DACUM-Informed Workforce Development Framework for Pacific Islands Natural Resource Management

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Acknowledgements

This report reflects the collective expertise, time, and commitment of natural resource professionals who participated in the DACUM occupational analysis workshops convened in Guam (April 22–23, 2025), Pohnpei (April 24, 2025), and Majuro (April 30, 2025). The DACUM process relies on the direct knowledge of practitioners, and the resulting competency framework is grounded in the experience and insight of the following contributors.

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- Winfred Mudong, Government Engagement & Partnerships Director, Micronesia Conservation Trust

With their participation, the DACUM chart, task statements, and competency mappings accurately reflect the realities of forestry, agroforestry, invasive species management, conservation, extension, and natural resource governance across the U.S.-Affiliated Pacific Islands.

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The strength of this DACUM effort reflects a shared regional commitment to advancing a resilient, skilled, and locally grounded natural resource workforce across Micronesia.

Acronyms and Abbreviations

The following acronyms and abbreviations are used throughout this report. Many refer to participating organizations, agencies, institutions, and professional titles represented in the DACUM workshops. Others originate directly from the DACUM findings and reflect occupational terminology used by practitioners, including technical skills, regulatory frameworks, equipment, tools, and professional practices associated with natural resource management in the Pacific Islands.

Table 1. List of acronyms referenced within the report.

Abbreviation	Full Term
AI	Artificial Intelligence
ATV	All-Terrain Vehicle
CBPR	Community-Based Participatory Research
CNAS	College of Natural & Applied Sciences (University of Guam)
CNMI	Commonwealth of the Northern Mariana Islands
COM-FSM	College of Micronesia – Federated States of Micronesia
CRE	Cooperative Research & Extension
DACUM	Developing A Curriculum
DAF	Division of Agriculture & Forestry (Yap)
DBH	Diameter at Breast Height
DCRM	Division of Coastal Resources Management
DOAG	Department of Agriculture (Guam)
EPA	Environmental Protection Agency
FAP	Forest Action Plan
FIA	Forest Inventory and Analysis
FSI	Forest Solutions Inc.
GAAR	Guam Administrative Rules and Regulations
GIS	Geographic Information Systems
GNSS	Global Navigation Satellite System
GISC	Guam Invasive Species Council
GPS	Global Positioning System
HAZWOPER	Hazardous Waste Operations and Emergency Response
HCA	Hawaii County Code (as referenced in biosecurity example 5HCA)
IPM	Integrated Pest Management
ISIFF	Invasive Species Inspection Fee Fund
IT	Information Technology
KIRMA	Kosrae Island Resource Management Authority
MEL	Monitoring, Evaluation, and Learning
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MWSC	Marshall Islands Water & Sewer Company

NBSAP	National Biodiversity Strategy and Action Plan
NEPA	National Environmental Policy Act
NGO	Non-Governmental Organization
NMC	Northern Marianas College
NRM	Natural Resource Management
PCR	Polymerase Chain Reaction
PPE	Personal Protective Equipment
QA/QC	Quality Assurance / Quality Control
R&D	Research and Development
SOP	Standard Operating Procedure
TOR	Terms of Reference
UH	University of Hawai‘i
UOG	University of Guam
USFS	United States Forest Service
UTV	Utility Task Vehicle

Executive Summary

Natural resource management across the Pacific Islands depends on a workforce that is technically competent, culturally grounded, and capable of responding to accelerating environmental, social, and governance challenges. Across jurisdictions, agencies and institutions face persistent workforce constraints, including limited local capacity, high turnover, and misalignment between education and job readiness, alongside increasing exposure to climate change, biosecurity threats, and policy volatility. These conditions present a clear opportunity to strengthen workforce readiness by better aligning existing academic programs with applied professional skills and by coordinating training efforts at a regional scale.

To address this need, a DACUM (Developing A Curriculum) process was conducted across multiple Pacific Island locations, engaging practitioners, employers, educators, and partners with direct experience in natural resource management occupations. The project goals were to:

1. Establish the foundation for a new educational program in forestry, agroforestry, or forest conservation with a Pacific Island focus.
2. Complete the DACUM process to define workforce needs, skill sets, and curriculum content in close collaboration with regional stakeholders.
3. Identify program requirements and student support needs.
4. Develop a conceptual framework and best practices for forest conservation workforce development across the Pacific Islands.

DACUM Phase I included background research and preliminary interviews to support an infrastructure assessment and occupational analysis. Findings identified persistent challenges related to staffing and recruitment, training needs (including GIS, forest monitoring, and pest management), access to education, and limitations in institutional support. In 2022, fewer than two percent of Pacific Island graduates completed degrees in agriculture or natural resource fields, underscoring the scale of the workforce development challenge.

This DACUM Phase II report builds directly on those findings and shifts from analysis to implementation. Practitioner-led workshops were conducted across the Pacific Islands and centered on a core DACUM question: *What work do you actually perform?* Through this process, participants defined eight core duties and more than 300 discrete tasks, as well as gaps in applied professional skills that are not consistently addressed through academic coursework alone.

Results from the DACUM process indicate that while foundational academic courses across Pacific institutions provide strong technical grounding, workforce readiness remains constrained by gaps in areas such as community engagement, project planning, financial and administrative management, field operations, data application, regulatory compliance, and interagency coordination. Addressing these gaps is essential to strengthening long-term capacity across Pacific Island natural resource institutions.

In response, Phase II proposes an integrated workforce development model consisting of three complementary components:

1. **Foundational Academic Courses**: Existing courses offered by universities and community colleges across the Pacific provide essential disciplinary knowledge in agriculture, forestry,

ecology, marine science, and related fields. These programs establish the technical foundation necessary for entry into natural resource professions.

2. **DACUM-Informed Professional Development Modules**: Seven interdisciplinary professional development modules supplement academia with applied, job-relevant competencies mapped to DACUM-identified duties and tasks. The modules focus on skills required for effective performance, including community engagement, project design and coordination, financial and grant management, field safety and regulatory compliance, data collection and adaptive management, training delivery, and policy literacy.
3. **Annual Regional Capacity-Building Convening**: An Annual Pacific Islands Natural Resource Capacity-Building Conference is proposed as a regional mechanism to deliver hands-on training, disseminate new materials, address emerging trends, and sustain professional networks across institutions and agencies.

This workforce readiness system supports education-to-employment pathways, improves onboarding efficiency for employers, and strengthens regional coordination across Pacific Island jurisdictions.

Anticipated outcomes include increased job readiness and confidence among students and early-career professionals, improved workforce retention, higher-quality project planning and implementation, stronger compliance and reporting performance, and enhanced capacity to respond to emerging global challenges. Over the long term, this approach supports resilient natural resource stewardship, sustained institutional capacity, and locally grounded leadership across the Pacific Islands.

This report provides partners with an actionable roadmap for adoption and implementation. Federal agencies, funders, educational institutions, and employers are invited to support pilot delivery of the professional development modules, integrate onboarding pathways within agencies, and participate in the proposed annual regional meeting. These actions transition workforce development efforts from fragmented training toward a durable regional system designed to meet current and future needs.

1. Introduction

This report advances the workforce analysis and recommendations established in the DACUM Phase I Synthesis Report, which examined natural resource management education and workforce capacity across Pacific Islands. Phase I documented systemic workforce challenges, identified skill gaps, and highlighted emerging trends affecting the region's ability to sustainably manage natural resources.

Natural resource practitioners across the Pacific operate in complex environments shaped by geographic isolation, limited staffing, rapidly evolving environmental risks, and deeply rooted cultural systems. Foundational academic programs provide essential technical knowledge, though academic coursework alone is insufficient to prepare graduates and early-career professionals for the full scope of job responsibilities they encounter in practice.

Through the implementation of DACUM workshops, results emphasized gaps in applied skills such as community engagement, project planning, financial management, data use, compliance, and interagency coordination. The need to address these issues becomes more critical due to future trends and concerns such as climate change, biosecurity threats, technological change, and political volatility. Addressing these challenges requires a coordinated approach that supplements academic learning with applied, job-relevant professional development and sustained regional collaboration.

1.1. Purpose of the Study

This project focuses on building a coherent workforce readiness system that connects education, training, and employment across the Pacific Islands. Key components of this phase include:

- Translating duties and tasks of natural resource professionals into competency domains
- Mapping existing foundational academic courses to workforce competencies
- Designing DACUM-informed professional development modules to address identified gaps
- Integrating future trend considerations into workforce preparation
- Establishing employer adoption pathways, including onboarding and hiring
- Proposing a regional model to sustain learning, coordination, and adaptation

These elements provide partners with actionable tools to strengthen workforce capacity while preserving institutional autonomy and cultural specificity. This Phase II deliverable is intended for multiple audiences, including:

- Federal and regional funders and partners
- Universities and community colleges
- Government agencies and NGOs employing natural resource professionals
- Practitioners, trainers, and workforce development leaders

The framework is designed to be adaptable and modular, allowing institutions and employers to adopt components incrementally while contributing to a shared regional workforce development approach.

Figure 1. Photo of DACUM Workshop participants in front of DACUM chart created in Majuro on April 30, 2025. Source: Winfred Mudong.

1.2. Scope and Limitations

The workforce analysis and synthesis was conducted across multiple Pacific Island jurisdictions, informed by practitioner participation from Micronesia, Marshall Islands, Guam, and Palau. The framework is intended to be regionally relevant across Pacific Island environments, recognizing shared ecological conditions, cultural systems, governance structures, and workforce constraints. At the same time, the results are not intended to prescribe a single, uniform workforce model. Jurisdictions vary in legal authorities, institutional capacity, funding structures, and cultural protocols. Its adaptable design allows partners to tailor implementation to local contexts while adhering to shared regional competencies and professional standards.

Occupational Focus: The DACUM analysis and results focus on natural resource management occupations that span government agencies, non-governmental organizations, extension services, and related institutions operating in the Pacific Islands. The scope includes a broad range of roles involved in planning, implementing, managing, and supporting natural resource programs, including but not limited to forestry, agriculture, conservation, biosecurity, invasive species management, and environmental stewardship.

This effort does not seek to define a single job title or replace existing classification systems. Instead, it identifies duties, tasks, and competencies that are common across many natural resource roles and essential for effective performance. Highly specialized or advanced technical roles may require additional training beyond the scope of this project.

The results of this DACUM assessment are intended to support:

- Workforce development planning and program design

- Supplementation of existing academic curricula with applied professional development
- Development of onboarding, training, and professional growth pathways for employers
- Regional coordination and shared learning across institutions and agencies

The framework is not intended to:

- Replace or supersede existing academic degree requirements
- Serve as a regulatory or certification mandate
- Be used as a rigid job classification or performance evaluation tool
- Substitute for jurisdiction-specific policies, laws, or cultural protocols

Users are encouraged to apply the findings as a guiding framework, adapting components as appropriate to institutional capacity and workforce needs.

As with any DACUM-based analysis, this framework reflects the perspectives and experiences of participating practitioners at the time of the workshops. While the report captures common patterns and shared needs, it may not fully represent all roles, emerging occupations, or future institutional changes across the Pacific.

Additionally, workforce conditions, funding environments, and policies are dynamic. For this reason, the report emphasizes adaptability, ongoing learning, and periodic updating through mechanisms such as professional development modules and regional convening, rather than static or fixed training requirements.

2. Methodology: DACUM Process

To ensure that workforce development recommendations were grounded in the realities of natural resources work across the Pacific Islands, this effort employed a structured, practitioner-led occupational analysis approach. Given the diversity of roles and cultural environments involved, a methodology was required that could capture both technical and professional competencies while centering the expertise of those currently performing the work. The DACUM process was selected to meet these needs, providing a system for identifying core duties, tasks, and emerging workforce requirements directly from experienced practitioners.

2.1. Overview of DACUM

DACUM is a competency-based occupational analysis methodology that defines the duties, tasks, and skill requirements of a profession through direct engagement with experienced practitioners. Unlike traditional job analyses that rely primarily on position descriptions or external experts, DACUM centers the knowledge of those actively performing the work, to support results that reflect real-world responsibilities and operations.

DACUM is particularly well suited for workforce analysis in Pacific Island natural resource management, where roles are often multifaceted, resource-constrained, and shaped by local cultural, environmental, and governance conditions. Practitioners frequently perform responsibilities that extend beyond formal job titles, making standardized occupational classifications insufficient to capture the full scope of work. The DACUM process allows these

realities to be documented systematically while remaining adaptable across jurisdictions and institutions.

A key strength of DACUM is its practitioner-led approach. By engaging individuals with direct experience in planning, implementation, management, and program support, the methodology captures both formal duties and critical tasks that are often underrepresented in academic curricula but essential to effective performance. This approach enhances the credibility, relevance, and usability of findings for employers, educators, and training providers.

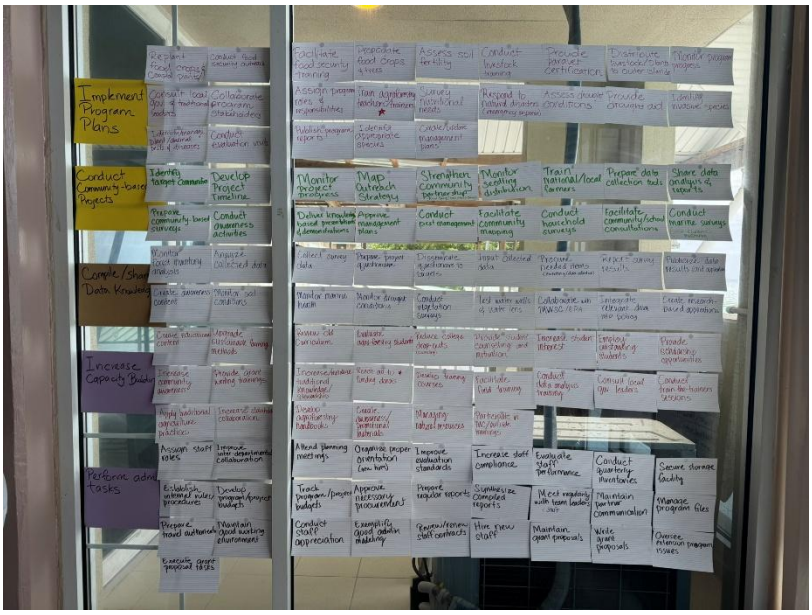

Figure 2. DACUM chart created during Majuro workshop on 4/30/2025.

DACUM serves as a bridge between workforce analysis and implementation. This project translates DACUM results into a structured competency framework with applied tools, integrating occupational analysis into workforce readiness and long-term capacity-building objectives.

2.2. Workshop Design and Participation

Forest Solutions, Inc., in partnership with the Micronesia Conservation Trust and the University of Guam, facilitated a series of DACUM workshops in April 2025. Over a two-week period, four practitioner-led workshops were conducted: two in Guam, one in Pohnpei, and one in Majuro (Republic of the Marshall Islands). All workshops were delivered in person, convening participants from geographically dispersed Pacific Island jurisdictions.

