

TRAIL COMPETENCY FRAMEWORK

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Contents

Executive Summary	4	Methodology	8
Project Background & Purpose	4	Approach	8
Summary of Study Findings	4	Study Design	8
Next Steps	6	Analysis	9
		Recruitment & Data Collection	10
Introduction	7		
Project Background & Purpose	7	Results	11
Competency Research	7	Study Participants	11
		Trail Construction	13
		Trail Maintenance	14

Project Preparation	15	Conclusion	20
Project Planning & Design	16	References	21
Project & Crew Management	17	Appendix	22
Program Administration & Leadership	16		
Next Steps	19		
Definitions by Persona Level	19		
Competency Framework Uses	19		

EXECUTIVE SUMMARY

Project Background & Purpose

Trail professionals generally acquire their skills through training provided by a network of trail organizations and on-the-ground experience. This serves many people well, but a clear, cohesive path of skill and professional development is lacking. At the same time, trail work often requires training and skill that is not consistently recognized.

With this context, in the past year, a group of nationwide trail professionals representing federal agencies, trail non-profits, and the private sector initiated this project to develop a common trail competency framework. American Trails, the coordinating organization, had identified the need for structure and methodological rigor in the approach and ultimately brought the opportunity to the attention of Indiana University's Eppley Institute for Parks and Public Lands.

The result was a project focused on enhancing professionalism as well as a higher level of skill for those working in trails through shared language around trail skills and expertise. The purpose of the resulting project was to codify a competency framework that would create opportunities to align, integrate and coordinate trail trainings nationwide, communicate needs for technical trail expertise, and increase the overall skill level of the trail workforce.

Summary of Study Findings

Employing a Modified Delphi study design to develop and validate this set of core competencies (Keeney et al., 2011), the resulting competency framework reflects the feedback of more than 200 trail experts nationwide. Collectively the respondents represent 44 states and, on average, 19 years of trail work experience. The final list of 47 competencies across 6 competency groups as validated by the study is summarized in Table 1.

Respondents also indicated the persona (i.e., skill) level that was most applicable to a given competency: Entry, Full Performance, and Expert. The analysis of this data and detailed results are provided in the full Results section.



TABLE 1. Competency Framework Overview

Competencies by Competency Group	
Trail Construction	
<ol style="list-style-type: none"> 1. Construction Specifications 2. Corridor Clearing 3. Hand-Built Trail Construction 4. Mechanized Trail Construction 5. Trail Finishwork 6. Water Management/Drainage Features 	<ol style="list-style-type: none"> 7. Water Crossing Structures 8. Retaining Walls 9. Tread Hardening 10. Trailside Structures / Dispersed Recreation 11. Decommissioning Trails
Trail Maintenance	
<ol style="list-style-type: none"> 1. Maintenance Specifications 2. Inventory & Assessment 3. Corridor Clearing: Power tools 4. Corridor clearing: Hand tools 	<ol style="list-style-type: none"> 5. Tread Maintenance - Hand tools 6. Tread Maintenance - Mechanized Equipment 7. Drainage Features/Water Management
Project Preparation	
<ol style="list-style-type: none"> 1. Land Use Plan Alignment 2. Define Purpose and Need of Project 3. Corridor Planning 	<ol style="list-style-type: none"> 4. Stakeholder Engagement 5. Justice, Equity, Diversity, and Inclusion (JEDI) Principles
Project Planning & Design	
<ol style="list-style-type: none"> 1. Project Cost Estimation 2. Implementation Plan 3. Trail Specifications 4. Design 	<ol style="list-style-type: none"> 5. Trail Plans 6. Interpretation 7. Permitting 8. Universal Design/ADA Accessibility
Project & Crew Management	
<ol style="list-style-type: none"> 1. Crew Recruitment 2. Crew Management 3. Jobsite Safety 	<ol style="list-style-type: none"> 4. Jobsite Risk Management 5. Performance Management 6. Field-based Resource Protection
Program Administration & Leadership	
<ol style="list-style-type: none"> 1. Program Budgeting 2. Communications 3. Contract Administration 4. Education and Public Outreach 5. Funding/Grants 	<ol style="list-style-type: none"> 6. Inspections/Monitoring 7. Partnership and Collaboration 8. Policy/Directives/Law 9. Visitor Use Management and Monitoring 10. Agreement Development

Next Steps

Trails are important corridors that connect users to spaces of natural, cultural, and historical significance. This project serves as an initial, but crucial, component in a longstanding process to increase the overall skill level of the trail workforce so as to build, maintain, plan, and manage trails well into the future.

