Coastal Restoration Competency Model:
Construction Sector

Louisiana Workforce Commission
www.LMI.LaWorks.net/Green

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In 2009, Louisiana and Mississippi partnered to research economic development opportunities and workforce needs associated with the region’s green economy. Through a $2.3 million grant from the U.S. Department of Labor, a consortium of the Louisiana Workforce Commission, Louisiana State University, Mississippi Department of Employment Security, and Mississippi State University conducted an extensive study of economic activity that is beneficial to the environment. This and other research products were developed as part of that effort.
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On the cover: wetland restoration in Louisiana.  
Photo © NOAA
Introduction

Louisiana’s wetland loss accounts for more than 90 percent of all wetland loss in the continental United States and the highest rate of land loss in the world.¹ A variety of factors contribute to this incredible loss of wetlands, from natural processes like hurricanes and sea level rise to direct human efforts such as dredging, levee and dam building, and the construction of transportation channels for ships and oil and gas pipelines.² The land loss created by this confluence of factors has led to a significant response by federal, state and local governments to conserve this natural resource, which in turn has provided a significant and unique contribution to Louisiana’s green economy.

Occupational requirements related to coastal restoration efforts were researched as part of a comprehensive study of Louisiana’s green economy. Information was gathered through a series of in-person interviews, telephone interviews and focus groups with employers involved in coastal restoration projects. In addition, a comprehensive review of online job advertisements was completed to identify education and skill requirements for recent job openings. Research findings were used to develop competency models for the three North American Industry Classification System (NAICS) sectors that are most involved in one or more phases of a restoration project.

What is a Competency Model?

A competency is the capability to apply or use a set of related knowledge, skills and abilities required for success in a defined work environment. Competency models are a collection of the competencies necessary to perform critical work functions in a particular industry, occupation or job. They are used by a variety of stakeholders to inform discussions and clearly communicate an industry’s occupational requirements. Job seekers will find them useful as a resource for career exploration and guidance while educators will be able to develop competency-based curricula and training models. Furthermore, these models may serve as a basis for the future development of industry-defined performance indicators, skill standards and certifications.³

The following model was created using a framework developed by the U.S. Department of Labor’s Employment and Training Administration. This model consists of four tiers of related competencies arranged in a hierarchy. Tiers 1 through 3 represent the competencies that provide a foundation for success in school or at work. These tiers, referred to as foundational tiers, include personal effectiveness, academic and workplace competencies that are crucial to successful job performance in many industries and occupations. These foundational competencies are considered prerequisites to learning the industry-specific competencies. Tier 4 includes competencies related to coastal restoration work in a specific NAICS sector.⁴
Coastal Restoration Competency Model: Construction Sector

Tier 1 — Personal Effectiveness Competencies
- Interpersonal Skills
- Integrity
- Professionalism
- Initiative
- Dependability and Reliability
- Willingness to Learn

Tier 2 — Academic Competencies
- Science
- Reading
- Writing
- Mathematics
- Communications: Visual and Verbal
- Critical and Analytical Thinking
- Basic Computer Skills

Tier 3 — Workplace Competencies
- Teamwork
- Following Directions
- Planning and Allocating Resources
- Problem Solving and Decision Making
- Tools and Technology
- Checking, Examining, and Recording
- Craftsmanship

Tier 4 — Industry-Related Competencies
- Industry Principles and Concepts
- Industry Operations
- Industry Laws and Regulations
- Quality Control and Assurance
- Health, Safety and Security
- Customer Service

