvania, 2017); Chester County plan to be developed (stated in 2014 Emergency Operations Plan). |
| Virginia | Virginia Emergency Management provides guidance on procurement and contracts and specific events. They have in the past offered a workshop on debris management. A more detailed analysis of 20 debris management plans from Virginia can be found in (Woody, 2020). |
| West Virginia | Guidance document (West Virginia Division of Highways, 2004); State 2016 CDBG Recovery Plan (West Virginia, 2017); 2013 West Virginia Statewide; Standard Hazard Mitigation; Plan Update (Dewberry, 2013); Several counties mention debris in Emergency Operations Plans, but lack a debris plan specifically. |

Debris management involves understanding:

- 1) Regulations versus guidance,
- 2) Reimbursement policies,
- 3) The nature of waste streams,
- 4) Procedures for managing different types of wastes,
- 5) Possible disposal sites, and
- 6) Contracting and procurement.

The challenges are:

- 1) What do local agencies need to know?
- 2) What do local agencies already know?
- 3) What resources are available?
- 4) What are best practices?

OBJECTIVES

The objectives of this project were to:

- 1) Catalog the activities in each state in Region 3,
- 2) Identify training needs and develop appropriate training programs,
- 3) Deliver a pilot training program, and
- 4) Disseminate the information and training materials to LTAP centers.

OVERVIEW OF THE METHODOLOGY AND REPORT

This project involved a review of debris management plans in the Mid-Atlantic region, a survey of state and local officials to determine training needs, development of training materials, and delivery of a pilot webinar and dissemination of the materials. This was followed by evaluation and revision of the materials.

This report documents each of these steps. The report is organized into four chapters and seven appendices. This chapter presents an overview. The following chapter details the methodology. The third chapter presents the findings. A final chapter provides recommendations. The appendices provide a summary of FEMA training (Appendix A); the survey instrument (Appendix B); reviews of existing plans (Appendix C); detailed documentation of the survey results (Appendix D); training materials, including the presentation and a list of other training resources (Appendix E); the survey developed to evaluate the training (Appendix F); and the webinar evaluation results (Appendix G).

CHAPTER 2

Methodology

REVIEW OF EXISTING DEBRIS MANAGEMENT PLANS

To better understand the state of debris planning for Region 3, a plan evaluation was conducted on state-level plans within the region. The goal of this process was to better understand the high-level debris planning operations in the region to better identify training needs and gaps of information. This chapter details the methods, analysis, and impacts for the study.

Study Area

Several debris management plans were evaluated for the project. The Delaware state-level debris plan (Delaware Emergency Management Agency, 2018), the Maryland Marine Debris Emergency Response Guide: Comprehensive Guidance Document produced by the National Oceanic and Atmospheric Administration (NOAA) (NOAA, 2015), ESF 3 - Public Works and Engineering Emergency Operations Plan from the State of West Virginia (State of West Virginia, 2016), and the Virginia Emergency Operations Plan (Commonwealth of Virginia, 2019) were evaluated for this project.

There are currently no state-level debris plans in Pennsylvania, and there is a debris plan for the District of Columbia, but it was not accessible for this study.

Metrics for Analysis

Each plan was evaluated against criteria in three major categories: scope and fact base, operations, and regulations and authority. The fact base category includes information that sets the scene for planning. It includes information regarding the community, major hazards, and overall characteristics. The operations category is the largest and includes metrics regarding specific operations that will take place in the event of disaster debris management. Lastly, the regulations and authority include information regarding major applicable regulations or state laws or codes that grant authority for certain agencies to conduct debris management. The full list of criteria is shown in Table 2.

SURVEY OF STATE AND LOCAL GOVERNMENTS

Disasters can leave a community grappling with high volumes of debris to manage. This debris can be in the form of construction material, vegetation, white goods, or electronics. This survey was designed to better understand how local, regional, and state governments prepare for, and respond to, disaster debris. The survey was designed to capture the attitudes and opinions of transportation staff regarding their perceived level of disaster debris preparedness and planning. The survey received an exemption from the University of Delaware Institutional Review Board (Project [1479380-1] on August 16, 2019).

Table 2 Criteria considered in plan evaluation

| Scope and Fact Base | Operations | Regulations and Authority |
|--|--|--|
| Purpose of Plan Debris Forecast-Volume Debris Forecast-Location Debris Type | General Procedure Aggregation Dissemination Contracting Staff Roles and Responsibilities Staff Organization Chart Relationship Between Other Levels of Government HAZMAT Closeout Procedures Training Public Information Strategy | Purpose of Plan Debris Forecast-Volume Debris Forecast-Location Debris Type |

Survey Population and Timeframe

The survey was emailed to the T2 (Delaware’s LTAP) distribution list in Delaware and the LTAP liaisons for distribution in all other states in Region 3. The District of Columbia was not surveyed given that the organizational structure is significantly different. The distribution lists included local, regional, and public employees in the region, as well as consultants that work with state and local agencies. These individuals work in a variety of departments, including public works, transportation, emergency management, or local leadership. For example, in Delaware the distribution list includes:

- State agencies (DelDOT, DTC, DNREC, etc.)
- Local agencies (Delaware municipalities, towns, counties)
- Delaware River and Bay Authority
- FHWA
- Private consultants/contractors

The survey was not sent to the consultants and contractors.

The survey was first piloted with colleagues at the University of Delaware prior to distribution. The email sent out is included in Appendix B. This email was sent out in August 2019 with follow up via email and announcements at the Roadway Management Conference. There was very limited response from Maryland and Virginia and follow up emails were sent with customized links. The timing and responses are shown in Table 3.

Survey Instrument

The survey instrument is included in Appendix A. The survey was administered through Qualtrics and a link provided in the email.

TRAINING

Building on the review of the documents and the survey, appropriate training materials were developed. The training also recognizes the opportunity provided by the existing FEMA self-study courses and

complements this material. Using the training materials developed, a pilot session was delivered, and assessment, evaluation, and revision undertaken.

Table 3 Time frame for survey distribution and response

| Date | Recipients | Response |
|------------------|------------------------|--|
| August 28, 2019 | All states in Region 3 | 207 Responses (October 18, 2019) Delaware – 87 Maryland – 9 Pennsylvania – 200 Virginia – 1 West Virginia – 0 District of Columbia – 0 |
| October 31, 2019 | Virginia | 0 Responses |
| October 31, 2019 | Maryland | 9 Responses |

CHAPTER 3

Findings

EXISTING DEBRIS MANAGEMENT PLANS

The analysis of state-level plans proved to be very informative. Of the four plans evaluated, there were few similarities between them. There were three primary functions of these plans, varying lengths, and there was not a plan representing each state in the region. Many of these plans are functionally different, and there is little standard practice between them. This section will review the plan analysis, but more comprehensive findings are in Appendix C.

Overall, the plan from Delaware is the most detailed and robust; the NOAA plan focuses primarily on policies, and the Virginia and West Virginia plans are similar in depth and function. Each category is discussed in more depth below.

Function of Plans

There were three primary functions identified in the plans. The plans for both Virginia and West Virginia are emergency support functions for public works departments. These plans were more focused on the high-level organization of operations and contracting than the detailed mechanics and decision-making.

The NOAA plan in Maryland was not an operations plan, but rather a guide and reference tool to explain the current state of debris management planning. It identifies what agencies are responsible for what areas of debris management, debris exposure forecasts, and defines many relevant regulations.

The Delaware plan was the most detailed and contained more information than the other state-level plans. This plan functions as both an operations plan with organizational charts as well as a reference guide with detailed background information and decision-making procedures.

Scope and Fact Base

The Delaware and NOAA plans included the most information regarding scope and debris forecasting. They included a clear plan purpose, which can serve as useful context for the information found in the rest of the plan.

These two plans also offered the most information regarding debris forecasting. The Delaware plan included information regarding debris type, location, and volume, while the NOAA plan offered information on location and type of debris. The Virginia and West Virginia plans offered no forecasting information.

Operations

Once again, the Delaware plan addressed each component of the category. Aggregation, contracting, and training were discussed without being fully addressed, but each other metric was sufficient.

The Virginia and West Virginia plans address the same topics, but to varying degrees. Both plans discuss general procedures, but the West Virginia plan discusses the issue in more detail. Contracting, however, is discussed in more detail in the Virginia plan than in the West Virginia plan. Lastly, aggregation sites were only discussed in the Virginia and Delaware plans.

The NOAA plan is primarily intended to be a reference guide, so it is unsurprising that it does not address several of the operations criteria. However, it does address some issues that communities may face in general procedures. It also offers information regarding staff roles and responsibilities and explains the relationship between other levels of government.

Regulations and Authority

Each plan addressed most regulations and authority metrics, and all four plans identified primary and secondary agencies. Private property policies were included in the Delaware, Virginia, and West Virginia plans.

The Delaware plan addressed each metric but did not fully address environmental and safety regulations. Instead of including information about specific regulations, the plan includes information regarding individuals who will manage regulatory issues. This plan was also the only one to include financing information.

Project Impacts

The state-level example, in most cases, has little actionable information for local-level governments. The non-uniformity of plans in the region indicates there may be varying levels of resources put toward plan development. The large gaps of information included in these plans indicates that training will likely be beneficial. Since there are already training and reference materials for these topics, it may be more beneficial to train individuals on the resources available rather than to teach each topic individually.

SURVEY RESULTS

Disasters can leave a community grappling with high volumes of debris to manage. This debris can be in the form of construction material, vegetation, white goods, or electronics. Debris is also often contaminated and must be treated as hazardous waste. This survey was designed to better understand how local, regional, and state governments prepare for, and respond to, disaster debris. This survey was also designed to explore the disaster debris management training needs of state and local governments as part of a project funded through the U.S. Department of Transportation Region 3 University Transportation Center led by The Pennsylvania State University. It captured the attitudes and opinions of transportation staff regarding their perceived level of disaster debris preparedness and planning. In total, there were 274 complete responses to the survey.

The following subsections summarize the results of the survey, and in particular results relevant to the selection of training content and format. Detailed charts and graphs are included in Appendix D.

Information about the Respondent

The survey asked about the respondents and the community or agency in which they work. Most of the respondents were from Pennsylvania (66%) and Delaware (31%). Sixty-one percent of respondents worked for towns or cities and 30% for states. Thirty-four percent of respondents worked for public works and 29% for transportation. Thirty-four percent indicated other, which include town engineering, and township or borough secretary or treasurer.

Community Profile

About half of the respondents have some experience with debris-generating events in the last 5 years and most respondents said they were confident to manage event-related debris.

Debris Planning in the Community

However, when asked specifics about the planning process, the respondents were less knowledgeable or indicated that information was not formalized. Overall, these responses were more variable. Fewer than 20% of respondents indicated that they had a debris plan and very few had plans under development.

Irrespective of the availability of a formal plan, respondents were asked about the function of plans and elements of their plan. Most respondents identified the major function of their plans as standard operating procedures. Table 4 summarizes the responses to questions related to specific plan elements.

Table 4. Planning element developed

| Element | Respondents indicating element developed (%) |
|------------------------------------|--|
| Financial protocols | 35.6 |
| Volume estimation | 8.6 |
| Mutual aid agreements | 37.4 |
| Contracts for collaboration | 60.4 |
| Aggregation sites identified | 41.3 |
| Defined roles and responsibilities | 60.5 |

Resources

Most respondents (70.5%) have not identified tools, guidelines training, regulations, and/or incentives to help in the planning process. However, 65% of respondents from state government indicated that they had identified such resources. This underscores the disparities in awareness between state and local government participants. The primary sources for such materials are state agencies and FEMA.

Training Participation

Only 22.4% of respondents have participated in training related to disaster debris (one third online and two thirds in person). When asked about interest in training topics, the most common response was plan development, although there was some interest in all the topics listed. The respondents were asked about their preference for different training methods. There was a split between participating in a 1- to 2-hour webinar and an in-person session, with the in-person session being split between a full-day and a half-day session.

Summary

Overall, most respondents to the survey had little experience with debris management and indicated that they are open to training sessions. Based on the survey responses, we decided to focus on local government and debris plan development. A webinar was also chosen to reach the most people with a reasonable investment.

TRAINING MATERIALS

Invitations and Invitees

The invitation to the webinar was sent to the same mailing list as the survey. The invitation is shown in Figure 2. Registrants were sent a confirmation and then a reminder the week before with the access information.

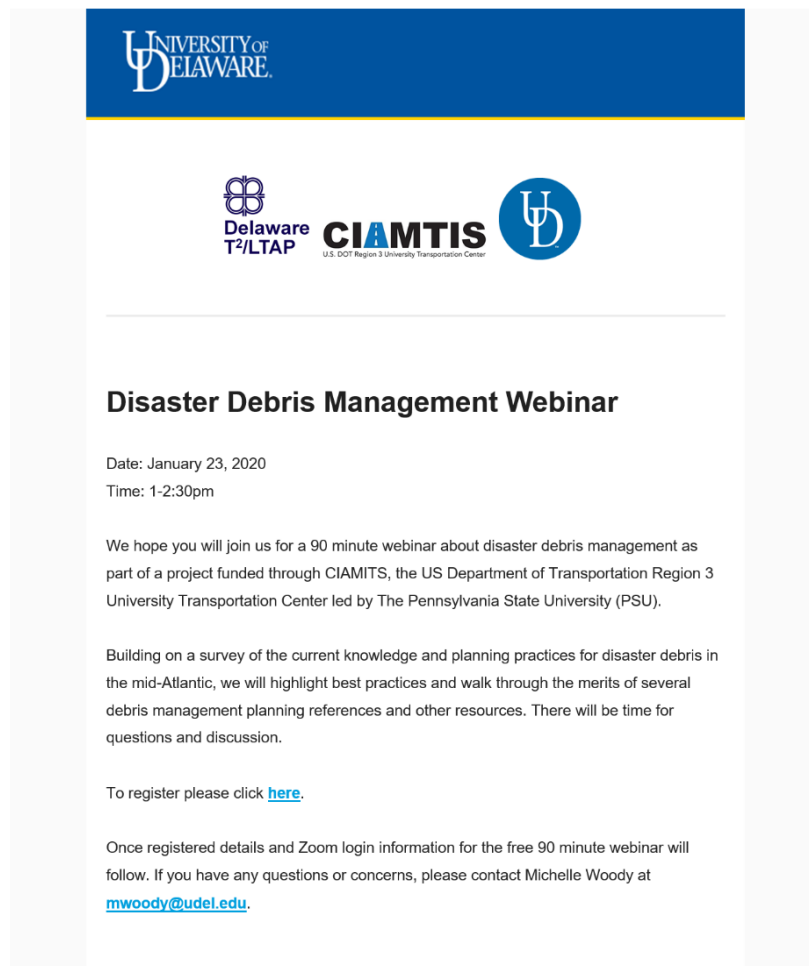


Figure 2. Invitation to disaster debris management webinar

Format

The webinar was a Zoom meeting. There was a PowerPoint presentation with a video of the hosts. Attendees could ask questions at any time through the Zoom chat function.