This project opens a door for several next steps (Figure 1). For example, future competency and standards development work might consider developing a definition differentiated by each persona level and/or the proposed specialty competencies. This competency framework can also be used in a performance management/human resources context. Possible uses include identifying skill or knowledge gaps among trail professionals, guiding the development and delivery of

training opportunities, communicating the needs for a position, or evaluating prospective hires. Across organizations, an agreed upon competency framework will help promote professionalism and a higher level of skill for those working in trails through shared language around trail skills and expertise. Eventually, trail trainings might be integrated and coordinated nationwide utilizing the trail competency framework validated in this study.

The project team sincerely thanks the more than 200 trail experts who shared their time and expertise through participating in this project. Their input was crucial in the development of this competency framework.

FIGURE 1. Recommended Use Flowchart for Trail



INTRODUCTION

Project Background & Purpose

Trail professionals generally acquire skills through training provided by a network of trail organizations and on-the-ground experience. This serves many people well, but a clear, cohesive path of skill and professional development is lacking. At the same time, trail work often requires training and skill that is not consistently recognized.

Given this context, approximately one year ago, a group of nationwide trail professionals representing federal agencies, trail nonprofits, and the private sector initiated this project in collaboration with Indiana University's Eppley Institute for Parks and Public Lands at the request of American Trails. Their goal was to develop a common trail competency framework. American Trails—a nonprofit organization that seeks to develop diverse, high-quality trails and greenways for the benefit of people and communities through collaboration, education, and communication—identified the need for structure and methodological rigor in the approach and ultimately brought the opportunity to the Eppley Institute's attention.

This project sought to develop a common trail competency framework that would help promote professionalism and a higher level of skill for those working in trails through shared language around trail skills and expertise. This will, in turn, create opportunities to align, integrate and coordinate trail trainings nationwide; communicate needs for technical trail expertise; and increase the overall skill level of the trail workforce.

Competency Research

Trail professionals are integral to the development of trails, parklands, green spaces, and protected areas at national, provincial or state, local, and non-profit levels. Their work constructing, maintaining, planning, and managing these spaces have wide-ranging benefits, as trail use not only provides access to important resources, but is associated with both positive economic and health outcomes (Starnes et al., 2011).

Given the dynamic and complex nature of trail work, highly competent trail professionals are needed across the field, which encompasses many job descriptions and demands proficiency across several skills (National Scenic and Historic Trails Training Needs Assessment, 2008; Outdoor Stewardship Institute, 2008). The successful management of human resources, then, is crucial to the overall performance of organizations in this and related industries (Minten, 2010).

Competency-based management is a managerial model that focuses on the personal characteristics of an employee to meet overall organizational goals (Shet, Patil, & Chandawarkar, 2019). Competencies have been described as the “essential skills, knowledge, abilities, and personal characteristics needed for effective job performance” (Hurd, 2005, p. 46). In simpler terms, competencies represent “the language of performance” (Armstrong, 2019, p. 159).

METHODOLOGY

Approach

This project employed a Modified Delphi study design to develop and validate a set of core competencies of trail professionals that would be both relevant to volunteers and paid staff (Keeney et al., 2011).

An additional, key element of this project was the involvement and direction of a project team that aided with study design, participant recruitment, data analysis, and synthesis. A nationwide group of trail professionals comprised the project team and included representatives from:

- American Trails
- Bureau of Land Management
- Eppley Institute for Parks and Public Lands
- Federal Highway Administration
- National Park Service
- Professional TrailBuilders Association
- Trailhead Consultants
- United States Forest Service

Study Design

A Delphi research technique generally employs several rounds of expert input until consensus is reached amongst experts (Keeney et al., 2011). Whereas the classical Delphi uses an open round of survey participation to facilitate idea generation, a modified Delphi adjusts the format of the first round. In this project’s study design, the first phase featured a process of developing competency statements from existing literature in the field and the input of project team members. The second phase employed one round of feedback via an online survey.

This second phase sought feedback from nationwide trail experts (see “Recruitment and Data Collection”) on several measures per competency: (a) the degree of consensus (i.e., the percentage of respondents not selecting “this is not a trail competency”) and (b) the level of agreement for each persona, or skill, level (e.g., percentage selecting entry, full professional, or expert). A full description of the three persona levels, as they were described to participants in the second round, is provided in Table 3.