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Tier 1 — Personal Effectiveness Competencies
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<table>
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<tr>
<th>Tier Name</th>
<th>Competencies</th>
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<tbody>
<tr>
<td>Tier 1</td>
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<td>Personal Effectiveness</td>
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<td>Competencies</td>
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<td>Interpersonal Skills:</td>
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<td>→ Demonstrating concern for others: Shows sincere interest in others and their concerns, and demonstrates sensitivity to the needs and feelings of others; helps others resolve sensitive interpersonal problems as appropriate; looks for ways to help people, and pitches in to help others.</td>
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<td>→ Demonstrating insight into behavior: Recognizes and accurately interprets the verbal and nonverbal behavior of others; shows insight into the actions and motives of others, and recognizes when relationships with others are strained.</td>
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<td>→ Learning about other cultures: Takes action to learn about and understand the climate, orientation, needs and values of other groups, organizations or cultures.</td>
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<td>→ Maintaining open communication: Maintains open lines of communication with others; encourages others to approach him/her with problems and successes; establishes a high degree of trust and credibility with others.</td>
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<td>→ Respecting diversity: Demonstrates sensitivity and respect for the opinions, perspectives, customs and individual differences of others; values diversity of people and ideas.</td>
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<td>→ Working with diverse people: Is flexible and open-minded when dealing with a wide range of people; listens to and considers others’ viewpoints; works well and develops effective relationships with diverse personalities.</td>
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<td>Integrity:</td>
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<td>→ Acting fairly: Treats others with honesty, fairness and respect; makes decisions that are objective and reflect the just treatment of others.</td>
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<td>→ Behaving ethically: Abides by a strict code of ethics and behavior; chooses an ethical course of action and does the right thing, even in the face of opposition; encourages others to behave accordingly.</td>
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<td>→ Taking responsibility: Takes responsibility for accomplishing work goals within accepted timeframes; accepts responsibility for one’s decisions and actions and for those of one’s group, team or department; attempts to learn from mistakes.</td>
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<td>Professionalism:</td>
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<td>→ Demonstrating self-control: Demonstrates self-control by maintaining composure and keeping emotions in check even in very difficult situations; deals calmly and effectively with stressful situations.</td>
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<td>→ Maintains a positive attitude: Projects a professional image of oneself and the organization; demonstrates a positive attitude toward work; takes pride in one’s work and the work of the organization.</td>
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→ **Professional appearance**: Maintains a professional demeanor; dresses appropriately for occupation and its requirements; maintains appropriate personal hygiene.

→ **Substance abuse**: Is free from substance abuse.

### Initiative:

→ **Achievement motivation**: Intrinsically driven to succeed and excel; strives to exceed standards and expectations; exhibits confidence in capabilities and an expectation to succeed in future activities.

→ **Persisting**: Pursues work with energy, drive and a strong accomplishment orientation; persists and expends extra effort to accomplish tasks even when conditions are difficult or deadlines are tight; persists at a task or problem despite interruptions, obstacles or setbacks.

→ **Setting challenging goals**: Establishes and maintains personally challenging but realistic work goals; exerts effort toward task mastery; brings issues to closure by pushing forward until a resolution is achieved.

→ **Taking initiative**: Goes beyond the routine demands of the job; takes initiative in seeking out new work challenges and increasing the variety and scope of one’s job; seeks opportunities to influence events and originate action; assists others who have less experience or have heavy workloads.

→ **Working independently**: Develops own ways of doing things; is able to perform effectively even with minimal direction, support or approval and without direct supervision.

### Dependability and Reliability:

→ **Attending to details**: Diligently checks work to ensure that all essential details have been considered; notices errors or inconsistencies that others have missed, and takes prompt, thorough action to correct errors.

→ **Complying with policies**: Follows written and verbal directions; complies with organizational rules, policies and procedures.

→ **Fulfilling obligations**: Behaves consistently and predictably; is reliable, responsible and dependable in fulfilling obligations; diligently follows through on commitments and consistently meets deadlines.

→ **Showing up on time**: Demonstrates regular and punctual attendance; rarely is late for meetings or appointments.

### Willingness to Learn:

→ **Anticipating changes in work**: Anticipates changes in work demands and searches for and participates in assignments or trainings that address these changing demands; treats unexpected circumstances as opportunities to learn.
Demonstrating an interest in learning: Demonstrates an interest in personal learning and development; seeks feedback from multiple sources about how to improve and develop, and modifies behavior based on feedback or self-analysis of past mistakes.

Identifying career interests: Takes charge of personal career development by identifying occupational interests, strengths, options and opportunities; makes insightful career planning decisions based on integration and consideration of others’ feedback, and seeks out additional training to pursue career goals.

Participating in training: Takes steps to develop and maintain knowledge, skills and expertise necessary to achieve positive results; participates fully in relevant training programs and actively pursues other opportunities to develop knowledge and skills.