Content

Learning Objectives

The primary function of this webinar is to educate participants about the resources to aid disaster debris planning.

Schedule

| | |
|---------------|---|
| 0-10 minutes | Introductions, background, and objectives |
| 10-20 minutes | Introduction to disaster debris and debris planning |
| 20-25 minutes | Q&A |
| 25-60 minutes | Debris planning resources |
| 60-75 minutes | Q&A |
| 75-90 minutes | Resources and Q&A |

Structure of Webinar

The presentation was given by Sue McNeil, Matheu Carter, and Michelle Woody. It consisted of four primary sections:

1. Introduction
2. Grant project and debris background information
3. Debris planning resources
4. Questions and discussion

First, Sue introduced the webinar and gave an overview of the CIAMTIS grant project along with previous efforts. Then, Matheu discussed the typical types of debris caused by regional hazards and encouraged participants to consider events that have not yet happened. He discussed the idea of planning as a process, and the importance of starting the process now.

Next, Michelle introduced the debris management process and provided an overview of the public assistance program. After that, she talked through several resources from the Federal Emergency Management Agency, the National Oceanic and Atmospheric Administration, Environmental Protection Agency, Occupational Health and Safety Administration, and state agencies. With each resource, she discussed the purpose of each document and their strengths and weaknesses.

Finally, there was time for questions and discussions. There were questions regarding the Alternate Procedures Program, reimbursement issues, and mutual aid agreements.

The webinar concluded with an explanation of each of the links in the reference section of the webinar.

Questions and Discussion

Throughout the presentation there were around 5 or 6 questions asked through the chat function of Zoom. Question topic included: Alternate Procedures Program, examples of mutual aid agreements, issues with reimbursement for procurement.

Resources

Each participant was emailed a PDF of the PowerPoint presentation, which includes links to all resources mentioned. These sources include information from FEMA, EPA, OSHA, and NOAA. The presentation and links to the resources can be found in Appendix E.

Audience

There were 55 registrants for the webinar, and during the presentation attendance ranged between 40 and 47 attendees. They represent a variety of organizations, including local governments, state agencies, and consultants as shown in Figure 3. There were registrants from each state in Region 3.

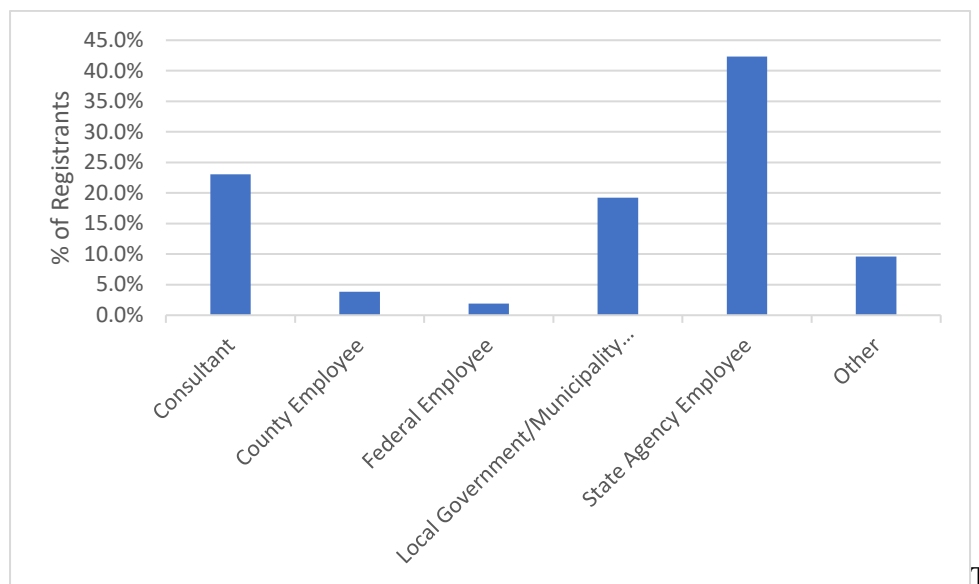


Figure 2. Webinar registrants by organization type

EVALUATION

Process

An anonymous online evaluation survey was distributed to the participants following the webinar. It was administered through Qualtrics and distributed after the webinar. It included questions regarding webinar scheduling communications, familiarity with content before and after the webinar, usefulness of the resources, and interest in future trainings. The survey is included in Appendix F. Six participants completed the survey.

Results

A detailed summary of the results is included in Appendix G. Although we have a limited number of responses (6 responses), the ones we do have suggest the webinar was well received and helpful to the audience. The comfort level with the topic increased, most found the resources useful, and most stated they would be interested in follow-up classes or a more advanced class on the same subject. No one had other comments to add at the end of the evaluation.

NEXT STEPS

There are many ways to continue this line of research and outreach, as the webinar only scratched the surface of debris planning. Next steps could include more detailed trainings on the same topic or inclusion of new topics.

This webinar was arranged by information source, but it could also be beneficial to arrange trainings by topic included in the initial survey. These topics could include hazardous materials management, aggregation site selection, financial protocols, environmental protection, and organizational workflow charts. Topic-specific trainings could cover fewer topics but dive deeper into the concepts, common practices, available resources, and time to workshop solutions for participants. These could also be conducted via webinar, but in-person trainings provide easier ideas-sharing among participants.

During the webinar there were multiple questions and comments about mutual aid agreements. It is clear from both the webinar and the prior survey that many local officials would benefit from learning more about the topic. There were two resources provided regarding mutual aid, but a more comprehensive training or outreach would be beneficial.

CHAPTER 4

Recommendations

Disaster debris management is an important topic, as debris removal and disposal is costly, and debris removal is a first step in disaster recovery and the repair of damaged infrastructure. Debris management is complex in terms of the requirements for reimbursement after a disaster declaration; the challenges presented, given limited resources and disrupted contracting and resource access; and the nature of the material, including potential hazardous waste, human remains, and large volumes of debris.

Based on a review of a limited number of debris management plans from the Mid-Atlantic region, we found a diversity of levels of maturity. This was followed by a survey of state and local agencies in the region distributed through the Delaware T² Center to their mailing list and contacts at the LTAP centers in each of the Mid-Atlantic states. The survey responses also underscored the diversity of experiences and interest in this topic. The survey results were used to develop a training webinar focused on debris plan development. Consistent with the survey responses, the training material developed focused on basics of plan development as a guide to getting started and the resources available to support this process. Over 40 people participated in the training session and the limited evaluations received were positive. These training materials and resources are available.

The survey and responses to the evaluation suggest that there are opportunities to offer other training topics or more advanced training on plan development, there is some value in repeating the training, and there is a potential audience for an in-person session that complements existing FEMA offerings.

Specific opportunities include a workshop at the CIAMTIS fall conference, a session at the regional LTAP conference, and a session at the fall Roadway Management conference. The ongoing COVID-19 pandemic introduces uncertainty into plans for each of these events. We are also planning to partner with the Disaster Research Center at the University of Delaware and develop a “DRC It!” resource (<https://www.drc.udel.edu/research/drcit>). This online educational resource will provide four products:

1. Topic summary
2. Theme summary
3. Short animated video
4. Bibliography

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Appendix A: FEMA Training - Planning for Disaster Debris Management

MGT-460 PLANNING FOR DISASTER DEBRIS MANAGEMENT

Class Name: MGT-460 Planning for Disaster Debris Management
Instruction: National Disaster Preparedness Training Center (NDPTC) at University of Hawaii
Date and Time: October 22, 2019 from 8:00AM-5:00PM
Location: Delaware State Fire School 1463 Chestnut Grove Rd, Dover, DE 19904
Format: In-person, classroom with lectures and exercise

Overview

The training was an in-person, one-day training for disaster debris management. The course was developed by FEMA and is built around a set of ten items that may be found in disaster debris plans.

Attendees

There were approximately thirty attendees. Attendees were mostly government employees from local and state agencies in Delaware. The departments where they worked were mostly transportation, public works, and environmental protection. There were also three graduate students from the University of Delaware in attendance.

Activities

There were three activities included in the course, detailed below.

Activity 1. Small Group Questions: A 10-minute exercise where attendees matched natural hazards to typical debris types, then identified the most common hazards and expected debris types in our area.

Activity 2. Debris Management Plan Outline: This worksheet was designed for attendees to start the planning process. Attendees wrote out how they would address each of the 10 elements in plans for their communities.

Activity 3. Problem Solving for Special Considerations: This activity intended to get attendees to think about how they would handle access issues, debris separation, competing interests/resource availability, and personal property unification.

Materials

Three types of paper handouts, as well as a USB drive, were provided to each attendee. There are three packets of paper handouts for the course. Each of these is produced by FEMA specifically for this course.

- MGT-460 Planning for Disaster Debris Management: Printed copy of the slides used for the lectures.

- Plan Examples Handout: Packet of excerpts from actual debris management plans. It is 27 pages and is organized by plan elements. Each of the 10 elements has 2 examples illustrating how some plans address the different aspects of plans.
- Activity Handouts: Worksheets for each of the three activities.

Files on USB Drive

There are four categories of documents on the USB Drive provided to each attendee, listed below.

- MGT-460 Planning for Disaster Debris Management Participant Guide: A more detailed version of the slides that includes notes and references, as well as a digital version of the Debris Management Plan Examples handout
- Video introducing NDPTC
- Fliers for other NDPTC courses
- 2019 Catalog for NDPTC courses

IMPLICATIONS FOR PROJECT

This course was productive in two ways. First, it helped to deepen understanding of debris management and public assistance. Second, it provided an opportunity to identify gaps in training needs. The training was developed by FEMA, so it was naturally primarily focused on FEMA resources and policies. This information is valuable to individuals creating or maintaining disaster debris plans, but it does not provide a complete picture of available resources. There was little mention of planning resources offered by NOAA, the EPA, or other government agencies. In light of this observation, the CIAMTIS webinar will recommend this training, but stress that it should be incorporated with other resources from other agencies.

Appendix B: Survey

EMAIL COMMUNICATION

Hello,

My name is Michelle Woody, and I am a graduate student in the Disaster Science & Management program at the University of Delaware. I am exploring the disaster debris management training needs of state and local governments as part of a project funded through the US Department of Transportation Region 3 University Transportation Center led by The Pennsylvania State University (PSU).

The first portion of the project is to understand current training and planning practice for disaster debris. In order to understand current practices, I have created a short survey that I hope you are willing to complete. It will take about **ten minutes** of your time.

The survey is **anonymous**, and we will not collect any identifying information. You may choose to terminate your participation in the survey at any point.

We are asking you to complete the survey because your professional expertise and insights will be particularly valuable. The results of this survey will be used to develop appropriate disaster debris training materials for the region. We would appreciate receiving your response by 5pm, Friday September 6.

You may access the survey by clicking on the following link:
https://delaware.ca1.qualtrics.com/jfe/form/SV_5mZSTottJY3d8YB

If you have any questions, please do not hesitate to contact me at mwoody@udel.edu. You may also contact the Principal Investigator for this project: Professor Sue McNeil (Email: smcneil@udel.edu; Telephone: 302-831-2442).

If you have any questions or concerns about your rights as a research participant, you may contact the University of Delaware Institutional Review Board at 302-831-2137.

Thank you,
Michelle Woody
MS Student
Disaster Science & Management Program
University of Delaware
Email: mwoody@udel.edu

SURVEY INSTRUMENT

Q1.1

Disasters can leave a community grappling with high volumes of debris to manage. This debris can be in the form of construction material, vegetation, white goods, or electronics. This survey is designed to better understand how local governments prepare for, and respond to, disaster debris. Using the information gathered through this survey, we will then create a disaster debris training tailored to the needs highlighted in the survey.

This survey has four parts:

1. We will ask some information about you. We are collecting generic information to understand your general role, but no identifying information will be collected.
2. We will ask general information about disaster debris planning in your community.
3. We ask about more technical information related to planning, response, and recovery.
4. We will ask you what training you are interested in.

Throughout the survey we mention "debris generating events." By this we mean any event that has generated enough debris to overwhelm local capacities. This could be a natural event, like a storm, tornado, or earthquake, or a man-made event, such as an explosion.

The survey should take about ten minutes to complete.

Q1.2 The first set of questions will focus on general information about you and your organization's debris planning.

Q1.3 In what state do you work?

- Delaware (1)
 - Maryland (2)
 - Pennsylvania (3)
 - Virginia (4)
 - West Virginia (5)
-

Q1.4 At what level of government do you work?

- Town (1)
 - City (2)
 - County (3)
 - Regional (4)
 - State (5)
-

Q1.5 At what agency or department do you work?

- Transportation (1)
 - Public Works (2)
 - Environmental Protection (3)
 - Emergency Management (4)
 - Other (5) _____
-

Q1.6 Has your community experienced a debris-generating event in the last five years?

- Yes (1)
 - No (2)
 - I don't know (3)
-

Q1.7 Does your community currently have a debris management plan?

- Yes (1)
- No (2)
- I don't know (3)

1. Skip To: Q1.10 If Does your community currently have a debris management plan? = No

Q1.8 Are you willing to share it with us?

- Yes (1)
- No (2)
- I don't know (3)

1. Skip To: Q1.11 If Are you willing to share it with us? != Yes

Q1.9

Thank you for offering to share your community's debris plan. You can either attach it here, or email it to Michelle Woody at mwoody@udel.edu

2. Skip To: Q1.11 If Thank you for offering to share your community's debris plan. You can either attach it here, or...() Is Displayed

Q1.10

Is there one in development?

- Yes (1)
 - No (2)
 - I don't know (3)
-

Q1.11 Do you know of any debris planning resources available to you, both inside and outside your organization? These can include guidelines, planning tools, or other educational materials.

- Yes (1)
- No (2)

3. Skip To: Q1.14 If Do you know of any debris planning resources available to you, both inside and outside your organ... = No

Q1.12

Who produces these resources?