TABLE 3. Example, potential characteristics of persona (skill) levels

Entry	Full Performance	Expert
<ul style="list-style-type: none"> • A competent crew member or volunteer • Does trail work periodically • Proficient with hand tools and can perform needed maintenance • Understands basic feature-level planning (e.g., causes of erosion, where to put drainage structures) • Trained on trail and tool safety 	<ul style="list-style-type: none"> • Has all abilities of Entry level • Does trail work on a regular basis • Expert in hand tool use and can train others on proper tool use, safety, and maintenance • Able to lead a crew • Understands user and natural trail impacts • Can perform field assessments of trails and make recommendations • Has skills in trails-related project management 	<ul style="list-style-type: none"> • Has all abilities of Full Performance level • Is a career professional in land management and/or planning • Expert in trail assessment, planning, and design • Able to manage permitting and bidding processes • Has specialized skills in some areas needed for trail planning or construction (e.g., NEPA, machine operations, stonework)

TABLE 4. Consensus icon descriptions by persona level

Icon	Entry	Full Performance	Expert
	Fewer than 25% of respondents selected Entry level for this competency.	Fewer than 25% of respondents selected either Entry level or Full Performance for this competency.	Fewer than 25% of respondents selected Entry, Full Performance, or Expert for this competency.
	Between 25% and up to 49.9% of respondents selected Entry level for this competency.	Between 25% and up to 49.9% of respondents selected either Entry level or Full Performance for this competency.	Between 25% and up to 49.9% of respondents selected Entry, Full Performance, or Expert for this competency.
	50% or more of respondents selected Entry level for this competency.	50% or more of respondents selected either Entry level or Full Performance for this competency.	50% or more of respondents selected Entry, Full Performance, or Expert for this competency.

Analysis

Respondents who failed to answer at least one substantive question beyond the first few demographic questions were excluded from further analysis. Data analysis continued with an evaluation on the subject matter expert consensus level of agreement for each competency among the expert respondents. While the concept of expert consensus is often regarded as a contentious component of Delphi research (von der Gracht, 2012), research suggests that minimum consensus levels can be set as low as majority consensus or up to and exceeding 70% agreement (Keeney et al., 2011). With this context, the project team chose 90% agreement. This higher threshold was selected to provide further validation to the resulting competency framework. Competencies not indicating this level of consensus were evaluated by the project team and ultimately included in the list of specialty competencies (Appendix, Table 12).

In addition to evaluating consensus, respondents were also asked to indicate the persona level that was most applicable to a given competency. They were also provided guidance that while “a basic skill related to the use of hand tools in constructing a trail may be applicable to all levels, it may be most applicable to the “Entry” level.” They were also informed that, for the purposes of analysis, an individual at the “Full Performance” level would also have “Entry” level competencies, and that an individual at the “Expert” level would have both “Full Performance” and “Entry” level competencies.

Given this assumption, the percent of respondents indicating each persona level was evaluated and assigned a repre-

sentative icon. For each persona level, the icon assignment followed the logic in Table 4. Of note, all competencies are indicated as “Expert” competencies based on the functional logic as outlined above.

Responses to open-ended responses were reviewed by one or more members of the project team, who flagged specific comments for future consideration. In some cases, and particularly where patterns arose across multiple comments, these patterns were summarized in the results to supplement the quantitative analysis. An additional use case for these competencies (defining competencies by persona level), is also outlined in “Next Steps.”

Recruitment & Data Collection

Initially, experts recruited to participate in the online survey consisted of expert referrals by members of the project team. This initial list of invited experts totaled 450 individuals. Snowball sampling, wherein survey respondents were invited to recommend other individuals for participation, was also employed (Dillman et al., 2014). Two members of the project team reviewed and confirmed these additional recruited individuals weekly over the course of two weeks. Over the course of additional expert referrals and snowball sampling, the list increased to 576 individuals.

Survey data collection occurred November and December 2021 via an online survey instrument housed in Qualtrics®.

TABLE 5. Survey participants by institutional category

Respondent Institution or Organization	Count	% of Total
Federal	87	40%
Bureau of Land Management (12, 5%)		
National Park Service (29, 13%)		
United States Forest Service (46, 21%)		
State System	23	10%
Private	70	32%
Nonprofit	29	13%
Local, County, Higher Education & Other	11	5%
Grand Total	220	100%

RESULTS

Study Participants

Ultimately, 220 individuals participated (38% response rate). Respondents represented a variety of government institutions at state and federal levels, and nearly half of the participants represented a nonprofit or private organizations (Table 5).

The respondent group also indicated substantial experience within the trails industry. The typical respondent had nearly 19 years of trail experience ($M = 18.9$, $SD = 11.5$; Figure 1).

Furthermore, more than half of respondents indicated 16 or more years of experience working in trails (Figure 1)

Geographically, respondents represented 44 U.S. states (Figure 2). While the respondent group was not representative of the U.S. population distribution, geographic locations of respondents generally reflect regions of greater conservation and recreational land uses (Theobald, 2014).