Approximately 50 participants took part in the workshops, representing a broad range of expertise in forestry, conservation, agriculture, education, and community engagement. Participants included frontline practitioners, program managers and employers, and educators from universities and community colleges. This mix reflects operational realities while remaining relevant to workforce development, curriculum design, and employer needs.

Across workshops, participants represented territorial and state natural resource and agriculture agencies, environmental protection authorities, conservation organizations, and postsecondary education institutions. Roles spanned forestry leadership, invasive species and biosecurity coordination, wildfire and forest stewardship management, agroforestry and agriculture programs, research and extension services, community planning and engagement, and academic and workforce development leadership. This breadth of sector representation provided multiple perspectives, from field operations to policy implementation and training.

Figure 3. Photo of DACUM workshop held in Pohnpei on 4/25/2025.

Each workshop followed a facilitated DACUM process in which participants collaboratively identified and defined the duties, tasks, knowledge, and skills required for effective performance in natural resource management roles. Facilitators guided balanced participation, clarified and consolidated task statements, and documented outputs in real time. DACUM charts were finalized during each session and reflect shared regional priorities as well as jurisdiction-specific considerations.

Participant feedback indicated high engagement and strong perceived relevance. Several participants expressed interest in additional time to deepen discussion and further refine outputs, highlighting both the applicability of the DACUM framework to their work and the complexity of the issues addressed.

Table 2. Sector representation by workshop location.

Sector Type	Guam (n=17)	Pohnpei (n=17)	Majuro (n=10)	Total (n=44)
Government Forestry & Agriculture	8	4	4	16

Environmental Protection / Regulatory Agencies	1	2	0	3
University / Land Grant / Extension	5	8	2	15
Conservation NGOs	0	1	3	4
Biosecurity / Invasive Species Specialists*	3	0	0	3
Research & R&D Staff**	0	2	0	2
Total Participants	**17**	**17**	**10**	**44**

* Biosecurity and invasive species roles are primarily embedded within government and university institutions but are highlighted here due to their functional relevance to DACUM findings.
** R&D staff are affiliated with state or national agencies but are distinguished here to reflect research-focused roles.

2.3. Data Synthesis and Validation

Outputs from individual DACUM workshops were compiled and synthesized to identify common duties, tasks, and workforce trends across Pacific Island contexts. Task statements were reviewed for clarity and redundancy, then organized into shared duty areas. Redundant or closely related tasks were consolidated while preserving original intent, resulting in a comprehensive inventory that captures both shared and jurisdiction-specific functions.

To support validity, synthesized results were cross-checked against original workshop outputs and examined for overlap with Phase I project findings. Priority was given to patterns observed across multiple locations rather than isolated inputs. This process strengthened the reliability of the resulting occupational competencies and workforce development recommendations.

As with all DACUM-based analyses, the results represent the perspectives of participating practitioners at the time of data collection. Although the synthesis captures common workforce needs and emerging trends, it does not encompass every role or anticipate future institutional shifts. Accordingly, Phase II emphasizes adaptability, periodic review, and regional coordination rather than fixed or prescriptive requirements.

3. DACUM Findings: Occupational Structure

3.1. DACUM Duty Framework

The DACUM analysis identified eight core duty areas that define the scope of natural resource management work across Pacific Island contexts. These duties describe the primary functional responsibilities shared across institutions and jurisdictions, regardless of job title. Together, they

provide an organizing structure for understanding workforce demands and guiding competency development and training design.

The eight duties span the full lifecycle of natural resource programs, from planning and implementation to administration, community engagement, data management, and response to emerging issues. Although individual positions may emphasize different responsibilities, the framework reflects the operational reality that practitioners in Pacific Island settings frequently work across multiple functional areas due to limited staffing, resource constraints, and integrated program mandates.

To maintain clarity and usability of the main report, detailed task-level tables are provided in the appendices. These tables preserve original task wording and workshop attribution and serve as a reference for partners engaged in curriculum development, training design, or workforce planning.

3.1.1. Overview of Core Duties

Each duty encompasses a set of associated tasks identified by practitioners during the DACUM workshops and reflects both shared regional priorities and locally specific responsibilities. The eight DACUM duty areas identified through the workshops are:

- **D1: Plan and Design Natural Resource Programs and Projects**
- **D2: Manage Program Administration and Resources**
- **D3: Build Capacity and Provide Technical Assistance**
- **D4: Collect, Manage, and Share Data and Knowledge**
- **D5: Engage Communities and Stakeholders**
- **D6: Implement and Manage Natural Resource Programs and Field Operations**
- **D7: Respond to Natural Resource Threats and Emerging Issues**
- **D8 Support Policy Development and Regulatory Processes**

Each duty is defined at a functional level rather than tied to specific job titles. This approach allows the DACUM results to remain applicable across government agencies, non-governmental organizations, educational institutions, and community-based programs. The descriptions emphasize observable work functions and decision-making responsibilities, providing a practical foundation for competency and curriculum development.

Detailed task-level descriptions are presented in subsequent sections and appendices, where they inform competency domains, professional development modules, and curriculum mapping (Appendix A. Full DACUM Duty and Task Table).

All eight duty areas were identified across multiple DACUM workshops, indicating strong consistency in workforce responsibilities across jurisdictions. Some areas, particularly those related to program implementation, capacity building, administration, and community engagement, generated greater task density, reflecting the broad scope of practitioner responsibilities in the region.

The frequency with which duties and tasks appeared across workshops was used as an indicator of relevance rather than workload or relative importance. Areas identified in fewer workshops were not considered less critical; instead, they often represent specialized functions essential to effective natural resource management, particularly in response to emerging threats or policy demands.

This frequency-informed approach recognizes both core, day-to-day responsibilities and specialized functions necessary for long-term resilience and adaptive capacity in the workforce.

3.2. Task-Level Synthesis

Across all DACUM workshops, participants identified more than 300 discrete task statements describing the day-to-day and strategic work of natural resource management practitioners in Pacific Islands. These tasks span technical, administrative, social, and adaptive functions and illustrate the breadth and complexity of responsibilities carried out by the regional workforce.

To support synthesis and analysis, task statements were reviewed for clarity, redundancy, and logical organization. While individual workshops generated location-specific tasks, many tasks reflected shared work functions across jurisdictions. Similar or overlapping task statements were consolidated where appropriate, while distinctions were preserved when they captured unique contextual, cultural, or regulatory considerations.

Several themes emerged consistently across duties and workshops. These include:

- **Multi-role functionality**, with practitioners routinely carrying out planning, implementation, administration, and engagement tasks concurrently
- **Capacity-building responsibilities**, including training, mentoring, and technical assistance embedded across multiple duties
- **Community and stakeholder engagement** as a foundational task area rather than a discrete activity
- **Data collection and reporting** serving both operational and accountability purposes
- **Adaptive management**, including monitoring, evaluation, and adjustment in response to environmental and institutional change

These themes reinforce the need for workforce development approaches that extend beyond technical specialization to include professional, interpersonal, and systems-level competencies.

Strong regional commonalities were observed across workshops, particularly in core program functions such as planning, implementation, field operations, administration, and engagement. These common responsibilities form the basis for regionally applicable competency domains and professional development modules.

At the same time, variation in themes reflected local ecological conditions, governance structures, cultural practices, and institutional mandates. For example, some jurisdictions emphasized biosecurity, invasive species response, or wildfire management, while others placed greater focus on community stewardship, traditional knowledge integration, or education and training delivery.

Rather than viewing this variation as inconsistent, the synthesis recognizes it as contextual

expression of shared duties. This approach supports a framework that is regionally connected while remaining adaptable to local needs.

4. Foundational Education Landscape

This section provides an overview of the postsecondary education landscape supporting natural resource workforce development across the Pacific Islands. It summarizes available academic programs, institutions, and disciplinary areas and situates these offerings within the broader occupational framework identified through the DACUM process.

4.1. Inventory of Existing Academic Programs

Across the Pacific Islands, foundational education in natural resource management is provided through a network of universities, community colleges, and technical institutions, including but not limited to the University of Guam, University of Hawai‘i (Mānoa and Hilo), College of Micronesia–FSM, College of the Marshall Islands, Northern Marianas College, Palau Community College, Guam Community College, and American Samoa Community College (Appendix B. Foundational Course Inventory).

These institutions collectively offer coursework and programs spanning a range of relevant disciplines, including:

- Forestry and agroforestry
- Agriculture and horticulture
- Environmental science and conservation
- Biology, ecology, and soil science
- Marine and aquaculture sciences
- Food systems and nutrition
- Geographic Information Systems (GIS) and applied technology
- Business, economics, and project management
- Applied science, math, and data analysis
- Internships, field practicums, and experiential learning

Programs vary in form and depth, ranging from associate and bachelor’s degrees to certificates, stand-alone courses, and field-based training requirements. Several institutions emphasize applied learning through extension services, internships, and community-based projects, reflecting the applied nature of NRM work in the islands.

4.2. Summary of Foundational Coverage

The existing education landscape provides foundational preparation in technical and disciplinary knowledge relevant to natural resource management. Academic offerings establish baseline competencies in ecological systems, resource management practices, scientific methods, and

applied field techniques.

However, participation in natural resource management programs across the Pacific Islands remains extremely limited. Despite the presence of relevant degree and certificate programs, fewer than an estimated two percent of Pacific Island students pursue formal education in natural resource–related fields. Programs are generally small, enroll limited numbers of students, and graduate relatively few individuals each year. As a result, the scale of the educational pipeline is insufficient to meet current workforce demand, let alone future needs driven by climate change, biosecurity risks, and expanding management responsibilities.

While technical knowledge is well represented within these programs, gaps persist in applied professional skills such as program implementation, community engagement, financial and administrative management, policy literacy, and adaptive decision-making, which are critical to effective workforce performance. DACUM workshop participants consistently emphasized that graduates who do enter the workforce often possess strong disciplinary foundations but limited preparation for the multi-functional responsibilities required in practice, particularly within small, resource-constrained island agencies.

Low enrollment, limited graduate output, and gaps in applied skill preparation collectively create a compounded workforce challenge. Strengthening workforce readiness in the Pacific Islands requires deeper integration between education and practice, alongside expanded access, engagement, and entry pathways for Pacific Island students and early-career professionals.

5. Competencies and Professional Development Modules

Existing academic programs provide important foundational knowledge in natural resource management, but do not fully prepare individuals for the range of duties identified through the DACUM process. Low enrollment, limited graduate output, and gaps in applied professional skill development indicate the need for a complementary, competency-based workforce development approach. Section 7 presents the DACUM-derived competency framework and professional development modules developed in Phase II to address these gaps.

5.1. Rationale for Supplemental Professional Development

Across workshops, practitioners consistently identified duties and tasks that extend beyond academia and require applied, cross-functional skills developed primarily through practice rather than traditional classroom instruction.

The synthesized DACUM task tables show high frequency and importance ratings for activities related to program implementation, community engagement, coordination across agencies, financial and administrative management, data application, and compliance with policy and regulations. These tasks are central to day-to-day performance but are only partially addressed, or addressed inconsistently, within existing academic programs. Participants also reported lower confidence levels in these areas, particularly among early-career staff and recent graduates, indicating a gap between foundational education and workplace readiness.

DACUM results further demonstrate that natural resource professionals in Pacific Islands are required to perform multiple roles simultaneously, often within small organizations with limited staff and resources. Practitioners are expected to design and manage projects, engage communities, oversee budgets, ensure compliance, supervise field operations, and adapt programs based on monitoring results. These integrated responsibilities require applied skills that are operational and reinforced through repetition and mentoring rather than academic exposure alone.

Supplemental professional development is therefore necessary to bridge the gap between foundational education and effective job performance. Targeted, competency-based modules allow workforce development efforts to focus on high-priority duties and tasks identified through DACUM, strengthen confidence in applied skills, and support consistent performance across jurisdictions. This approach complements existing academic programs by reinforcing job-ready competencies while remaining flexible enough to accommodate diverse educational backgrounds, career stages, and institutions.

5.2. Competency Framework Overview

The competency framework translates DACUM-identified duties and tasks into a structured set of applied competency domains designed to strengthen workforce readiness across Pacific Island natural resource management. It provides a common reference point for workforce development while remaining flexible enough to support diverse institutional, jurisdictional, and career needs.

The framework is organized around competency domains rather than job titles or disciplinary specializations (Appendix F. Competency Framework Supporting Table). This structure reflects DACUM findings that natural resource professionals routinely perform integrated jobs spanning program design, implementation, community engagement, administration, field operations, data application, and policy compliance. Competencies are therefore grouped to reflect how work is actually performed in practice, particularly within small, resource-limited organizations.

The competency framework is intended to complement existing academic programs by reinforcing applied, job-ready skills that are difficult to develop through coursework alone. It can be used to inform onboarding, in-service training, professional development pathways, curriculum development, and regional capacity-building initiatives, while allowing for local adaptation in delivery format and emphasis.

5.3. DACUM-Based Professional Development Modules

Based on the competency framework, the DACUM analysis identified a set of professional development modules designed to address high-priority duties and task areas consistently identified across DACUM workshops. Each module aligns explicitly to one or more DACUM duties (D1–D8) and targets applied competencies associated with high frequency, high importance, and lower confidence ratings (Appendix D. Competency Domain Analysis of Frequency, Importance, and Confidence).

Table 3 presents the connection between DACUM duties and the professional development modules, illustrating how practitioner-identified work functions informed module design.

Table 3. Professional Development Modules and DACUM Duties

Module Title	DACUM Duties Supported (Codes and Names)	Primary Focus of Competency Development
Module 1. Community Engagement, Cultural Competency & Traditional Knowledge	**D1** Plan and Design Natural Resource Programs and Projects **D5** Engage Communities and Stakeholders **D6** Implement and Manage Natural Resource Programs and Field Operations **D7** Respond to Natural Resource Threats and Emerging Issues **D8** Support Policy Development and Regulatory Processes	Community engagement planning and facilitation; integration of traditional ecological knowledge; cultural protocols; stakeholder inclusion; conflict-sensitive communication; gender and social considerations
Module 2. Project Design, Work Planning & Coordination	**D1** Plan and Design Natural Resource Programs and Projects **D2** Manage Program Administration and Resources	Needs assessment and feasibility analysis; defining scope and deliverables; work planning and task sequencing;

	D6 Implement and Manage Natural Resource Programs and Field Operations	coordination across teams and partners; risk and contingency planning
Module 3. Financial Management, Grants & Administrative Compliance (Foundational)	**D1** Plan and Design Natural Resource Programs and Projects **D2** Manage Program Administration and Resources **D6** Implement and Manage Natural Resource Programs and Field Operations **D7** Respond to Natural Resource Threats and Emerging Issues	Budget development and tracking; grant writing and compliance fundamentals; procurement and contracting basics; financial documentation and reporting; alignment of budgets with work plans
Module 4. Field Operations, Safety & Compliance	**D6** Implement and Manage Natural Resource Programs and Field Operations **D7** Respond to Natural Resource Threats and Emerging Issues	Field safety and PPE; equipment operation and maintenance; biosecurity and contamination prevention; SOP use; crew supervision; operational risk awareness
Module 5. Data Collection, Monitoring & Adaptive Management	**D1** Plan and Design Natural Resource Programs and Projects **D4** Collect, Manage, and Share Data and Knowledge **D6** Implement and Manage Natural Resource Programs and Field Operations **D7** Respond to Natural Resource Threats and Emerging Issues **D8** Support Policy Development and Regulatory Processes	Standardized data collection and monitoring; data management and QA/QC; introductory analysis; applied GIS and spatial literacy; use of data for adaptive management and decision-making
Module 6. Technical Assistance, Training Delivery & Workforce Development	**D3** Build Capacity and Provide Technical Assistance **D5** Engage Communities and Stakeholders **D6** Implement and Manage Natural Resource Programs and Field Operations	Field-based training delivery; train-the-trainer methods; mentorship and coaching; learning exchanges; workforce pipeline support for youth and early-career professionals
Module 7. Policy Literacy, Communication & Reporting	**D1** Plan and Design Natural Resource Programs and Projects **D2** Manage Program Administration and Resources **D7** Respond to Natural Resource Threats and Emerging Issues **D8** Support Policy Development and Regulatory Processes	Policy and regulatory literacy; compliance roles; translating policy into practice; reporting to communities, partners, and funders; professional written, verbal, and media communication

5.4. Narrative Module Descriptions

The professional development modules presented in this section are directly grounded in the DACUM results and reflect clusters of duties and tasks that practitioners consistently identified as high priority and insufficiently addressed through formal coursework alone. Each module supports multiple, interrelated DACUM duties, reflecting the integrated and context-dependent nature of natural resource management work in Pacific Island settings.