- Federal Emergency Management Agency (FEMA) (1)
 - Environmental Protection Agency (EPA) (2)
 - The National Oceanic and Atmospheric Administration (NOAA) (3)
 - State agency (4)
 - Other (5) _____
-

Q1.13 Have you ever participated in any FEMA Debris Management training?

- Yes, I have completed the online class (1)
 - Yes, I have completed the in person training (2)
 - No (3)
-

Q1.14 If an event occurred, are you confident in your community's ability to manage the disaster debris efficiently and safely?

- Yes (1)
 - No (2)
 - Unsure (3)
-

Q1.15 Please elaborate on why you are or are not confident in your community's ability to manage disaster debris efficiently and safely.

End of Block: General Debris Management

Start of Block: Operations

Q2.1

The following questions will focus on technical aspects of disaster debris planning.

Q2.2

Are you aware of the existence of current disaster and/or disaster debris plans for your community? For example, debris related activities mentioned or highlighted in Emergency Operations Plans. If yes, please list.

- Yes (1) _____
 - No (2)
-

Q2.3

Plans can serve a variety of functions. They can be used as a reference to answer quick questions, checklists to provide a general list of tasks, or they can be step by step procedures. What is the primary function of your current plans?

- Reference (1)
- Checklist (2)
- Standard Operating Procedure (3)
- Other (4) _____

Q2.4 Has your agency identified debris management resources: tools, guidelines, training, regulations, and/or incentives?

- Yes (1)
- No (2)
- I don't know (3)

Q2.5

Please explain what resources your agency has identified or used to aid debris management planning.

Q2.6 Has your agency estimated the volume and/or type (vegetative debris, construction and demolition, electronics, etc.) of debris is likely to be generated in an incident?

- Yes, we have estimations of both type and volume of debris possible (1)
- Volume of debris estimated, type of debris not estimated (2)
- Type of debris identified, volume not estimated (3)
- I don't know (4)

End of Block: Operations

Start of Block: Block 3

Q3.1 The next set of questions pertain to operations and logistics in response to a debris-generating event.

Q3.2

Is there a general plan for response, including resource acquisition and deployment?

- Yes (1)
- No (2)
- I don't know (3)

Q3.3

Have contacts at related departments and agencies been identified in order to ensure smooth collaboration during emergency response?

- Yes (1)
- No (2)
- I don't know (3)

Q3.4 Does your agency have Mutual Aid Agreements in place related to debris management?

- Yes (1)
- No (2)
- I don't know (3)

1. Skip To: Q3.6 If Does your agency have Mutual Aid Agreements in place related to debris management? != Yes

Q3.5 Please explain what mutual aid agreements your organization has in place. Are they with nearby counties, out of state counties, or other? What type of organization is it with? Public Works, Department of Transportation, etc.

Q3.6

Typically, due to the volume of material, debris needs to be taken to an aggregation site before it can be disposed of. Have debris aggregation sites been identified?

- Yes (1)
 - No (2)
 - I don't know (3)
-

Q3.7 Hazardous sites can be cause for extra concern during a disaster. Have hazardous sites been identified and have contingency plans been developed for debris removal in the vicinity?

- Yes (1)
 - No (2)
 - I don't know (3)
-

Q3.8

Does your agency have a workflow process (org charts and flow charts) in the evening of a debris-generating event?

- Yes (1)
 - No (2)
 - I don't know (3)
-

Q3.9

Is there a clear division of responsibilities among the various agencies and departments in your community?

- Yes (1)
 - No (2)
 - There is division of responsibilities, but it is not very clear (3)
 - I don't know (4)
-

Q3.10 Have financial protocols been developed to ensure reimbursement?

- Yes (1)
 - No (2)
 - I don't know (3)
-

Q3.11 Does your community already have access to the equipment necessary to manage disaster debris?

- Yes, we have all equipment we might need (1)
- No, but we have a plan to access equipment as needed (2)
- I don't know (3)

End of Block: Block 3

Start of Block: Block 2

Q4.1 The remainder of the questions will focus on debris management training and educational topics you think your organization could benefit from.

Q4.2 Are you interested in future disaster debris training?

- Yes (1)
 - No (2)
 - Maybe (3)
-

Q4.3 Please select the debris management topics you would like to learn more about.

- Hazardous site management (1)
 - Aggregate site selection (2)
 - Financial protocols (3)
 - Mutual Aid Agreements (4)
 - Organizational or Workflow charts (5)
 - Contracting and equipment procurement (6)
 - Plan development (7)
 - Environmental Protection (8)
 - Other (9) _____
-

Q4.4 What format would best suit your training needs?

- Webinar (1-2 hours) (1)
 - In person workshop (full day) (2)
 - In person workshop (half day) (3)
-

Q4.5 Is there anything else you would like to add about your community's disaster debris plans and operations?

Q4.6 Thank you for completing this survey. If you have any questions or concerns regarding this survey, please contact Michelle Woody at mwoody@udel.edu.

End of Block: Block 2

Appendix C: Plan Evaluations

This appendix includes the evaluation of the plans for the region using the criteria specified. Table 5 reviews the scope and fact base. Table 6 reviews the operations. Table 7 reviews regulations and authorities, and includes some notes. An “X” in the table indicates the criteria is discussed. A “/” indicates that the criteria is mentioned.

Table 5 Scope and Fact Base

| STATE | Scope Articulated - Purpose of Plan | Debris Forecast - Volume | Debris Forecast - Location | Debris Type |
|--|-------------------------------------|--------------------------|----------------------------|-------------|
| DELAWARE | X | X | X | X |
| WEST VIRGINIA ESF 3 – Public Works and Engineering | X | - | - | - |
| VIRGINIA | X | - | - | - |
| MARYLAND-NOAA PLAN | X | - | X | X |

Table 6 Operations

| STATE | Operations - General Procedure | Aggregation | Dissemination | Contracting | Staff Roles and Responsibilities | Staff Org Chart | Relationship Between other levels of Government | HAZMAT | Closeout Procedures | Training | Public Information Strategy |
|--|--------------------------------|----------------|---------------|------------------|----------------------------------|-----------------|---|--------|---------------------|----------------|-----------------------------|
| DELAWARE | X | X ¹ | X | X ^{2,3} | X | X | X | X | X | \ ⁴ | X |
| WEST VIRGINIA ESF 3 – Public Works and Engineering | X | - | - | / | - | - | - | - | - | - | - |
| VIRGINIA | / | X | | X ⁵ | - | - | - | - | - | - | - |
| MARYLAND-NOAA PLAN | / ⁶ | - | - | - | X | - | X | - | - | - | - |
| ¹ Sort location dependent on situation ² Procedures in place, not contractors ³ DEMA will assist Delaware in pre-event contracts ⁴ Will train on a yearly basis, no other details provided ⁵ Procedures in place, not contractors ⁶ Lists challenges and possible solutions to disposal of debris | | | | | | | | | | | |

Table 7 Regulation and Authority, and Notes

| | Regulations and Authority | | | | | | | | |
|---|---------------------------|-----------|------------------|--------------------|-----------------------|---------------------------|--------------------|--------------|--|
| STATE | Private Property | Financing | Primary Agencies | Secondary Agencies | Authority Regulations | Environmental Regulations | Safety Regulations | HAZMAT | Notes |
| DELAWARE | X | X | X | X | X | X ¹ | X ² | X | Overall, they don't say how or if each individual or agency knows their responsibilities |
| WEST VIRGINIA ESF 3 – Public Works and Engineering | X | - | X | X | X | X | - | - | |
| VIRGINIA | X | - | X | X | - | - | - | ³ | The main point of their plan is to outline stipulations for contractors |
| MARYLAND-NOAA PLAN | - | - | X | X | X | X | X | - | Half the document explained the various players at different levels of government and NGOs |
| ¹ Mention who will manage them, mention some specific regulations regarding aggregation sites ² Mention who will manage them, not what they need to abide by ³ States will be regulated, but not based on what regulations | | | | | | | | | |

Appendix D: Survey Results

This Appendix documents the survey responses. The responses are grouped into broad areas:

- Information about the respondent
 - Respondent profile
 - Community profile
- Debris planning in the community
 - Status of debris management plan
 - Function of plan
 - Elements of plan
- Resources
- Training

In each area, the relevant question is reiterated, and a chart or graph summarizes the responses. A total of 274 complete responses were received.

Information about the Respondent

Respondent Profile

This survey collected basic data regarding what state the responders were from, what industry they worked in, and at what level of government.

The first question asked, “In what state do you work?” Almost all the respondents were from Delaware or Pennsylvania and the majority worked for state or local government. More specifically, the majority worked for public works or transportation with a large proportion also indicating “other.” The number of respondents from each state is shown in Figure 4. Most of the respondents worked in either Delaware or Pennsylvania. There were 181 originating from Pennsylvania, 85 from Delaware, 7 from Maryland, and 1 from Virginia. There were no responses from West Virginia.

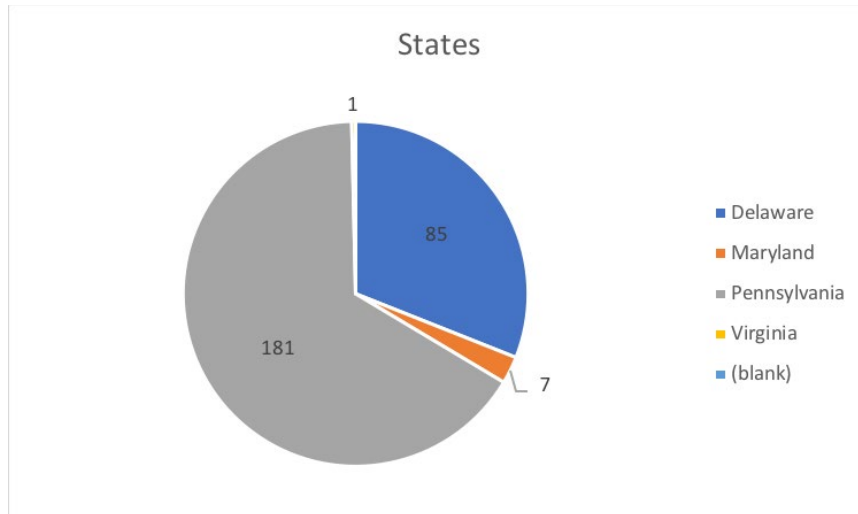


Figure 3 Respondents by State

Respondents were then asked, “At what level of government do you work?” Individuals who participated in this survey worked at city, town, county, regional, or state governments. Over half of the respondents worked for town governments, roughly one third worked for a state agency, and the remainder worked for a city, county, or regional government. The breakdown is shown in Figure 5. Most of the participants worked in public works, transportation, town leadership or administration, or emergency management. This breakdown is shown in Figure 6.

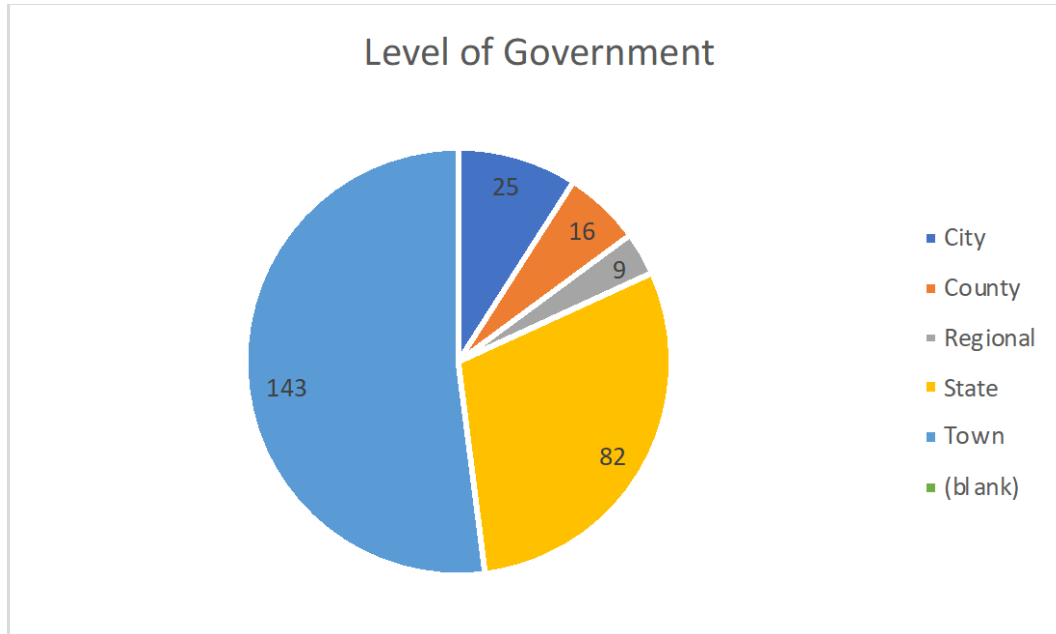


Figure 4 Respondents by Level of Government

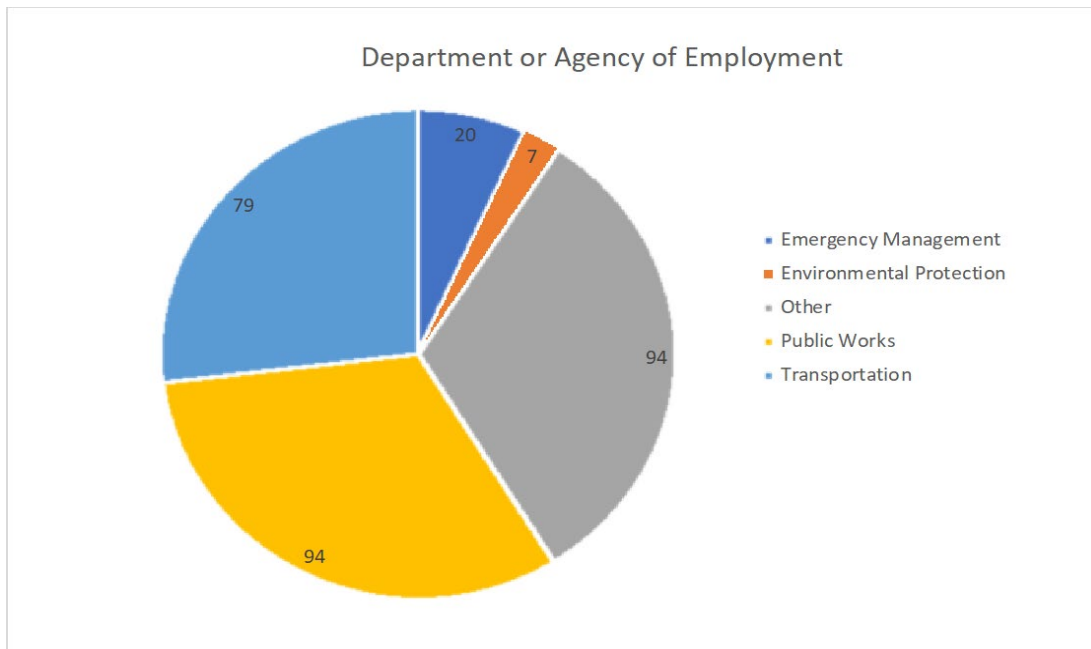


Figure 5 Respondents by Department or Agency of Employment

Community Profile

To understand the experiences of the respondents, the survey asked about experiences with recent debris-generating events (“Has your community experienced a debris-generating event in the last five years?”), and the respondents’ level of confidence in managing event-related debris (“If an event occurred, are you confident in your community’s ability to manage the disaster debris efficiently and safely?”). About half of the respondents have some experience with recent debris-generating events but fewer respondents from towns and townships have this experience (Figure 7). Sixty-eight percent of respondents indicated that they are confident to manage event-related debris (Figure 8).

