Professional Development Needs Assessment for the Connecticut National Estuarine Research Reserve

Avery Point Lighthouse on August 6, 2020 (Photo Credit: Peter Morenus UConn)

Conducted for the
Connecticut National Estuarine Research Reserve

By Responsive Management

2025

RESPONSIVE MANAGEMENT

Professional Development Needs Assessment for the Connecticut National Estuarine Research Reserve

2025

Responsive Management
Mark Damian Duda, Executive Director
Martin Jones, Senior Research Associate
Tom Beppler, Senior Research Associate
Amanda Center, Research Associate
Andrea Criscione, Senior Research Associate
Patrick Doherty, Research Associate
Gregory L. Hughes, P.E., Research Associate
Jeremiah Morris, Survey Center Manager
Alison Lanier, Business Manager

PO Box 1828
Harrisonburg, VA 22801-9500
540/432-1888
Email: mark@responsivemanagement.com
www.responsivemanagement.com

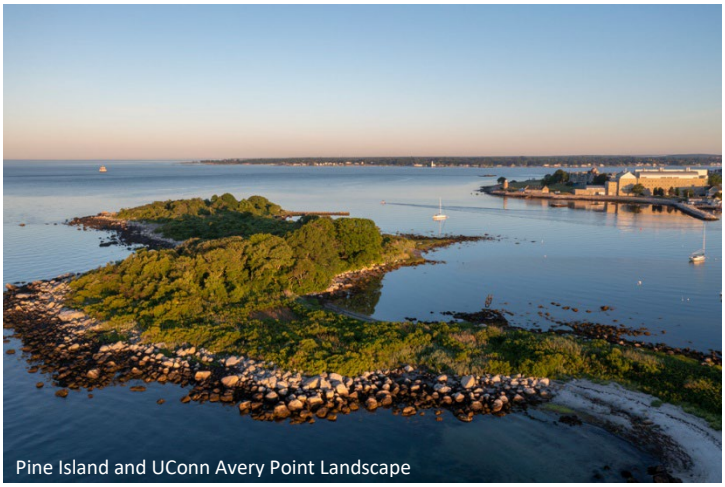
Connecticut National Estuarine Research Reserve
Larissa Graham, Education Coordinator
Katie Lund, Coastal Training Program Coordinator

University of Connecticut – Avery Point
Lowell P. Weicker Jr. Building
1080 Shennecossett Road, Suite 207
Groton, CT 06340

EXECUTIVE SUMMARY

The National Estuarine Research Reserve System is a network of 30 coastal sites designated to protect and study estuarine systems in collaboration with and service to surrounding communities. Established through the Coastal Zone Management Act, this partnership program between National Oceanic and Atmospheric Administration (NOAA) and the coastal states supports ecosystem health and the interconnectedness of people and the environment.

Established in 2022, the Connecticut National Estuarine Research Reserve (hereinafter referred to as CTNERR) is a part of this NOAA-funded national network of coastal areas designated for stewardship, research, and education of estuarine systems. The CTNERR works in partnership with state and federal organizations to provide communities with science-based information and skills needed to address coastal management issues.


Pine Island and UConn Avery Point Landscape

In alignment with their goals of providing science-based information and skills to address coastal management issues, the CTNERR and Responsive Management conducted this research to develop an understanding of the professional development needs and interests that exist on the topics of climate resilience and storm preparedness, habitat, and water quality. In addition, this research sought to understand current use of and need for training programs, preferred delivery methods and modes of training and education, concerns about future coastal management issues, and information about existing education programming and resources, among other topics that will be discussed in this report. Ultimately the findings from this research will be used to develop education and training opportunities that are most valuable to and meet the needs of those involved in coastal management and stewardship in Connecticut.

To establish the methodology, potential participant list, and survey instrument content, Responsive Management collaborated on all components of the research with the CTNERR staff. In addition, prior to survey development, a research review was conducted that examined the findings, methodologies, and content of various needs assessments conducted for the National Estuarine Research Reserve (NERR) System and other social science research that addressed coastal management issues, public attitudes and needs, and attitudes and opinions about coastal resources within the Connecticut and Long Island Sound region.

STUDY PARAMETERS AND PARTICIPANT GROUPS

Based on discussions with the CTNERR staff and the previously described research review, the project team established a list of potential participant groups and regions in which to focus survey efforts. Potential participant groups included those whom the CTNERR staff deemed important for inclusion in the research and groups that had been included in other needs assessments conducted for the NERR System. The region of focus included all towns, cities, and Councils of Governments (COGs) in proximity to the Reserve (Southeastern Connecticut Council of Governments (SCCOG) and RiverCOG). The potential participants list (Table 1) and maps of the focus areas (Figures 1 and 2) are shown on the following pages.

Table 1: Potential Respondent Type for Inclusion in Needs Assessment

Elected officials (local and state)	Former training/seminar/event attendees	Chapters of environmental organizations
State legislators	Engineers, architects, designers, and landscapers	Watershed associations
Appointed officials (local)	Environmental justice organizations and nonprofits	Building/development association
Appointed officials (state)	City/town engineers	Fisheries and wildlife personnel
City/town council members	Nonprofit/NGO staff and/or members	Volunteer organizations
County and Councils of Government staff	Code enforcement officers	Environmental consultants
Indigenous/tribal groups/communities	Coastal business professionals and associations	Wetland scientists
Municipal staff (such as planning, public work, and stormwater departments)	Environmental health officers	Environmental educators
County commissioners	Education professionals	Universities
State agency personnel	Transportation officials	Estuarine researchers
Planning commission members	Environmental professionals	Coastal regulators
State and regional professional associations	Conservation commissions	Coastal planners
City/town managers	Land trusts	Marine resource agency personnel
City/town planners	Environmental Protection Agency personnel	

Figure 1: CTNERR Boundary Map

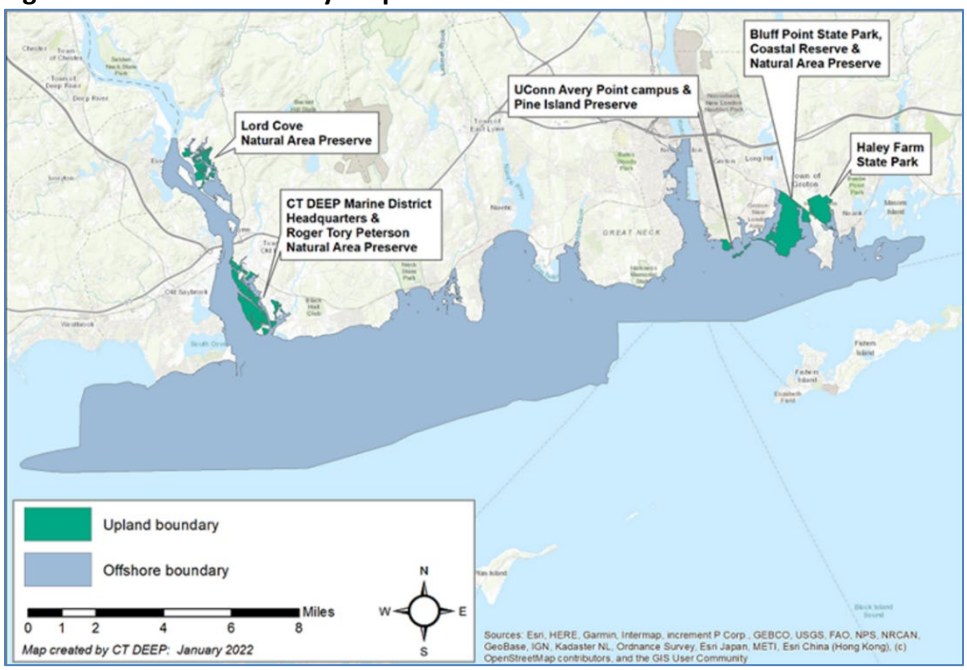
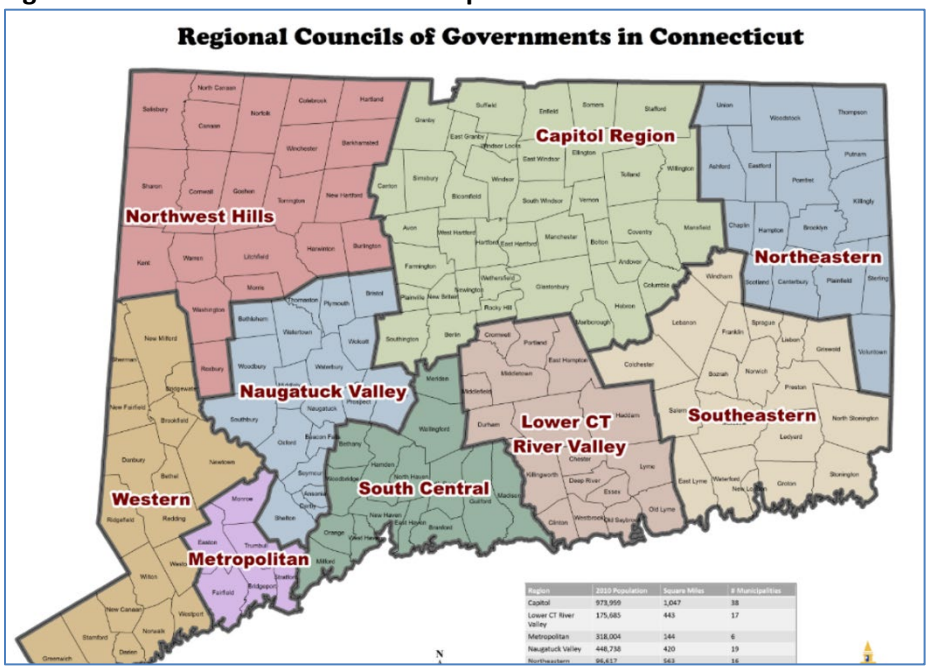


Figure 2: Councils of Governments Map



The following is a brief description of the survey methodology and design, some of the key findings from the survey of 176 respondents involved in coastal management or stewardship activities, and a list of recommendations based on the findings from the study.

SURVEY METHODS AND DESIGN AT A GLANCE

This research entailed an online survey of individuals who are/could be involved in education, training, and stewardship activities in the CTNERR's marsh, upland, and open waters of Long Island Sound, Fishers Island Sound, and the lower Connecticut and Thames Rivers (referred to as respondents for the remainder of this report).

The survey was conducted using an online approach, in which potential participants were contacted via email with information about the study and a link they could use to access the survey (additional details about the survey methodology are included on page 7 of this report).

The survey questionnaire was developed by Responsive Management in collaboration with the CTNERR. The questionnaire was designed to first capture respondent background information, such as respondents' position within organizations (e.g., elected officials, municipal staff, nonprofit staff, academia), education and professional experience, required continuing education credits, localities served, work with distressed municipalities, and organizational and personal focus on coastal management topics. With regard to their coastal management focus, respondents could choose from four major coastal management categories: water quality, habitat management and restoration, climate resilience and/or storm preparedness, and/or educational programming.

Later in the survey, respondents were asked to describe their audience, experience with the CTNERR training program, interest in and need for training topics, and preferences for program training delivery and format. Survey questions about interest in and needs related to training topics were organized based on three of the primary categories of focus established earlier in the survey: water quality, climate resilience and/or storm preparedness, and habitat management (those who selected educational programming as their primary focus were sent down a separate path that is described below). The topics within each of the three categories are shown in Table 2.

Several questions in the survey were asked only of respondents for which the question was applicable. For example, several survey questions were intended only for those who indicated that their role was associated with land trusts and open space committees and municipal, nonprofit, consulting (engineer, architect, designers), and volunteer organizations. In addition, respondents who indicated their focus included educational programming (developing content programs that promote environmental literacy and/or providing hands-on opportunities for environmental stewardship for educators, students, volunteers, or community members) were asked a series of questions that served as a follow-up to a needs assessment that was conducted in 2023 to determine what resources were available to educators. Throughout the report, questions that were only asked of a subsection of respondents are identified.