Module 1. Community Engagement, Cultural Competency, and Traditional Knowledge

This module corresponds to DACUM duties related to program planning, community engagement, implementation, emergency response, and policy support. DACUM workshops consistently demonstrated that effective natural resource management depends on the ability to work respectfully and legitimately with communities, leaders, and traditional systems. The module strengthens applied skills in engagement planning, facilitation, stakeholder inclusion, conflict-sensitive communication, and the integration of traditional ecological knowledge, gender, and social considerations. These competencies support trust-building, compliance, and long-term sustainability across programs and jurisdictions.

Module 2. Project Design, Work Planning, and Coordination

This module addresses DACUM duties associated with planning, administration, and program implementation. Practitioners emphasized that inadequate project design and coordination contribute to delays, staff overload, and burnout. The module develops applied competencies in needs assessment, feasibility analysis, work planning, task sequencing, coordination, and risk management. These skills support realistic project scoping and improve implementation efficiency in resource-constrained island environments.

Module 3. Financial Management, Grants, and Administrative Compliance

This module supports DACUM duties related to planning, administration, implementation, and emergency response. Across workshops, financial and administrative functions were identified as high importance and low confidence areas. The module builds foundational capacity in budgeting, grant writing and compliance, procurement, contracting, and financial reporting. Strengthening the integration of expenditures, work plans, and deliverables reduces funding risk and improves organizational sustainability and credibility.

Module 4. Field Operations, Safety, and Compliance

This module aligns primarily with DACUM duties focused on program implementation and response to natural resource threats. Practitioners identified safety, equipment use, biosecurity, and SOP compliance as critical areas where failures can result in immediate human, legal, and reputational consequences. The module develops practical field-based competencies in safety protocols, PPE use, equipment maintenance, biosecurity practices, crew supervision, and risk awareness to promote consistent and responsible operations.

Module 5. Data Collection, Monitoring, and Adaptive Management

This module supports DACUM duties related to planning, data management, implementation, emergency response, and policy support. DACUM results highlighted the importance of reliable data for funding credibility, accountability, and learning. The module builds competencies in standardized data collection, environmental monitoring, data management and quality control, introductory analysis, and applied GIS and spatial data literacy. Emphasis is placed on

translating data into actionable insights and adjusting management approaches based on monitoring results.

Module 6. Technical Assistance, Training Delivery, and Workforce Development

This module connects with DACUM duties related to capacity building, community engagement, and program implementation. DACUM workshops demonstrated that workforce sustainability depends on effective training, mentorship, and knowledge transfer. The module strengthens skills in field-based training delivery, train-the-trainer approaches, mentorship and coaching, and the design of learning exchanges. It supports engagement with youth, interns, and early-career professionals and contributes to workforce continuity and institutional memory.

Module 7. Policy Literacy, Communication, and Reporting

This module is structured around DACUM duties associated with planning, administration, emergency response, and policy development. While many practitioners are not policy authors, DACUM results showed that they routinely operate within complex regulatory systems and are responsible for translating policy into practice. The module builds practical understanding of environmental and biosecurity laws, compliance roles, and enforcement pathways, while strengthening professional communication, reporting, and outreach skills, including appropriate use of media and social media tools.

6. Preparing for the Future: Trends and Workforce Gaps

While the competency framework and professional development modules address current workforce gaps identified through DACUM, long-term workforce readiness also requires anticipating emerging trends and future pressures. Section 8 examines key social, environmental, economic, and technological trends identified by DACUM participants and their implications for natural resource workforce development in the Pacific Islands (Appendix E. DACUM Workshop Enabler Tables).

6.1. Overview of DACUM-Identified Future Trends

In addition to defining current workforce duties and competency gaps, DACUM workshops surfaced a broad set of emerging forces expected to shape natural resource management in the Pacific Islands over the coming decades. These reflect both conditions already evident across jurisdictions and anticipated pressures that will further complicate workforce demands. While specific examples varied by location, strong thematic consistency emerged across workshops.

Significant cultural and social shifts include continued out-migration, erosion of traditional knowledge and language, and changing relationships between communities and land. At the same time, there is growing emphasis on community stewardship, participatory research, and revitalization of traditional practices. Together, these dynamics increase expectations for practitioners to engage communities effectively, navigate cultural transitions, and integrate traditional and scientific knowledge in legitimate and respectful ways.

Environmental and climate pressures were among the most urgent. Accelerating climate change impacts, biodiversity loss, invasive species expansion, biosecurity threats, wildfire, drought, sea level rise, and more frequent natural disasters are intensifying across the region. These pressures require a workforce capable of rapid response, adaptive management, cross-jurisdictional coordination, and sustained monitoring under increasingly uncertain conditions.

Economic and labor market conditions present structural constraints that affect recruitment, retention, and long-term capacity. Agency performance is constrained by low wages relative to cost of living, funding instability, staff turnover, loss of trade skills, and limited local capacity to fill technically demanding roles. Although education levels are rising in some areas, gains are offset by brain drain and limited opportunities for early-career professionals to acquire applied experience locally.

Governance and policy environments are becoming more complex and volatile. Natural resource work is shaped by changing political administrations, uneven regulatory enforcement, fragmented or outdated policies, procurement delays, and geopolitical pressures. This context heightens the need for stronger policy literacy, compliance capacity, and communication skills among practitioners operating within evolving institutional environments.

Technological change is rapidly transforming practice. Expanded use of GIS, data platforms, remote communication tools, online learning systems, and emerging technologies such as artificial intelligence offers new opportunities for coordination and efficiency. However, critical concerns regarding data security, misinformation, and unequal access underscore the need for competencies not consistently addressed in existing education and training pathways.

The full set of DACUM-based future trends is documented in Appendix E. DACUM Workshop Enabler Tables. To translate these into actionable workforce strategies, this analysis mapped each thematic area against existing professional development modules, identified gaps, and proposed targeted enhancements. The rest of Section 8 summarizes this analysis and provides a foundation for strengthening workforce readiness in response to future conditions rather than past assumptions.

6.2. Implications for Workforce Readiness

The future trends identified through the DACUM process have direct implications for the skills, capacity, and institutional arrangements required to sustain an effective natural resource workforce in the Pacific Islands. Collectively, these trends indicate that future workforce demands will be more complex, more interdisciplinary, and more adaptive than those reflected in many current education and training pathways.

At the individual level, practitioners will require stronger applied competencies in community engagement, cross-cultural communication, adaptive management, data interpretation, and policy navigation. Increasing environmental uncertainty, social change, and governance complexity mean that technical expertise alone is insufficient. Workforce readiness will increasingly depend on the ability to integrate scientific knowledge with local context, manage competing priorities,

respond to emerging threats, and communicate effectively with communities, partners, and decision-makers.

At the organizational level, institutions require stronger internal capacity to manage projects, meet funding and regulatory requirements, retain staff, and transfer institutional knowledge as experienced personnel retire or transition. High turnover, limited staffing, and funding volatility heighten the importance of standardized, accessible professional development that accelerates onboarding, reduces reliance on informal knowledge transfer, and supports consistent performance.

At the system level, these pressures highlight the need for coordinated workforce development beyond individual institutions or jurisdictions. Shared challenges related to climate impacts, invasive species, data management, and policy compliance create clear opportunities for regional collaboration in training, competency development, and resource sharing. Absent such coordination, workforce gaps are likely to widen as demands increase and institutional capacity remains uneven.

These implications reinforce the need for a workforce development model that is anticipatory rather than reactive, supports continuous skill development, and complements foundational education with applied, job-ready training reflective of real-world conditions.

6.3. Mapping Trends to Modules and Enhancements

To respond to the future trends and workforce implications identified through DACUM, the analysis systematically mapped trend themes to the professional development modules described in Section 7. This mapping assessed the extent to which existing modules address emerging needs, identified areas where coverage is partial or absent, and proposed targeted enhancements to strengthen future workforce readiness.

The mapping demonstrates that many high-priority trends, including climate change impacts, community-based stewardship, and data-driven decision-making, correspond with existing modules but require expanded emphasis, updated content, or new delivery approaches. Other trends, particularly those related to emerging technologies, misinformation, institutional resilience, and long-term workforce sustainability, reveal gaps that are not fully addressed through current modules and warrant additional focused enhancements.

Table 4 presents this mapping by trend theme, corresponding DACUM-identified concerns, relevant professional development modules, identified gaps, and recommended enhancements. This analysis provides a clear, actionable link between practitioner-identified future conditions and specific workforce development responses. It also informs subsequent sections on the integrated workforce readiness model and regional coordination mechanisms; therefore, training remains responsive as conditions continue to evolve.

Table 4. Future trend mapping for capacity-building.

Future Trend Theme	Representative Trends / Concerns	Recommended Modules	Identified Gap	Recommended Enhancements
Cultural & Social Change	• Loss of traditional knowledge, language, and practices • Youth out-migration and aging populations • Community displacement and cultural change • Increasing need for community stewardship	Module 1: Community Engagement, Cultural Competency & Traditional Knowledge Module 6: Technical Assistance & Workforce Development	Current modules emphasize engagement skills but under-address long-term knowledge continuity and demographic change	Add a focused Community Resilience & Knowledge Continuity component, including community-based participatory research (CBPR), intergenerational knowledge transfer, youth engagement pathways, and program design for declining or mobile populations
Economic & Workforce Instability	• Brain drain and staff turnover • Low wages and rising cost of living • Hiring and retention challenges • Loss of institutional memory	Module 2: Project Design & Coordination Module 3: Financial Management & Grants Module 6: Technical Assistance & Workforce Development	Workforce sustainability and retention are implicit but not explicitly addressed	Integrate Workforce Sustainability & Retention content, including workload prioritization, role clarity, mentorship as retention strategy, knowledge transition planning, and use of stackable credentials
Education & Capacity Shifts	• Declining university enrollment • Fewer degrees, more certificates • Students not returning home • Limited NRM exposure in K-12	Module 6: Technical Assistance & Workforce Development	Existing modules focus on training delivery but not system-level education pathways	Strengthen emphasis on stackable credentials, service learning, and early exposure pathways, including alignment with internships, apprenticeships, and government onboarding agreements
Environmental & Climate Change (Compound Risk)	• Climate change, sea-level rise, drought, wildfire • Invasive species spread and biosecurity threats • Biodiversity loss and environmental degradation	Module 4: Field Operations, Safety & Compliance Module 5: Data Collection, Monitoring & Adaptive Management	Modules address individual risks but not compound or cascading threats	Add Compound Risk & Biosecurity Readiness training using scenario-based learning that integrates climate, invasive species, health, and social impacts, with emphasis on inter-island coordination

Political & Governance Volatility	• Changing administrations and political instability • Obsolete or unenforced policies • Politicization of science • Loss of institutional knowledge	Module 7: Policy Literacy, Communication & Reporting	Policy literacy is addressed, but resilience under political pressure is not explicit	Strengthen Module 7 with Science-to-Policy Resilience, including communicating evidence under uncertainty, maintaining scientific integrity, ethical standards, and operating across political transitions
Technology & Data Acceleration	• Rapid growth in AI and machine learning • Data overload and cloud storage needs • Cybersecurity risks • Junk science and misinformation	Module 5: Data Collection, Monitoring & Adaptive Management Module 7: Policy Literacy, Communication & Reporting	Focus is on data use, not data discernment or digital risk	Add a Digital & Data Literacy strand covering data quality evaluation, ethical use of AI, cybersecurity basics, misinformation management, and responsible use of social media for outreach
Health, Stress & Quality of Life	• Elevated stress across sectors • Burnout and work overload • Declining morale and well-being	Module 2: Project Design & Coordination Module 6: Technical Assistance & Workforce Development	Human well-being is largely absent from technical training	Light-touch integration of Professional Well-being & Resilience, including workload boundaries, team-based resilience, burnout recognition, and sustainable professional practice

Several future trends identified through DACUM warrant elevated attention; however, the framework intentionally limits the number of standalone professional development modules. Rather than expanding the structure, priorities such as community resilience, workforce sustainability, compound risk management, and digital literacy are embedded as defined competency enhancements within existing modules.

This design preserves structural coherence, avoids fragmentation of training pathways, and enables institutions and employers to adjust depth, sequencing, and emphasis based on local workforce conditions and capacity

7. Regional Convening Model

7.1. Purpose and Rationale

DACUM workshops confirmed that Pacific Island natural resource practitioners operate within highly interconnected yet geographically dispersed systems, where workforce capacity, institutional knowledge, and technical expertise vary across jurisdictions. Shared environmental risks, funding instability, workforce turnover, and technological change further compound these conditions.

An annual regional convening provides a scalable mechanism to address these dynamics by strengthening coordination, reinforcing shared professional standards, and accelerating the dissemination of applied practices. Unlike a traditional academic conference, this convening is structured as a practice-oriented workforce development forum grounded explicitly in DACUM-identified duties, tasks, and future trends.

The conference complements existing academic programs and professional development modules by addressing applied skill needs that cannot be met through coursework or isolated training events alone.

7.2. Structure and Core Function

The conference operates as the iterative learning and update mechanism within the broader workforce readiness framework. Rotating host locations and hybrid participation options promote equitable access, local ownership, and regional collaboration.

Core functions include:

- Delivering hands-on workshops aligned with DACUM-informed professional development modules
- Introducing, testing, and refining training materials, toolkits, and stackable credentials
- Addressing emerging conditions such as climate extremes, biosecurity risks, technological shifts, and policy volatility
- Providing a forum for employers to communicate evolving competency expectations
- Creating visibility and transition pathways for students and early-career professionals

By embedding applied learning and structured feedback into a recurring regional forum, the convening ensures that workforce development efforts remain current, coordinated, and grounded in practitioner realities.