Debris Planning in the Community

Debris management refers to a series of tasks, including planning, contracting, debris volume estimations, collection, aggregation, hauling, and disposal. The responsibility to manage disaster debris primarily falls on local governments. Within these local governments, public works, transportation, and environmental protection offices often manage disaster debris management after a disaster.

While it is generally acknowledged that the planning process is as important as or more important than the plan, the plan serves as an important tool. Therefore, we asked the respondents about the status of a debris management plan in their community or agency, and then probed to understand if a plan was in development.

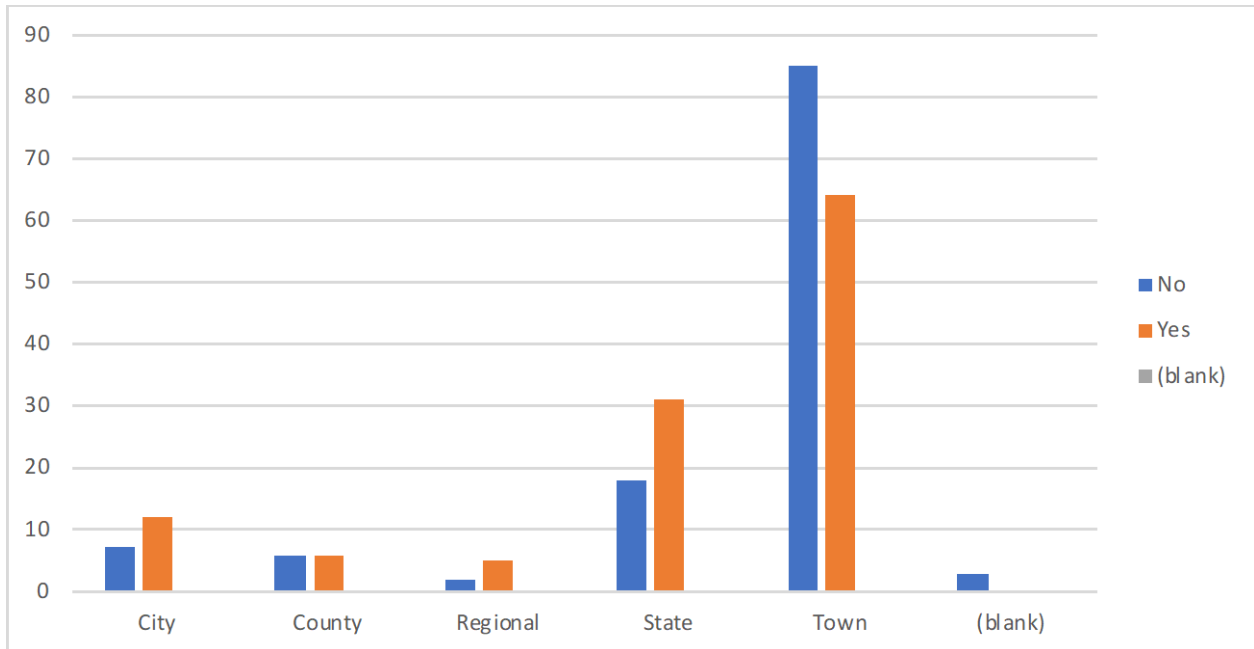


Figure 6 Experience with Recent Debris Generating Events

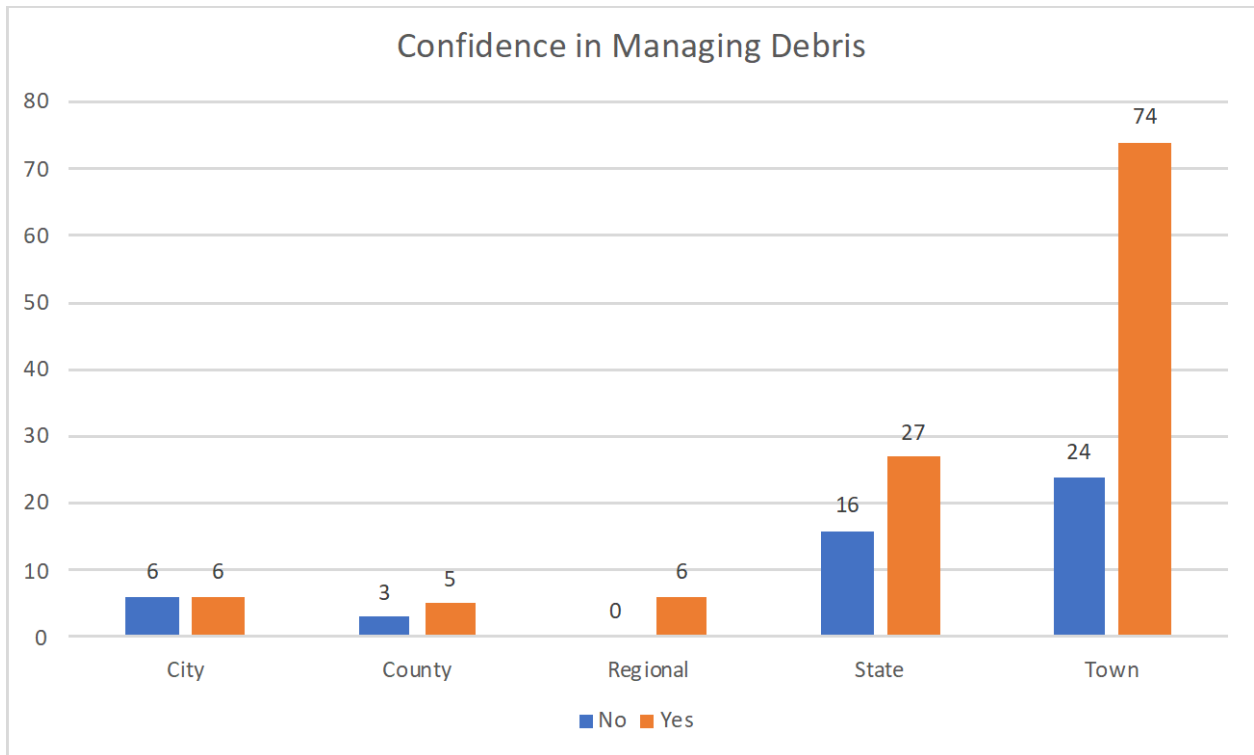


Figure 7 Confidence in Managing Debris

Status of Debris Management Plan

Respondents were asked, “Are you aware of the existence of current disaster and/or disaster debris plans for your community? For example, debris-related activities mentioned or highlighted in Emergency Operations Plans. If yes, please list.” Figure 9 shows whether the community has a debris plan or not, or the respondent did not know, broken down by the type of organization. Fewer than 20% of respondents indicated that they had a debris plan. The responses differ significantly from organization to organization. Of the respondents indicating that they did not have a debris management plan, the majority also indicated that there was not a plan under development. These results are shown in Figure 10 and Figure 11.

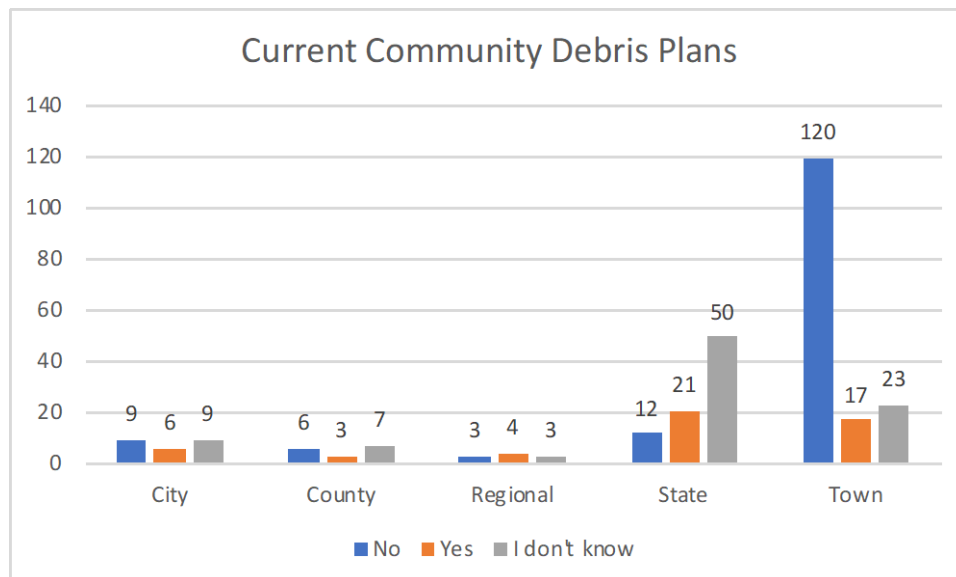


Figure 8 Status of Debris Management Plans

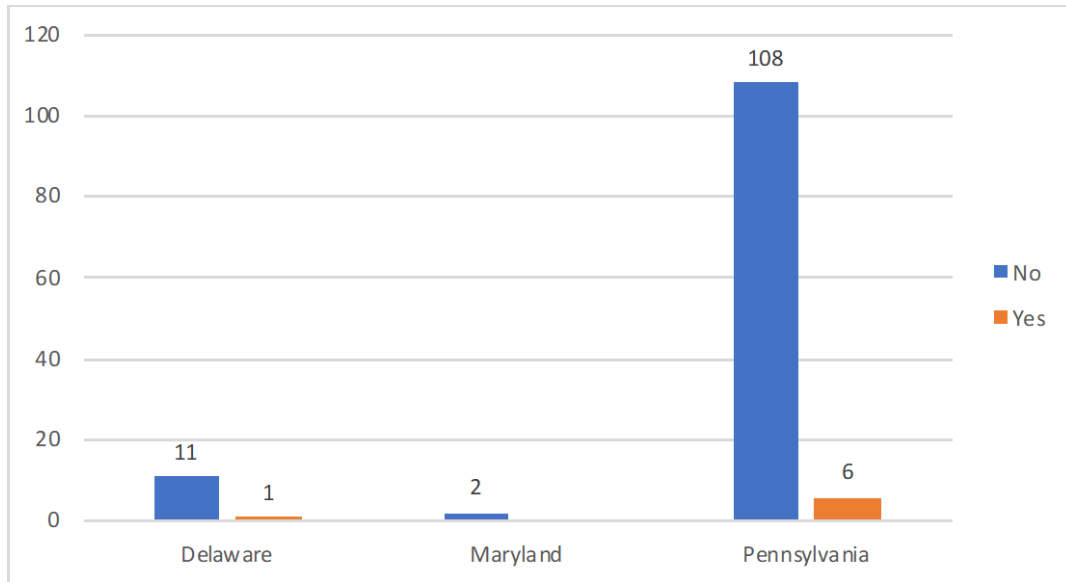


Figure 9 Debris Plan under Development (by State)

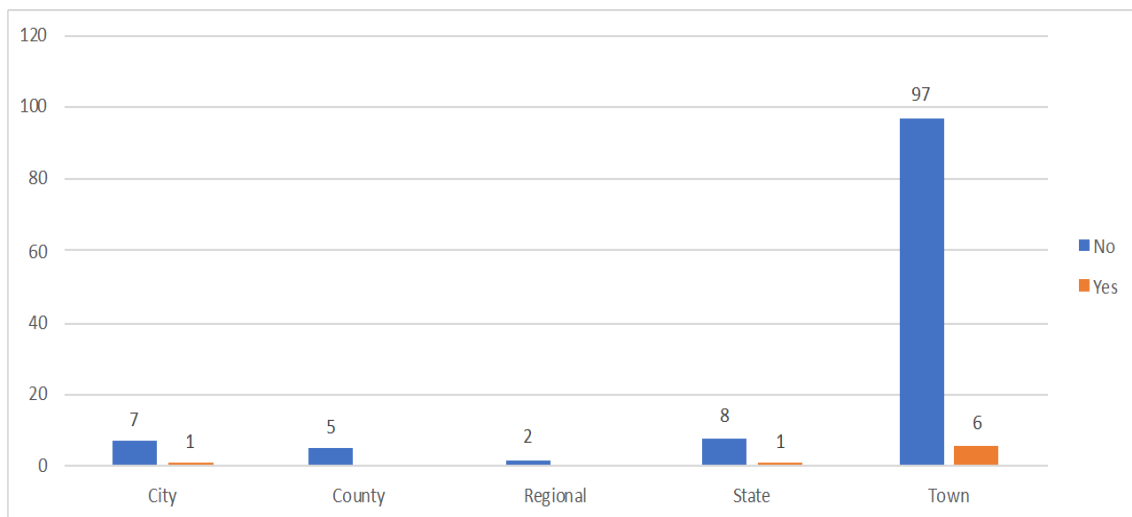


Figure 10 Debris Plan under Development (by Organization Type)

Function of Plan

Plans can serve a variety of functions. They can be a checklist, reference material, or a standard operating procedure. Participants were asked, “Plans can serve a variety of functions. They can be used as reference to answer quick questions, checklists to provide a general list of tasks, or they can be step by step procedures. What is the primary function of your current plans?” Of participants with local debris plans, most are standard operating procedures as shown in Figure 12. The other responses included “unknown”, “NA”, and “A lot of the time the DPW takes orders from the police and or fire department.”