FIGURE 2. Years of Trail Experience

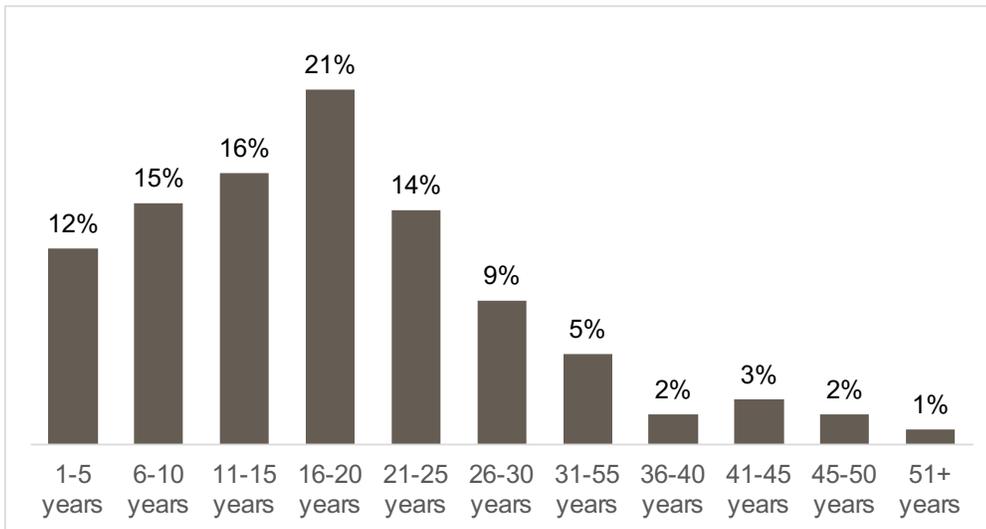
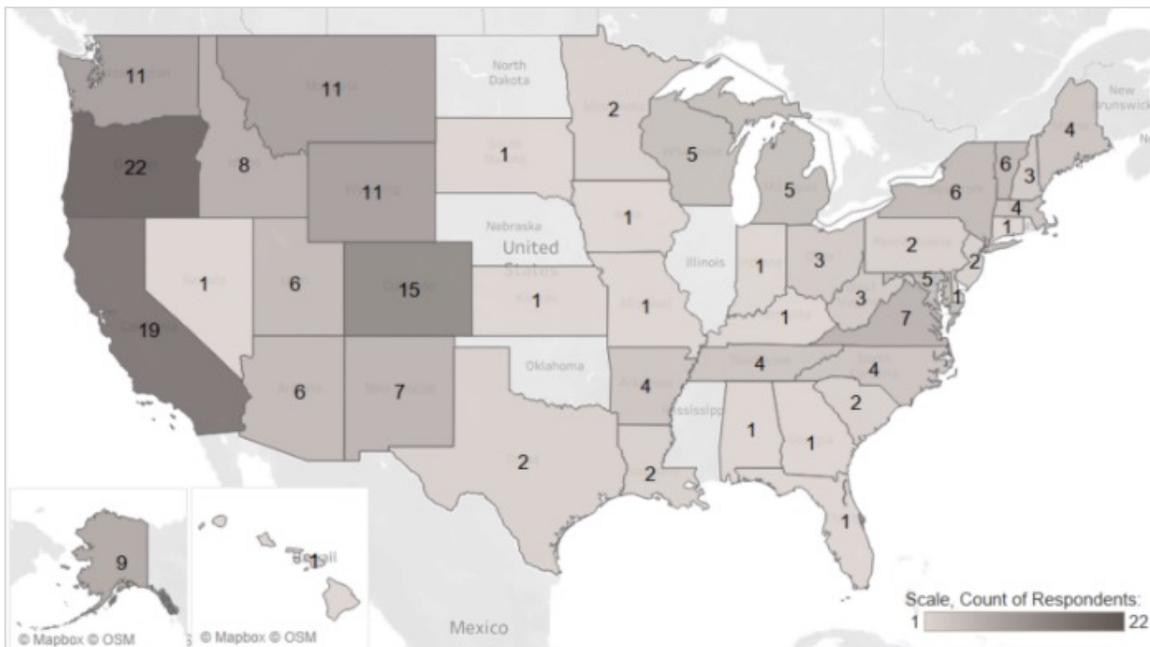


FIGURE 3. U.S. State of Respondents



Note. Eight respondents did not provide their state, one of whom indicated working in Canada. One other selected Maryland, without the option to indicate Washington, D.C.

