


Cluster Level Report

Including Knowledge and Skills, and Performance Indicators



 Career Area: Ag, Food and Natural Resource Systems

 Cluster: **Natural Resources Management**

Industry-based knowledge and skill

Skill Type

NR 01.01 Acquire the specific academic knowledge and skills necessary to pursue a full range of career and post-secondary opportunities within natural resources management.

Technical Academic Skill

Performance Indicators

Delivery Level

NR 01.01.01	Pass academic assessment tests.
NR 01.01.01.01	Achieve an acceptable score on Oregon statewide academic assessments.
NR 01.01.01.02	Score successfully on an assessment test (e.g., SAT, Compass, to achieve entrance into a natural resources college program).
NR 01.01.02	Use reading and investigation strategies to obtain and analyze natural resources information from a variety of resources (e.g., books, journals, magazines and the Internet).
NR 01.01.02.01	Obtain required information through research to expand knowledge and skills for conversations, presentations and work assignments.
NR 01.01.02.02	Identify and access key resources appropriate for general reference materials (e.g., books, journals and magazines).
NR 01.01.02.03	Identify and access key resources appropriate for obtaining scholarly and academic information.
NR 01.01.02.04	Analyze materials to determine their value for research and development.
NR 01.01.02.05	Organize information by topics.
NR 01.01.02.06	Use word analysis strategies and dictionaries to demonstrate new words.
NR 01.01.02.07	Identify scope sequence and content of material.
NR 01.01.02.08	Break complex sentences apart to enhance understanding.
NR 01.01.02.09	Read difficult passages orally to further clarify understanding.
NR 01.01.03	Demonstrate knowledge and skill proficiency related to academic skills.
NR 01.01.03.01	Identify the academic skill levels necessary to work in a specific field.
NR 01.01.03.02	Identify the academic degrees or certifications required to enter a desired job/career.

Industry-based knowledge and skill

Skill Type

NR 02.01 Use oral and written communication skills in creating, expressing and interpreting natural resource management information and ideas including technical terminology.

Technical Academic Skill

Performance Indicators


Delivery Level

NR 02.01.01	Develop good reading skills and practices to enhance oral and written communications.
NR 02.01.01.01	Read a variety of materials that include technical concepts, knowledge and vocabulary to develop a broad knowledge base to enhance communication.
NR 02.01.01.02	Increase reading skills through reading and examining challenging material.
NR 02.01.01.03	Identify words, technical language and content for further study and analysis.
NR 02.01.02	Compose written materials to communicate technical information, either orally or in writing, to a variety of audiences.
NR 02.01.02.01	Incorporate multi-paragraph writing, technical concepts, knowledge and vocabulary to convey technical information.
NR 02.01.02.02	Develop and incorporate tables, charts, graphs and figures to support written and oral communications.
NR 02.01.02.03	Use information technology to design, produce and present written and multimedia materials.
NR 02.01.02.04	Produce written communications for journals, newsletters or other informative articles using language appropriate for the audience.

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Delivery Level

NR 02.01.02.05	Produce a document that describes and discusses aspects and components of the industry for people who are either not informed or not involved.
NR 02.01.03	Apply active listening skills to acquire information in both formal and informal circumstances.
NR 02.01.03.01	Identify and accommodate the personal communication styles of the participants to achieve full meaning in processing and sharing information.
NR 02.01.03.02	Demonstrate non-verbal attending (e.g., eye contact, body language, use of silence).
NR 02.01.03.03	Develop a portfolio to provide evidence of academic skills or proficiencies that are necessary for a specific natural resources job or career.
NR 02.01.03.04	Demonstrate skills in recognizing the variety of foci communication can take (e.g., speaker focus, topic focus, listener focus).
NR 02.01.03.05	Record and summarize information in written notes.
NR 02.01.04	Use speaking skills to present information orally in formal and informal situations.
NR 02.01.04.01	Access a broad range of technical concepts, knowledge and vocabulary to develop and conduct both formal and informal presentations and discussions.
NR 02.01.04.02	Identify and apply human relations skills to contribute effectively to group discussions and meetings (e.g., inclusiveness, safe environment for discussion, sensitivity to ethnic and social concerns).
NR 02.01.04.03	Identify characteristics of the audience and adjust the presentation to their knowledge and skill level
NR 02.01.04.04	Use technical terms and concepts correctly and in language that all audience participants can understand.
NR 02.01.04.05	Use logical organization and structure to achieve coherence of major points.
NR 02.01.06	Use speaking skills to conduct a dialogue regarding issues/opportunities in natural resources, in both formal and informal situations.
NR 02.01.06.01	Monitor listener behaviors when speaking in order to improve communication.
NR 02.01.06.02	Prepare presentations to explain issues of a natural resources industry to both large groups and individuals.
NR 02.01.06.03	Discuss aspects of the industry with an audience of both industry professionals and people who are not involved in the industry.