Table 2: Training Topics by Category		
WATER QUALITY	**HABITAT MANAGEMENT AND RESTORATION**	**CLIMATE RESILIENCE AND/OR STORM PREPAREDNESS**
Stormwater management	Eelgrass management and restoration	Coastal flooding
• Green infrastructure	Assessing and managing tidal restrictions/road stream crossings	Coastal hazards management and planning for sea level rise
• Structural technology	Tidal wetland/marsh migration	Nature-based solutions to address flooding and erosion
• Other stormwater management topic	Protecting coastal resources such as dunes, tidal wetlands, bluffs/escarpments	• Green infrastructure / stormwater management
Land use and nutrient loading to coastal waters	Living shorelines for habitat restoration and protection	• Living shorelines techniques
Benefits of natural habitats on water quality	Invasives assessment and management	○ Site assessment
Ocean acidification	○ Terrestrial invasives	○ Design criteria
Pathogen monitoring	• Freshwater invasives	• Permitting
	• Marine invasives	• Monitoring protocols
	• Other invasives assessment and management topic	• Use of reef balls or other artificial reef components
	Blue carbon	• Other living shoreline technique topic
	Role of riparian buffers	• Other nature-based solution to address flooding and erosion topic
	Watershed assessment	Municipal climate resilience
	Habitat mapping	• Zoning for climate resilience (updates and review of regulations, codes, and ordinances)
	Soil survey mapping applications	• Vulnerability assessment
	Sea floor mapping applications	• Other municipal climate resilience topic
	Stream barrier removal for wildlife migration	

KEY SURVEY FINDINGS

The highlighted sections below show some of the key findings from the survey.

Knowledge of CTNERR

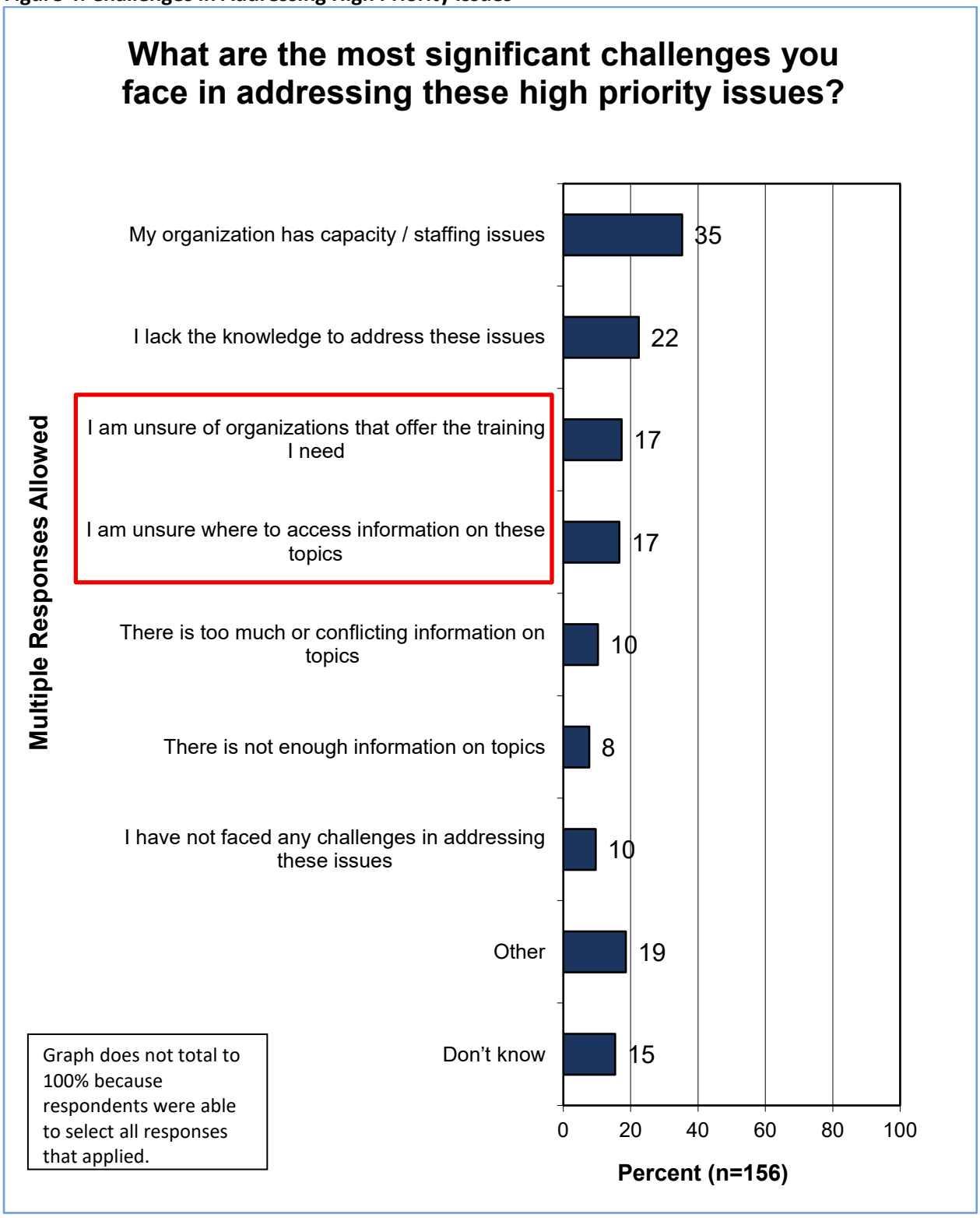
Most survey respondents are at least somewhat familiar with the Reserve, although questions about barriers to coastal training indicated that some might not be as aware of the services and programs offered through the Reserve.

Before beginning the survey, respondents were given a brief description of the CTNERR, which included information about the land and waterways included in the Reserve and their methods of and goals for promoting healthy estuaries, watersheds, and resilient coastal communities. After being provided with the description, participants were asked whether they had been familiar with the Reserve prior to the survey. A large majority of respondents (86%) indicated that they had been at least somewhat familiar with the Reserve.

Later in the survey, respondents were asked to select topics on which they could benefit from training, as well as any other high priority topics not listed in the survey. The responses shown in Figure 3 below (and the full list of responses shown in Appendix B) indicate that many high priority topics can be addressed through the CTNERR's resources and programming; however, a later question asking about significant challenges in addressing high priority issues showed that, while staff capacity was the biggest challenge, respondents also indicated they lack knowledge to address topics and also selected "I am unsure of the organizations that offer the training I need" and "I am unsure where to access information on these topics," both at 17% (shown in Figure 4).

Figure 3: Word Cloud of High Priorities Topics

Figure 4: Challenges in Addressing High Priority Issues



Organization and Respondent Focus

Organizations are often focused on multiple coastal topics and issues.

Survey respondents were asked to describe their organization from a list of possible responses. Figure 5 shows the breakdown of survey participants. While respondents from a variety of organizations took the survey, Figure 6 shows that a majority of organizations are providing services related to *all* the general coastal topics and issues listed in the survey.

Figure 5: Respondent Organizations

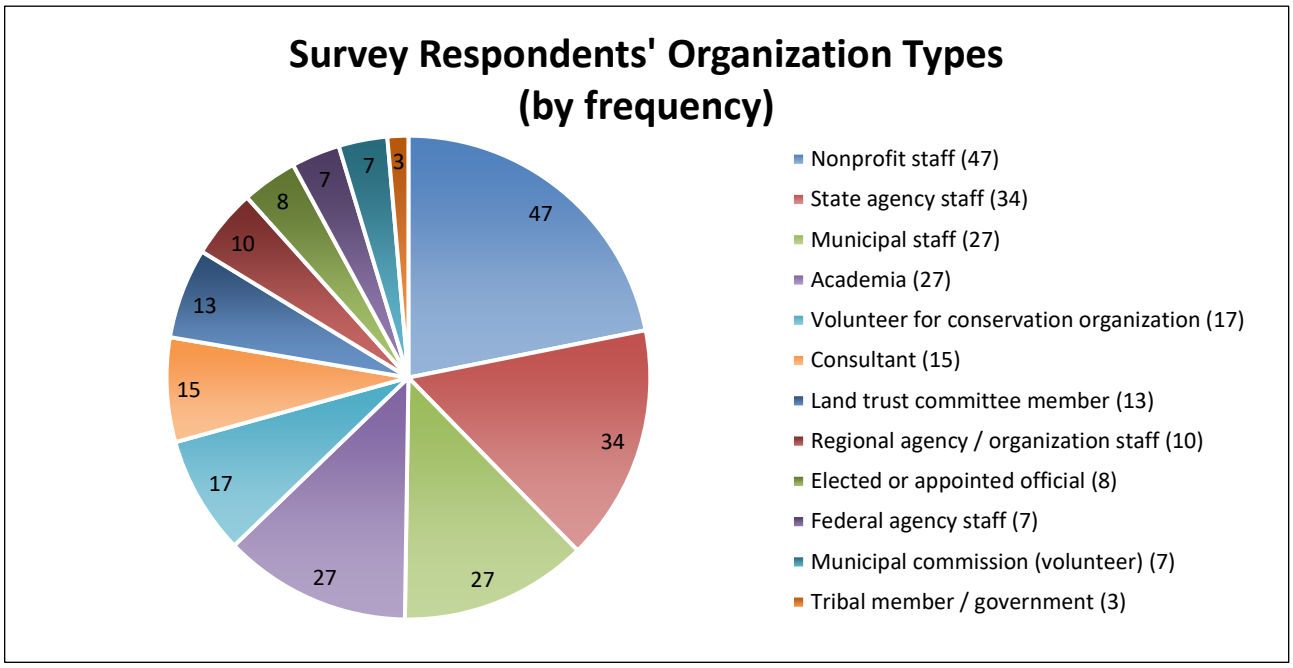
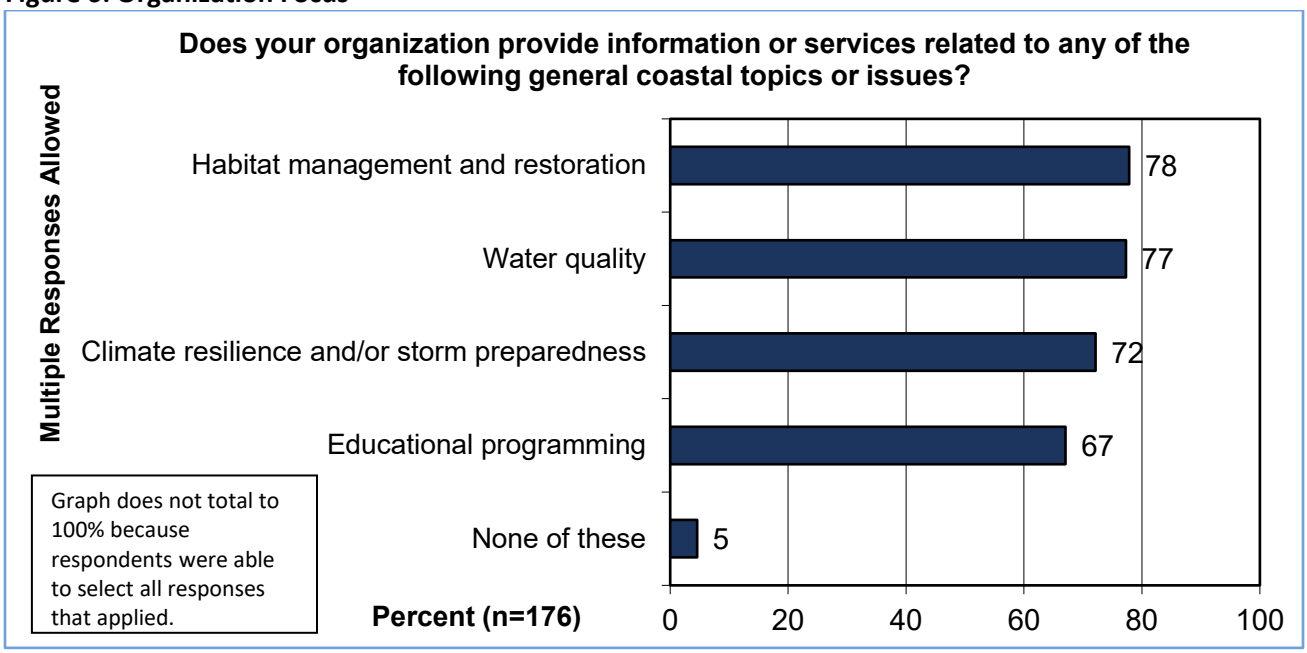