7.3. Sustaining Regional Workforce Capacity

The annual convening serves as the primary mechanism for maintaining alignment between workforce demands and professional development resources. Practitioner feedback,

implementation experience, and emerging trend analysis inform periodic updates to DACUM-based modules and training priorities.

Beyond training delivery, the conference strengthens professional networks across institutions, jurisdictions, and career stages. These networks support mentorship, peer learning, and knowledge continuity, which are critical factors in workforce retention.

Through sustained annual implementation, the model is expected to:

- Expand access to applied professional development
- Improve consistency and effectiveness of workforce competencies
- Strengthen coordination around shared regional risks
- Support recruitment, retention, and professional identity development

Federal and regional partners play a central role in sustaining the convening as a shared regional resource. This positions funders as long-term partners in maintaining an adaptive workforce development system rather than supporting isolated, one-time training activities.

Figure 1. Photo of Pohnpei's forest resources, taken from a boat on the ocean, demonstrating dramatic ridge to reef connection for natural resource managers in Pacific Islands. source: Aviva Gottesman, April 2025.

8. Workforce Readiness Model

The workforce readiness model is grounded in DACUM findings, the existing education landscape, identified competency gaps, and projected future conditions. It strengthens workforce capacity across Pacific Island natural resource management by integrating foundational education, applied professional development, and regional coordination mechanisms.

The model emphasizes flexibility and scalability while remaining anchored in actual work functions rather than prescriptive career pathways.

8.1. Integrated Workforce Development Approach

The workforce readiness model recognizes that no single intervention can address the current and projected workforce needs identified through the DACUM process. Effective workforce development in Pacific Island natural resource management therefore requires an integrated approach linking education, applied competency development, and institutional coordination.

The foundation consists of existing academic programs across the Pacific region, which provide essential disciplinary knowledge in forestry, agriculture, biology, environmental science, and related fields. While this preparation is critical, DACUM findings indicate that academic coursework alone does not provide the full range of applied competencies required for effective performance.

Building on this base, the professional development modules described in Section 7 deliver targeted, competency-based training aligned with DACUM-defined duties and tasks. The modules emphasize applied, job-ready skills that span roles and institutions, including program implementation, community engagement, financial and administrative management, field operations, data application, and policy literacy. They are designed to complement varied educational backgrounds and support readiness across career stages.

The model also prioritizes regional coordination to address shared pressures that transcend jurisdictional boundaries. Climate impacts, invasive species, funding instability, and workforce turnover require coordinated training, shared resources, and structured peer learning to strengthen institutional capacity and reduce duplication.

Table 5 illustrates the interaction among foundational education, DACUM-based professional development modules, and regional coordination mechanisms. The model centers applied competencies critical to performance, including community engagement, field safety, data-informed decision-making, grant and financial management, and regulatory compliance. Emphasis on climate adaptation, biosecurity readiness, interagency coordination, and science-to-policy communication reflects operational realities identified through DACUM and aligns with partner agency workforce priorities. Integrated onboarding pathways and stackable credentials further support recruitment, retention, and long-term professional growth within a locally grounded workforce.

Table 5. Workforce readiness model.

Model Component	Description	Primary Inputs	Key Activities	Immediate Outputs	Workforce Outcomes
Foundational Education	Academic programs providing core disciplinary knowledge	University and college coursework	Degree and certificate instruction	Graduates with technical knowledge	Baseline technical competency
Professional Development Modules	DACUM-based applied skill development	Competency modules, instructors, materials	Short courses, applied training, mentoring	Completed modules, demonstrated skills	Job-ready applied competencies
Onboarding & Career Pathways	Structured transition into workforce roles	Employer agreements, stackable credentials	Onboarding training, supervised practice	Workforce entry and retention	Reduced skill gaps and turnover
Regional Coordination & Convening	Shared learning and capacity building across jurisdictions	Partners, regional networks	Annual convenings, peer learning	Shared resources and practices	Consistent regional capacity
Monitoring, Evaluation & Learning	Continuous improvement and adaptation	Data, feedback mechanisms	Evaluation and refinement	Updated training and practices	Sustained workforce readiness

These elements form a workforce readiness model that is flexible, scalable, and responsive to both current demands and future trends. The model supports multiple entry points, accommodates varied institutional capacities, and provides a clear pathway for strengthening workforce performance without requiring wholesale restructuring of existing education or employment systems.

8.2. Logic Model

The logic model reflects how inputs, activities, outputs, and outcomes are intentionally linked to address workforce gaps identified through practitioner-led analysis while remaining adaptable to diverse institutional and jurisdictional settings (Table 6).

Inputs draw from multiple sources, including DACUM workshop results, existing foundational courses, participating institutions, federal and philanthropic partners, and subject-matter expertise spanning both technical and cultural knowledge systems. Hybrid delivery infrastructure enables broad access across geographically dispersed islands and supports multiple learning modalities.

Activities focus on education and training with DACUM-based competency needs. Foundational coursework is mapped to competency domains, while seven professional development modules provide applied, job-ready skill development. Future-oriented enhancements addressing climate risk, governance complexity, technology, and workforce sustainability are integrated throughout delivery. Employer onboarding agreements, micro-credentials, and hybrid training formats support practical application and reduce barriers to workforce entry. An annual Pacific Islands Natural Resource Capacity-Building Conference serves as a regional coordination mechanism, providing skills-based training, dissemination of new materials, and peer learning opportunities.

Outputs include standardized professional development modules, tools, training resources, and credentials that verify demonstrated competency. Conference materials and updated resources maintain training relevance to emerging trends and shared regional priorities.

Outcomes are defined across short-, medium-, and long-term time horizons. In the short term, the model supports increased job readiness, improved access to professional development, and stronger professional networks. Medium-term outcomes include improved workforce retention, higher-quality program implementation, increased grant success, and enhanced regional coordination. Long-term impacts center on the development of a resilient, locally grounded workforce capable of sustaining stewardship outcomes, maintaining institutional knowledge, and adapting to ongoing environmental, social, and governance change.

Table 6. DACUM Logic Model for Natural Resource Management in Pacific Islands.

Inputs	• DACUM workshop results (duties, tasks, future trends) • Foundational courses across Pacific institutions • Universities, community colleges, NGOs, government agencies • Federal and philanthropic partners (e.g., USFS) • Trainers, cultural knowledge holders, subject-matter experts • Hybrid delivery infrastructure

Activities	• Align foundational courses to DACUM competency domains (Appendix B)
	• Design and deliver seven DACUM-informed professional development modules, integrating future-trend enhancements related to climate risk, governance, technology, and workforce resilience
	• Deliver modules via hybrid formats (online, field-based, short courses)
	• Establish micro-credentials and completion evidence
	• Implement employer onboarding agreements
	• Convene an annual Pacific Islands Natural Resource Capacity-Building Conference, including:
	  o Skills-based workshops
	  o Emerging issues and future trends sessions
	  o Dissemination of new training materials and opportunities
	  o Regional networking and coordination
	• Monitor, evaluate, and refine modules

Outputs	• Seven standardized professional development modules • Foundational course-to-competency tables • Training toolkits, templates, and case studies • Micro-credentials and certificates • Employer onboarding and MOA templates • Annual regional conference proceedings, materials, and recordings • Updated training resources reflecting emerging trends
Outcomes & Impacts	**Short-term:** • Increased confidence and job readiness among students and practitioners • Improved access to professional development across islands • Reduced onboarding burden for employers • Stronger professional networks and peer learning **Medium-term:** • Improved workforce retention and reduced turnover • Higher-quality project planning, implementation, and compliance • Increased success in grant acquisition and management • Enhanced regional coordination on shared risks (e.g., climate, invasive species, disasters) **Long-term:** • A resilient, locally grounded, and regionally coordinated natural resource workforce • Improved stewardship outcomes and community trust • Sustained institutional knowledge and leadership pipelines • Adaptive capacity to respond to environmental, social, and governance change

8.3. Theory of Change

If foundational academic programs across Pacific Island institutions are intentionally supplemented with DACUM-informed professional development modules that address applied professional skills and emerging future trends, natural resource practitioners will enter the workforce with stronger job readiness, confidence, and adaptive capacity. Training structured around real-world duties and tasks, combined with strengthened onboarding pathways and reinforced competencies in community engagement, program planning, financial and administrative management, data application, and policy literacy, better prepares practitioners to manage complex environmental, social, and governance challenges. Over time, this approach is expected to improve workforce retention, strengthen institutional capacity, and support resilient, community-centered natural resource stewardship across the Pacific Islands.

9. Implementation and Adoption Pathways

9.1. Institutional Adoption

Developing a new degree program or substantially redesigning an existing one requires significant time and financial investment. The workforce readiness approach can be adopted by universities and community colleges without undertaking full program redesign.

The most practical pathway is curriculum supplementation through the seven professional development modules delivered as co-curricular or credit-adjacent learning that reinforces applied competencies aligned with DACUM-defined duties. Implementation may include short courses, intensive workshops, field practicums, capstone enhancements, and hybrid micro-courses offered in partnership with employers and training providers.

Multiple Pacific institutions already maintain delivery channels capable of hosting DACUM-based training. For example, the University of Guam has implemented short-term professional training in applied technical skills such as GIS, delivered as focused courses for agency and regional professionals. UoG also maintains a professional development and lifelong learning structure through Global Learning and Engagement and related programs, providing an institutional home for non-degree training.

In Hawai‘i, the University of Hawai‘i System’s micro-credentials policy establishes a formal mechanism for issuing credentials linked to credit-bearing coursework, enabling stackable recognition of discrete skills aligned with DACUM competency clusters.

Stackable credentials can serve as documented completion of professional development modules through badges or certificates, with optional articulation pathways for institutions that elect to attach credit or embed modules within existing courses. This structure supports consistent regional skill signaling while allowing jurisdiction-specific delivery and locally grounded case content.

9.2. Employer Adoption

Employer adoption is strongest when professional development is positioned as a workforce readiness pathway, not optional enrichment. Government agencies and NGOs can implement onboarding agreements that specify a progression: (1) completion of priority modules within a

defined onboarding window for new hires, and (2) continued module completion as a professional development pathway for advancement into supervisory or program management roles.

This model complements existing regional workforce pipeline mechanisms. For example, the PIPES internship program at UH Hilo is explicitly structured around mentored placements with agencies and organizations across Hawai‘i and the U.S.-Affiliated Pacific Islands, providing a recognized model for experiential learning tied to professional readiness. Similarly, the Micronesia Challenge Young Champions model demonstrates how regional internship and leadership programming can be used to cultivate early-career conservation capacity and create visibility for emerging professionals.

Employer-side adoption can also be supported through:

- Hiring preferences (not requirements) for candidates who have completed specified modules or credentials, particularly for applied competencies that are consistently high-frequency and high-importance in DACUM task results (e.g., engagement, project coordination, grants, compliance, data application).
- Supervisor-endorsed learning plans that pair module completion with job shadowing, mentoring, and supervised practice, improving retention by reducing early-career overload and uncertainty.
- MOA templates between agencies and institutions to support structured internships, applied capstones, and module delivery embedded in workforce transition pathways.

9.3. Phased Implementation

Implementation should proceed through a staged rollout to support high-quality delivery, employer usability, and regional scalability (Table 7).

Phase 1: Pilot (Demonstrate feasibility and refine delivery)

- Pilot a subset of modules in a limited number of jurisdictions and institutional settings using hybrid delivery.
- Prioritize modules that address the most consistent DACUM gaps (community engagement, work planning/coordination, grants/financial compliance, field safety/compliance, and data-to-decisions).
- Establish baseline measures (participation, completion, confidence, supervisor feedback) and refine materials based on delivery results.

Phase 2: Scale (Expand access and standardize credentialing)

- Expand module offerings across additional institutions and employer partners using shared templates, regional instructor support, and localized case studies.
- Implement stackable credentials at scale using existing institutional mechanisms, including UH System micro-credentials where applicable.
- Formalize employer onboarding agreements and integrate modules into internship and early-career pathways, building on models already used in the region.

Phase 3: Sustain (Institutionalize and continuously update)

- Integrate module refresh and continuous improvement through the annual regional convening model so that content reflects emerging issues and DACUM-identified trends.
- Maintain a shared library of training materials, case studies, and recorded content, and rotate delivery leadership across institutions to reduce dependency on a single provider.
- Transition from grant-dependent delivery toward durable, shared ownership across education, employers, and partners, with ongoing evaluation feeding adjustments in content, credentialing, and delivery methods.

Use Case 1: University or Community College Program
An academic program aligns selected courses with DACUM competency domains and integrates two to three professional development modules as supplemental requirements or co-curricular offerings. Students complete applied modules in community engagement, project planning, or data application prior to graduation, strengthening job readiness without altering existing degrees.

Use Case 2: Government Agency Onboarding
A territorial or state natural resource agency incorporates DACUM-based modules and micro-credentials into onboarding for new hires. Early-career staff complete targeted modules during probationary periods, reducing supervisor burden, increasing confidence in applied skills, and improving consistency across field offices.

Use Case 3: NGO or Regional Program Capacity Building
An NGO uses the framework to structure staff development plans and prioritize training investments. Modules are selected based on staff roles and DACUM duty clusters, supporting cross-training in small teams and improving continuity during staff transitions.

Use Case 4: Regional Workforce Coordination
Multiple institutions and agencies use the annual regional conference to share tools, refresh modules, and address emerging workforce challenges such as climate impacts, invasive species, or policy changes. This coordinated approach reduces duplication and strengthens regional coordination while allowing for local adaptation.

Box 1. Illustrative use cases for the Workforce Readiness Framework.

Table 7. DACUM workforce readiness model adoption pathways.

Adoption Pathway	Lead Actors	Core Actions	Outputs	Risks & Mitigation
Institutional Adoption (Education Providers)	Universities and community colleges	• Integrate DACUM-based modules as co-curricular or hybrid offering • Align selected modules with existing courses, capstones, or practicums • Issue stackable credentials or certificates of completion	• Supplemental training embedded within academic pathways • Stackable credentials linked to applied competencies • Increased job readiness among graduates	**Risk:** Limited faculty capacity or curriculum overload **Mitigation:** Modular delivery, external trainers, optional integration
Employer Adoption (Government & NGOs)	Government agencies, NGOs, employers	• Establish onboarding agreements referencing priority modules • Recognize module completion in hiring preferences and early-career development • Pair modules with mentoring and supervised practice	• Reduced onboarding burden • Clear early-career skill expectations • Improved retention and performance	**Risk:** Perceived training burden on staff **Mitigation:** Phased completion, supervisor-supported learning plans
Professional Development Delivery	Training providers, practitioners, subject-matter experts	• Deliver modules via hybrid formats (online, field-based, short courses) • Localize case studies while maintaining core competencies • Update content based on DACUM trends	• Standardized yet adaptable training materials • Applied skill development across jurisdictions	**Risk:** Inconsistent delivery quality **Mitigation:** Shared templates, facilitator guidance, peer review
Credentialing & Evidence of Competency	Institutions, employers, partners	• Implement micro-credentials and certificates tied to modules	• Clear competency signals for employers• Portable recognition	**Risk:** Credential inflation or lack of recognition

Adoption Pathway	Lead Actors	Core Actions	Outputs	Risks & Mitigation
		• Document completion and applied practice evidence	across institutions	**Mitigation:** Align credentials to DACUM duties and employer input
Regional Coordination & Convening	Regional partners, host institutions, funders	• Convene annual Pacific Islands Natural Resource Capacity-Building Conference • Share training materials, tools, and lessons learned • Facilitate peer learning and networking	• Updated modules and resources • Strengthened professional networks • Reduced duplication of effort	**Risk:** Dependence on single host or funder **Mitigation:** Rotating hosts, shared governance, hybrid access
Phased Implementation (Pilot → Scale → Sustain)	All partners	• Pilot modules in select jurisdictions • Scale delivery and credentialing regionally • Institutionalize updates through annual convening and MEL	• Gradual expansion with quality control • Sustainable workforce development system	**Risk:** Loss of momentum after pilot phase **Mitigation:** Early employer buy-in, conference-based refresh cycle

10. Monitoring, Learning and Framework Adaptation

The workforce readiness framework proposed in this report is designed to be adaptive rather than static. Because it is grounded in practitioner-led DACUM analysis, its effectiveness depends on ongoing learning and adjustment as workforce conditions, institutional capacity, and regional priorities evolve. Monitoring and learning therefore focus on the performance of the framework, rather than on individual training activities or participants.