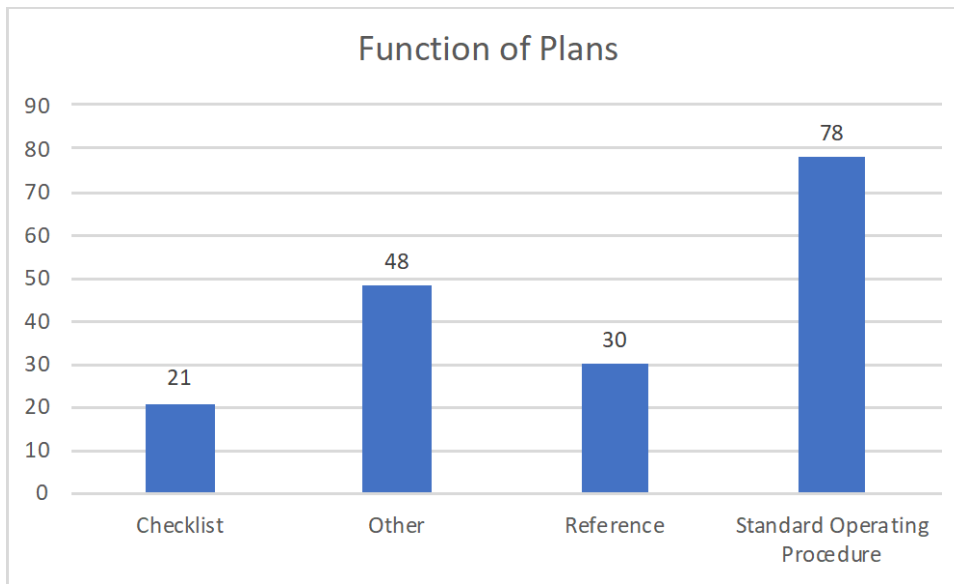


Figure 11 Functions of Plans

Elements of Plans

Plans include information about financial protocols, type and volume estimation, mutual aid agreements, agency collaboration, aggregation sites, roles and responsibilities.

The survey asked, “Have financial protocols been developed to ensure reimbursement?” Most respondents answered no but respondents from state agencies were more likely to answer yes. The results are shown in Figure 13.

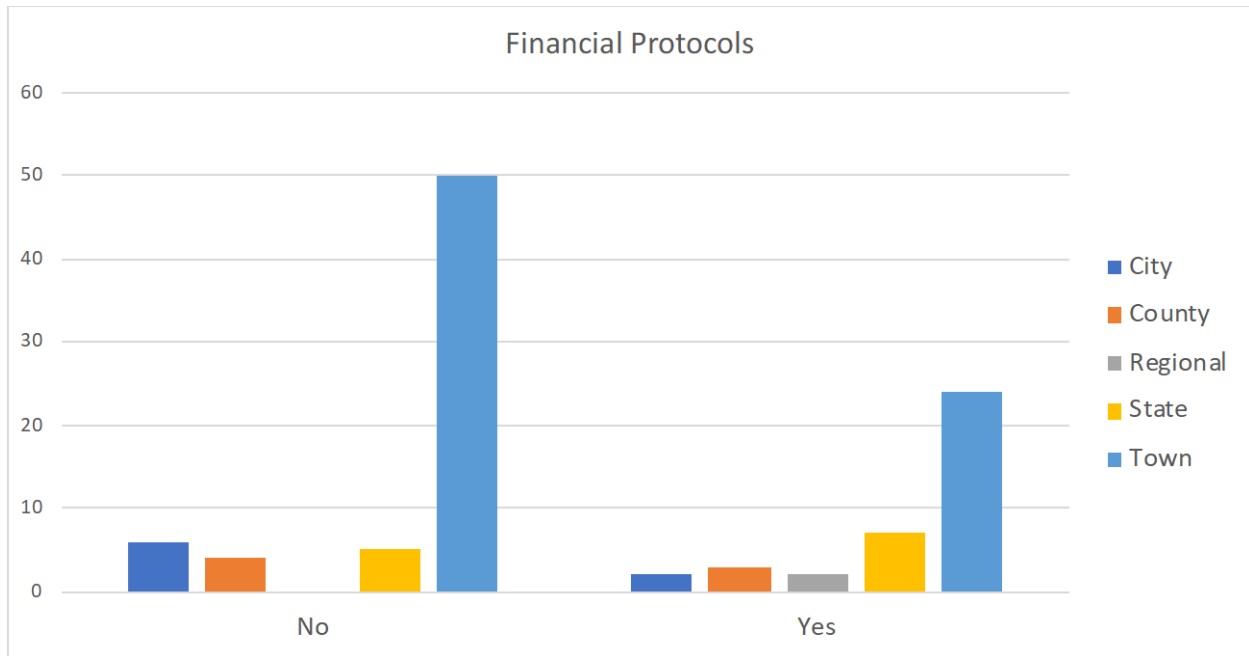


Figure 12 Financial Protocols

Participants were then asked, “Has your agency estimated the volume and/or type (vegetative debris, construction and demolition, electronics, etc.) of debris that is likely to be generated in an incident?” Most respondents did not know, as shown in Figure 14. Of those that did know, the type rather than the volume was more common. As Figure 15 shows, local government agencies are more likely to respond yes.

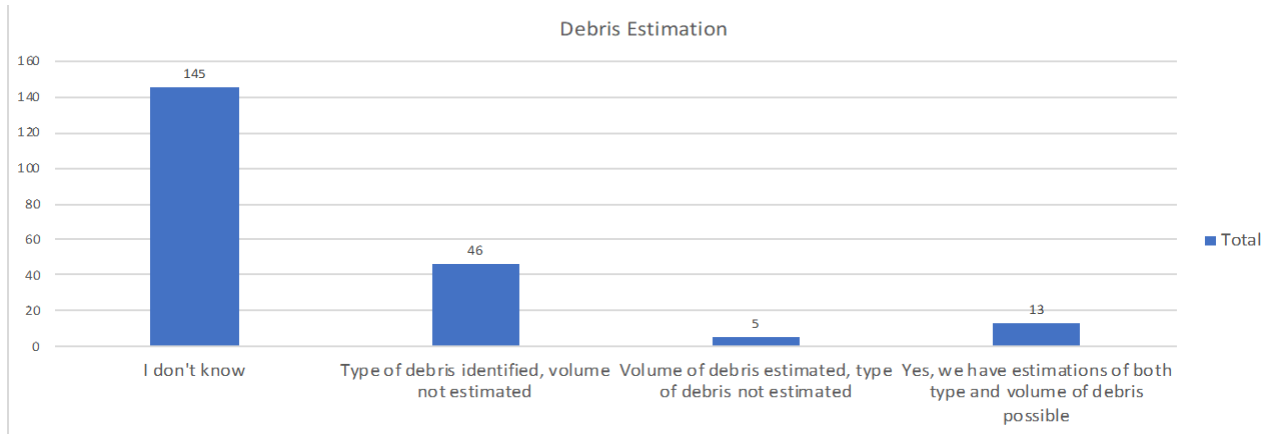


Figure 13 Debris Estimation

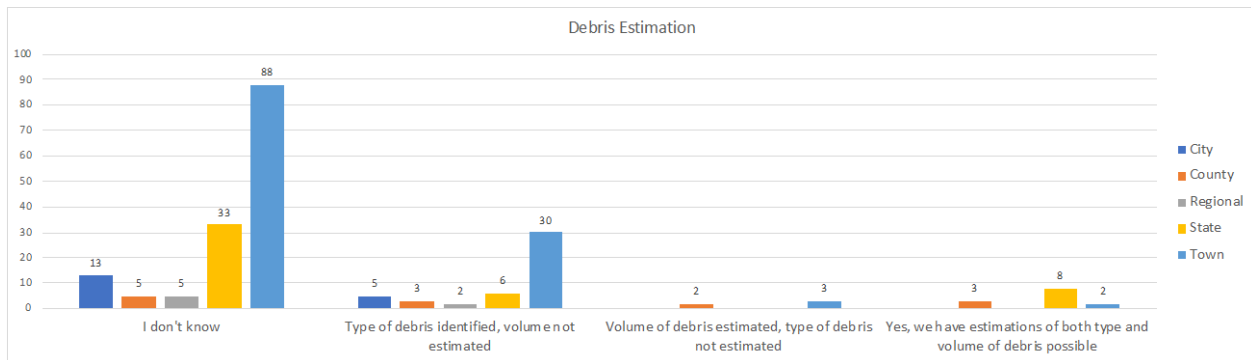


Figure 14 Debris Estimation by Type of Organization

The survey also asked about mutual aid agreements: “Does your agency have Mutual Aid Agreements in place related to debris management?” Most respondents said no, although a significance portion of state agencies do have a mutual aid agreement, as shown in Figure 16.

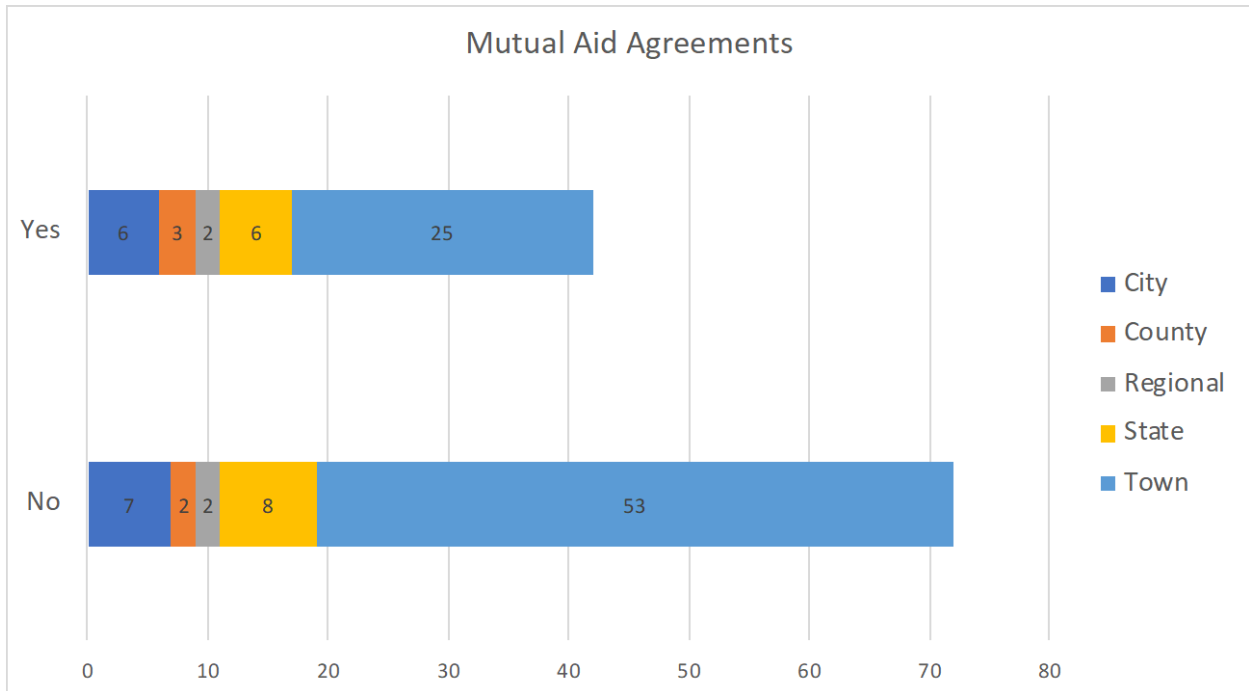


Figure 15 Mutual Aid Agreements

Respondents were asked, “Have contracts at related departments and agencies been identified in order to ensure smooth collaboration during emergency response?” Figure 17 shows that most respondents are aware of contracts for collaboration.

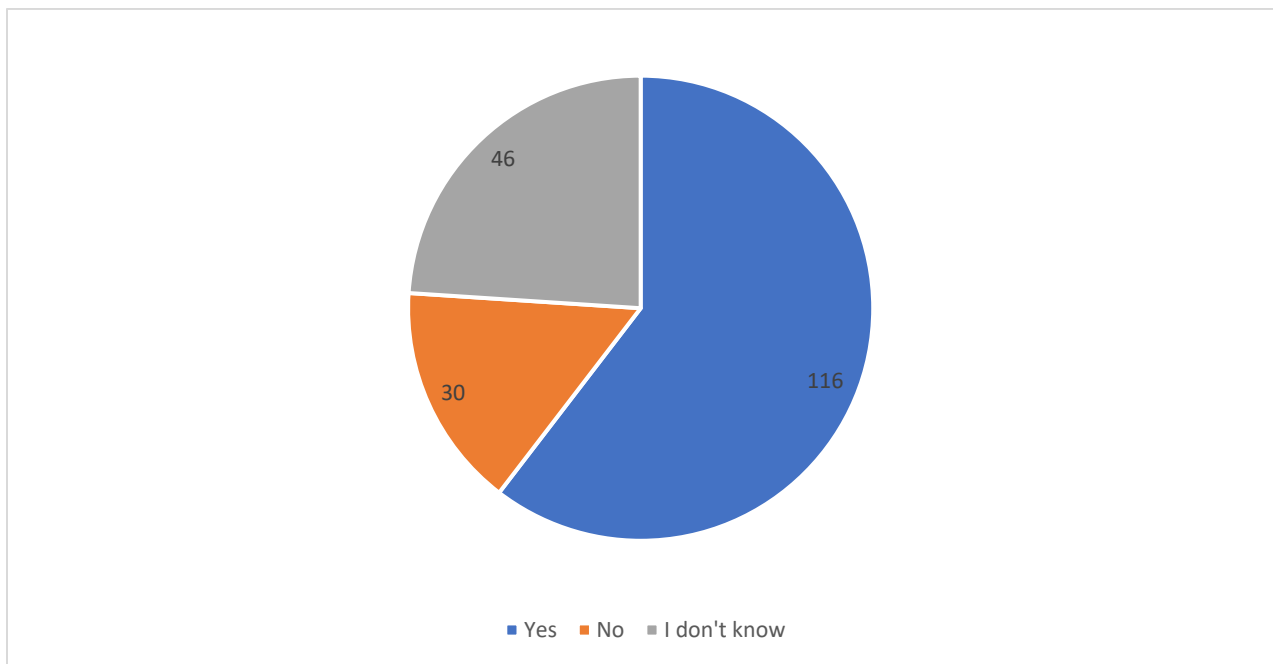


Figure 16 Contracts for Collaboration

The next question asked about aggregation sites: “Typically, due to the volume of material, debris needs to be taken to an aggregation site before it can be disposed of. Have debris aggregation sites been identified?” While most respondents had not identified aggregation sites, the majority of respondents from states had identified aggregation sites as shown in Figure 18.