Industry-based knowledge and skill

Skill Type

NR 02.02	Communicate natural resource management technical information clearly and efficiently using templates, standard formats and technical instruments and tools.	Technical Career Skill
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Performance Indicators

Delivery Level

NR 02.02.01	Use technical language and tools to document work and progress.
NR 02.02.01.01	Record technical information (e.g., soil pH or water quality using a technical tool).
NR 02.02.01.02	Compose a technical report (e.g., food caloric value analysis using industry standard formats or templates).
NR 02.02.01.03	Communicate/ transfer documentation to others.

Industry-based knowledge and skill

Skill Type

NR 03.01	Solve natural resource problems using critical thinking skills (e.g., analyze, synthesize and evaluate, independently and in teams).	Technical Career Skill
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Performance Indicators


Delivery Level

NR 03.01.01	Use structured problem-solving methods to improve the performance of organizational or technological systems.
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Performance Indicators

Delivery Level

NR 03.01.01.01	Identify a written tool or a graphic organizer to illustrate the dynamics of the problem.
NR 03.01.01.02	Identify and apply the elements of management of oral forums to facilitate problem-solving.
NR 03.01.02	Use critical and judicious analysis of information to solve problems.
NR 03.01.02.01	Identify a process to analyze, synthesize and evaluate information and apply the implications to a variety of issues.
NR 03.01.02.02	Break large problems into smaller ones.
NR 03.01.02.03	Identify key issues involved in the problem and define the problem in concrete terms.
NR 03.01.02.04	Conduct research to broaden the understanding of a problem.
NR 03.01.02.05	Develop a matrix of pros, cons, risk liabilities and potential outcomes.
NR 03.01.02.06	Identify all affected parties.
NR 03.01.02.07	Brainstorm possible alternatives.
NR 03.01.02.08	Explore the consequences and potential impact of each alternative.
NR 03.01.03	Synthesize elements in a problem to develop a solution(s); include creative options.
NR 03.01.03.01	Verify information for completeness and accuracy.
NR 03.01.03.02	Identify key elements and show relationships through mapping.
NR 03.01.03.03	Prioritize recommendations and support with discussion.
NR 03.01.03.04	Identify and apply methods to obtain creative solutions (e.g., brainstorming, mind mapping).
NR 03.01.04	Evaluate problem solutions to determine their potential efficiency and effectiveness.
NR 03.01.04.01	Evaluate the problem solving process for efficiency and effectiveness.
NR 03.01.04.02	Evaluate the feasibility of each potential solution.
NR 03.01.04.03	Compare and contrast the actual outcomes with the anticipated outcome.
NR 03.01.04.04	Formulate a corrective action plan as necessary.

Industry-based knowledge and skill

Skill Type

NR 03.02 Access relevant resources to identify public policies, issues and regulations impacting natural resource management. **Technical Career Skill**

Performance Indicators


Delivery Level

NR 03.02.01	Review federal, state and local laws regulating natural resources management.
NR 03.02.01.01	Identify key information resources for changes to existing regulations, major laws and new laws.
NR 03.02.01.02	Describe the major regulations that impact the management of an individual resource (e.g., a timber stand).
NR 03.02.01.03	Identify business or farming practices that support or violate regulations.
NR 03.02.01.04	Based on current information sources, list significant issues that impact a natural resources business or industry.
NR 03.02.02	Research current issues related to natural resources management; identify resources (e.g., professional journals, research).
NR 03.02.02.01	Determine if resources and information are biased toward a particular objective or outcomes.
NR 03.02.02.02	Develop a list of priority issues that affect natural resources management.
NR 03.02.03	Gather public input for natural resources management decision-making.
NR 03.02.03.01	Conduct a local survey of public perceptions and desires concerning a natural resources issue(s).
NR 03.02.03.02	Analyze the results of a survey.
NR 03.02.03.03	Organize the results of the survey for a report.
NR 03.02.04	Synthesize information to evaluate public policy issues related to natural resources.

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Delivery Level

- NR 03.02.04.01 Identify alternatives to an issue's potential solution.
- NR 03.02.04.02 Evaluate alternatives for strengths and weakness and risk.
- NR 03.02.04.03 Recommend a solution based on research and analysis.