Science:

Comprehension: Understands scientific principles critical to the construction profession: physics, chemistry, geology and environmental science, hydraulics, hydrology, and engineering; understands the scientific method (i.e., identifies problems, collects information, forms hypothesis and draws conclusions); recognizes and understands the interactions of compatible and incompatible substances; understands overall intent and proper procedures for setup and operation of equipment; understands and evaluates the characteristics and hazards of electricity; understands physical principles such as forces, friction and energy; understands physical-chemical properties such as the effects of moisture and temperature changes on materials; understands weight and mass and how it relates to rigging, wind and structure supports.

Application: Applies basic scientific principles and technology to complete tasks.

Reading:

Comprehension: Reads and understands operating directions, installation instructions and standard operating procedures as well as technical and workplace documents such as regulations, manuals, reports, memos, forms, graphs, charts, tables, calendars, schedules, signs and notices; recognizes the meaning of specialized words or phrases unique to the industry.

Application: Integrates what is learned from written materials with prior knowledge; applies what is learned from written material to follow instructions and complete specific tasks; applies what is learned from written material to future situations.

Writing:

Organization and development: Creates documents such as letters, directions, manuals, reports, graphs and flow charts; ideas are well developed with supporting information and examples; writes in a manner appropriate for business using industry terminology, acronyms and jargon appropriately.
Mechanics: Uses correct English spelling, grammar and punctuation to produce logical and accurate written correspondence, instructions and documentation.

Comprehension: Communicates thoughts, ideas, information and messages, which may contain technical material, in a logical, organized and coherent manner.

Mathematics:

Application: Chooses the correct mathematical method or formula to solve a problem; calculates amount of materials needed to complete a task.

Number operations, computation, estimation, geometry, trigonometry and rounding: Uses addition, subtraction, multiplication and division; calculates ratios, proportions, rates; uses decimal to fraction conversions; uses shapes and geometric principles to solve problems; uses triangles and trigonometric functions.

Measurement and estimation: Calculates measurement of time, temperature, distances, length, width, height, perimeter, area, volume, weight, velocity and speed; unit conversions (e.g., standard to metric).

Mathematical reasoning and problem solving: Uses inductive and deductive reasoning, conjectures, arguments, strategies, and interpretation of results.

Communication-Visual and Verbal:

Listening and speaking: Speaks in English well enough to be understood by others; speaks clearly and succinctly to convey information correctly; picks out important information in verbal messages and respond to instructions; comprehends terminology spoken on a construction site and demonstrates knowledge of jargon related to different trades.

Visual communication: Uses hand signals to communicate with other workers and identify the location to see the signaler and be seen as the signaler; recognizes universal signs and symbols such as colors, flags and stakes to function safely in the workplace.

Critical and Analytical Thinking:

Mental agility: Identifies connections between issues; quickly understands, orients to and learns new assignments; shifts gears and changes direction when working on multiple projects or issues.

Reasoning: Possesses sufficient inductive and deductive reasoning ability to perform job successfully; critically reviews, analyzes, synthesizes, compares and interprets information; draws conclusions from relevant and/or missing information; understands the principles underlying the relationship among facts and applies this understanding when solving problems.
Basic Computer Skills:

- **Comprehending the basics**: Possesses knowledge of basic computer hardware (e.g. PCs, printers) and software (e.g. word processing software, spreadsheet software) to perform tasks; understands fundamental capabilities of computers and common computer terminology (e.g., program, operating system); understands how to organize, store and retrieve files; understands how to use the Internet and email to search for information and communicate.

- **Preparing documents**: Uses word processing programs to create, edit and retrieve document files; types materials quickly and accurately; checks work carefully and identifies/corrects typographical errors; uses basic reference materials and tools (e.g., spell check) to ensure accuracy.

- **Entering data**: Enters data into computer files, such as spreadsheets, databases and presentation software, quickly and with an acceptable degree of accuracy.

Teamwork:

- **Acknowledging team membership and role**: Understands the roles and responsibilities of the individual as part of a team and the hierarchy of individuals on the jobsite; performs responsibly as a team member and assists other members of the work team, especially those who have less experience or have heavy workloads.

- **Identify with the team and its goals**: Effectively communicates with all members of the group or team to achieve team goals; learns from other team members.

- **Resolving conflicts**: Effectively resolves conflicts with co-workers to maintain a smooth workflow.