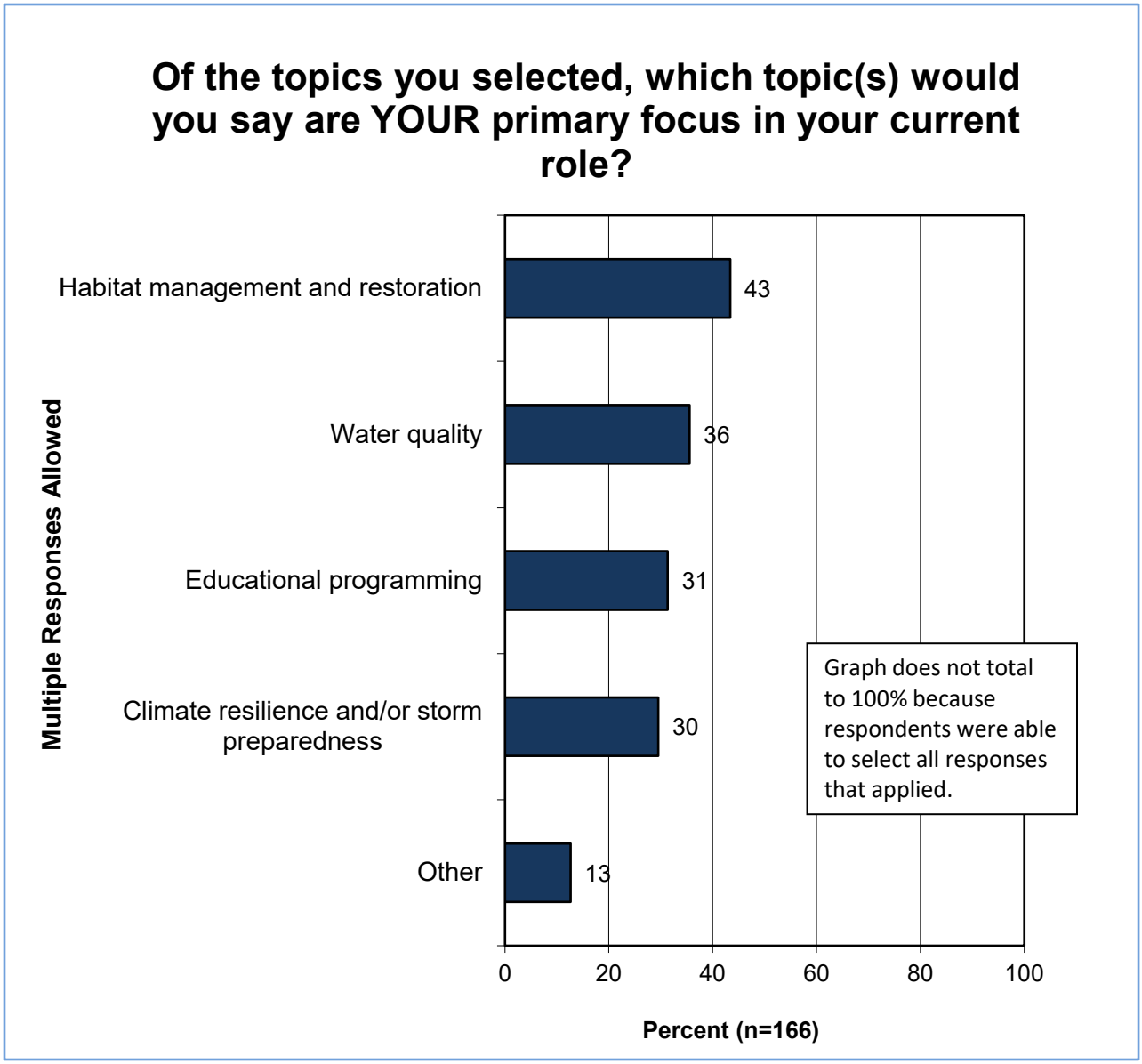
Figure 6: Organization Focus



Organizational focus is often split among multiple topics, with large percentages of respondents selecting all 4 categories (78% selected habitat management and restoration, 77% selected water quality, 72% selected climate resilience and/or storm preparedness, and 67% selected educational programming). Individual focus, however, is most often habitat management and restoration (43% said this).

When asked about their individual primary focus, respondents selected habitat management and restoration most frequently (43%), with water quality (36%), educational programming (31%), and climate resilience and/or storm preparedness (30%) following (Figure 7).

Figure 7: Individual Focus



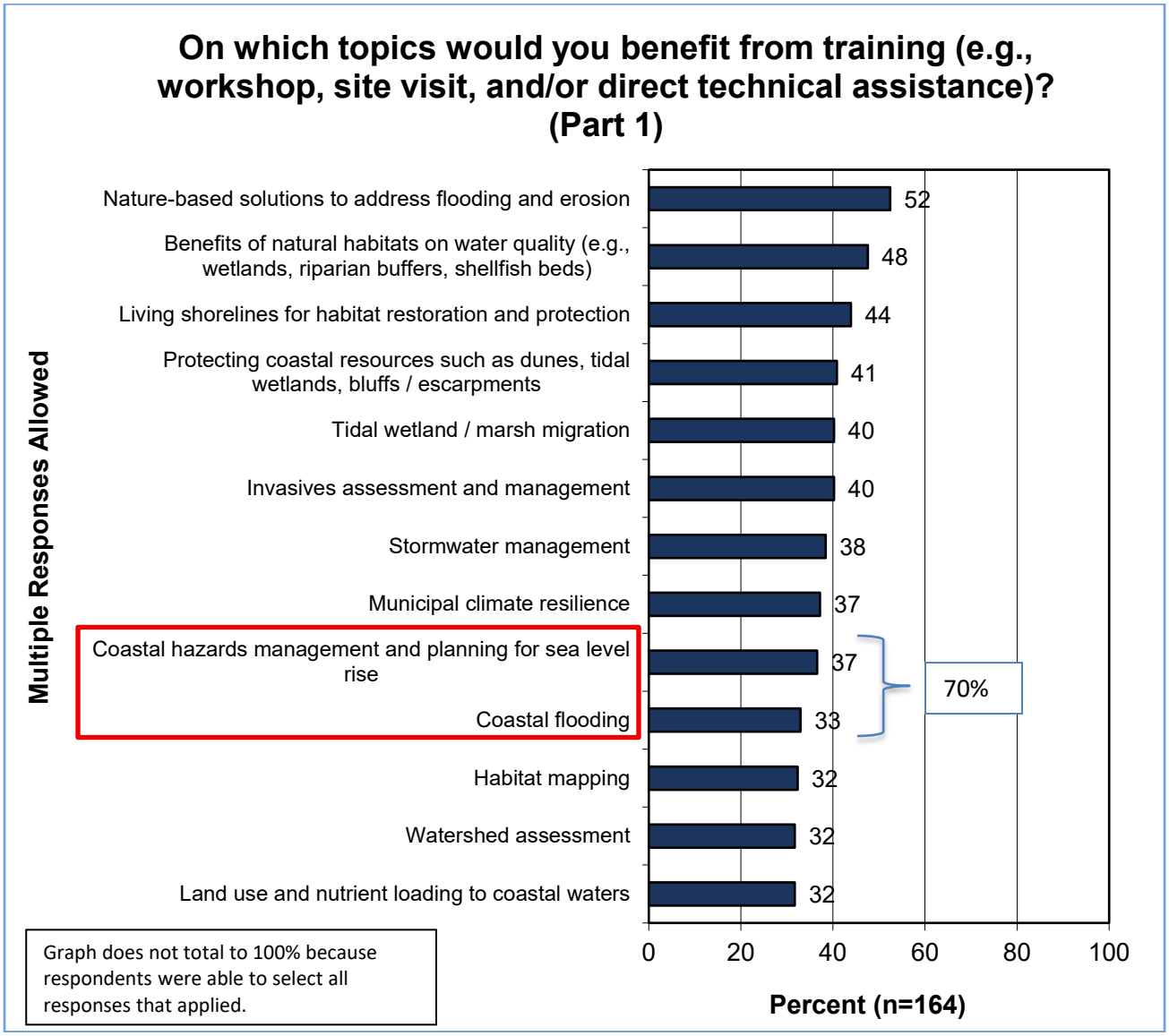
General Training Needs Findings

When asked about topics of interest in general, the most frequently selected need for training was nature-based solutions to address flooding and erosion.

Figures 8 and 9 show the percentage of respondents who selected each coastal management topic. Topics on which 40% or more of respondents said they could benefit from training are:

- nature-based solutions to address flooding and erosion
- benefits of natural habitats on water quality (e.g., wetlands, riparian buffers, shellfish beds)
- living shorelines for habitat restoration and protection
- protecting coastal resources such as dunes, tidal wetlands, and bluffs/escarpments
- tidal wetland/marsh migration
- invasive assessment and management

Figure 8: General Training Needs (Part 1)