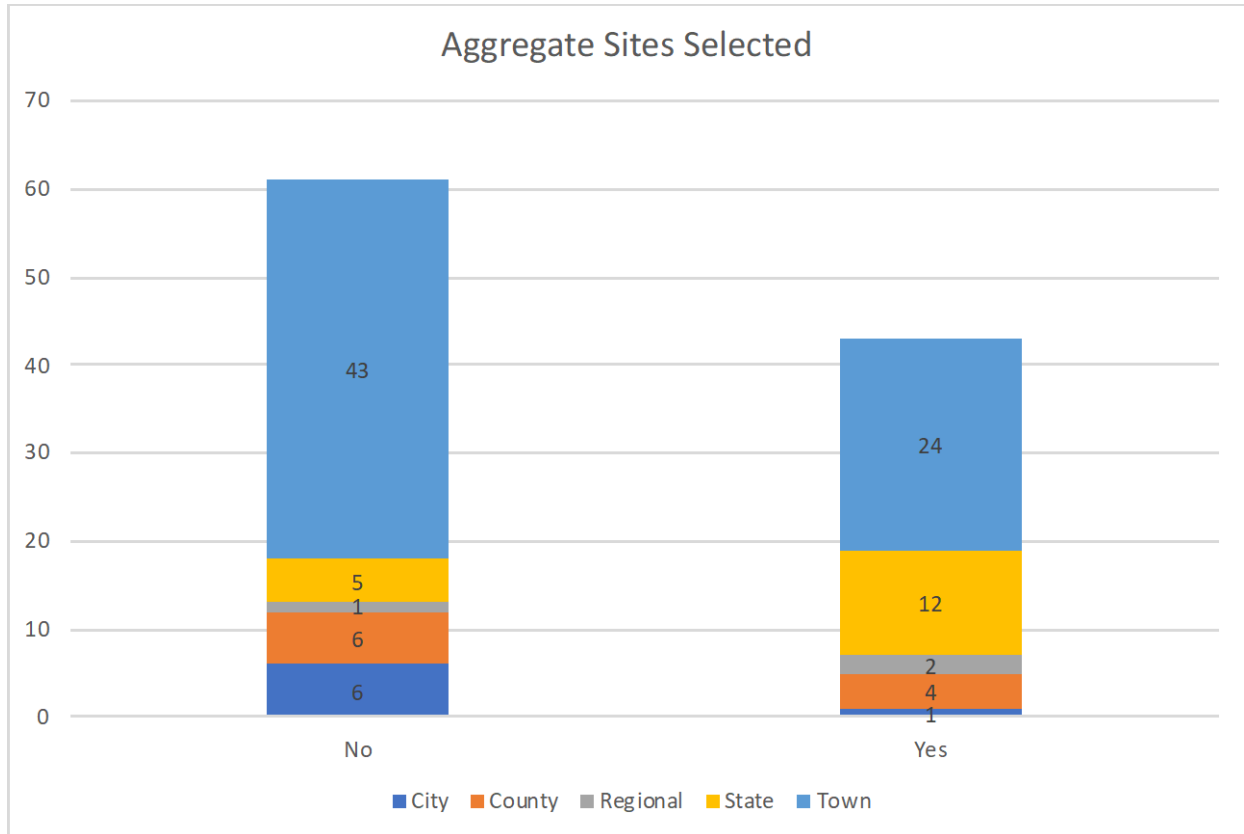


Figure 17 Aggregation Site Selection

Respondents were asked, “Is there a clear division of responsibilities among the various agencies and departments in your community?” Almost 60% of respondents felt that roles and responsibilities are defined and another 23.5% indicated that responsibilities are defined but not roles, as shown in Figure 19.

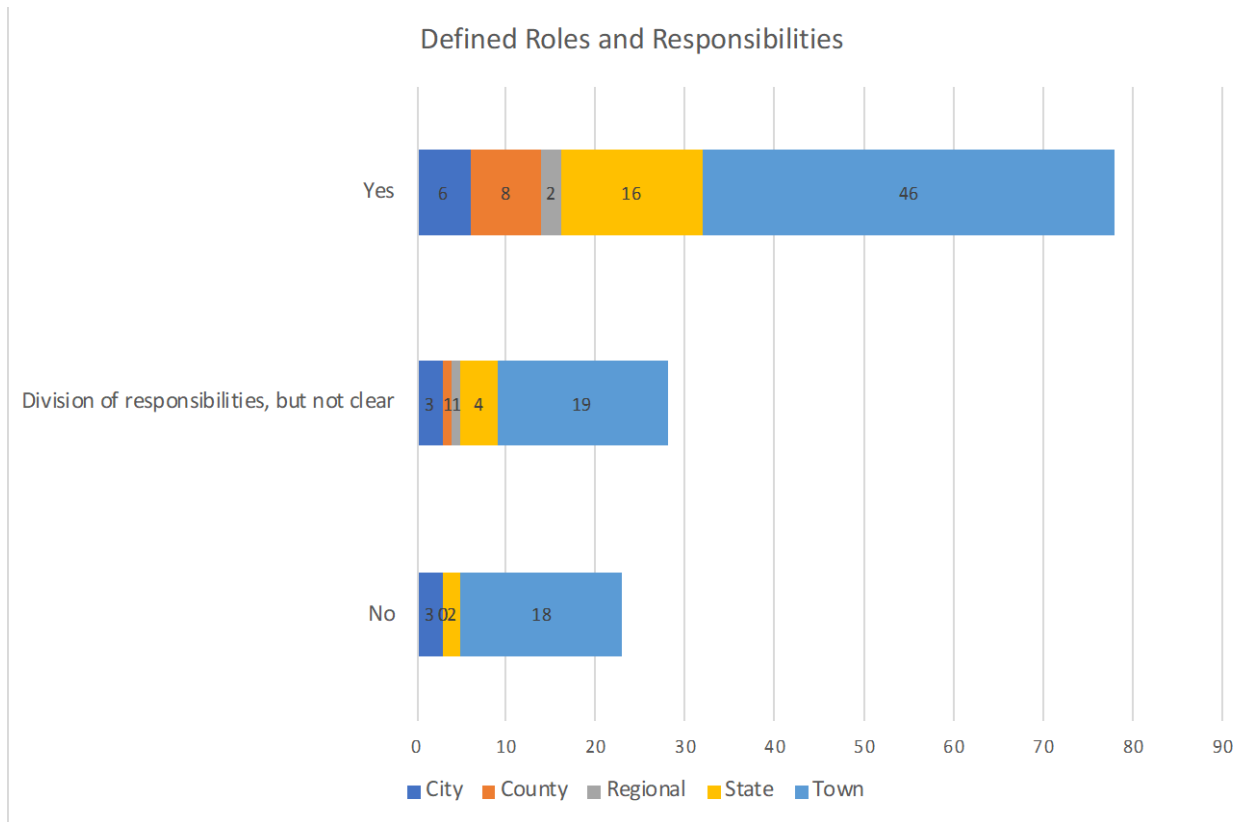


Figure 18 Roles and Responsibilities Defined

Resources

Questions were asked about resources related to awareness of planning resources.

Participants were asked, “Has your agency identified debris management resources: tools, guidelines, training regulations, and/or incentives?” Of those surveyed, most had not identified resources to help plan for debris but similar to other resources states have identified resources (Figure 20).

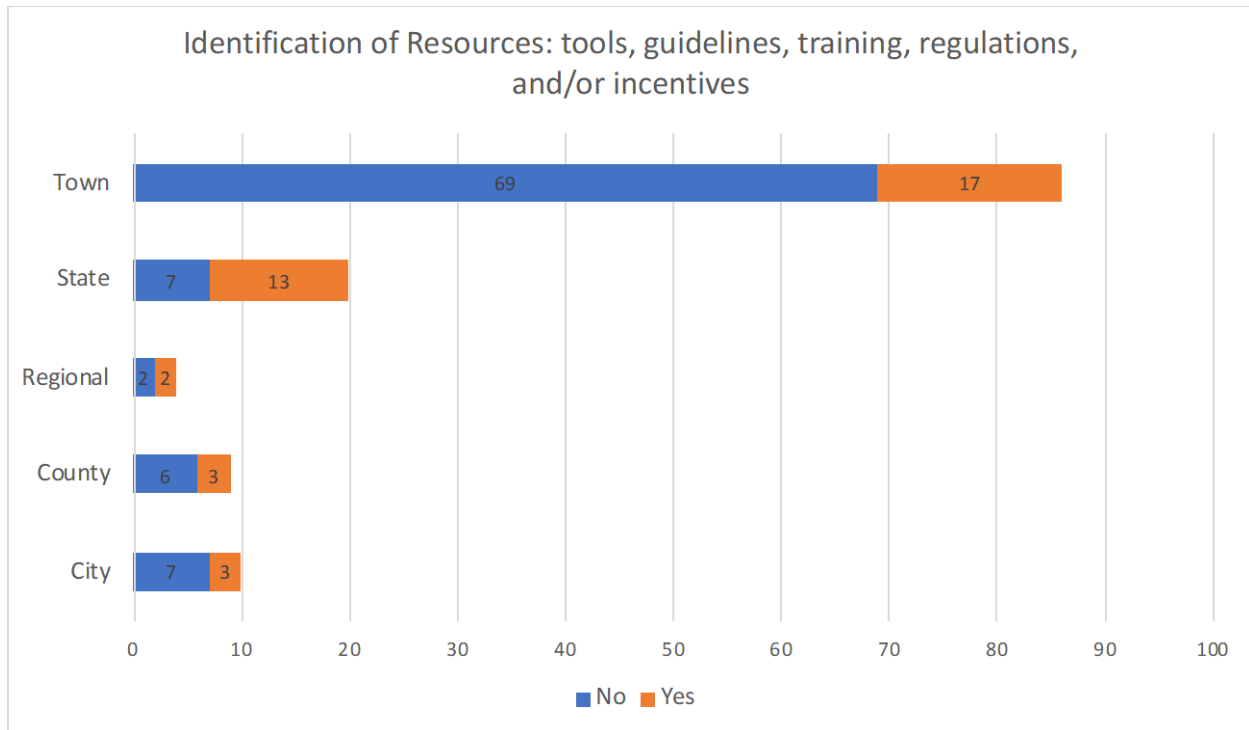


Figure 19 Identification of Resources

When asked about the sources of resources (“Who produces these resources?”), the most common debris planning resources identified in the survey are produced by either a state agency or FEMA, as shown in Figure 21.

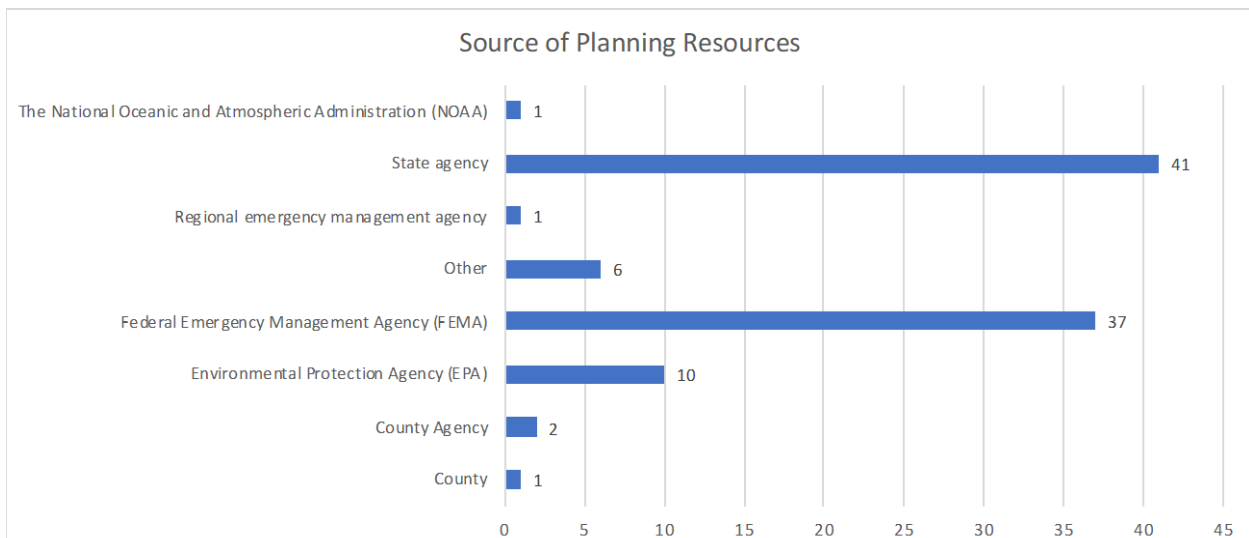


Figure 20 Types of Resources

Training Participation

A series of questions were aimed at understanding respondents' experience with training and their training needs. The questions asked about past training and needed training.

In response to "Have you ever participated in any FEMA Debris Management training?" most participants had not completed any sort of FEMA debris training. Only 15 survey participants had taken some sort of FEMA debris training as shown in Figure 22.