10.1. Feedback, and Learning Loops

Monitoring remains grounded in DACUM-identified duties, task clusters, and future trends. Periodic review assesses whether professional development modules, shared resources, and convening activities remain focused on high-frequency, high-importance work functions and areas where practitioners reported lower confidence.

Feedback from practitioners, educators, and employers serves as the primary learning input. Practitioners provide insight on relevance and applicability of modules to daily work. Employers contribute perspective on onboarding needs, workforce preparedness, and applied skill gaps. Educators offer feedback on how the framework complements existing academic pathways. This feedback is used to identify emerging gaps, confirm continued relevance, and inform targeted refinements.

10.2. Framework Adaption and Regional Stewardship

The annual regional convening functions as the central mechanism for synthesizing learning and updating the framework. In addition to delivering training, the convening provides opportunities to reflect on changing conditions, emerging risks, and workforce pressures surfaced across jurisdictions. Insights from these discussions inform updates to module content, tools, and recommended pathways for the following cycle.

Responsibility for adaptation is shared among regional partners rather than centralized within a single institution. A small, representative committee or group can periodically review feedback and recommend adjustments, maintaining practitioner leadership and regional ownership. This approach ensures that the workforce framework remains responsive, credible, and grounded in operational realities over time.

11. Conclusions and Recommendations

The DACUM analysis confirms that Pacific Island natural resource management roles are complex, interdisciplinary, and highly place-based. Practitioners are required to perform a broad range of technical, administrative, social, and regulatory functions, often within small organizations facing chronic staffing constraints, high turnover, and increasing environmental and governance pressures.

Existing academic programs across the Pacific region provide essential foundational knowledge in forestry, agriculture, environmental science, and related fields. However, low enrollment and graduate output, combined with limited emphasis on applied professional skills, result in a persistent gap between formal education and workplace readiness. DACUM workshops consistently identified high-frequency, high-importance duties related to program implementation, community engagement, financial and administrative management, field operations, data application, and policy literacy, with lower confidence reported in these areas among early-career professionals.

This project demonstrates that workforce development in the Pacific requires a complementary, competency-based approach that strengthens applied skills, supports onboarding and retention, and remains responsive to emerging trends such as climate impacts, biosecurity risks, workforce mobility, and institutional change.

11.1. Strategic recommendations

Based on DACUM findings and regional workforce conditions, the following strategic actions are recommended:

1. **Adopt a DACUM-based competency framework as a regional reference**
   Use the DACUM duty framework and professional development modules as a shared foundation for workforce development across universities, colleges, government agencies, and NGOs, while allowing for local adaptation.
2. **Supplement academic programs with applied professional development modules**
   Implement the seven DACUM-informed modules to address cross-cutting skills not consistently covered in coursework, with emphasis on job-ready competencies that directly support day-to-day performance.
3. **Formalize onboarding and workforce pathways with employers**
   Encourage government agencies and NGOs to integrate modules and micro-credentials into onboarding, probationary training, and early-career development to reduce onboarding burden and improve workforce retention.
4. **Use the annual regional convening as the system refresh mechanism**
   Establish the annual Pacific Islands Natural Resource Capacity-Building Conference as the primary venue for updating modules, addressing emerging risks, sharing tools, and strengthening professional networks.

These recommendations are consistent with research and practice in Pacific Island forestry and conservation, which indicate that workforce effectiveness depends as much on institutional capacity, applied professional skills, and continuity as on technical expertise alone. Addressing

these needs requires coordinated investment in workforce systems rather than stand-alone training activities.

The proposed framework presents a clear opportunity for federal agencies, regional organizations, and philanthropic partners to support shared workforce infrastructure. Strategic investments can strengthen delivery of DACUM-based professional development modules, expand hybrid and regionally accessible training formats, sustain the annual regional convening as a shared resource, and support onboarding agreements, micro-credentials, and workforce transition pathways. By emphasizing coordination and reuse, partners can increase return on investment, reduce duplication, and strengthen long-term stewardship capacity across jurisdictions.

11.2. Long-term vision for Pacific workforce resilience

The long-term objective of this effort is a resilient, locally grounded, and regionally connected natural resource workforce capable of responding to environmental change, governance complexity, and community needs. Workforce resilience is built through sustained capacity development, professional identity, mentorship, and institutional learning rather than one-time interventions.

By aligning education, applied training, and regional coordination around practitioner-defined competencies, Pacific Island institutions can strengthen stewardship outcomes, retain local talent, and sustain continuity of knowledge and leadership across generations. The DACUM-informed framework presented in this report provides a practical, scalable pathway to achieve this goal.

11.3. Next steps for the DACUM initiative

This report establishes a workforce framework grounded in practitioner-defined duties, competency gaps, and future conditions. The workforce readiness model, professional development structure, and regional convening approach can be adopted immediately at a structural level. However, full implementation requires additional investment in curriculum development and contextual adaptation.

The seven professional development modules provide a competency architecture rather than fully developed instructional packages. Translating these modules into high-quality, deliverable curricula will require subject-matter specialists, instructional designers, and regional practitioners to develop detailed syllabi, learning objectives, applied exercises, case studies, and assessment tools aligned with DACUM-defined tasks.

Module development must also ensure contextual relevance across Pacific Island jurisdictions. Existing training materials may serve as foundations in areas such as GIS, grant management, compliance, or field safety; however, content should be reviewed and adapted to reflect Pacific Island governance structures, ecological conditions, cultural contexts, workforce constraints, and regional regulatory frameworks. Incorporating locally grounded case studies, culturally informed engagement approaches, and region-specific policy environments will be essential to ensure legitimacy and usability.

Priority next steps include:

- Convening subject-matter working groups to translate each module into structured curricula and facilitator guides
- Reviewing existing regional and national training resources for adaptation potential
- Developing standardized competency verification tools and micro-credential criteria
- Piloting modules through partner institutions and the regional conference model
- Refining content based on practitioner feedback and implementation experience

Targeted funding and technical support will be required to complete module development, pilot delivery, and establish quality assurance mechanisms. Investment at this stage positions the initiative to move from framework design to operational implementation.

With structured curriculum development and coordinated institutional support, the DACUM initiative can transition from competency mapping to sustained, regionally grounded workforce advancement.

Appendix A. Full DACUM Duty and Task Tables

Duty	Task Code	Task Statement
Plan and Design Natural Resource Programs and Projects	D1-T1	Assess natural resource and forest management needs
	D1-T2	Survey community priorities and stakeholder perspectives
	D1-T3	Conduct key informant interviews
	D1-T4	Review past and current programs and initiatives
	D1-T5	Evaluate gender, cultural, and social considerations in project context
	D1-T6	Identify knowledge gaps and information needs
	D1-T7	Conduct regulatory and policy reviews
	D1-T8	Engage community stakeholders and contextual experts in co-design processes
	D1-T9	Integrate traditional ecological knowledge into project design
	D1-T10	Identify project sectors, focus areas, and boundaries
	D1-T11	Define project purpose, goals, and objectives
	D1-T12	Align projects with strategic plans and frameworks (e.g., FAP)
	D1-T13	Assess project feasibility and implementation capacity
	D1-T14	Determine funding requirements and resource needs
	D1-T15	Identify key personnel and project team members
	D1-T16	Conceptualize project implementation approaches
	D1-T17	Develop work plans and objective-based task layouts
	D1-T18	Create project timelines and milestones
	D1-T19	Develop program deliverables and outputs
	D1-T20	Prepare logic models and theory of change
	D1-T21	Align deliverables, timelines, and budgets
	D1-T22	Identify potential project barriers and risks
	D1-T23	Develop contingency and risk mitigation plans
	D1-T24	Develop coordination and collaboration platforms
	D1-T25	Create monitoring, evaluation, and learning (MEL) plans
	D1-T26	Collect and document baseline data
	D1-T27	Source and secure project funding
	D1-T28	Write project and funding proposals
	D1-T29	Develop project transition and sustainability plans
Manage Program Administration and Resources	D2-T1	Establish and manage program and project budgets
	D2-T2	Develop and implement financial policies, procedures, and systems
	D2-T3	Align budget allocations with program priorities and funder requirements
	D2-T4	Obtain budget approvals and endorsements
	D2-T5	Track, reconcile, and monitor program expenditures
	D2-T6	Prepare, submit, and coordinate financial reports
	D2-T7	Ensure compliance with donor, financial, and regulatory requirements
	D2-T8	Secure, diversify, and leverage funding sources

Manage Program Administration and Resources	D2-T9	Assess long-term financial stability and sustainability
	D2-T10	Process procurement requests, purchase orders, and contracts
	D2-T11	Maintain program financial records, ledgers, and filing systems
	D2-T12	Develop and monitor project plans, schedules, and timelines
	D2-T13	Create and update strategic action plans and annual work plans
	D2-T14	Coordinate reporting schedules and progress reviews
	D2-T15	Monitor program progress, outputs, and resource utilization
	D2-T16	Monitor social and environmental issues related to program operations
	D2-T17	Manage human resources, staffing, and personnel actions
	D2-T18	Recruit, onboard, supervise, and evaluate staff and consultants
	D2-T19	Develop and manage consultant terms of reference (TORs)
	D2-T20	Process payroll, compensation, leave, and travel requests
	D2-T21	Update position descriptions and assign work duties
	D2-T22	Facilitate staff performance reviews and professional development
	D2-T23	Support safe, functional, and compliant work environments
	D2-T24	Provide and coordinate safety briefings and training
	D2-T25	Obtain required permits, licenses, and security clearances
	D2-T26	Develop, update, and implement standard operating procedures (SOPs)
	D2-T27	Streamline and improve administrative procedures and systems
	D2-T28	Coordinate IT needs and utilize organizational technology
	D2-T29	Maintain project documentation and administrative records
	D2-T30	Coordinate internal team meetings and partner engagements
	D2-T31	Collaborate with program staff, partners, and leadership
	D2-T32	Respond to public and stakeholder inquiries
	D2-T33	Disseminate success stories and program communications
	D2-T34	Provide reports and updates to stakeholders and donors
	D2-T35	Negotiate program support and partnership contributions
Collect, Manage, and Share Data and Knowledge	D3-T1	Gather technical and baseline data
	D3-T2	Collect survey and questionnaire data
	D3-T3	Prepare project questionnaires and data collection tools
	D3-T4	Conduct vegetation, forest, soil, and marine surveys
	D3-T5	Monitor forest inventory and natural resource conditions
	D3-T6	Monitor drought, water wells, and freshwater lens conditions
	D3-T7	Procure equipment and supplies for data collection and inventory
	D3-T8	Input, store, and manage collected data
	D3-T9	Analyze and interpret collected data
	D3-T10	Integrate relevant data into policies, plans, and decision-making
	D3-T11	Report survey findings and monitoring results
	D3-T12	Publish and publicize data results and applications
	D3-T13	Create environmental awareness and data-informed outreach content

Collect, Manage, and Share Data and Knowledge	D3-T14	Collaborate with partner agencies on data collection and sharing (e.g., MWSC, EPA)
	D3-T15	Compile and synthesize relevant research
	D3-T16	Develop research-based applications and proposals
	D3-T17	Recommend data-driven natural resource strategies to decision-makers
	D3-T18	Develop and maintain knowledge-sharing platforms (e.g., websites, databases)
	D3-T19	Disseminate data and findings through workshops and presentations
	D3-T20	Assess existing curricula and training materials
	D3-T21	Develop and update natural resource management curricula and degree programs
	D3-T22	Convert and share curricula through online platforms and partnerships
	D3-T23	Conduct occupational and workforce analyses
	D3-T24	Promote internships and experiential learning opportunities
	D3-T25	Mentor undergraduate and graduate students
Engage Communities and Stakeholders	D4-T1	Develop community and stakeholder engagement plans and strategies
	D4-T2	Plan engagement logistics and obtain required permissions
	D4-T3	Assign engagement team roles and responsibilities
	D4-T4	Identify and recruit relevant community participants
	D4-T5	Mobilize engagement teams and resources
	D4-T6	Schedule and plan community meetings and events
	D4-T7	Facilitate community meetings and engagement activities
	D4-T8	Provide hands-on learning and participatory engagement activities
	D4-T9	Explore and document community and farmer issues
	D4-T10	Develop and deliver training programs for community members
	D4-T11	Provide farmer- and stakeholder-focused training
	D4-T12	Coordinate learning exchanges and peer-to-peer engagement
	D4-T13	Exchange and integrate traditional knowledge and stewardship practices
	D4-T14	Develop and distribute educational and cultural materials
	D4-T15	Provide engagement incentives and refreshments, as appropriate
	D4-T16	Facilitate conflict resolution and address stakeholder concerns
	D4-T17	Conduct needs assessments and baseline community surveys
	D4-T18	Conduct pre- and post-engagement surveys
	D4-T19	Evaluate engagement activities and participation outcomes
	D4-T20	Assess long-term impacts of engagement efforts
	D4-T21	Secure adequate funding to support engagement activities
	D4-T22	Coordinate with government leaders and institutional partners
	D4-T23	Notify communities and stakeholders of findings and results
	D4-T24	Disseminate monitoring results and shared outcomes