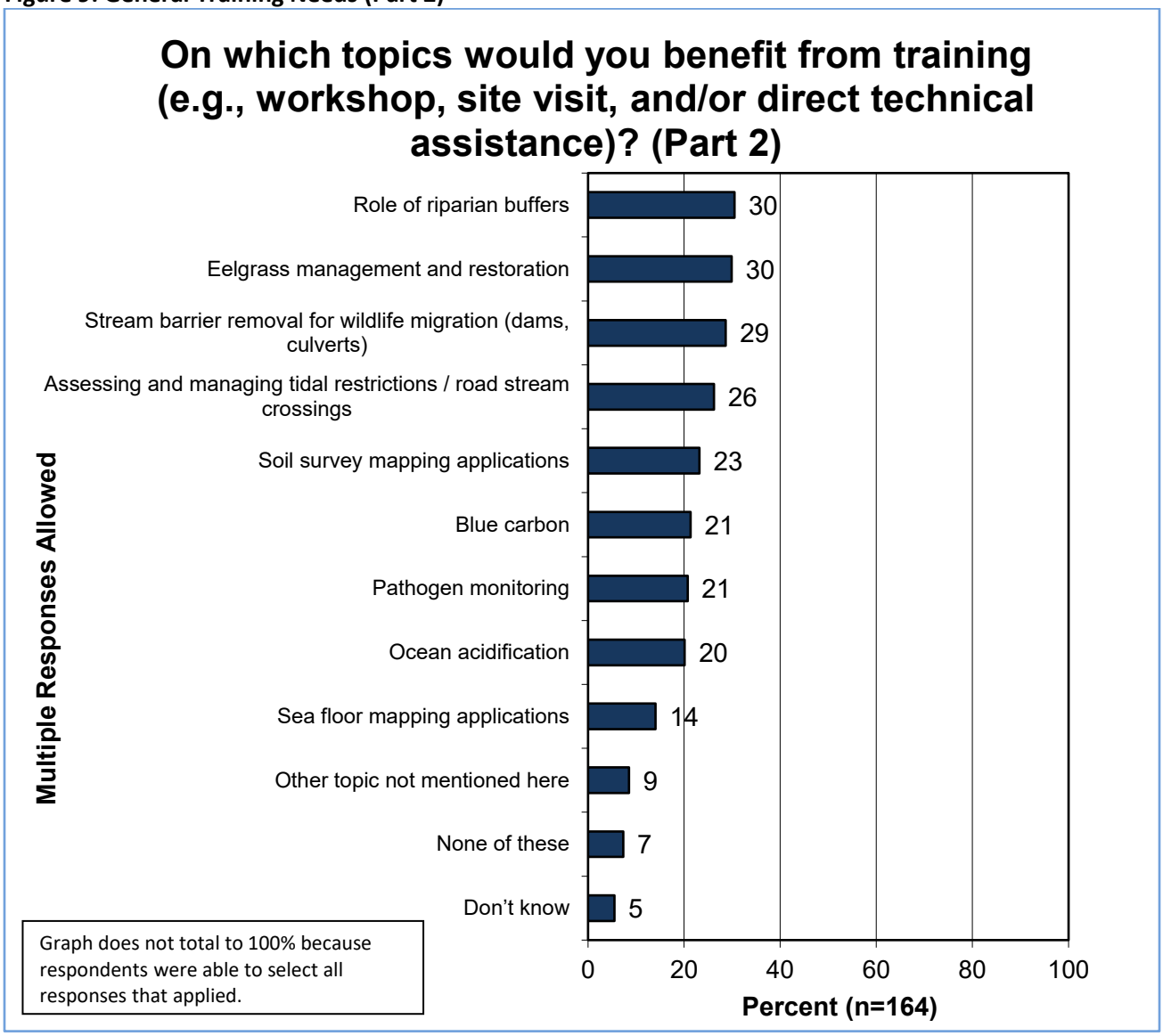


It should also be noted that although they are separated for the purpose of this survey, coastal hazards management and planning for sea level rise *AND* coastal flooding are all closely related topics. If these topics are combined, 70% of respondents selected one or both of them, making the topic the top choice for respondents (shown in Figure 8).

Topics selected by the smallest percentage of respondents included sea floor mapping applications, ocean acidification, pathogen monitoring, blue carbon, and soil survey mapping applications (Figure 9).

Respondents were also given an option to list a topic not included on the list. The verbatim responses to this question can be found later in the body of the report on page 24.

Figure 9: General Training Needs (Part 2)



Respondents who selected nature-based solutions went on to indicate equal interest in both green infrastructure/stormwater management and living shorelines techniques. When asked about specific living shoreline subtopics, more than 70% of respondents indicated interest in training related to site assessments, design criteria, and monitoring protocols.

Respondents who selected nature-based solutions to address flooding and erosion topics were asked a follow-up question to understand interest in specific components of nature-based solutions. As can be seen in Figure 10, a large percentage (78%) of respondents who selected this category indicated that both green infrastructure/stormwater management and living shoreline techniques are equally beneficial.

Respondents who selected living shorelines techniques were further asked about specific subtopics related to living shorelines; more than 70% of respondents indicated they could specifically benefit from training on site assessments, design criteria, and monitoring protocols (Figure 11).

Figure 10: Nature-Based Solutions Training Needs

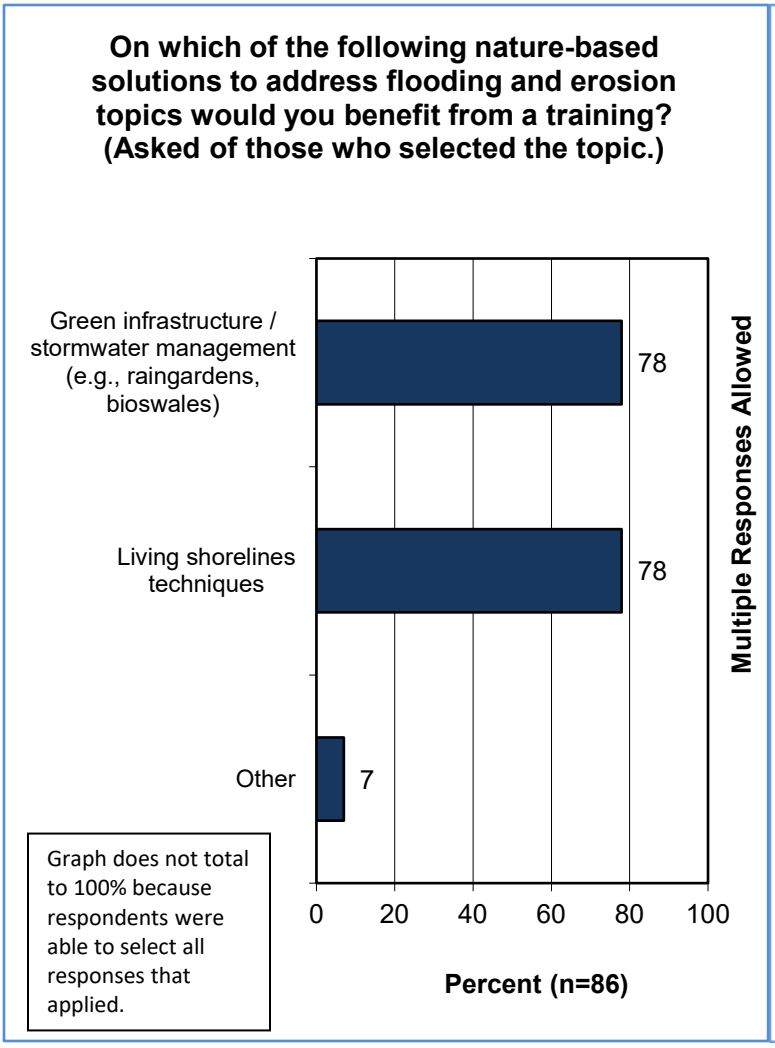


Figure 11: Living Shoreline Training Needs

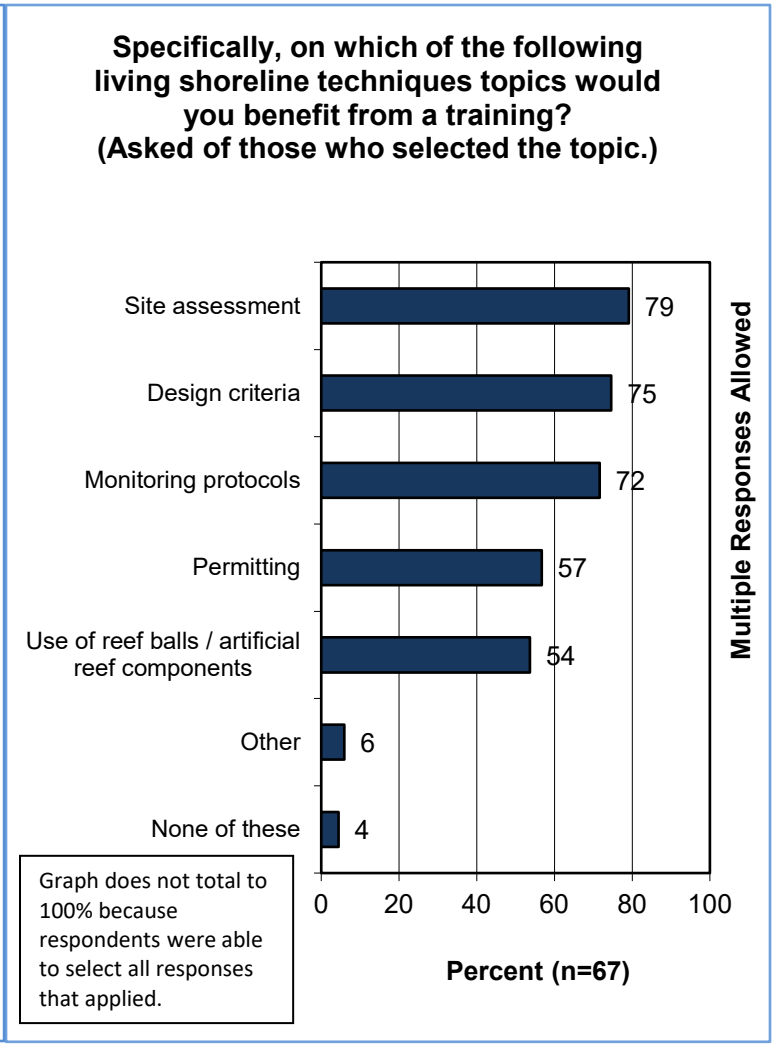
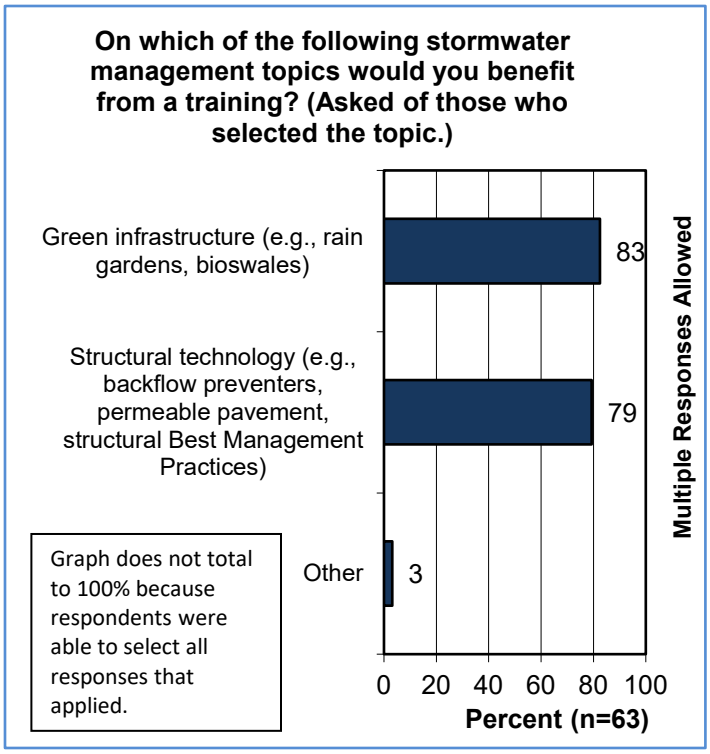


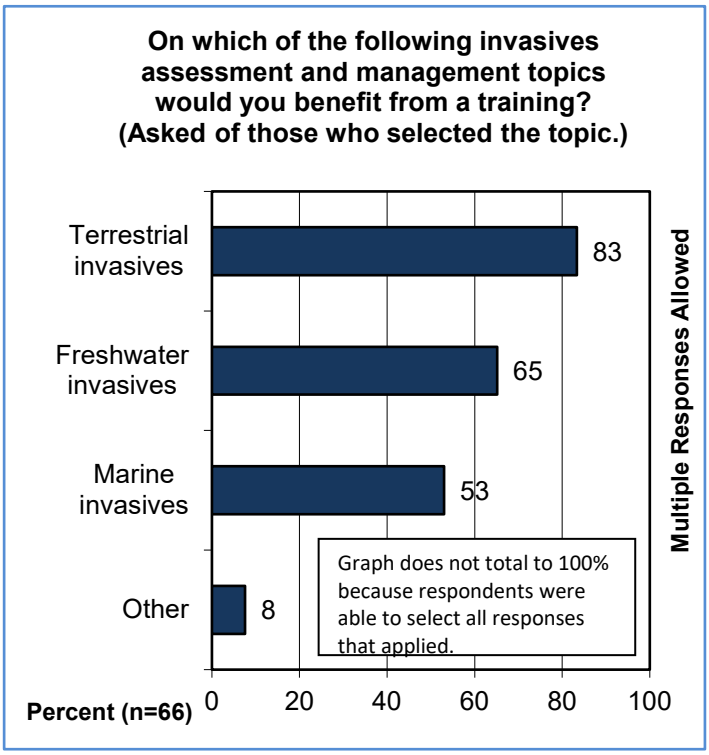
Figure 12: Stormwater Management Training Needs



Among those who selected stormwater management as a training topic of interest, green infrastructure and structural technology are nearly equally beneficial for respondents.