Following Directions:

- **Receive and carry out directions**: Receives, interprets, understands and responds to verbal messages and other cues; asks questions to clarify complex or unclear directions; acts upon instruction to complete an assignment with minimal supervision.

Planning and Allocating Resources:

- **Planning**: Estimates the time required to perform activities needed to accomplish a specific task; allocates time and resources effectively in order to meet the established schedule; establishes specific goals to accomplish work in a timely manner; creates work sequences for tasks and units of work.

- **Anticipate obstacles**: Adjusts plans/schedules to respond to unexpected events and conditions.

- **Allocating resources**: Plans work processes including matching material amounts and types of work to be done; understands the relationship between available resources
and requirements of a project; provides updates on complete work, materials used and materials needed for project completion.

Problem Solving and Decision Making:

- **Identify the problem**: Recognizes the existence of a problem and identifies the nature of the problem; defines critical issues and locates, obtains and reviews information relevant to the problem.

- **Generate alternatives**: Generates a variety of approaches to the problem by thinking creatively to develop new ideas for and answers to work-related problems; uses logic and reasoning to identify the strengths and weaknesses of alternative solutions or approaches to problems.

- **Choosing a solution**: Chooses the best solution after contemplating approaches to the problem and commits to a solution in a timely manner; uses strategies, tools, resources and equipment to implement the solution; observes and evaluates the outcomes of implementing the solution to assess the need for alternative approaches and identifies lessons learned.

Tools and Technology:

- **Select and use tools and technology**: Identifies the hand and power tools appropriate to the work site and to the trade, and selects tools, technology, machinery and equipment appropriate for given job; identifies potential hazards related to the use of tools and equipment; demonstrates appropriate use of tools to complete work functions; operates hand or power tools and equipment in accordance with established operating procedures and safety standards.

- **Maintenance/Troubleshooting**: Performs routine maintenance on tools, technology and equipment; determines causes of operating errors and chooses the appropriate response; troubleshoots maintenance problems in accordance with established procedures.

- **Keeping current**: Demonstrates an interest in learning about new and emerging tools and technologies; seeks out opportunities to improve knowledge of tools and technologies that may assist in streamlining work and improving productivity.

Checking, Examining and Recording:

- **Checking**: Monitors work and records progress of the project; uses checklists to track preventative maintenance.

- **Examining**: Diagnoses malfunctioning systems, apparatus and material components; examines structures and systems to determine need for repair.

- **Recording**: Enters, transcribes, records, stores and maintains information in written or electronic format; completes and maintains preventative maintenance records; keeps
logs, records and files that are up-to-date and readily accessible; keeps track of details to ensure work is performed accurately and completely.

**Craftsmanship:**

- **Physical aptitude:** Recognizes the physical aptitudes necessary to perform critical work functions; demonstrates manual dexterity, balance and hand-eye coordination; demonstrates sufficient stamina to complete critical work functions (e.g., complete full shift, walking, carrying heavy objects for extended periods).

- **Trade knowledge:** Stays up-to-date technically and applies new knowledge and skills; performs quality work, meeting or exceeding the standards of the industry; exerts effort toward task mastery.

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**Tier 4**

**Industry-Related Competencies**

**Industry Principles and Concepts:**

Knowledge of construction principles and concepts as they relate to coastal restoration projects.

- **Industry characteristics:** Exhibits knowledge of industry features and characteristics; demonstrates awareness of restoration project factors that could contribute or hinder product or service development.

- **Deltaic processes:** Understands challenges faced by Louisiana’s coastal region; demonstrates knowledge of factors causing coastal land loss.

- **Restoration techniques:** Understands ecosystem restoration techniques such as marsh creation and restoration, shoreline protection, beneficial use of dredged material, terracing, sediment trapping, vegetative planting, barrier island restoration, bank stabilization, and hydrologic restoration.

- **Coastal geography:** Exhibits knowledge of coastal geography including coastal communities; ability to read various types of maps.

- **Construction of heavy and civil structures:** Has an understanding of construction components and structures; understands the construction methods and materials needed to complete tasks.

- **Design and construction:** Reads blueprints, drawings and specifications; recognizes basic engineering and architectural principles as well as elements and symbols of blueprints, drawings and specifications; interprets dimensions, symbols, types of lines, scales and views, including elevations, plans and sections; visualizes three-dimensional forms from two-dimensional drawings; converts scaled blueprint drawing measurements to full dimensions for a given project.