	D4-T25	Publicize future opportunities and ongoing initiatives
	D4-T26	Document engagement activities and evidence
	D4-T27	Prepare engagement reports and summaries
Build Capacity and Provide Technical Assistance	D5-T1	Conduct capacity and needs assessments
	D5-T2	Identify training needs and knowledge gaps
	D5-T3	Identify community and organizational resource needs
	D5-T4	Identify specialty and inventory resources
	D5-T5	Align training objectives with desired outcomes
	D5-T6	Design training modules and courses
	D5-T7	Develop educational and outreach content
	D5-T8	Review and update curricula
	D5-T9	Develop technical manuals and handbooks (e.g., agroforestry handbook)
	D5-T10	Conduct field-based training
	D5-T11	Facilitate classroom, virtual, and hybrid trainings
	D5-T12	Implement train-the-trainer programs
	D5-T13	Provide ongoing technical assistance and advisory support
	D5-T14	Respond to requests for technical advice
	D5-T15	Facilitate knowledge sharing and learning exchanges
	D5-T16	Map and engage knowledge and research networks
	D5-T17	Collaborate with local institutions and partners
	D5-T18	Consult with technical, cultural, and subject-matter experts
	D5-T19	Incorporate traditional and scientific knowledge into programs
	D5-T20	Apply and revitalize traditional agricultural practices and stewardship
	D5-T21	Incorporate modern technologies and tools (e.g., AI, data systems)
	D5-T22	Maintain and update technical proficiency
	D5-T23	Mentor youth and early-career professionals
	D5-T24	Support internships, fellowships, and scholarship opportunities
	D5-T25	Evaluate student and trainee performance
	D5-T26	Encourage participation in external trainings and exchanges
	D5-T27	Engage stakeholders and build collaborative relationships
	D5-T28	Determine appropriate communication methods for target audiences
	D5-T29	Create and disseminate awareness and promotional materials
	D5-T30	Promote available programs, services, and resources
	D5-T31	Identify and pursue funding opportunities
	D5-T32	Provide grant writing and proposal development support
	D5-T33	Support submission of funding and development applications
	D5-T34	Evaluate personnel capacity and compensation considerations
	D5-T35	Track capacity-building progress and outcomes
	D5-T36	Collect pre- and post-training data
	D5-T37	Evaluate effectiveness and implementation of technical assistance
	D5-T38	Formulate recommendations for improvement

	D5-T39	Document institutional knowledge and best practices
	D5-T40	Compile and synthesize relevant research
	D5-T41	Create information resources for sharing
	D5-T42	Disseminate technical information and key data for decision-making
	D5-T43	Prepare reports and project narratives
Implement and Manage Natural Resource Programs and Field Operations	D6-T1	Identify target communities and stakeholders
	D6-T2	Develop outreach and engagement strategies
	D6-T3	Develop program scope, objectives, and work plans
	D6-T4	Develop project timelines and tracking systems
	D6-T5	Develop contingency and risk management plans
	D6-T6	Secure program funding and allocate program budgets
	D6-T7	Finalize agreements, contracts, and memoranda of understanding
	D6-T8	Identify and engage project partners and collaborators
	D6-T9	Mobilize program resources, equipment, and supplies
	D6-T10	Hire, assign, and supervise project staff, contractors, and volunteers
	D6-T11	Assign roles, responsibilities, and specific field tasks
	D6-T12	Train staff, partners, farmers, and volunteers
	D6-T13	Coordinate program logistics and daily operations
	D6-T14	Prepare vehicles, equipment, and field supplies
	D6-T15	Provide safety briefings and ensure proper PPE use
	D6-T16	Implement cultural protocols and community expectations
	D6-T17	Conduct site assessments and identify site characteristics
	D6-T18	Establish demonstration plots, nurseries, and installations
	D6-T19	Implement natural resource management activities (e.g., planting, pruning, fertilizing, pest management)
	D6-T20	Conduct surveys and field monitoring (ecological, marine, socio-economic)
	D6-T21	Monitor seedling distribution and best management practices
	D6-T22	Collect, analyze, and manage field and project data
	D6-T23	Monitor project progress against indicators and milestones
	D6-T24	Evaluate short- and long-term environmental and social impacts
	D6-T25	Apply adaptive management based on monitoring results
	D6-T26	Maintain project sites, equipment, and installations
	D6-T27	Ensure equipment cleaning, sterilization, and biosecurity
	D6-T28	Review program compliance with requirements and standards
	D6-T29	Prepare and submit periodic progress and data reports
	D6-T30	Disseminate project results and communicate progress to stakeholders
	D6-T31	Engage communities, leaders, and agencies throughout implementation
	D6-T32	Promote public awareness through media, events, and outreach
	D6-T33	Mitigate implementation challenges and conflicts

	D6-T34	Conduct after-action reviews and periodic program evaluations
	D6-T35	Transition, close out, and document completed projects
	D6-T36	Celebrate program successes and achieved objectives
Respond to Natural Resource Threats and Emerging Issues	D7-T1	Prepare funding needs and resource requirements for rapid response
	D7-T2	Request and secure emergency response funds
	D7-T3	Develop, update, and maintain rapid response plans
	D7-T4	Integrate site-specific cultural and place-based protocols into response actions
	D7-T5	Develop project plans for threat response
	D7-T6	Develop and maintain standard operating procedures (SOPs) for response
	D7-T7	Identify and maintain high-risk threat lists
	D7-T8	Develop and maintain threat site data sheets
	D7-T9	Prioritize response efforts based on risk and impact
	D7-T10	Implement timely and appropriate response actions
	D7-T11	Conduct site visits to affected communities and locations
	D7-T12	Dispatch and manage appropriate response crews
	D7-T13	Provide logistical and operational support to field crews
	D7-T14	Identify, train, and maintain reliable responders
	D7-T15	Organize and adjust response activities based on seasonal trends
	D7-T16	Respond to emergency requests and incident reports
	D7-T17	Coordinate response actions with government partners
	D7-T18	Coordinate communication among partners and agencies
	D7-T19	Monitor environmental indicators (e.g., groundwater, fire conditions)
	D7-T20	Maintain operational communication systems (e.g., radio communication)
	D7-T21	Map impact areas and affected sites
	D7-T22	Assess and analyze threat behavior (e.g., fire behavior, pest spread)
	D7-T23	Identify intercepted pests and verify invasive species presence
	D7-T24	Investigate causes of natural resource threats (e.g., wildfire origins)
	D7-T25	Interface with subject matter experts and technical specialists
	D7-T26	Maintain and update subject matter expert contact lists
	D7-T27	Present natural resource and incident data to decision-makers
	D7-T28	Consult with public officials and leadership
	D7-T29	Provide pre-incident and post-incident briefings
	D7-T30	Influence and support public awareness and risk communication
	D7-T31	Organize restoration and recovery activities (e.g., outplanting)
	D7-T32	Maintain native plant nursery resources for response and recovery
	D7-T33	Maintain community relationships during and after response actions
	D7-T34	Incorporate stakeholder input into response planning and actions
	D7-T35	Convene natural resource and partner coordination meetings

	D7-T36	Propose mitigation or resolution strategies for invasive species and threats
	D7-T37	Enforce natural resource regulations during response actions
	D7-T38	Review and revise incident and wildfire response reports
	D7-T39	Recommend updates to biosecurity and natural resource policies
	D7-T40	Facilitate cooperation among federal, territorial, and external partners
Support Policy Development and Regulatory Processes	D8-T1	Identify applicable rules and regulations related to biosecurity (e.g., 5HCA, 8GAAR)
	D8-T2	Review existing biosecurity and environmental public laws
	D8-T3	Draft and update rules and regulations associated with biosecurity laws
	D8-T4	Secure stakeholder support for proposed policy and regulatory updates
	D8-T5	Clarify and document fee authorities and enforcement mechanisms (e.g., ISIFF)
	D8-T6	Develop and secure approval for annual policy-related work budgets
	D8-T7	Develop and maintain an annually updated invasive species priority list
	D8-T8	Establish and support governance bodies and committees (e.g., grant committees, GISC)
	D8-T9	Facilitate leadership selection and governance processes (e.g., chair elections)
	D8-T10	Communicate policy issues and recommendations to elected officials
	D8-T11	Build and sustain public support for environmental and biosecurity policies
	D8-T12	Develop policy briefs and position papers for decision-makers
	D8-T13	Provide evidence-based policy recommendations
	D8-T14	Provide technical guidance and subject-matter expertise to inform policy
	D8-T15	Review, revise, and adapt policies to local cultural, social, and environmental contexts
	D8-T16	Identify policy gaps and emerging regulatory needs
	D8-T17	Conduct policy-relevant research and analysis
	D8-T18	Compare national, regional, and international standards and best practices
	D8-T19	Gather and synthesize field data to support policy development
	D8-T20	Evaluate policy relevance, effectiveness, and outcomes
	D8-T21	Seek and secure funding to support policy development and updates
	D8-T22	Facilitate policy-focused consultations and learning exchanges
	D8-T23	Participate in and support stakeholder consultation processes
	D8-T24	Promote community awareness of environmental and biosecurity policies

	D8-T25	Promote environmental policy awareness through educational systems
	D8-T26	Support hiring, training, and coordination of enforcement personnel
	D8-T27	Enforce environmental and biosecurity policies in coordination with authorities
	D8-T28	Develop and implement regulatory compliance systems
	D8-T29	Deliver policy and regulatory training to staff, partners, and stakeholders
	D8-T30	Monitor illegal or non-compliant activities related to natural resources

Appendix B. Foundational Course Inventory

Competency Domain	Course Title	Institution
Capacity Building, Training, and Technical Assistance	Environmental Service Learning Exchange	American Samoa Community College
	Practical Job Experience	American Samoa Community College
	Agroforestry Internship	College of Marshall Islands
	Directed Field Experience	College of Micronesia
	Agriculture Internship	Northern Mariana College (Saipan)
	NRM Internship	Northern Mariana College (Saipan)
	NRM Seminar	Northern Mariana College (Saipan)
	Internship	Palau Community College (Koror)
Community Engagement and Co-Management	Nutrition	American Samoa Community College
	Parenting: Models for Guiding & Nurturing Children	American Samoa Community College
	Food Preservation and Safety	College of Marshall Islands
	Food Sovereignty: Traditional Crops for Healthy Lifestyle	College of Marshall Islands
	Food Processing	College of Micronesia
	Selected Topics in Land Resources and Food Systems	College of Micronesia
	Food Science	Northern Mariana College (Saipan)
Data Collection, Monitoring, and Applied Research	Geographic Information Systems	College of Micronesia
	Introduction to Chemistry	College of Micronesia
	Multimedia Design	College of Micronesia
	Statistics	College of Micronesia
	Chemistry	Guam Community College
	Environmental Biology	Guam Community College
	Intro to GIS	Guam Community College
	Introduction to Microbiology	Guam Community College
	Math	Guam Community College
	Scientific Methods and Data Analysis	Guam Community College
	Gen Chem	Northern Mariana College (Saipan)
	Species and Ecosystem Management	Northern Mariana College (Saipan)
	Biology (1, 2)	University of Guam
	Calculus	University of Guam
	Chemistry	University of Guam
	Genetics	University of Guam
	Inorganic Chemistry	University of Guam
	Physics	University of Guam
NRM Program Implementatio	Animal Science	American Samoa Community College
	Forests & Agroforestry	American Samoa Community College

n and Field Operations	Introduction to Aquaculture	American Samoa Community College
	Introduction to Horticulture	American Samoa Community College
	Agro- Industry Products	College of Marshall Islands
	Agroforestry & Terrestrial Ecosystems	College of Marshall Islands
	Aquaponics	College of Marshall Islands
	Nutrient Dynamics on Agroforestry	College of Marshall Islands
	Silvicultural Systems in Agroforestry Management	College of Marshall Islands
	Social Forestry	College of Marshall Islands
	Textiles & Plant-Based Cultural Arts	College of Marshall Islands
	Agricultural Project Management	College of Micronesia
	Aquaculture	College of Micronesia
	Crop Production	College of Micronesia
	Ethnobotany	College of Micronesia
	General Botany with lab	College of Micronesia
	Introduction to Agriculture	College of Micronesia
	Principles of Animal Science	College of Micronesia
	Geology	Guam Community College
	Intro to Marine Biology	Guam Community College
	Agricultural Science	Northern Mariana College (Saipan)
	Crop Production	Northern Mariana College (Saipan)
	Farm Management	Northern Mariana College (Saipan)
	Micropropogation and Nursery Practices	Northern Mariana College (Saipan)
	Plant Science	Northern Mariana College (Saipan)
	Soil Science	Northern Mariana College (Saipan)
	Crop Protection	Palau Community College (Koror)
	Farm Management	Palau Community College (Koror)
	General Animal Husbandry	Palau Community College (Koror)
	Horticultural Crop Production	Palau Community College (Koror)
	Introduction to Tropical Agriculture	Palau Community College (Koror)
	Plant Science	Palau Community College (Koror)
	Poultry and Swine Production	Palau Community College (Koror)
	Soil Technology	Palau Community College (Koror)
	Tropical Landscape Horticulture	Palau Community College (Koror)
	Animal Science	University of Guam
	Aquaculture	University of Guam
	Entomology	University of Guam
	Environmental Soil Science	University of Guam
	Horticultural Science	University of Guam
	Ornamental Crop Production In The Tropics	University of Guam
	Ornamental Crop Production in the Pacific Laboratory	University of Guam
	Pest Management	University of Guam

	Plant Pathology	University of Guam
	Plant Science	University of Guam
	Principles of Soil Science	University of Guam
	Soil Science	University of Guam
	Tropical Fruits Horticulture	University of Guam
	Tropical Vegetable Production	University of Guam
NRM Program Planning and Design	Natural Resources	American Samoa Community College
	Polynesian Culture & Natural Resources Learning Project	American Samoa Community College
	Survey of Community & Natural Resources	American Samoa Community College
	Introduction to NRM	Northern Mariana College (Saipan)
	Special Topics in NRM	Northern Mariana College (Saipan)
Policy, Governance, and Regulatory Support	Environmental Studies	American Samoa Community College
	Climate, Food Security, and Health	College of Marshall Islands
	Conservation Politics and Economics	Northern Mariana College (Saipan)
	Environmental Conservation	Northern Mariana College (Saipan)
	Environmental Conservation	Northern Mariana College (Saipan)
Program Administration and Resource Management	Agriculture Economics	American Samoa Community College
	Family Finance	American Samoa Community College
	Agricultural Entrepreneurship	College of Marshall Islands
	Introduction to Business	College of Marshall Islands
	Intro to Business	College of Micronesia
	Microeconomics	College of Micronesia
	Macroeconomics	Northern Mariana College (Saipan)
	Agricultural Business Management	University of Guam
	Waste Site Worker Safety HAZWOPER	Guam Community College