Stormwater management was selected as a beneficial training topic by 38% of respondents (shown in Figure 8). As with many of the topics that included follow-up questions, respondents often indicated that all components of the larger topic could provide beneficial training.

Figure 13: Invasives Management Training Needs



Invasive assessment and management was selected by 40% of respondents (Figure 8); within the larger topic, respondents specified that terrestrial invasives trainings would be most beneficial.

Terrestrial invasives trainings were selected by the largest percentage of respondents (83%), with freshwater invasives (65%) and marine invasives (53%) following.

Immediate Training Needs Findings

When asked about their highest or most immediate need for training, nature-based solutions to address flooding and erosion (specifically green infrastructure/stormwater management) and structural technology as a component of stormwater management were the top two responses.

Following the questions that asked about general training topics of interest, respondents were asked to select topics that related to their highest or most immediate needs for training. Whereas the general topics showed every possible option for respondents to choose from, when asked about their top priority/immediate need, respondents were only shown the topics they had previously selected, essentially asking each respondent to prioritize their selections.

Figure 14 shows the highest training need by major category. Note that when asked about their individual focus, the smallest percentage of respondents selected climate resilience and/or storm preparedness (shown in Figure 7); however, Figure 14 shows that half of all respondents have training needs related to the topic.

Figure 15 shows immediate training needs grouped by these major categories and second-level categories (in other words, increased specificity within the major category).

Figure 14: Most Immediate Training Needs 1 (Major Categories)

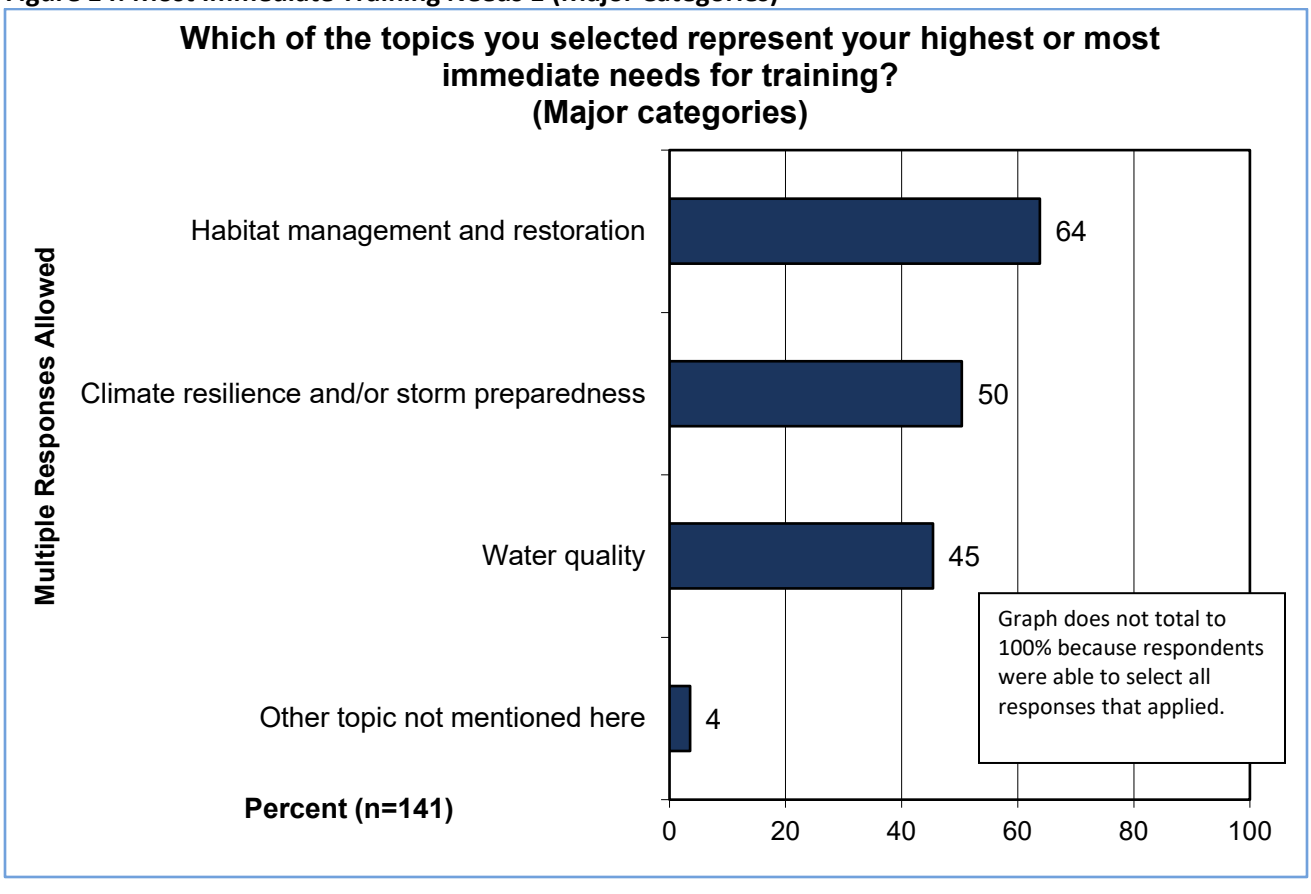
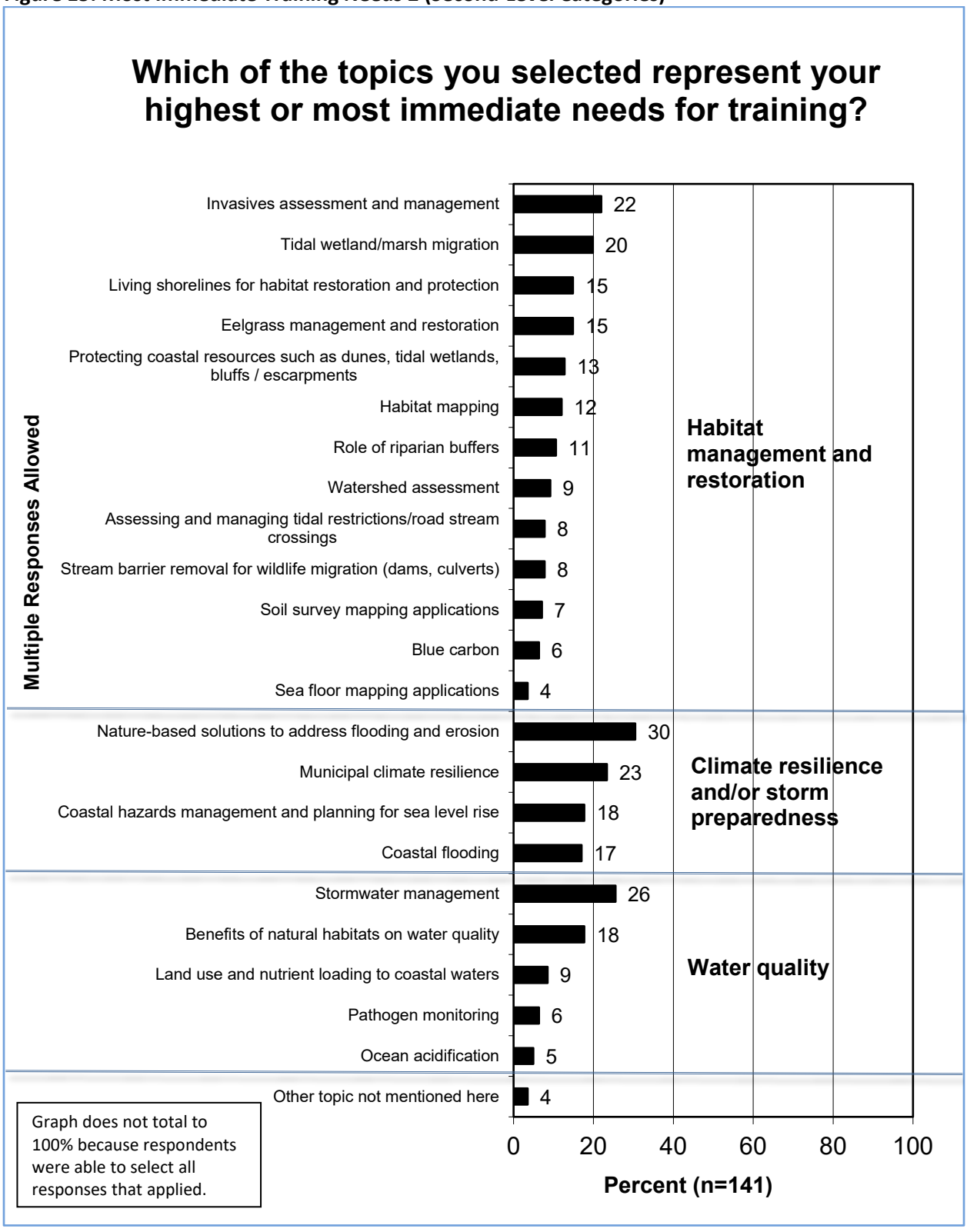


Figure 15: Most Immediate Training Needs 2 (Second-Level Categories)

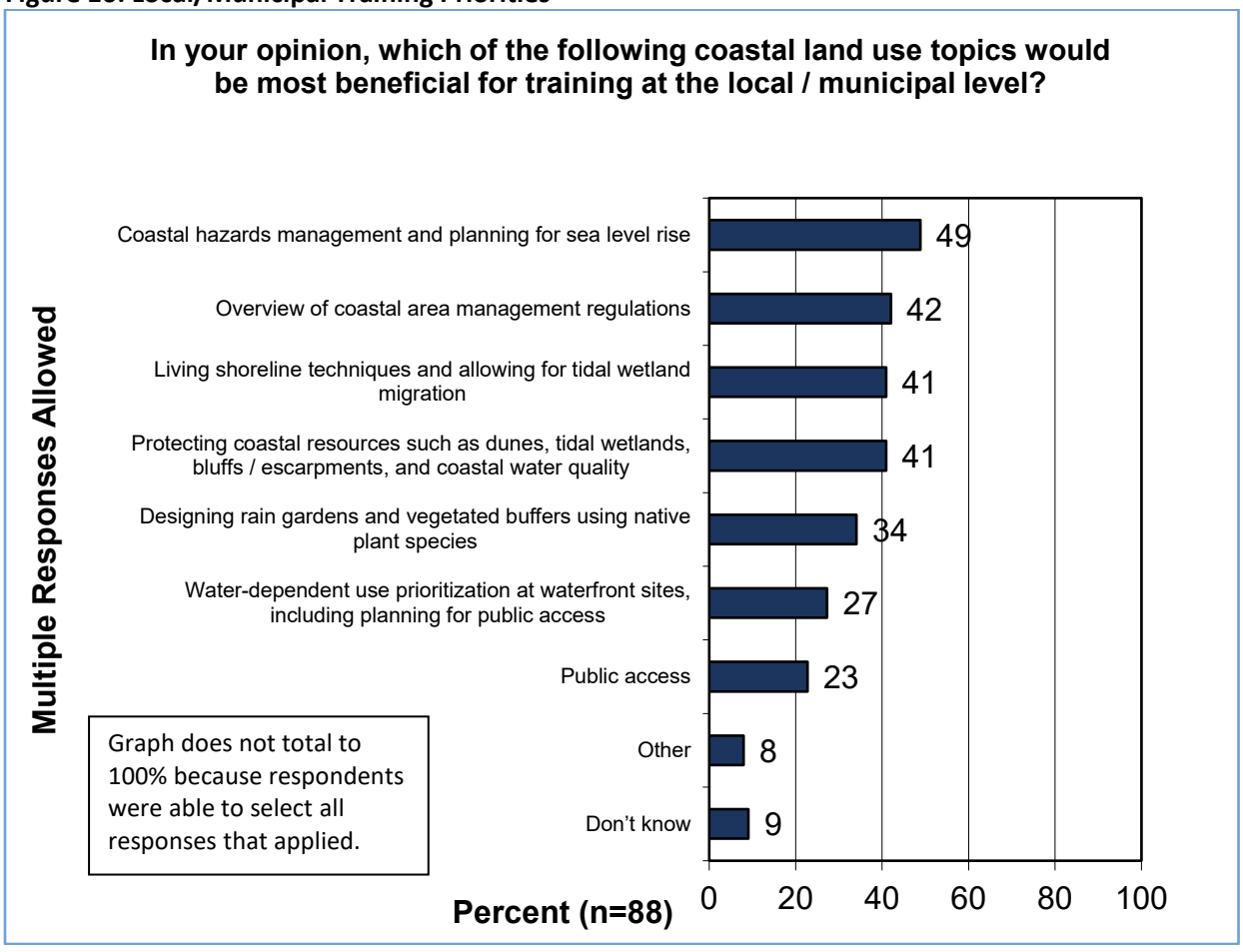


Local and Municipal Needs

Respondents from local or municipal organizations/agencies (e.g. land trusts, open space committees, and municipal staff) could benefit most from training related to coastal hazards management and planning for sea level rise.