- **Developments:** Demonstrates awareness of emerging coastal restoration concepts and principles; adapts current practices to incorporate advances in restoration techniques.
Industry Operations:

Ability to perform tasks associated with coastal restoration construction projects; knowledge of roles played by organizations involved in worksite operations.

- **Site planning**: Applies surveying methods to problems of leveling, line direction, measurement of angles, measurement of distance, and transverse computations; uses surveying equipment to check location and measure elevations; identifies worksite hazards and is aware of them while performing tasks.

- **Operation of equipment**: Displays proficiency in operating worksite equipment and/or machinery including marsh excavators, dredging equipment, airboats and other marine vessels; safely performs equipment inspections; safely operates machinery; diagnoses and performs minor maintenance and repairs on equipment.

- **Operating procedures**: Uses appropriate techniques and processes that include the latest methods, materials, tools and technologies associated with restoration construction projects such as marsh creation, the construction of river diversion structures and vegetative planting; coordinates the operation of equipment to ensure the satisfactory execution of each project in accordance with standards of governing bodies.

Industry Laws and Regulations:

Knowledge of federal, state and local laws and regulations governing coastal restoration construction projects.

- **Legal responsibilities**: Understands the legal responsibilities of construction firms conducting work on coastal restoration projects; performs duties in accordance with contractor responsibilities outlined in legal agreements with government clients.

- **Procedural and regulatory compliance**: Follows standards and procedures established by federal, state and local agencies overseeing restoration projects; demonstrates knowledge of agency jurisdiction; complies with all regulations issued by federal, state and local entities such as:
  - U.S. Army Corps of Engineers (USACE), U.S. Environmental Protection Agency (EPA), U.S. Fisheries & Wildlife Services (USFWS), Louisiana Office of Coastal Protection and Restoration (OCPR), Louisiana Department of Environmental Quality (DEQ), the Louisiana Department of Natural Resources (DNR), and local Public Works offices.

- **Legal framework**: Basic knowledge of relevant legislation such as the Clean Water Act, the National Environmental Policy Act (NEPA), the Endangered Species Act (ESA), the Coastal Wetlands Planning, Protection, and Restoration Act (CWPPRA), and USACE Permitting.

Quality Control and Assurance:

Ensures materials, processes, services and products meet quality specifications during and after production or performance.
Quality assurance: Verifies whether a project under construction meets specified requirements; inspects project sites during construction to catch problems before project completion; monitors quality of materials and work throughout the project lifecycle.

Quality control: Identifies quality standards for a coastal restoration construction project; ensures that completed projects conform to an establish set of quality standards within the industry; determines if a project meets industry codes and conforms to regulatory requirements; identifies defects or negative impacts to wetlands or other sensitive areas; reports quality failures to appropriate individuals for corrective action.

Health, Safety and Security:
Abides by the procedures necessary to ensure a safe and healthy work environment.

Safety procedures: Demonstrates knowledge of relevant occupational safety and health laws and regulations including the Occupational Safety and Health Administration (OSHA) standards; complies with safety codes, standards and guidelines; adheres to work-site safety programs; understands emergency response plans; demonstrates knowledge of first aid procedures; demonstrates knowledge of safe handling and disposal of materials with hazardous properties.

Safe behaviors: Is cognizant of surroundings; practices boater safety; uses caution while in the field and remains aware of unique hazards associated with restoration work.

Corrects unsafe situations: Identifies unsafe working conditions and takes prompt, corrective action; stays alert to, and takes preventive action against, hazards and threats; recommends measures to protect employees or workers from hazardous working conditions including appropriate use of personal protective equipment; follows protocol for reporting safety violations; investigates accidents to determine how to prevent future occurrences.

Customer Service:
Listens to the needs of state and federal agencies overseeing coastal restoration projects and provides personalized assistance to meet those needs.

Client services: Initiates contact with client; educates the client regarding potential and existing projects through telephone, email and face-to-face interactions; responds to client inquiries; ensures that appropriate actions were taken to meet client’s standards; resolves complaints, refers unresolved concerns to appropriate entities for further action.