TABLE 6. Trail Construction competencies

Trail Construction Competency	Entry	Full Performance	Expert
A. Construction Specifications. Understand and apply common construction specifications/trail management objectives such as corridor height/width, tread width, cross/outslope, protrusions, obstacles, and compaction.			
B. Corridor Clearing. Clear the corridor (brushing, logging out, hazard tree removal, rock/stump removal) in preparation for construction using proper pruning techniques.			
C. Hand-Built Trail Construction. Using hand tools, construct a trail with a full bench, raised tread, and/or combination that meets the construction specifications.			
D. Mechanized Trail Construction. Safely use and maintain mechanized trail construction equipment (e.g., mini-excavators, skid steers, trail dozers, compactors) to construct trail that meets construction specifications.			
E. Trail Finishwork. Utilize tools, often mechanical (i.e. excavators, harrow rakes, compact utility loaders, compactors), to meet specifications for final tread surface and backslope preparation and compaction, construction spoils management, and erosion control stabilization.			
F. Water Management/Drainage Features. Construct drainage features that decrease erosion, including grade reversals, berms, ditches, and sheet drains.			
G. Water Crossing Structures (Boardwalk, Puncheon, Turnpike, Ford). Construct a water crossing structure (e.g., puncheon, turnpike, bridge) to span drainageways or wetland areas and raise the trail above the high water line while maintaining uninterrupted hydrology beneath the constructed feature.			
H. Retaining Walls. Construct stone or wood retaining walls to bolster unconsolidated soils, gain elevation, or transition tread from rocks/ natural barriers.			
I. Tread Hardening. Install the appropriate treadway hardening technique for a trail given the slopes, soils, available material (e.g., wood, rock, gravel) and designed use, including advanced hardening techniques (e.g., turnpiking, rock culverts, boulder causeway, rock drains).			
J. Trailside Structures / Dispersed Recreation. Build and maintain trailheads, parking lots, kiosks, sanitary facilities, camping facilities, traffic barriers, and directional signage.			
K. Decommissioning Trails. Demonstrated ability to plan and implement the closure, reclamation, and revegetation of a trail segment.			

Trail Construction

Among the Trail Construction competencies (Table 6), nearly all competencies should be demonstrated by an individual at the Full Performance and Expert levels (excluding J. Trailside Structures/Dispersed Recreation, which was most frequently identified as an Expert competency). Corridor clearing (B) was indicated as a skill across all three levels. Additionally, a substantial number of respondents indicated competencies that may be indicated by an Entry level trail professional. (A. Construction Specifications, C. Hand-Built Trail Construction, and F. Water Management/Drainage Features).

Open-ended feedback in Trail Construction suggested several minor revisions for future consideration, including:

- A. Construction Specification should include fine tuning of trail layout
- B. Corridor Clearing should exclude hazard tree removal, if an Entry level competency

- G. Water Crossing Structures should address “placement” of structures as well as reference to “basic” structures (i.e., rather than steel beam construction)
- J. Trailside Structures/Dispersed Recreation should exclude parking lots and sanitary facilities
- K. Decommissioning Trails should address more vegetation management skills (e.g., trimming, placement of slash)

Trail Maintenance

Within Trail Maintenance, respondents indicated that all competencies should be demonstrated by an individual at both Full Performance and Expert levels (Table 7). Respondents also indicated that several skills would be expected of Entry level workers (A. Maintenance Specifications, D.,

TABLE 7. Trail Maintenance competencies

Trail Maintenance Competency	Entry	Full Performance	Expert
A. Maintenance Specifications. Understand and apply common maintenance specifications/trail management objectives such as corridor height/width, tread width, cross/outslope, protrusions, obstacles, and water management techniques.	●	●	●
B. Inventory & Assessment. Demonstrate ability to assess trail conditions, identify causes of trail degradation (e.g., water, grades, soil conditions, users, and/or use patterns), and appropriate actions to address the deficiencies.	○	●	●
C. Corridor Clearing: Power tools. Safely use chainsaws and other power tools in trail development and maintenance and resource management.	◐	●	●
D. Corridor clearing: Hand tools. Use hand tools to safely remove small standing trees, hazard trees, fallen logs, brush, vegetation, rocks, or other impediments to trail tread construction to the specified trail corridor width and height.	●	●	●
E. Tread Maintenance - Hand tools. Restore trail to its designed specifications for tread width, cross/outslope, protrusions, and obstacles using hand tools.	●	●	●
F. Tread Maintenance - Mechanized Equipment. Restore trail to its designed specifications for tread width, cross/outslope, protrusions, and obstacles using mechanized equipment (e.g., compactors, mini-excavator, skid steer, trail dozer).	○	●	●
G. Drainage Features/Water Management. Construct/restore trail drainage features that decrease erosion, (e.g., knicks, grade dips, grade reversals, berms, ditches, and sheet drains).	◐	●	●

Corridor clearing: Hand tools, and E. Tread Maintenance – Hand tools), as well as—in some cases—C. Corridor clearing: Power tools and G. Draining Features/Water Management. Open-ended feedback in the Trail Maintenance group identified several additions, particularly in relation to trail signage. These included:

- Trail marking installation (location, industry specifications)
- Trail marking maintenance (blazes, signage)
- Maintenance of trail structures (e.g., bridges, boardwalks)

Project Preparation

Analysis of results in this competency group indicates that respondents generally believe project preparation competencies are those demonstrated by experts; less than half of respondents ranked these competencies at the Full Performance level (Table 8). Few (less than 9%) indicated that entry level trail professionals would demonstrate these competencies.