This question focused specifically on survey participants who had positions with local or municipal organizations/agencies. When asked what topics would be most beneficial, more than 40% of these respondents selected training on coastal hazards management and planning for sea level rise; overview of coastal area management regulations; living shoreline techniques and allowing for tidal wetland migration; and protecting coastal resources such as dunes, tidal wetlands, bluffs/escarpments, and coastal water quality (Figure 16). Note that when compared to a 2017 study of municipal issues and needs in Connecticut,[1] responses showed a fair amount of overlap, and there has been little change in areas of concern in the 8 years since the municipal study.

Figure 16: Local/Municipal Training Priorities

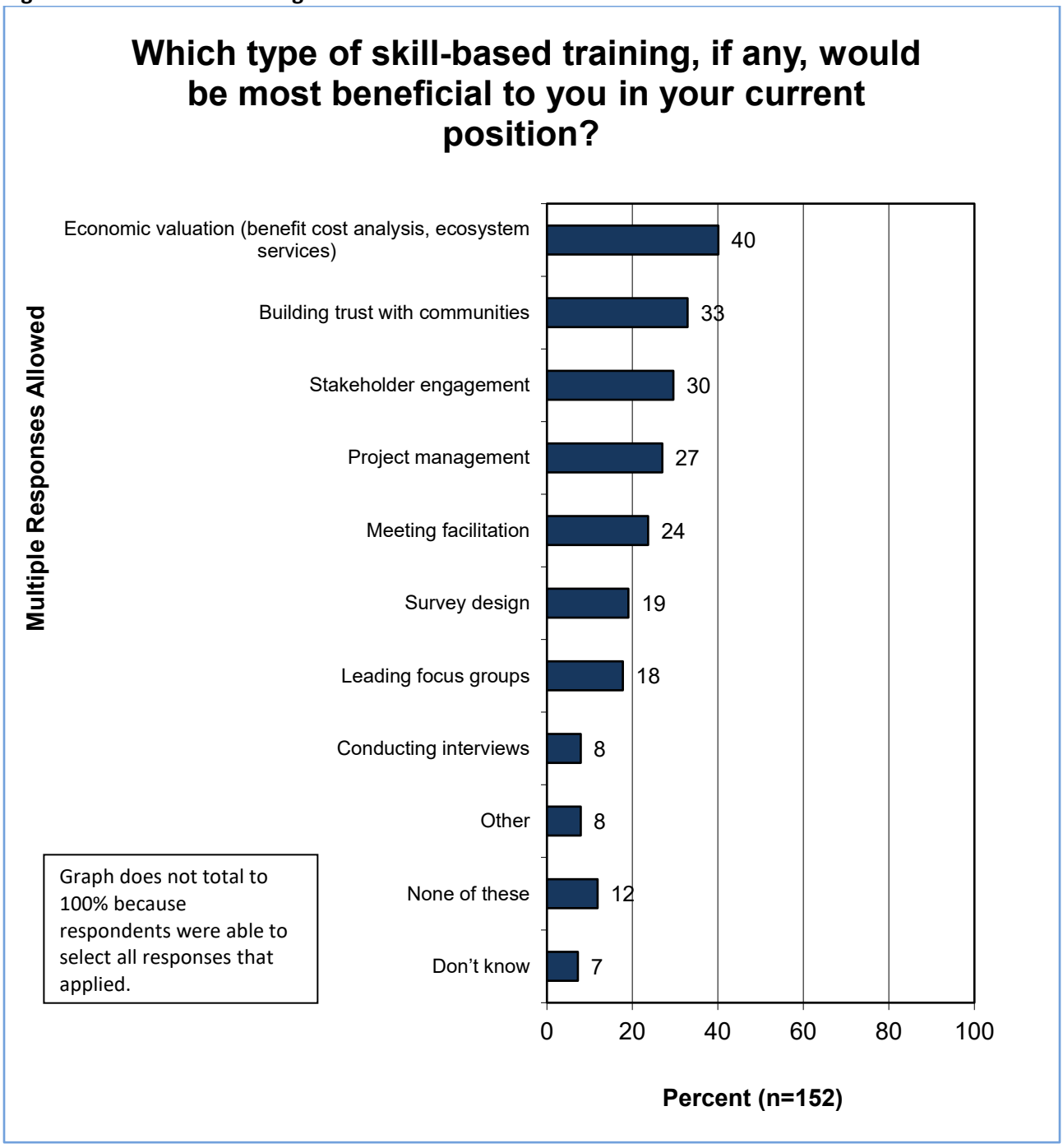


[1] Hyde, B., & Barrett, J. (2017). *Municipal issues & needs for addressing climate adaptation in Connecticut*. Connecticut Institute for Resilience and Climate Adaptation (CIRCA), University of Connecticut.

Skill-Based Training Needs

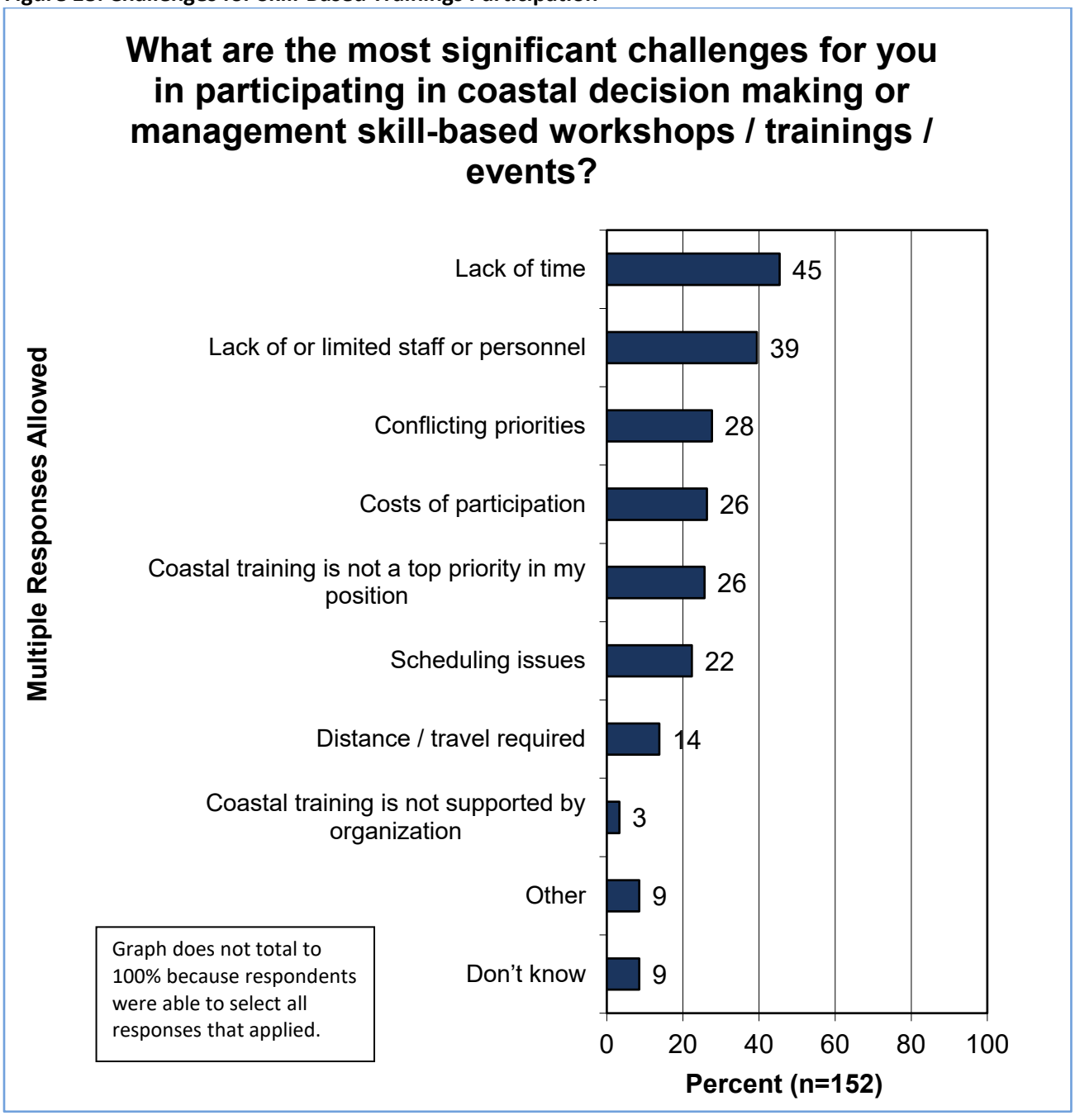
When asked about their needs for skill-based training, economic valuation (benefit cost analysis, ecosystem services) was the top response. Other responses that were selected by more than 30% of respondents related to better engaging audiences and building trust (Figure 17).

Figure 17: Skill-Based Trainings Needs



Respondents were further asked what significant challenges prevented them from participating in skill-based workshops, trainings, or events. As the top responses were lack of time and lack of or limited staff or personnel, trainings on these skill-based topics should be considered for easily distributable materials and/or shorter sessions (Figure 18).