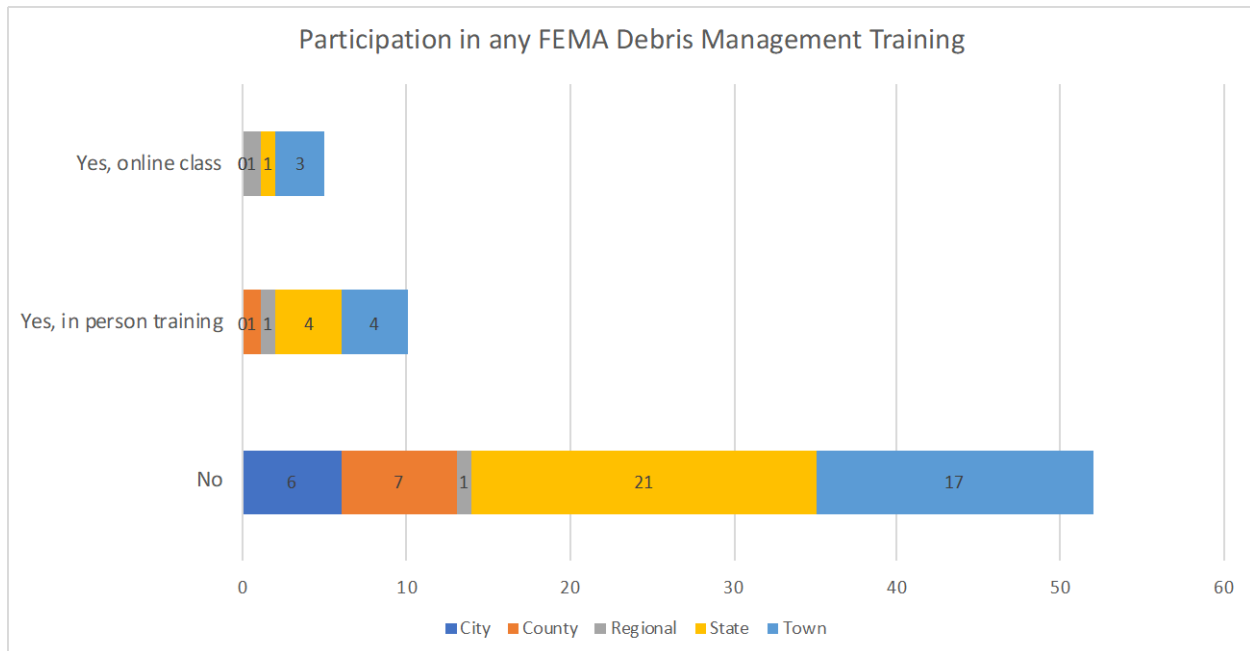


Figure 21 Participation in FEMA Training

When asked about requested training topics, respondents indicated interest in all topics proposed (hazardous site management, aggregation site selection, financial protocols, mutual aid agreements, organizational or workflow charts, contracting and equipment procurements, plan development and environmental protection). Respondents were invited to indicate all topics of interest. The most common response was plan development. Of the respondents that indicated interest or possible interest in future training, 72% indicated that they were interested in plan develop with 56% interested in hazardous site management, the next most popular response. Only two additional topics were requested; these are debris site monitoring and permitting and removal post disasters.

Respondents were then asked to select their preferred training type ("What format would best suit your training needs?"). The majority of respondents indicated that they would prefer a webinar with the remaining respondents distributed between a half-day and a full-day in-person session, as shown in Figure 23.

Preferred Training Method

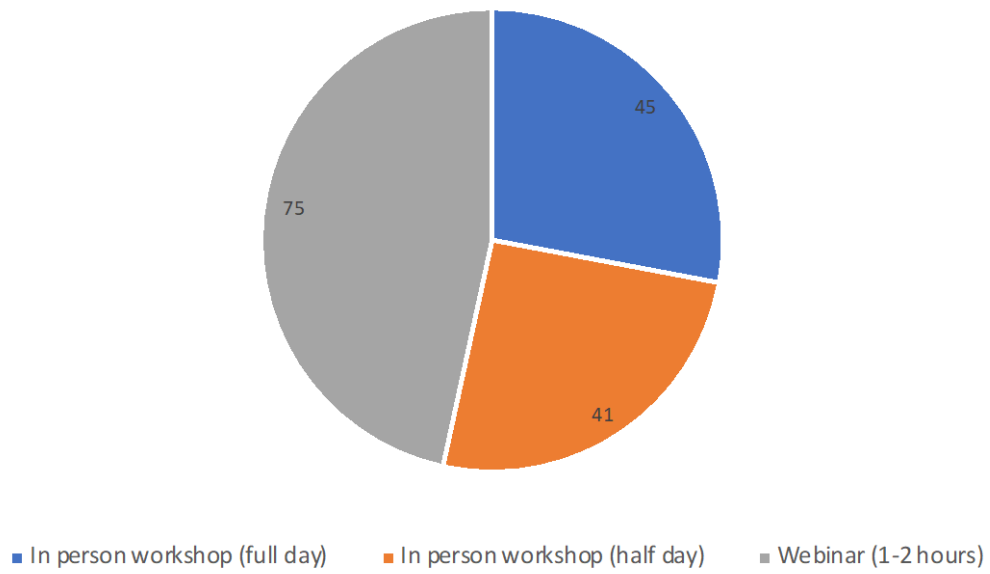


Figure 22 Preferred Training Method

Appendix E: Training Materials

PRESENTATION

The presentation used for the webinar is included below.



Introductions

- Dr. Sue McNeil: chair of the Department of Civil and Environmental Engineering, research centers on transportation asset management, life-cycle costing, application of advanced technologies, economic analysis, condition assessment and deterioration modeling, and decision support
- Michelle Woody: Master of Science student in Disaster Science and Management, research focusing on the quality of local disaster debris plans. Debris management experience in response to Sandy in NJ
- Matheu Carter: Civil and environmental engineer, background in consulting and public administration. Debris management experience from his time as Director of Public Works and Capital Facilities Administrator for Cecil County, Maryland. Currently the T² Engineer and Municipal Circuit Rider for the Delaware Center for Transportation's T² Center at the University of Delaware.

CIAMTIS Project



Identify the current knowledge, practice, and knowledge gaps of local debris managers



Compile and understand current resources



Connect resources to practitioners

Webinar Overview

IMPACT OF DISASTER DEBRIS

CURRENT PRACTICE AND REGULATIONS

DEBRIS PLANNING RESOURCES: FEMA, EPA, NOAA, AND STATE AGENCIES

DISCUSSIONS AND QUESTIONS

Debris Origins

- Natural disasters (Mid-Atlantic perspective)
 - Snow and ice storms
 - Tropical storms, remnants thereof, even hurricanes
 - Flash floods
 - Tornados
 - Even earthquakes
 - For other parts of the country – mud slides, wildfires, etc.
- Man-made disasters
 - Terrorism
 - Structural failures (think failed dams)

Types of Debris



Woody debris

Trees
Tree limbs
Power lines



Parts of buildings blown by the wind



Failed buildings or other structures (e.g., bridges)

Construction and
demolition debris

- Asbestos
- Chemicals
- Hazardous waste
building contents



Flooded vehicles

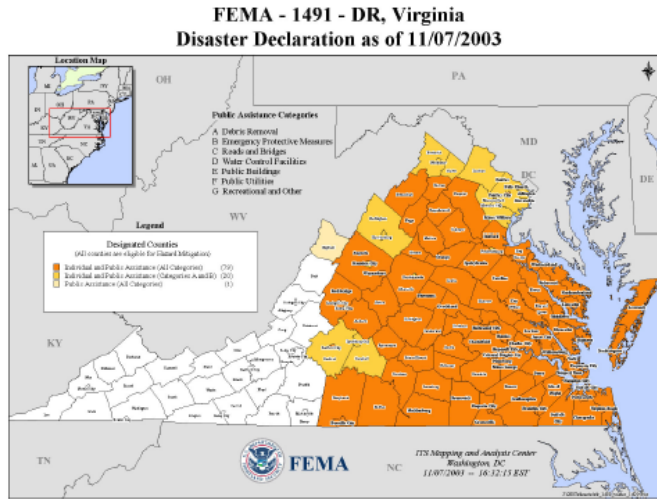
Planning is a Process

In developing your debris response, expand your thinking to include the disaster that almost never happens in your area

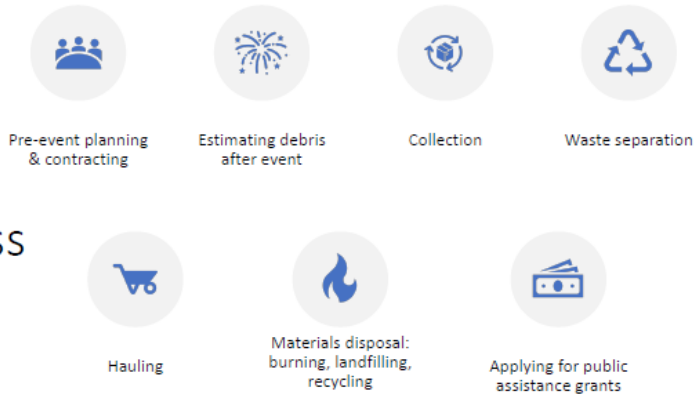
- What kind of debris would it generate, how much?
- Would it be segregated or require separation?
- Do you have access to big enough staging and disposal areas?
- Do you have the tools (trucks, loaders, saws, etc.) to handle the material?
 - If not, will contractors in your area be able to fill gaps?
- Are you prepared for traffic control? Crowd control?
- Adequate safety training for personnel? Personal Protective Equipment (PPE)?
- Controls at the staging or disposal sites
 - Observation tower
 - Procedures for intake, chain of custody, weigh scales


Hurricane Isabel Debris

- 1/3 of disaster recovery costs
- Overwhelms local agencies
- Enough Debris to fill 660,000 dump trucks
- 75% of VA localities were eligible for funding





Debris Management Process






Public Assistance

- At the core of disaster debris operations
 - Cost sharing program for public entities
 - Alternate Procedures Program
- 



Questions?



Requested Training Topics



HAZARDOUS SITE
MANAGEMENT



AGGREGATE SITE
SELECTION



MUTUAL AID
AGREEMENTS



FINANCIAL
PROTOCOLS

Debris Management Planning Resources

- FEMA
 - Public Assistance
 - Trainings
 - Alternate Procedures Program
- NOAA
 - Coastline Debris Planning
- EPA
 - Debris Planning Guide
 - Planning Tools
 - Webinars and Trainings
- OSHA
 - Hazardous Materials Handling
- State Agencies



FEMA



OSHA[®]
Occupational Safety
and Health Administration

Federal Emergency
Management
Agency



FEMA

- Public Assistance Planning Guide
- Alternate Procedures Planning Guidance
- Trainings: in person and online
- Related Training Topics: Mutual Aid Agreements, Financial Protocols
- Strengths: Accessible, comprehensive, several training options
- Weaknesses: PA focused

National Oceanic
and Atmospheric
Administration



- Detailed coastal plans
- Can be used for both coastal planning and using as a guide for more detailed local plans
- Includes environmental policies, stakeholders, local and state responsibilities
- Related Training Topic: Plan Development
- Strengths: detailed debris and hazard forecasting
- Weaknesses: focus is on waterway debris, less useful for inland states

Environmental Protection Agency



- Debris planning guide from an environmental/materials handling perspective
- Periodic webinars specifically about debris management that are open to the public
- Some regions provide specific tools to connect local governments with available facilities
- Related Training Topics: Aggregate Site Selection,
- Strengths: Great resource for technical information about materials handling and disposal
- Weaknesses: narrow scope

Occupational Health and Safety Administration



- Hazardous Waste Operations and Emergency Response guide
- Principal Emergency Response and Preparedness guide
- Related Training Topic: Hazardous Site management, Hazardous Materials Management
- Strengths: Great resource for technical information about materials handling and disposal safety
- Weaknesses: narrow scope


State Agencies

- State level debris plans
- Training opportunities
- Resource for debris forecasting
- Plan templates




Key Takeaways

- FEMA: Public Assistance focused, but robust guidelines in a variety of formats
- NOAA: Example plans, great resource for communities near bodies of water
- EPA: Robust guidelines for planning, focused on materials handling and environmental safety
- OSHA: Guides specific for hazardous materials in disasters
- State Agencies: General planning and training support



Questions?



Helpful Tips



START SOMEWHERE



GATHER WHAT YOU
KNOW



ONE PLAN DOES NOT FIT
ALL



Questions and Discussion

CIAMTIS
U.S. DOT Region 3 University Transportation Center



RESOURCES

The resources provided to participants are listed below.

Resources: FEMA

- Mutual Aid
 - National Incident Management System Guideline for Mutual Aid, November 2017: https://www.fema.gov/media-library-data/1510231079545-1fab7af0e06d89d8c79c7b619e55a03/NIMS_Mutual_Aid_Guideline_20171105_508_compliant.pdf
 - Independent Study Training, IC-706: NIMS Intrastate Mutual Aid – An Introduction: <https://training.fema.gov/is/courseoverview.aspx?code=IS-706>
- Public Assistance
 - Public Assistance Debris Management Guide: https://www.fema.gov/media-library-data/1566415013468-ef2ae682ccafb18f32ca687e53046626/PAAP_Debris_Guide_V7_6-28-2019_508.pdf
 - Public Assistance Alternative Procedures Pilot Program for Debris Removal: https://www.fema.gov/media-library-data/1566415013468-ef2ae682ccafb18f32ca687e53046626/PAAP_Debris_Guide_V7_6-28-2019_508.pdf
 - Alternative Procedures for Direct Administrative Costs: https://www.fema.gov/media-library-data/1529332841196-4a2a329cdf55e15c833de2386e5ccc21/DAC_Pilot_Policy_V1.1_508_FINAL.pdf
- Debris Management Planning:
 - Independent Study Training, IS-633: Debris Management Plan Development: <https://training.fema.gov/is/courseoverview.aspx?code=IS-633>
 - Debris Management Planning Workshop Handbook: https://www.fema.gov/pdf/government/grant/pa/dmpw_handbook.pdf

Resources: NOAA

- Marine Debris Program: <https://marinedebris.noaa.gov/emergency-response/marine-debris-emergency-response-guides>
- Impact of Hurricanes Harvey, Irma, and Maria: <https://marinedebris.noaa.gov/emergency-response/hurricanes-harvey-irma-and-maria>
- Marine Debris Emergency Response Guides: <https://marinedebris.noaa.gov/emergency-response/marine-debris-emergency-response-guides>
 - Maryland: <https://marinedebris.noaa.gov/emergency-response-guide/maryland-marine-debris-emergency-response-guide>
 - Virginia: <https://marinedebris.noaa.gov/emergency-response-guide/virginia-marine-debris-emergency-response-guide>

Resources: EPA

- Guidance about Planning for Natural Disaster Debris: <https://www.epa.gov/homeland-security-waste/guidance-about-planning-natural-disaster-debris>
- Webinar, Introduction to EPA's Planning for Natural Disaster Guidance: <https://www.epa.gov/smm/sustainable-materials-management-smm-web-academy-webinar-introduction-epas-planning-natural>
- I-Waste Incident Waste Decision Support Tool Webinar: <https://www.epa.gov/research/i-waste-incident-waste-decision-support-tool-webinar-archive>
- Monthly Webinars about Hazardous Waste Electronic Manifest: <https://www.epa.gov/e-manifest/monthly-webinars-about-hazardous-waste-electronic-manifest-e-manifest>

Resources: OSHA

- Hazardous Waste Operations and Emergency Response (HAZWOPER) : <https://www.osha.gov/SLTC/emergencypreparedness/hazwoper/preparedness.html#collapse1>
- Hazardous Waste Operations and Emergency Response: <https://www.osha.gov/SLTC/emergencypreparedness/hazwoper/preparedness.html#collapse1>
- Health and Safety Videos: <https://www.osha.gov/video/#h>
- State Plans: <https://www.osha.gov/stateplans/>

Appendix F: Training Evaluation

This appendix includes the survey questions used to evaluate the training. The questions were built around similar surveys used to evaluate training offered by the Delaware T2 Center. The survey was administered in Qualtrics. The survey was distributed to all participants along with copies of the webinar slides and resources.