Appendix C. Competency-Based Performance Crosswalk

DACUM Duty	Core Competency Focus	Example Job Functions / Performance Expectations	Supporting Professional Development Modules
D1. Plan and Design Natural Resource Programs and Projects	Program planning, needs assessment, feasibility analysis, work planning	Design project proposals; develop work plans and timelines; align objectives with funding and policy requirements	Module 2: Project Design, Work Planning & Coordination; Module 5: Data Collection, Monitoring & Adaptive Management
D2. Manage Program Administration and Resources	Financial management, administration, compliance, human resources	Develop and track budgets; manage contracts and procurement; supervise staff; ensure regulatory compliance	Module 3: Financial Management, Grants & Administrative Compliance; Module 7: Policy Literacy, Communication & Reporting
D3. Build Capacity and Provide Technical Assistance	Training delivery, mentorship, technical assistance, workforce development	Deliver trainings; mentor staff and partners; coordinate learning exchanges; support internships and fellowships	Module 6: Technical Assistance, Training Delivery & Workforce Development; Module 1: Community Engagement, Cultural Competency & Traditional Knowledge
D4. Collect, Manage, and Share Data and Knowledge	Data collection, analysis, knowledge management, information sharing	Conduct field monitoring; manage datasets; analyze and report results; share findings with stakeholders	Module 5: Data Collection, Monitoring & Adaptive Management
D5. Engage Communities and Stakeholders	Community engagement, cultural competency, stakeholder coordination	Facilitate community meetings; integrate traditional knowledge; manage stakeholder relationships; resolve conflicts	Module 1: Community Engagement, Cultural Competency & Traditional Knowledge; Module 7: Policy Literacy, Communication & Reporting
D6. Implement and Manage Natural Resource Programs and Field Operations	Field operations, safety, supervision, implementation management	Oversee field crews; promote safety and SOP compliance; manage day-to-day project operations; track progress	Module 4: Field Operations, Safety & Compliance; Module 2: Project Design, Work Planning & Coordination
D7. Respond to Natural Resource Threats and Emerging Issues	Risk response, emergency coordination, adaptive decision-making	Coordinate rapid response; assess threats; mobilize resources; adapt programs to emerging conditions	Module 4: Field Operations, Safety & Compliance; Module 5: Data Collection, Monitoring & Adaptive Management; Module 7: Policy Literacy, Communication & Reporting
D8. Support Policy Development and Regulatory Processes	Policy literacy, compliance support, science-to-policy communication	Provide technical input to policy; support compliance and enforcement; communicate findings to decision-makers	Module 7: Policy Literacy, Communication & Reporting; Module 5: Data Collection, Monitoring & Adaptive Management

Appendix D. Competency Domain Analysis

Competency Domain	Duty Statement	Synthesized Task Statement	Frequency	Importance (1–5)	Confidence (1–5)	Notes / Source Evidence
Capacity Building, Training, and Technical Assistance	Build Capacity and Provide Technical Assistance	Deliver training and train-the-trainer programs	3/4	5	5	Guam Day 1, Majuro, Pohnpei
	Build Capacity and Provide Technical Assistance	Mentor students and early-career professionals	3/4	3	5	Guam Day 1, Majuro, Pohnpei
	Build Capacity and Provide Technical Assistance	Provide technical assistance and advisory support	3/4	3	5	Guam Day 1, Majuro, Pohnpei
	Collect, Manage, and Share Data and Knowledge	Mentor students and early-career professionals	1/4	3	3	Guam Day 2
	Collect, Manage, and Share Data and Knowledge	Provide technical assistance and advisory support	2/4	3	4	Guam Day 2, Majuro
	Engage Communities and Stakeholders	Deliver training and train-the-trainer programs	1/4	5	3	Pohnpei
	Engage Communities and Stakeholders	Provide technical assistance and advisory support	1/4	3	3	Pohnpei
	Implement and Manage Natural Resource Programs and Field Operations	Deliver training and train-the-trainer programs	3/4	5	5	Guam Day 1, Majuro, Pohnpei
	Implement and Manage Natural Resource Programs and Field Operations	Provide technical assistance and advisory support	4/4	3	5	Guam Day 1, Guam Day 2, Majuro, Pohnpei
	Manage Program Administration and Resources	Deliver training and train-the-trainer programs	1/4	5	3	Pohnpei
	Manage Program Administration and Resources	Mentor students and early-career professionals	1/4	3	3	Pohnpei
	Manage Program Administration and Resources	Provide technical assistance and advisory support	3/4	3	5	Guam Day 1, Guam Day 2, Pohnpei
	Plan and Design Natural Resource Programs and Projects	Provide technical assistance and advisory support	1/4	3	3	Guam Day 1
	Respond to Natural Resource Threats and Emerging Issues	Provide technical assistance and advisory support	1/4	3	3	Guam Day 2

	Support Policy Development and Regulatory Processes	Deliver training and train-the-trainer programs	1/4	5	3	Pohnpei
	Support Policy Development and Regulatory Processes	Mentor students and early-career professionals	1/4	3	3	Pohnpei
	Support Policy Development and Regulatory Processes	Provide technical assistance and advisory support	2/4	3	4	Guam Day 2, Pohnpei
Community Engagement and Co-Management	Build Capacity and Provide Technical Assistance	Develop and disseminate outreach and communications	2/4	3	4	Guam Day 1, Majuro
	Collect, Manage, and Share Data and Knowledge	Develop and disseminate outreach and communications	1/4	3	3	Majuro
	Implement and Manage Natural Resource Programs and Field Operations	Develop and disseminate outreach and communications	3/4	3	5	Guam Day 2, Majuro, Pohnpei
	Respond to Natural Resource Threats and Emerging Issues	Develop and disseminate outreach and communications	1/4	3	3	Guam Day 2
	Support Policy Development and Regulatory Processes	Develop and disseminate outreach and communications	2/4	3	4	Guam Day 2, Pohnpei
Data Collection, Monitoring, and Applied Research	Build Capacity and Provide Technical Assistance	Collect, manage, analyze, and share data	2/4	3	4	Guam Day 1, Pohnpei
	Build Capacity and Provide Technical Assistance	Monitor, evaluate, and document outcomes	1/4	4	3	Pohnpei
	Collect, Manage, and Share Data and Knowledge	Collect, manage, analyze, and share data	2/4	3	4	Guam Day 2, Majuro
	Collect, Manage, and Share Data and Knowledge	Monitor, evaluate, and document outcomes	1/4	4	3	Majuro
	Engage Communities and Stakeholders	Collect, manage, analyze, and share data	1/4	3	3	Pohnpei
	Engage Communities and Stakeholders	Monitor, evaluate, and document outcomes	1/4	4	3	Pohnpei
	Implement and Manage Natural Resource Programs and Field Operations	Collect, manage, analyze, and share data	4/4	3	5	Guam Day 1, Guam Day 2, Majuro, Pohnpei
	Implement and Manage Natural Resource Programs and Field Operations	Monitor, evaluate, and document outcomes	4/4	4	5	Guam Day 1, Guam Day 2, Majuro, Pohnpei

	Manage Program Administration and Resources	Monitor, evaluate, and document outcomes	3/4	4	5	Guam Day 1, Guam Day 2, Pohnpei
	Plan and Design Natural Resource Programs and Projects	Collect, manage, analyze, and share data	1/4	3	3	Guam Day 1
	Plan and Design Natural Resource Programs and Projects	Monitor, evaluate, and document outcomes	1/4	4	3	Guam Day 1
	Respond to Natural Resource Threats and Emerging Issues	Collect, manage, analyze, and share data	1/4	3	3	Guam Day 2
	Respond to Natural Resource Threats and Emerging Issues	Monitor, evaluate, and document outcomes	1/4	4	3	Guam Day 2
	Support Policy Development and Regulatory Processes	Monitor, evaluate, and document outcomes	1/4	4	3	Pohnpei
NRM Program Implementation and Field Operations	Build Capacity and Provide Technical Assistance	Implement and manage programs and field operations	1/4	5	3	Guam Day 1
	Implement and Manage Natural Resource Programs and Field Operations	Implement and manage programs and field operations	4/4	5	5	Guam Day 1, Guam Day 2, Majuro, Pohnpei
	Manage Program Administration and Resources	Implement and manage programs and field operations	2/4	5	4	Guam Day 2, Pohnpei
	Plan and Design Natural Resource Programs and Projects	Implement and manage programs and field operations	1/4	5	3	Guam Day 1
	Respond to Natural Resource Threats and Emerging Issues	Implement and manage programs and field operations	1/4	5	3	Guam Day 2
NRM Program Planning and Design	Build Capacity and Provide Technical Assistance	Conduct assessments and identify needs	2/4	3	4	Guam Day 1, Pohnpei
	Build Capacity and Provide Technical Assistance	Design programs, curricula, and materials	3/4	3	5	Guam Day 1, Majuro, Pohnpei
	Build Capacity and Provide Technical Assistance	Identify training needs and knowledge gaps	2/4	5	4	Guam Day 1, Pohnpei
	Collect, Manage, and Share Data and Knowledge	Conduct assessments and identify needs	1/4	3	3	Guam Day 2
	Collect, Manage, and Share Data and Knowledge	Design programs, curricula, and materials	1/4	3	3	Guam Day 2

	Engage Communities and Stakeholders	Conduct assessments and identify needs	1/4	3	3	Pohnpei
	Engage Communities and Stakeholders	Design programs, curricula, and materials	1/4	3	3	Pohnpei
	Implement and Manage Natural Resource Programs and Field Operations	Conduct assessments and identify needs	1/4	3	3	Pohnpei
	Implement and Manage Natural Resource Programs and Field Operations	Design programs, curricula, and materials	2/4	3	4	Majuro, Pohnpei
	Manage Program Administration and Resources	Conduct assessments and identify needs	2/4	3	4	Guam Day 2, Pohnpei
	Manage Program Administration and Resources	Design programs, curricula, and materials	2/4	3	4	Guam Day 1, Pohnpei
	Plan and Design Natural Resource Programs and Projects	Conduct assessments and identify needs	1/4	3	3	Guam Day 1
	Plan and Design Natural Resource Programs and Projects	Design programs, curricula, and materials	1/4	3	3	Guam Day 1
	Plan and Design Natural Resource Programs and Projects	Identify training needs and knowledge gaps	1/4	5	3	Guam Day 1
	Respond to Natural Resource Threats and Emerging Issues	Conduct assessments and identify needs	1/4	3	3	Guam Day 2
	Respond to Natural Resource Threats and Emerging Issues	Design programs, curricula, and materials	1/4	3	3	Guam Day 2
	Support Policy Development and Regulatory Processes	Design programs, curricula, and materials	2/4	3	4	Guam Day 2, Pohnpei
Policy, Governance, and Regulatory Support	Build Capacity and Provide Technical Assistance	Support policy development and regulatory compliance	1/4	5	3	Guam Day 1
	Collect, Manage, and Share Data and Knowledge	Support policy development and regulatory compliance	1/4	5	3	Majuro
	Implement and Manage Natural Resource Programs and Field Operations	Support policy development and regulatory compliance	1/4	5	3	Guam Day 1

	Manage Program Administration and Resources	Support policy development and regulatory compliance	1/4	5	3	Guam Day 2
	Respond to Natural Resource Threats and Emerging Issues	Support policy development and regulatory compliance	1/4	5	3	Guam Day 2
	Support Policy Development and Regulatory Processes	Support policy development and regulatory compliance	2/4	5	4	Guam Day 2, Pohnpei
Professional Practice and Interdisciplinary Skills	Build Capacity and Provide Technical Assistance	Integrate traditional and scientific knowledge	2/4	3	4	Majuro, Pohnpei
	Engage Communities and Stakeholders	Integrate traditional and scientific knowledge	1/4	3	3	Pohnpei
	Implement and Manage Natural Resource Programs and Field Operations	Integrate traditional and scientific knowledge	1/4	3	3	Majuro
	Plan and Design Natural Resource Programs and Projects	Integrate traditional and scientific knowledge	1/4	3	3	Guam Day 1
Program Administration and Resource Management	Build Capacity and Provide Technical Assistance	Secure funding and support grant development	2/4	3	4	Majuro, Pohnpei
	Engage Communities and Stakeholders	Secure funding and support grant development	1/4	3	3	Pohnpei
	Implement and Manage Natural Resource Programs and Field Operations	Secure funding and support grant development	2/4	3	4	Guam Day 1, Pohnpei
	Manage Program Administration and Resources	Secure funding and support grant development	3/4	3	5	Guam Day 1, Guam Day 2, Pohnpei
	Plan and Design Natural Resource Programs and Projects	Secure funding and support grant development	1/4	3	3	Guam Day 1
	Respond to Natural Resource Threats and Emerging Issues	Secure funding and support grant development	1/4	3	3	Guam Day 2
	Support Policy Development and Regulatory Processes	Secure funding and support grant development	2/4	3	4	Guam Day 2, Pohnpei

Appendix E. DACUM Workshop Enabler Tables

Table 8. Knowledge and Skills sorted by theme. Language unaltered from DACUM workshop participants.

Knowledge and Skills for Natural Resource Management in the Pacific Islands
Agriculture & Food Systems
Agriculture
Agriculture Science
Agroecology
Agroforestry
Agronomy
Animal Science
Aquaculture
Aquaponics
Climate Smart Agriculture
Food Processing
Food Security
Food System
Food System/ Food Economics
Harvesting
Horticulture
Hydroponics
Institutional Farm Practices
IPM
ISA Certification
Maintenance - Harvesting, Pruning
Mulching Application (Hand And Mechanical)
Organic Agriculture
Regenerative Agroforestry Systems
Soil Sampling
Soil Science
Soils
Traditional Agricultural Method
Vegetable Production
Community, Communication & Engagement
Communication
Communication Skills
Community Oriented
Conflict Resolution
Cultural Sensitivity
Culture
Facilitating, Facilitation, Moderating
Facilitation
Indigeneous / Traditional Knowledge
Integration Of Secular And Cultural Knowledge
Languages (Local Language)
Listening
Local Knowledge
Marketing
Networking
Networks / Networking
Proficient In Local Policies And Community Dynamics
Site Specific Communications
Stakeholder Engagement, Knowing Partners
Traditions
Data, Monitoring & GIS
Coral Reef Monitoring
Data Analysis
Data Collection
Data Entry, Analysis, Processing, Interpretation
Drone Operation
Excel / Data Organization
GIS mapping skills
Inventory And Monitoring, Ecological Survey, Forest Inventory Analysis
Inventory Skills
Monitoring
Environmental & Ecological Knowledge
Botany
Climate Change Adaptation
Composting
Ecology
EIA
Entemology
Entomology
Environmental Auditing
Environmental Engineering
Environmental Weather / Climate

FIA
Fire Behaviour (Place-Based)
Floriculture
Geology
Impacts Of Climate Change
Lab Procedure Skills
Local Botanical Knowledge/ Plant Varieties
Native Species Vs. Invasive Species Identification
Natural Resource / Local Place-Based Natural Science
Nursery Propagation
Pest And Disease Identification
Plant Identification
Plant Pathology
Plant Science
Propagation Methods
Remote Sensing
Site Preparation
Species Selection
Traditional Ecological Knowledge
Traditional Knowledge/ Stewardship
Tree Species Identification
Place-Based Ecological Knowledge
Field Operations & Safety
Arborist Certification
Back Up/ Drive Trailer
Drone Operations
Equipment Certification (Chainsaw)
Equipment Maintenance
Field Knowledge
Food Safety
Navigation, Reading Maps, Orienteering
Safety Practices
Financial & Administrative Skills
Accounting
Basic Accounting
Budget Management
Grant Management
Grant Writing
Reporting
General Professional Knowledge
Adapt Materials For Audience

Administrative Skills
AI utilization
Arborculture, Certified Arborist
Biology
Communicate To Difference Audiences (Non-Technical)
Computer
Computer Skills
Consensus Building
Documentation
Economy Of Expression
Entrepreneurship
Extension Methods
First Aid
Google Workplace
Graphic Art
Graphic Design
Graphic Designing
Inorganics
Institutional Protocols
IT
Marketing Skills
Mathematical Skills
Observation
People Skills/ Social Skills
Pesticide Application
Presentation
Problem-Solving Skills
Proposal Writing
Public Speaking
Report Writing
Research Methods
Right Level Of Degree For Your Position
Scheduling
Scientific Method
Site Assessment
Small Machine Operation
Social Media
Content Creation
Statistics
Surveying
Team Building
Technical

Technical Expert
Technological Skills, Computer Skills
Technology
Technology Skills
Translation
Value Addition
Value Chain
Writing
Speaking
Marine, Coastal & Water Resources
Aquamarine Biology
Certified Diver
Marine Science
Scuba Diving
Water Security
Policy, Governance & Compliance
Comprehend Regulatory Requirements
Environmental Policy And Regulation
Federal Laws (Nepa)
Pesticide Handling Permit
Political
Public Law
Program & Project Management
Adaptive Management
Awareness Planning
Chemical Management
Coordination (Project, People, Schedules)
Ecosystem Management
Farm Management
Hatchery Management
Integrated Crop Management
Integrated Pest Management
Invasive Species Management
Leadership
Livestock Management
Management Skills
Nursery Management
Plan Development
Planning
Poultry Management
Project Management
Stress Management
Technical Planning Advice

Waste Management
Wildlife Management
Training, Mentorship & Capacity Building
Chainsaw Training
Learning Theories, Styles, Best Practices
Teaching
Training
Tree Pruning / Arborist Training
Youth Development

Table 9. Behaviors sorted by theme. Redundant responses combined and synthesized from DACUM workshops.