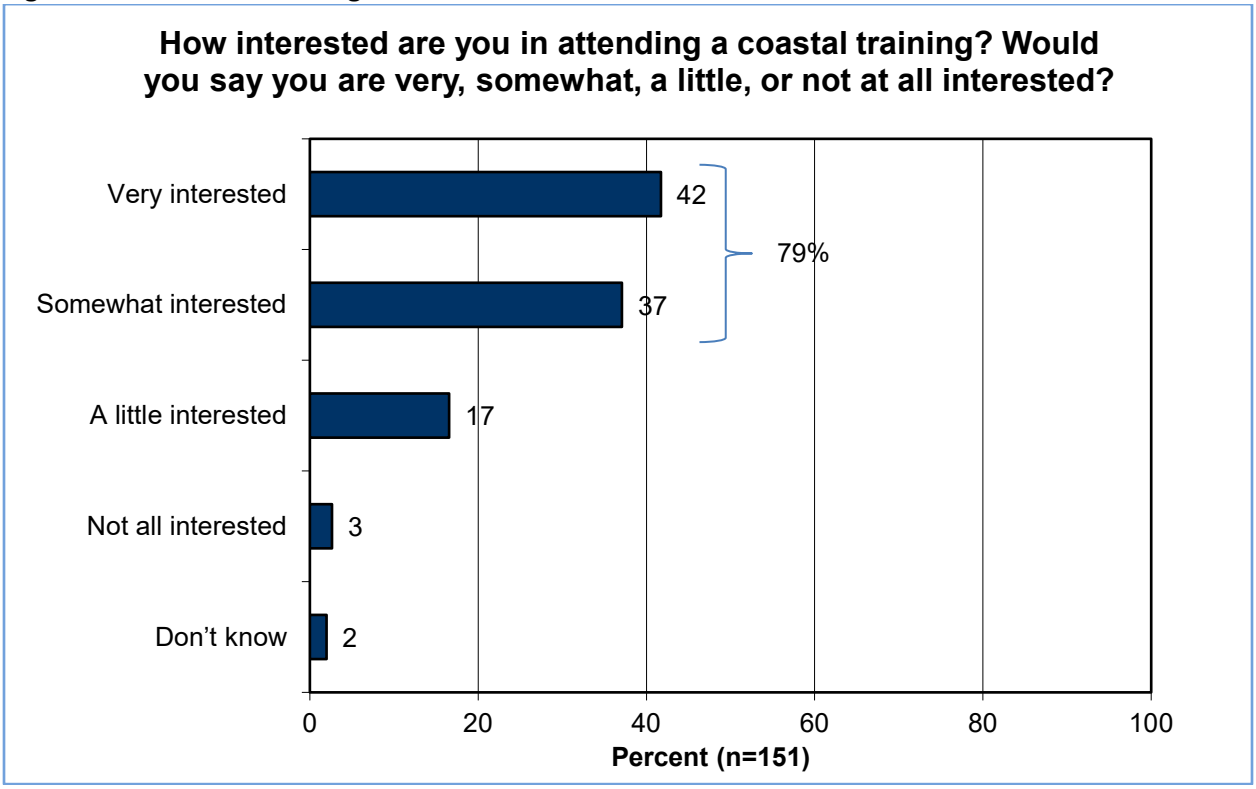
Figure 18: Challenges for Skill-Based Trainings Participation



Participation in and Preferences for Training

While 56% of respondents have not ever participated in a training, there is a great deal of interest in attending trainings (79% said they are *very* or *somewhat* interested in attending a coastal training).

Figure 19: Interest in Training



For the most part, respondent preferences for the timing, location, and logistics of training showed clear consensus that can be used by the CTNERR to plan and schedule coastal and skill-based trainings.

Table 3 shows the top training preferences, followed by additional information about specific aspects of coastal training.

Table 3: Preferences for Training

Topic	Top option	Percent of respondents who selected top option
Travel distance	31 to 60 minutes of travel	51%
Location (in-person, virtual, etc.)	In-person event – field trip	49%
Length	Half day (3-4 hours)	67%
Time of day	Morning	64%
Season	No preference (among seasons, fall was selected most often)	43%
Encouraging incentive	Food and drink	34%

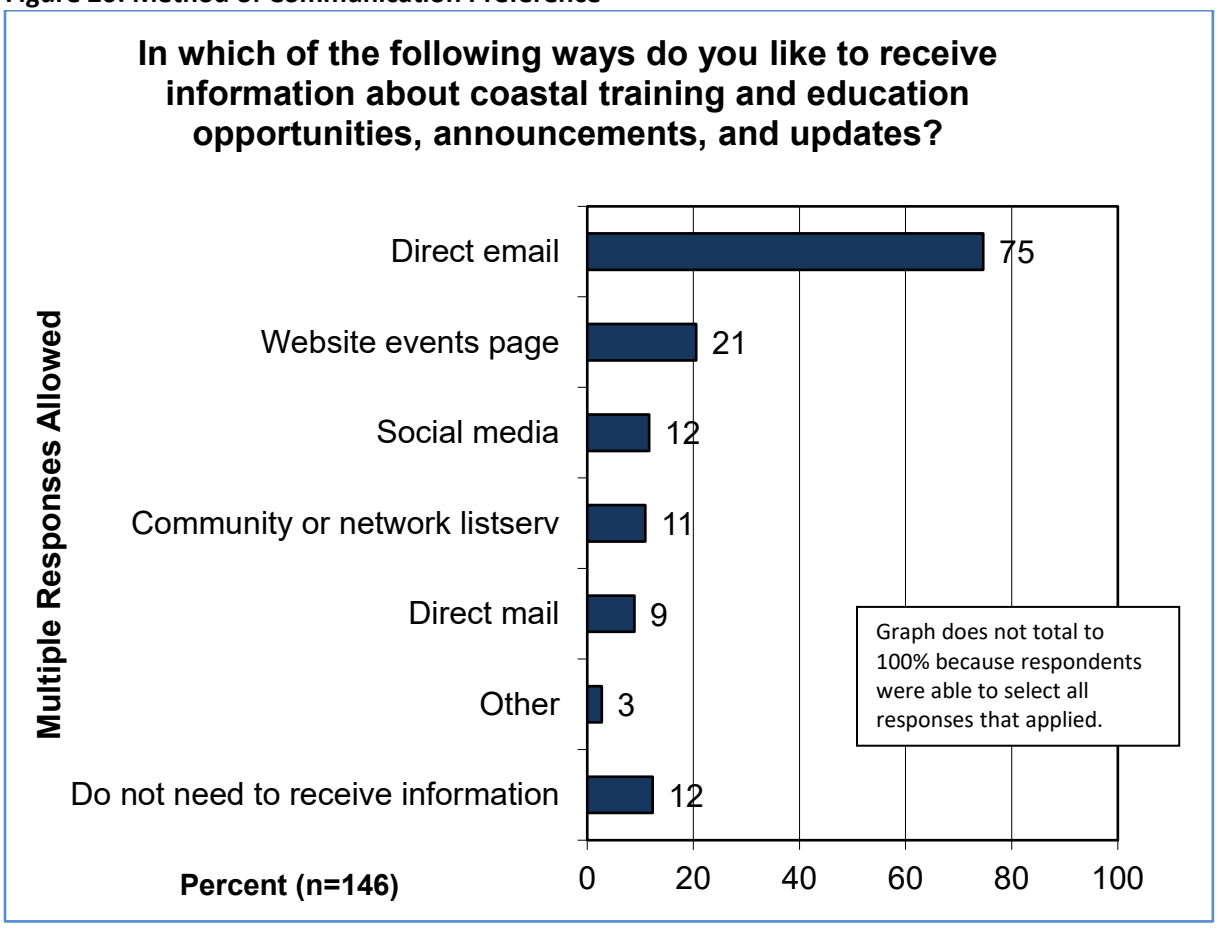
Respondents were also asked to rate the value of several aspects of coastal training, on a scale of 1 to 3, where 1 is *no value at all* and 3 is *extremely valuable*.
In descending order of mean ratings, the results of the aspect ratings are:

- Site visits or demonstrations (in-person only): mean rating of 2.76
- In-person half- or full-day workshop: 2.68
- Webinars: 2.33
- Small group break-out activities: 2.21
- Panel or roundtable discussions: 2.19

Communication Preferences

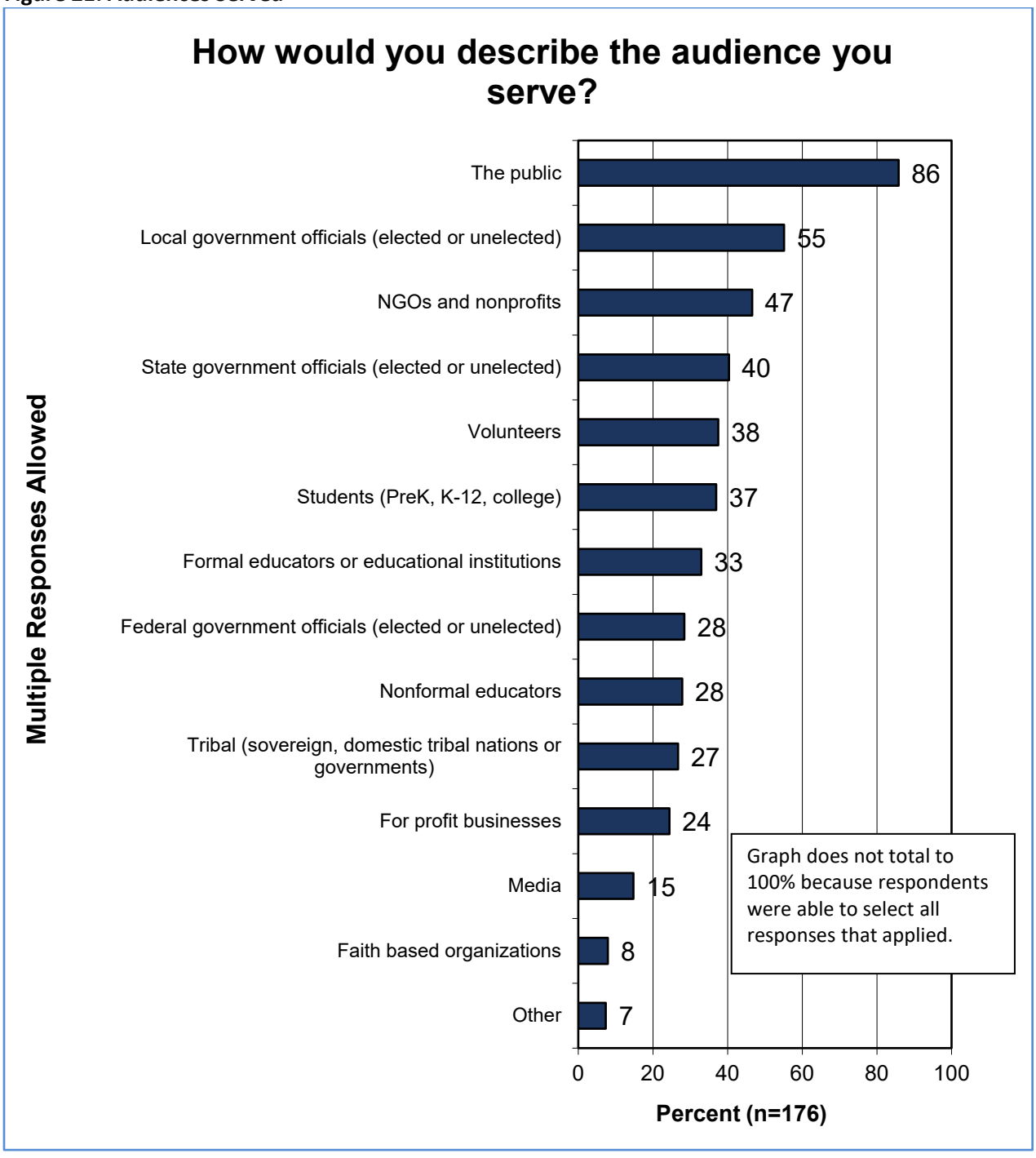
Most respondents agree that direct emails are the preferred method of receiving communication about coastal training and education opportunities, announcements, and updates (75%, full graph shown later in body of report).

Figure 20: Method of Communication Preference



Related to communication, however, it should be noted that several findings from this research indicate that many respondents serve the public (as shown in Figure 21), wish to build trust and communication with the public (Figure 17), and lack the time and capacity to communicate with the public (Figure 18).

Figure 21: Audiences Served



Educational Programming

Among those who received questions related to educational programming, the largest percentage (49%) serve the public, specifically adults.

As can be seen in other questions in the survey regarding audiences, respondents who indicate that educational programming is their primary focus most often serve the adult public. In addition, elementary through high school students and formal educators were also listed by more than 30% of respondents as audiences they serve with educational programming (figure shown in body of report). As a reminder, formal educators, such as K-12 teachers, were not included in this needs assessment; instead, this research focused on organizations that provide coastal management education *to* formal educators, the public, and others.

Across different audiences, the most common programs and activities provided by those who focus on educational programming are based on watersheds, habitats and restoration, and fisheries/wildlife ecology. With few exceptions, coastal hazards, emerging contaminants, nature-inspired art, and cultural history were the least provided programs and activities.

Table 4 shows the top types of programs and activities provided for each audience. Figure 22 shows that more than 50% of respondents offer volunteer opportunities, off-site based programs, internship opportunities for adults, and classroom programs. Finally, Figure 23 shows that 38% of respondents indicated that they are not using Reserve sites for their off-site based programs.