Much of the open-ended feedback in the Project Preparation group addressed E. Justice, Equity, Diversity, and Inclusion (JEDI) Principles. Whereas most respondents rated this competency at the “Expert” level, several individuals suggested that this competency is relevant and important across all persona levels.

TABLE 8. Project Preparation competencies

Project Preparation Competency	Entry	Full Performance	Expert
A. Land Use Plan Alignment. Identify elements of the general management, forest, or comprehensive resource management plans as they relate to the trail project.			
B. Define Purpose and Need of Project. Use primary data (e.g., stakeholder outreach, trail use data, trail counters) and secondary data (e.g., planning documents, natural and cultural resource survey information, and site-specific resource limitations including soils, hydrology, geology, slope) to define the purpose of the proposed project and the need that it will meet.			
C. Corridor Planning. Identify potential areas (broad corridors) that meet the purpose and need of the project. Work with staff and partners to assess the proposed corridor(s) by analyzing resource data and management plan alignment.			
D. Stakeholder Engagement. Identify all the external interested individuals, agencies, and private organizations to inform an outreach strategy. Integrate public education opportunities throughout planning, construction, and maintenance efforts.			
E. Justice, Equity, Diversity, and Inclusion (JEDI) Principles. Engage with local and regional communities, as well as groups representing ethnically, socially, and economically diverse populations, to address specific trail management issues.			

Project Planning & Design

Like the results of Project Preparation, analysis of results in the Project Planning & Design group also generally indicated these competencies as Expert level; fewer than half of respondents ranked any of these competencies at the Full Performance level (Table 9). Very few (less than 7%) indicated that entry level trail professionals would demonstrate these competencies. Among patterns in the open-ended feedback, several comments questioned whether “Inter-

pretation” and “Permitting” were generally applicable competencies. However, because the threshold for consensus was reach in both cases (90+%), these competencies were upheld in this group.

TABLE 9. Project Planning & Design competencies

Project Planning & Design Competency	Entry	Full Performance	Expert
A. Project Cost Estimation. Ability to determine cost of project construction, maintenance and related oversight, permitting and planning (including tools, consumables, volunteer and staff time, equipment, materials), locating sources of professional and technical assistance, and evaluating contract proposals.			
B. Implementation Plan. Accurately interpret specifications, construction process notes, and construction documents to develop an implementation plan based on available labor and funding.			
C. Trail Specifications. Identify trail elements (i.e., tread material, width, height, grades, and structures) that are appropriate for the intended use, resource conditions, budget, and stewardship capacity.			
D. Design. Delineate the trail alignment, width, height, grade and structures appropriate to the intended trail use.			
E. Trail Plans. Transfer field-delineated trail design (location, alignment, structures), along with construction process, materials, notes, special conditions into a document that will guide the trail development process.			
F. Interpretation. Identify specific interpretive and educational opportunities on trails to contextualize the visitor experience (e.g., history, habitats, scenery, flora/fauna), and make recommendations for interpretive method.			
G. Permitting. Ensure compliance with applicable permitting requirements including (but not limited to): National Environmental Protection Act (NEPA), Section 106 of the Antiquities Act, the Historic Preservation Act, National Pollutant Discharge Elimination System (NPDES), local and regional permitting, water/wetland crossings, environmental review compliance, etc.			
H. Universal Design/ADA Accessibility. Use universal design principles, the Americans with Disabilities Act, and the Architectural Barriers Act accessibility standards to design, layout, and lead construction of accessible trail and trail facilities.			

Project & Crew Management

Within the project & crew management group, respondents indicated that nearly all competencies should be demonstrated by individuals at both Full Performance and Expert levels, with the exception of E. Performance Management (Table 10). Respondents did not indicate that Entry level trail professionals should be expected to demonstrate these competencies

Whereas the results in Table 8 indicate that accountability for jobsite safety may fall at the “Full Performance” level when it comes to job hazard analysis and overall job site safety, several individuals indicated that safety should generally be prioritized across all persona levels. In other words, even individuals at the “entry” level should be held accountable for safe work with respect to their immediate job tasks and that a culture of promoting safety is important for every individual at a job site.