Behaviors of Natural Resource Management in the Pacific Islands
Adaptability, Critical Thinking & Problem Solving
Analytical thinking
Critical thinking
Innovative, thinks outside the box, creative
Adaptable / Flexible
Collaboration & Team Practice
Mentor / role model
Collaborative team player
Communication & Engagement
Good listener
Cultural Competence & Community Relations
Community driven
Community-minded
Culturally respectful
General Professional Behavior
Active
Care
Clean
Compassionate
Competent
Confident
Considerate
Courageous
Disciplined
Empathetic
Energetic
Entrepreneurial
Forgiving
Hard working
Healthy and fit
High endurance
Humanitarian
Humility
Hygenic
Inclusive
Observant
Optimistic
Passionate
Patience
Responsive
Tolerant
Truth seeker
Understanding
Motivated and committed
Trustworthy
Approachable and positive demeanor
Logical / Rational
Proactive and decisive
Learning-Oriented
Leadership & Accountability
Accountable
Confident leader
Go getter, self-sufficient, initiative
Leadership
Responsible
Professional Ethics & Integrity
Honesty
Open-minded
Transparency
Ethical integrity
Resilience & Self-Management
Resilient
Selfless
Timely
Safety & Compliance Mindset
Safety conscious
Careful, thoughtful
Work Habits & Reliability
Attention to detail
Dependable
Independent
Organized
Punctual
Consistent and reliable

Table 10. Tools and Equipment sorted by theme. Redundant responses combined and synthesized from DACUM workshops.

Tools for Natural Resource Management in the Pacific Islands
Digital Tools & Software
Accounting tools (quickbook…)
Adobe
AI
Calendar organizational tools
Cell phone apps
Cellphones
Computer
Databases
Drone processing software, mapping software
Drones, censors, processing software
Email
GIS software
High resolution imagery
Internet
Kobo tool box
Laptop
Measurement apps
Microsoft programs
Mobile star link
R program
Slack, communication tools
Software
TV monitors
Weather data
Field Tools & Machinery
Air curtain burner
Auger
Back hoe
Chainsaw
Chipper, shredder, mulcher
Dibble
Farm tools
Fire suppression tools
Hand pruner
Measuring tools
Mower
Mulcher
Pick axe
Planting tools (auger)
Pruner
Pruning saw
Shovel
Small machinery
Spraying tools
Tractor
Tractor attachments
General Equipment & Supplies
Bags
Camping gear
Coolers
Drying oven
Existing research, historical documents, online journals
Facilities
Fencing
Flagging
Fuel
Fume hood
Gant charts
Gas / oil
Generators
Herbicides
Incubator
Ladder
Peanut butter
Pencils
Pesticide
Pesticides
Posters, banners, flyers
Power / energy source
Power banks
Radios
Satellite phone
Slideshow / presentation
Social media

Sprayer
Storage facilities
Tablets
Timer
Trackers
Translator services
Vacuum
Laboratory & Research Equipment
C and N analyzer
Centrifuge
Compound microscope
Ethanol
Lab equipment
Microscopes
PCR kits
Pipettes
Refractometry meter
Refrigerator, freezers
RNA later
Scales
Vials
Winkler bags
Monitoring, Survey & Sensing Equipment
Baits
Berleze funnels
Binoculars
Bush cutter
Caliper
Cameras
Clinometer
DBH tapes
Densiometer
Drip torch
Drones
Field guides
Field kits
Field notebooks
Field tablet
Flashlight
GNSS
GPS
Hypsometer
Identification keys

Insect display box
Insect pins
Investigation kits
Knife
Machete
Magnifying glass
Malaise traps
Mapping apps
Metal detector
Planting materials
Pressure bombs
Rainproof notebook
Sensors
Survey equipment
Tape measures
Transect tapes
Traps
Tweezers
Water level logger
Nursery, Agriculture & Planting Supplies
Fertilizers
Green house/ nursery
Irrigation pots
Livestock management equipment
Nursery equipment, supplies
Peat moss
Pots, soil, irrigation, hori hori
Seeds, seed processing gear
Soil tester
Office, Training & Outreach Equipment
3D printer
Backpacks
Compass
Hydration packs
Microphone
Office equipment
Office space
Office supply
Outreach material
PA system
Paper maps
Pen / paper
Printer

Projector & screen
Stationary
Safety & Protective Equipment
Aspirator
Bee suit
Boots, field gear, clothes
First aid kit
Forestry vests
Harness
Helmets
PPE
Safety equipment
Safety gear
Safety glasses
Safety uniforms
Transportation & Mobility
4 x 4 vehicle
Cars
Dirt bikes
Fire trucks
Helicopters
Motor boat
Transportation
Trucks
UTV/ ATV
Vehicles
Water, Marine & Field Support Equipment
Access to water
Buoys
Diving gear
Lures
Water
Water bottle
Water pump
Water quality tester
Water tank

Table 11. Future Trends and Concerns sorted by theme. Language unaltered from DACUM workshop participants.

Future Trends and Concerns for Natural Resource Management in the Pacific Islands
Cultural & Social Change
Attention spans
Community-based participatory research
Cultural change
Depression
Diminished attention span quick opportunity for info
Displacement of local communities
Enculturation acculturation
Increase in aquaculture apiculture small-scale industries (scale could be positive)
Increase youth programs for nr
Joint cooperation in wildfire in community
Loss of cultural identification
Loss of traditional knowledge
Loss of traditional knowledge and skills and language
Loss of traditional practices
Mass migration
Migration out migration
More community outreach/ engagement empower individuals to gain responsibility vested interest/ buy in
More community stewardship management
Need for more face to face interaction
Out-migration
Personal issues
Renaissance of traditional knowledge
Self-care and mindfulness
Youth migration
Youth pregnancy
Economic & Workforce
4-day work week
Availability of funding
Brain drain
Example - programs that require you to come back and work available but no interest
Financial barrier- go off island may not come back if salary is low
Funding cuts
Funds disappearing for invasive species mgmt
Hiring and staff retention
Inflation
Local workforce development is needed
Low salary rising cost of living..... climate change
Low wages not increasing with inflation (minimum wage has not been updated)
Misuse of funds
More local communities taking initiative to apply for grants
More non-profits to elevate work/ more collaborative projects
More work flexibility
Projects are comprehensive local capacity not available (hiring challenges). might have really good jobs but no one available with experience to hire.
Retirement age - but no benefits available
Salaries not keeping up with inflation
Short staff / lack of man power
Staff resigning turnover
Transition of federal employees knowledge void
Workforce is becoming better educated
Workforce recruitment
Education & Capacity
Declining enrollment in university
Experts "retiring" loss of institutional knowledge
Hard to find technical experts
Lack of capacity and technical skills
Lack of nr education in k-12
Lack of youth education and curriculum on environment/ natural resources
Less university degrees more certificates/ stackable
Need for service learning (forestry initiatives in k-12)
Nobody to hire
Online curriculum trend
Phd increasing in local communities diaspora of micronesian researchers
Student dropping out of schools
Students not coming home

Work overload stack duties and pay not reflect
Environmental & Climate
(over) development big threat to environment
Biodiversity loss
Biosecurity
Birth declines
Changes in biodiversity loss of biodiversity
Climate change
Coastal erosion
Coral bleaching
Deep sea mining
Deforestation
Disease outbreaks epidemics
Dredging
Emerging pathways for invasives
Environmental degradation
Extinction
Flooding
Increase of invasive species
Increasing endangered species
Invasive species
Invasive species could get to other islands
Invasive species increase spread
Lack of awareness on environment/ resources
Littering
Losing protections (species environment)
More planting cutting forest for agriculture
Movement of plant and animal pathogens / invasives
Natural disaster
Natural disasters
Office of insular affairs has been good tbd..... drought
Over harvesting
Pirates
Poachers
Political climate
Resource exploitation/ conversion
Sea level rise
Severe drought
Soil erosion
Solid waste management
Some decline in critical science

Vector born diseases
Waste management
Water born diseases
Wildfire
Food, Agriculture & Resources
Access to outer islands
Agricultural development plan
Decline in farmers
Decrease in food production
Eat local - relience on imported food
Egg price increase more people raising chickens (adapting)
Food safety
Food security / insecurity
Food supplies
Greater communication between islands greater guam influence
Increasingly globalized food systems
Land dispute
Land tenure system
Landscape change
Less home / land ownership
Loss of agriculture land / industry loss of sustainable food source
Price increase (food everything)
Resource scarcity
Resurgence of local food systems
Rising cost of living
Salinity impacts on soil agriculture water etc...
Salt water intrusion
Salt water invasion into gardens/ agriculture
Health & Demographics
Aging population
Drug use
Elevated stress (all sectors)
Increase of drug abuse
NCD‘s
Nutrition
Overpopulation
Population increase
Pacific Island Structural Trends
(lack of) accessibility to resources increased costs
Balance public interests --> concern of 50-acre hospital

Challenges of access for materials supplies
China wants to build resort in yap (didn't do it but it passed)
End of programs
Gentrification militarism
Geographical isolation - to rest of world
Great partnership with forest service strong advocates
Growth in fields (new buildings at UoG)
Increasing militarization of the region
Jones Act
Lack of urban planning
Loss of trade skills craftsman
Monopolies of various sectors
More deportees
Receiving supplies (access concerns)
Trade war
Travel monopoly
Political & Governance
Administrative change
Change of administration
Change of political language politicizing of science
Geopolitical tensions
Government corruption
Limited political will
Local government change
Military expansion
Obsolete laws
Policy concerns
Political corruption
Political issues
Political posturing
Political volatility
Uncertainty of future (politically financially)
Unenforced policy (including military not following regulations)
Technology & Data
Access of information - increase access not all accurate
AI
Cloud-based storage
Communication and technology on the rise
Cyber security

Data security
Increase of data need repository
Junk science
Machine learning
More webinars and online learning
New opportunities with internet
Quantum computing
Scientific misconduct
Scientific propaganda
Social media
Social media trend for outreach
Technology has increased communication
Unsustainable development
Unclassified
Increase value items
Lack of stakeholder support
Might get worse before it gets better
Misinformation from media
Possibility to service region more
Procurement too slow
Quality of life decline or redefining quality of life
Rapid change
Relevant research

Appendix F. Competency Framework Supporting Table

Capacity Domain	Key Behaviors	Core Knowledge & Skills	Minimum Tools & Resources	Advanced / Expanded Capacity
Communication & Stakeholder Engagement	Collaborative; respectful; good listener; empathetic; culturally aware	Communication skills; facilitation; public speaking; writing; translation; stakeholder engagement	Phone; email; basic presentation tools; printed outreach materials	PA systems; projectors; multimedia tools; social media platforms
Professional Ethics & Accountability	Ethical; accountable; transparent; responsible	Regulatory awareness; institutional protocols; public law; compliance	Policy documents; record-keeping systems	Digital compliance systems; audit tools
Critical Thinking & Problem Solving	Critical thinking; analytical; logical; pragmatic	Problem-solving; data interpretation; scientific method; research methods	Computer; basic software; calculators	Advanced analytics software; AI tools
Data, GIS & Monitoring	Detail-oriented; observant; consistent	GIS; GPS; data collection; monitoring; inventory analysis	GPS unit; field notebooks; basic GIS software	Drones; GNSS; remote sensing platforms; field tablets
Field Operations & Technical Practice	Disciplined; safety-conscious; dependable	Field techniques; site assessment; harvesting; pruning; maintenance	Hand tools; PPE; vehicles	Mechanized equipment; advanced field machinery
Natural Resource & Ecological Knowledge	Knowledge-seeking; open-minded; respectful of place	Ecology; botany; soils; species identification; local ecological knowledge	Field guides; identification keys	Laboratory facilities; advanced diagnostics
Agriculture, Forestry & Production Systems	Hard-working; resilient; adaptive	Agroforestry; horticulture; nursery management; soil management	Planting tools; nursery supplies; irrigation	Greenhouses; mechanized systems

Pest, Disease & Chemical Management	Careful; responsible; safety-focused	IPM; pesticide application; chemical management; entomology	PPE; sprayers; approved chemicals	Advanced application systems; monitoring traps
Planning, Management & Coordination	Organized; proactive; leadership-oriented	Project management; scheduling; budgeting; coordination	Calendars; spreadsheets; planning templates	Project management platforms; accounting systems
Collaboration, Leadership & Mentorship	Team player; inclusive; confident; role model	Team building; leadership; mentoring; consensus building	Meeting space; communication tools	Formal leadership programs; regional coordination platforms
Cultural & Community Integration	Respectful; community-minded; humble	Traditional ecological knowledge; cultural sensitivity; community engagement	Local networks; cultural protocols	Formal partnerships; cultural advisory structures
Safety, Health & Well-being	Safety-conscious; calm; resilient	First aid; risk management; stress management	First aid kits; PPE; hydration	Emergency response equipment; satellite communication
Technology & Innovation	Innovative; adaptable; curious	Technology use; AI utilization; remote sensing; digital tools	Computers; basic software	AI platforms; advanced IT infrastructure
Outreach, Education & Capacity Building	Patient; encouraging; enthusiastic	Teaching; training; extension methods; learning theories	Training materials; flip charts	Dedicated training facilities; e-learning platforms
Operations, Logistics & Infrastructure	Reliable; prepared; organized	Equipment maintenance; logistics planning; supply management	Vehicles; storage; generators	Fleet management systems; renewable power
Climate Adaptation & Resilience	Forward-thinking; resilient; adaptive	Climate-smart practices; adaptive management; fire behavior	Weather data; field tools	Advanced climate models; early warning systems