Table 4: Educational Programming by Audience

Audience	Top program or activity provided
Pre K/K	Emotional connection to nature, fisheries/ wildlife ecology, nature-inspired art, habitats / restoration
Grades 1-4	Watersheds
Grades 5-8	Watersheds
Grades 9-12	Watersheds
Homeschool educators and/or students	Fisheries / wildlife ecology
Community colleges	Watersheds
4-year colleges	Habitats / restoration
Regional or school systems	Habitats / restoration
Public (youth under the age of 18)	Watersheds, Habitats / restoration
Public (adults over the age of 18)	Habitats/ restoration
Nonformal educators	Habitats / restoration
Formal educators	Watersheds

Figure 22: Educational Services Provided by Organization

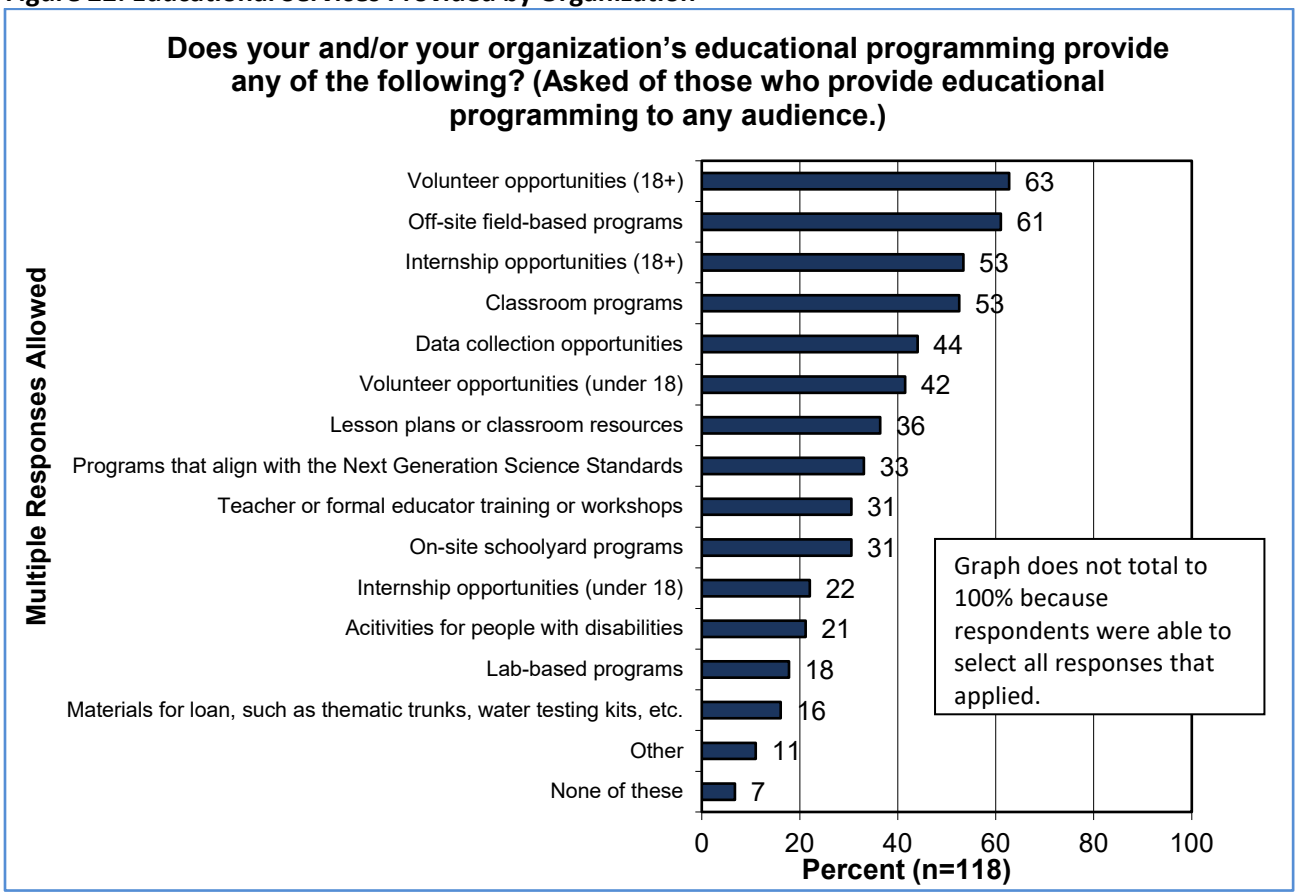
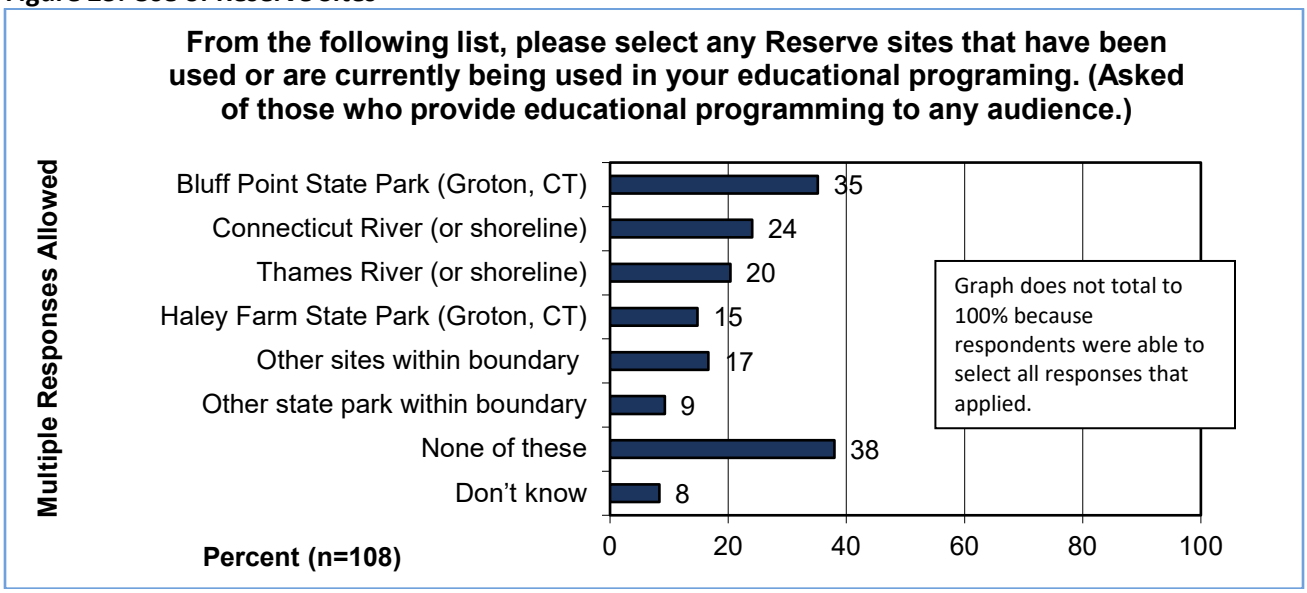


Figure 23: Use of Reserve Sites



In an open-ended question, respondents were asked what gaps in teacher training and educational programming the Reserve could help with. Respondents often mentioned a need for more place-based learning opportunities, partnerships, and access to research and teaching resources.

Several respondents indicated that there were many things that the Reserve could help with but did not list specifics. A full list of the responses to this question can be found in Appendix B.

RECOMMENDATIONS

Based on the key findings from this survey, the project team offers several recommendations to meet the needs of survey respondents. While not all recommendations may be feasible for the CTNERR, needs assessments often reveal gaps that exist that were not previously known to the facilitator (in this case, the CTNERR).

RECOMMENDATION #1: MARKET PROGRAMS AND RESOURCES
While many respondents indicate they are familiar with the CTNERR, there were a fair number of respondents who listed being unsure of where to access information and being unsure of organizations that offer information as major barriers to better addressing their priority coastal issues. Based on this information, the CTNERR should focus on outreach that specifically outlines the support, resources, and programs they offer.

RECOMMENDATION #2: SEND DIRECT EMAILS
There is widespread agreement that direct emails are the preferred method of receiving communication about coastal training and education opportunities, announcements, and updates. A smaller percentage of survey participants indicate that providing updates and communication on a website events page would be helpful, but the overwhelming majority prefer direct emails.

RECOMMENDATION #3: USE A PLACE-BASED APPROACH AND LEARN ABOUT RESPONDENTS WHO ARE USING RESERVE SITES FOR TRAINING AND EDUCATION PROGRAMMING
Respondents indicated that a gap and preference for training and education programming was place-based learning opportunities. As the Reserve offers a number of different sites in which place-based learning can take place, there is a need to develop a better understanding of who is using Reserve sites and for what purpose. This information can ultimately be used to leverage partnerships and fulfill training and education gaps using a place-based approach.

RECOMMENDATION #4: PROVIDE MATERIALS AND BRIEF SKILL-BASED TRAININGS
When asked about major barriers to participating in skill-based trainings, many respondents indicated they lacked time and/or capacity. Easily distributed materials or brief training seminars or sessions that focus on the top priorities for skill-based training (economic valuation, building trust with communities, stakeholder engagement, and project management) would be helpful to those lacking time and capacity.

RECOMMENDATION #5: FOCUS TRAINING ON GENERAL TOPICS SELECTED BY MORE THAN 32% OF RESPONDENTS

Respondents have many training needs, but attempting to focus on all topics might stretch the capacity of the CTNERR. Leveraging partnerships and providing training on the topics of interest for the greatest number of respondents would offer the most utility. Topics of focus should include nature-based solutions to address flooding and erosion; benefits of natural habitats on water quality; living shorelines for habitat restoration and protection; protecting coastal resources, such as dunes, tidal wetlands, and bluffs/escarpments; tidal wetland/marsh migration; invasive assessment and management; stormwater management; municipal climate resilience; coastal hazards management and planning for sea level rise; coastal flooding; habitat mapping; watershed assessment; and land use and nutrient loading to coastal waters (see Figures 8 &9).

RECOMMENDATION #6: FOCUS MUNICIPAL TRAININGS ON SEA LEVEL RISE AND COASTAL HAZARD MANAGEMENT

When asked about the biggest challenges municipalities will face in the coming 5 years, respondents most often indicated that they were concerned about changes in precipitation and sea level rise. Current training needs questions revealed similar results ("coastal hazards management and planning for sea level rise" was the top response). As these concerns did not substantially vary from the concerns discussed in municipal research conducted in 2017, there is still a clear need for municipal trainings on these topics.

RECOMMENDATION #7: CONNECT WITH COMMUNITY LEADERS AND MEMBERS

Many respondents indicated that they serve the public. Respondents also indicated that they would like to engage in trainings that help them build trust with communities (as seen in the responses to questions in Figure 17 about interests in skill-based trainings). Further, 71% of respondents indicated that some or all the communities they serve are distressed. (The full list of distressed communities provided by survey respondents can be seen in Appendix B.) Given that findings from the 2024 Long Island Sound Study Environmental Justice Needs Assessment indicated that relationship-building with communities and community leaders in distressed communities is an integral part of ensuring ongoing community engagement, [2] the CTNERR staff should continue to develop preexisting relationships with trusted community leaders and build on the work done during the Long Island Sound Environmental Justice Needs Assessment to help facilitate connections and ultimately build community trust.

RECOMMENDATION #8: BUILD TRAININGS AROUND RESPONDENT LOGISTICAL PREFERENCES

The findings from this research show many clear preferences for the timing and logistics of coastal training, including time of day, length of training, location of training, and incentives. To increase and encourage participation, it is recommended that, when possible, trainings align with respondent preferences that are detailed in the body of this report.

[2] Responsive Management. 2024. Environmental Justice Needs Assessment for the Long Island Sound Watershed. Conducted for the Long Island Sound Study.