TABLE 10. Project & Crew Management competencies

Project & Crew Management Competency	Entry	Full Performance	Expert
A. Crew Recruitment. Perform inclusive and proactive recruitment and hiring (i.e., hiring beyond basic knowledge, skills, and abilities) of diverse crew members and staff.			
B. Crew Management. Work closely with agency/organization personnel and volunteers to schedule, assign specific tasks and general duties, ensure appropriate safety and operational equipment is assigned, and provide overall management of personnel in carrying out assigned project work.			
C. Jobsite Safety. Demonstrate ability to create a site- and task-specific job hazard analysis and manage a safe job site.			
D. Jobsite Risk Management. Develop a jobsite specific plan for risk management that includes engaging law enforcement, local EMT, search and rescue, and other public safety capabilities.			
E. Performance Management. Create and utilize a systematic approach for oversight of agency/organization personnel and volunteers to ensure skills, knowledge, and behaviors meet agency/organization standards for high quality trail operations, the implementation of trail management goals, safe operations, and overall effectiveness.			
F. Field-based Resource Protection. Communicate inventory, regulations, and field practices related to resource preservation (e.g., plant and animal species common to the area, invasive species, and threatened resources) to avoid damage during trail projects, and/or maintenance.			

Program Administration & Leadership

Similar to competencies related to preparation, planning, and design, no competencies in Program Administration & Leadership were identified as Entry level (Table 11). The degree to which several competencies in this area would be expected of a Full Professional level varied. For example, whereas Contract Administration was rated as Expert level by more than 75% of respondents, nearly one-third of respondents indicated that Program Budgeting might be

expected of workers at Full Performance or below. In contrast, more than half of respondents expected that Communications would be a competency indicated by workers at the Full Performance level. Notably, two proposed competencies in this group did not meet the consensus threshold: Visitor Communications & Trail Use Permits. As a result, these were excluded from this group and reassigned as “Specialty” competencies (Appendix, Table 12).

TABLE 11. Program Administration & Leadership competencies

Program Administration & Leadership Competency	Entry	Full Performance	Expert
A. Program Budgeting. Determine the overall costs of programs including tools, consumables, volunteer and staff time, equipment, materials.			
B. Communications. Effectively communicate trail and partnership information to trail administrators, trail managers, and the public.			
C. Contract Administration. Provide management of trail-related contracts and agreements as well as oversight of contractor activities and deadlines.			
D. Education and Public Outreach. Develop and conduct workshops, seminars and other training for employees, public and private sector partners, and others on management issues and policy, direction, and guidelines. Empower others to competently and safely sustain the trail.			
E. Funding/Grants. Align trail projects and their specific goals to grant funds. Grant administration includes grant writing, project reporting, financial tracking, and funding/funder communication.			
F. Inspections/Monitoring. Monitor and document use and trail conditions to determine impacts on natural, social/experiential, historic, and cultural resources.			
G. Partnership and Collaboration. Demonstrate awareness of the capabilities of both (1) one’s own agency/organization as well as (2) partners. Develop the capacity to work with a variety of user groups and partners to identify and promote various interests related to trails.			
H. Policy/Directives/Law. Apply knowledge of land management agency policies and law (including legislation, regulations, policy, planning, strategy, and management directives/guidelines) to the management of trails.			
I. Visitor Use Management and Monitoring. Manage trails for a variety of uses and visitor experiences while meeting trail objectives. Monitor use to evaluate the trail experience (i.e., “Does the trail meet visitor expectations and agency/org. mission?”).			
J. Agreement Development. Develop contracts, cooperative agreements or memo. of understanding with land managers and partners that address the roles and resp. of all parties and define cooperative relationships.			

NEXT STEPS

Definitions by Persona Level

As written by the joint project team and validated through the survey process, the expert respondents were asked to read each competency definition and select the persona level (Basic, Full Performance, or Expert) that was most applicable. However, future project work might consider developing a definition differentiated for each persona skill level. Open-ended feedback could be used to inform these changes.

For example, “K. Decommissioning Trails” within the Trail Construction group was generally identified as a competency that would be expected at both the Full Performance and Expert levels. This competency was defined as “Demonstrated ability to plan and implement the closure, reclamation and revegetation of a trail segment.” However, one comment indicated that if not for the phrase “to plan,” this competency might be represented by Entry level workers. As a result, an effort to develop a definition for each level might result in level-based, such as:

Example 1: Trail Construction - K. Decommissioning Trails

- Entry: Demonstrated ability to implement the closure, reclamation, and revegetation of a trail segment
- Full Performance: Demonstrated ability to plan and implement the closure, reclamation, and revegetation of a trail segment
- Expert: Demonstrated ability to lead, instruct, and/or manage efforts that result in the planning and implementation of trail segment closure, reclamation, and revegetation

As a second example, the joint project team may decide that a definition is not appropriate for each competency level. For example, “C. Contract Administration” within Program Administration and Leadership” was overwhelmingly indicated as an Expert level competency. In this case, an acknowledgement that an Entry or Full Performance level worker would generally not be expected to demonstrate competency in this area might be most appropriate.