CIAMTIS Webinar Evaluation

Start of Block: Default Question Block

Q12



Q1 The Center for Integrated Asset Management for Multi-modal Transportation Infrastructure Systems (CIAMTIS) Region 3 University Transportation Center, the Delaware T 2 /LTAP Center, and the University of Delaware hope you enjoyed the January 23, 2020 Disaster Debris Management Planning Webinar.

Please share your feedback regarding the webinar so that we can assess the impact of our outreach and improve future deliverables. Your thoughts will be anonymous, so you can be candid.

Q2 Did you receive a notice last fall regarding the survey for this project and did you complete it (many of you did and it was very helpful)?

- Yes (1)
 - No (2)
 - I am unsure (3)
 - I don't recall being contacted (4)
-

Q3 What was your comfort level with the topic of disaster debris management before the webinar?

- I was uncomfortable; I was weak on the topic (1)
 - I was comfortable; I was familiar with the topic (2)
 - I was very comfortable; I was well versed in the topic (3)
-

Q4 What was your comfort level with the topic of disaster debris management after the webinar?

- I was uncomfortable; I was weak on the topic (1)
 - I was comfortable; I was familiar with the topic (2)
 - I was very comfortable; I was well versed in the topic (3)
-

Q5 Was the structure of the webinar helpful to you? Was the webinar easy to follow?

- Yes (1)
 - No (2)
-

Q6 In the future, would you be interested in a follow-up class or more advanced class on the same subject?

- Yes (1)
 - No (2)
-

Q7 Did you find the lists of resources included in the presentation (.pdf) useful?

- Yes (1)
- No (2)

Q8 Would you recommend the webinar to other colleagues?

- Yes (1)
- No (2)

Q9 How did you hear about this webinar?

- My Local Technical Assistance Program (LTAP/T2) Center (1)
- Other direct contact (email, etc.) (2)
- Colleague shared it with me (3)
- Other (4) _____

Q11 Other comments:

Q10 Thank you for your feedback and your participation in our webinar. If you have any questions, concerns, or further comments, please contact Michelle Woody at mwoody@udel.edu.

End of Block: Default Question Block

Appendix G: Webinar Evaluation Results

The results from the survey of participants (Appendix F) in the webinar are summarized in Figure 24 through Figure 32.

The survey began by asking: “Did you receive a notice last fall regarding the survey for this project and did you complete it?” Two reported no, two reported they were unsure, and two reported they did not recall being contacted (Figure 24).

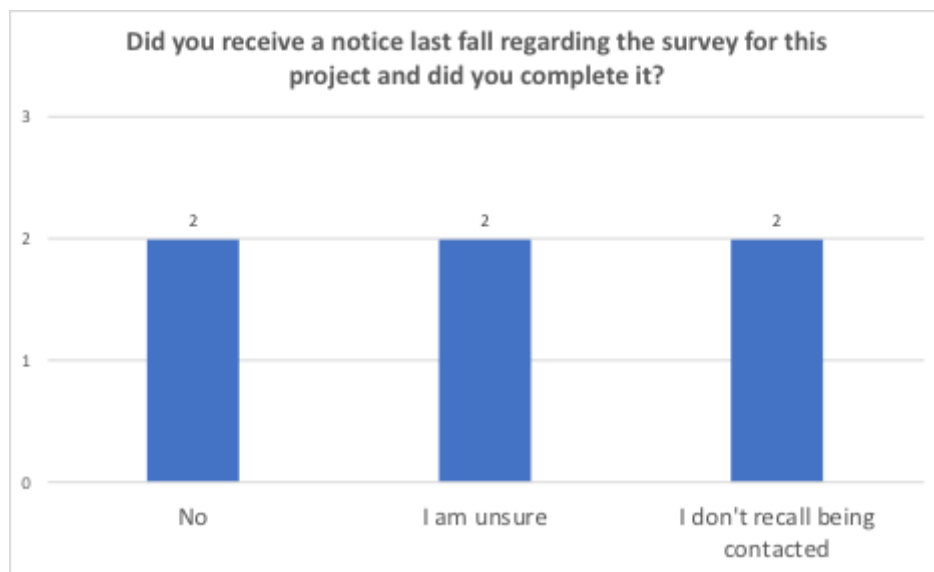


Figure 23 Participation in Survey

The next question asked, “What was your comfort level with the topic of disaster debris management before the webinar?” Four reported they were uncomfortable/weak, one reported they were comfortable/familiar, one reported they were very comfortable/well versed (Figure 25). This suggests that the webinar engaged the right audience.

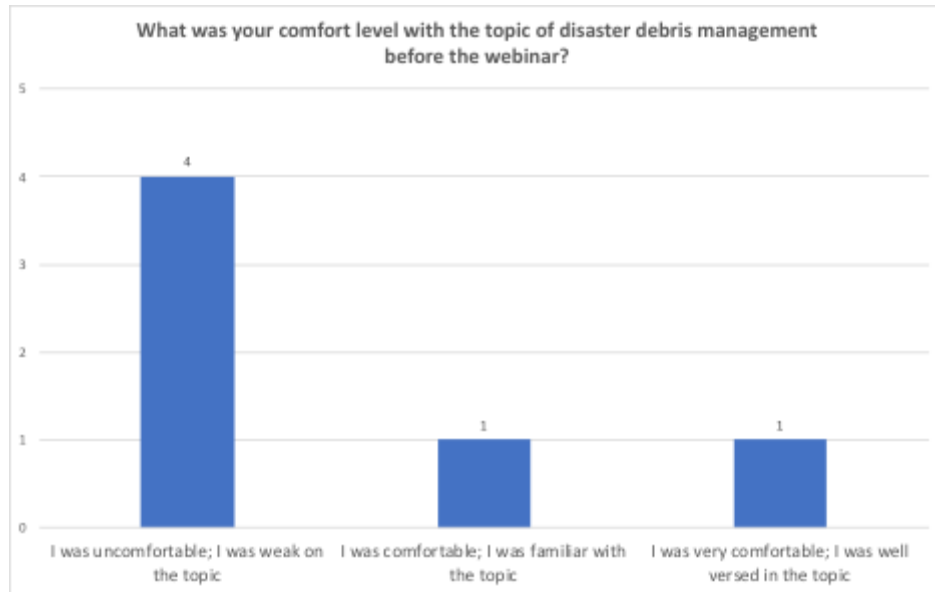


Figure 24 Comfort Level Before the Webinar

The follow-up question was “What was your comfort level with the topic of disaster debris management after the webinar?” One reported they were uncomfortable/weak, five reported they were comfortable/familiar, zero reported they were very comfortable/well versed (Figure 26). This suggests that the webinar helped most of the respondents.



Figure 25 Comfort Level after the Webinar

Participants were asked: “Was the structure of the webinar helpful to you? Was the webinar easy to follow?” Six reported yes, zero reported no (Figure 27).

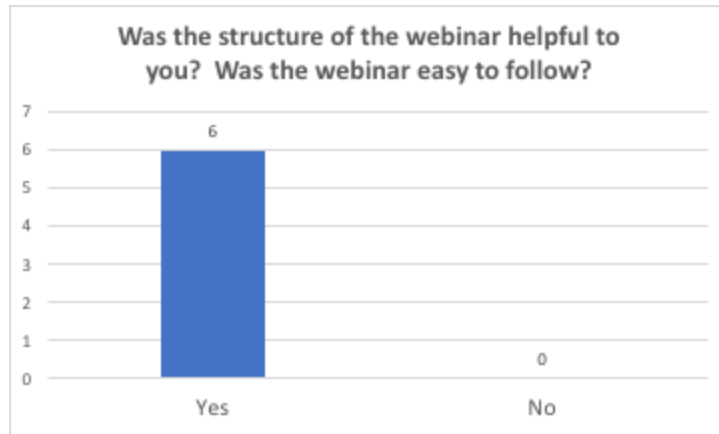


Figure 26 Overall Value of Webinar

Participants were asked about follow-up classes: “In the future, would you be interested in a follow-up class or more advanced class on the same subject?” Four reported yes, two reported no (Figure 28).

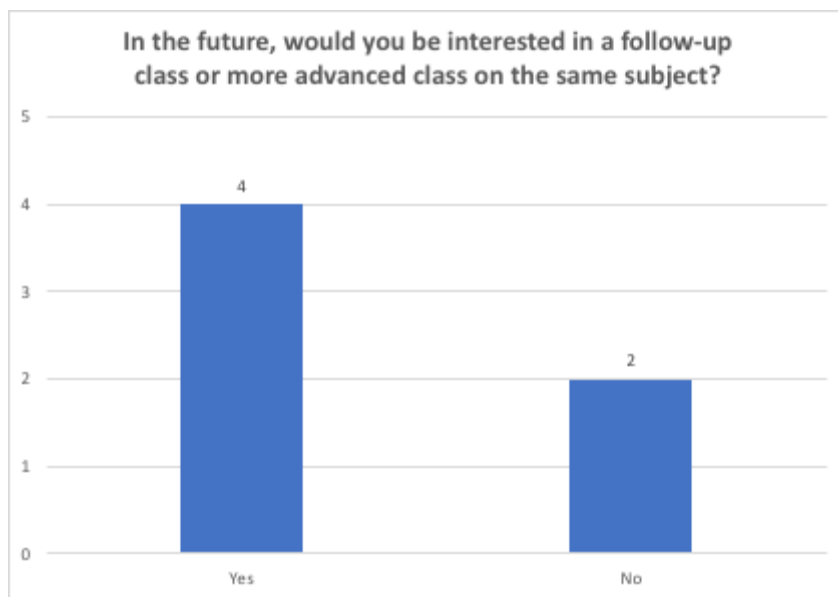


Figure 27 Follow-up Classes

Participants were then asked: “Did you find the lists of resources included in the presentation (.pdf) useful?” Four reported yes, two reported no (Figure 29).

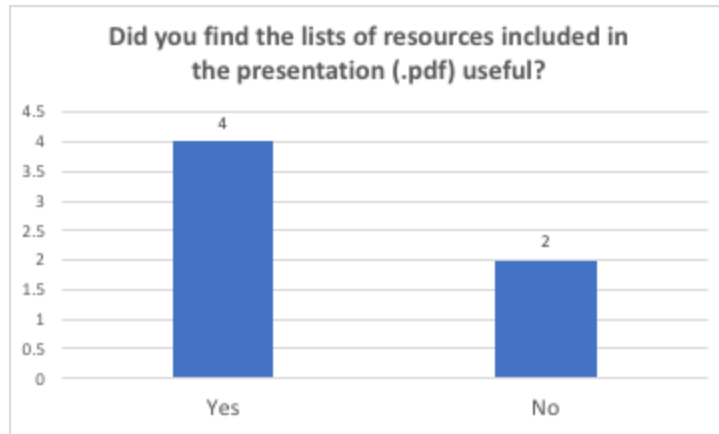


Figure 28 Value of Resources

The participants were asked: “Would you recommend the webinar to other colleagues?” Five reported yes, one reported no (Figure 30).

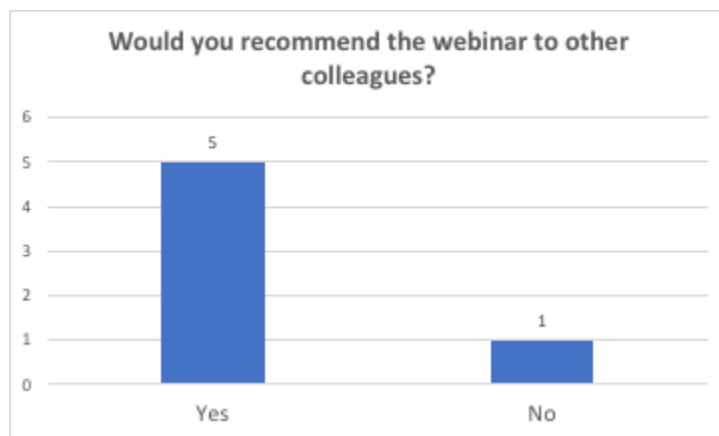


Figure 29 Would you Recommend the Webinar to Other Colleagues?

The final question asked participants how they heard about the webinar. Two stated a colleague shared it with them, three heard about it through their local Technical Assistance Program (LTAP/T2) Center, one said it was through other direct contact (email, etc.), and zero chose other (Figure 31).

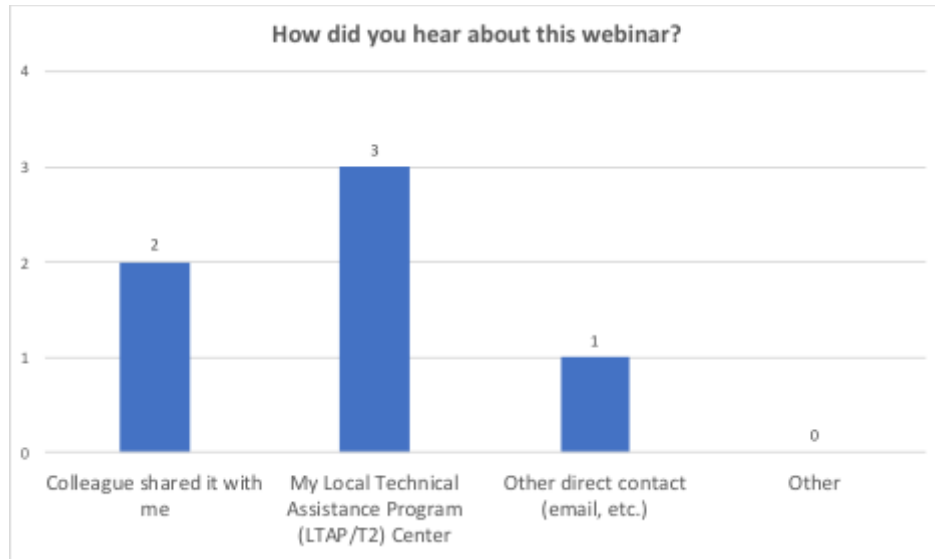


Figure 30 How Did You Hear about this Webinar?

Overall, the participants were satisfied with the webinar.