Example 2: Program Administration and Leadership - C. Contract Administration

- Entry: [Generally not applicable or expected at this level]

- Full Performance: [Generally not applicable or expected at this level]
- Expert: Provide management of trail-related contracts and agreements as well as oversight of contractor activities and deadlines.

Competency Framework Uses

The competency framework validated through this process can be employed in a myriad of use cases. Within an organization, competencies can be used to (1) identify skill or knowledge gaps among volunteers and/or staff and (2) guide the development and delivery of training opportunities. Competencies can also be used in other human resources processes, such as to communicate needs for a position (e.g., via the development of a job description) or to evaluate prospective hires. Across organizations, a generally agreed upon competency framework can help promote professionalism and a higher level of skill for those working in trails through shared language around trail skills and expertise. Eventually, trail trainings might be integrated and coordinated nationwide, increasing the overall skill level of the trail workforce. Notably, at the time of this report publication, several expert participants have followed up with the team seeking to obtain a copy of competency framework for these purposes and to participate in future project-related endeavors.

Of note is a caveat that the findings of this competency framework study would not be expected to standardize all training professional qualifications across the many organizations that plan, fund, develop, operate, and maintain trails nationwide. Each of these organizations, from non-profits to local, state and federal government agencies, is unique and complex with respect to mission, volunteer use, seasonal staffing, legal and organization requirements, as well as other factors that makes strict standardization impossible. As the research study used an inductive approach to create general trail competencies for the profession, an organization or individual seeking to develop trail professionals through the competency framework should also utilize a deductive process to draw specific conclusions about what is required for the duties and work required. In short, one size does not work for every organization when it comes to the application of a competency framework.

CONCLUSION

In 2021, a group of nationwide trail professionals representing federal agencies, trail nonprofits, and the private sector initiated this project, which sought to develop a trail competency framework. Seeking to promote professionalism as well as a higher level of skill for those working in trails through shared language around trail skills and expertise, the joint project team's work, and the feedback of more than 200 trail experts nationwide resulted in the final list of 47 competencies across 6 competency groups.

The resulting competency framework outlines the knowledge, skills, and abilities generally expected of trail professionals at entry, full performance, and expert levels. Through its development, it is hoped that these competencies can be used in many contexts, such as in the adoption of shared language of measurement, description performance benchmarks, cultivation of professional growth, and/or the development of training opportunities.

Ultimately, it is hoped that this project serves an initial, but crucial, component in a longstanding process to increase the overall skill level of the trail workforce so as to better build, maintain, plan, and manage these important corridors that connect users to spaces of natural, cultural, and historical significance.

As a final note, the project team sincerely thanks the trail experts who shared their time and expertise through participating in this project. Their input was crucial in the development of this competency framework.

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APPENDIX

Specialty Competencies

The survey instrument acknowledged that there are many more “specialty competencies” that warrant further development and definition. However, these were generally outside the scope of this project. In the table below, “Original” specialty competencies reflect those that were

brainstormed among the joint project team prior to survey implementation. “Relocated” specialty competencies are those in which consensus was not met, but the team felt was still relevant as a unique area of expertise. Finally, “Additions” reflect those competencies suggested, generally by more than one respondent, in open-ended comments.

TABLE 12. Specialty Competencies by Group

Specialty Group	Suggested Specialty Competency
Original	<ul style="list-style-type: none"> • MTB-optimized trails • Bike Parks and trails • Blasting • Bridge Design/Construction; Boardwalk Design/Construction • Data/GIS/Mapping • Horsemanship, Packing & Stock Management • Paved Trails • Rigging/Highlining • Road to Trail Conversion • Stonework • Turn Development (Climbing turn, Switchbacks) • Technical Trail Features (TTF) • Viewing Platforms • Water Trail Put-in/Take-out • Equestrian Trail • OHV Trail
Relocated	<ul style="list-style-type: none"> • Visitor Communications • Trail Use Permits
Additions	<ul style="list-style-type: none"> • Accessible/Universal/ADA trails • Aviation/helicopter support • Rail trail management/construction • Multi/shared-use and/or adaptive trails, including motorized & non-motorized (MTB, hiking, snowshoeing, cross-country ski, surfaced trail) • Emergency Response (e.g., Wilderness First Aid) • Special tool/equipment use (e.g., clinometer, welding/fabricating, saws) • Advanced drainage structures (e.g., french drains, groundwater seeps, ledge drainage) • Backcountry travel • Leased land or easement projects