Industry-based knowledge and skill

Skill Type

NR 04.01 Use information technology tools to access, manage, integrate, create and communicate natural resource management information. **Technical Career Skill**

Performance Indicators


Delivery Level

- NR 04.01.01 Develop or incorporate a personal time management system to improve personal productivity.
- NR 04.01.01.01 Manage personal schedule and contact information.
- NR 04.01.01.02 Create memos and notes.
- NR 04.01.01.03 demonstrate and identify the functions and purpose of e-mail systems and applications.
- NR 04.01.02 Use electronic communicative applications.
- NR 04.01.02.01 Identify and demonstrate the functions and purpose of electronic communicative systems for professional use.
- NR 04.01.02.02 Demonstrate use of electronic applications to communicate within and across organizations.
- NR 04.01.02.03 Identify the professional and ethical responsibilities associated with using electronic communicative applications.
- NR 04.01.03 Use Internet applications.
- NR 04.01.03.01 Search for, access and validate information.
- NR 04.01.03.02 Develop an electronic filing system to manage information.
- NR 04.01.04 Use writing/publishing applications.
- NR 04.01.04.01 Prepare simple reports or a business communication.
- NR 04.01.04.02 Prepare complex reports and other business communications, integrating graphics and other non-text related elements.
- NR 04.01.04.03 Develop a filing system to manage a variety of resources.
- NR 04.01.04.04 Demonstrate how writing/publishing applications can enhance a professional presentation, including spell check, grammar and appropriate language.
- NR 04.01.05 Use presentation applications
- NR 04.01.05.01 Prepare and deliver presentations (e.g., training, marketing plans and information updates).
- NR 04.01.05.02 Demonstrate proficiency using the key features of a presentation application (e.g., PowerPoint to illustrate workforce employment projections in natural resources careers).
- NR 04.01.06 Use spreadsheet applications.
- NR 04.01.06.01 Demonstrate use of a spreadsheet application to document real or hypothetical business activity.
- NR 04.01.06.02 Set up a spreadsheet application (e.g., Excel).
- NR 04.01.07 Use database applications.
- NR 04.01.07.01 Manage, analyze and report on interrelated data elements to demonstrate product productivity, analyze costs, or project future sales.
- NR 04.01.07.02 Use application features to develop related charts and graphs (e.g., Excel, Access, File Pro) to present natural resources product information to a potential buyer.
- NR 04.01.08 Use collaborative/groupware applications.
- NR 04.01.08.01 Demonstrate the use of shared schedule and contact information to facilitate group work.
- NR 04.01.08.02 Demonstrate management of shared files and online applications to facilitate project team work.

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NR 04.01.08.03	Use interactive computer applications to work collaboratively from a distance.
NR 04.01.09	Use Geographic Information System/Global Positions System (GIS/GPS) applications.
NR 04.01.09.01	Create a map for a particular natural resources industry purpose (e.g., planning crop(s) field layout).
NR 04.01.09.02	Locate people, places or things (e.g., forest clear cuts, food processing plants).
NR 04.01.09.03	Identify the best route for travel for efficient transport of supplies, equipment or products such as timber.
NR 04.01.10	Use computer operations applications.
NR 04.01.10.01	Manage personal computer operation (e.g., set up, start up).
NR 04.01.10.02	Establish and maintain a file storage system including disk clean up.
NR 04.01.10.03	Compress or alter files.
NR 04.01.10.04	Use anti-virus applications.
NR 04.01.11	Use computer- based equipment (e.g., containing embedded computers/processors used to control electromechanical devices).
NR 04.01.11.01	Operate computer driven equipment and machines (e.g., lathes, pumps, irrigations systems).
NR 04.01.11.02	Use information from installation and operation manuals to set up and maintain equipment.
NR 04.01.11.03	Troubleshoot computer-driven equipment and machines and access support information.

Industry-based knowledge and skill

Skill Type

NR 05.01 Identify organizations in the natural resource management system and their roles.

Technical Career Skill

Performance Indicators


Delivery Level

NR 05.01.01	Analyze organization performance and goals to demonstrate the level of complexity of natural resources organizations and the natural resources system.
NR 05.01.01.01	Define the role and major functions of natural resources organizations to effectively utilize industry guidelines.
NR 05.01.01.02	Explain the major guidelines used by natural resources organizations to manage and improve performance.
NR 05.01.01.03	Identify the primary economic, social and technological changes and describe their impact on natural resources organizations and the industry during a specific period of time (e.g., the last twenty years).
NR 05.01.01.04	Identify primary technological changes and describe their impact in the industry (e.g., information technology and transportation).
NR 05.01.02	Manage and improve organizational systems to better serve customers.
NR 05.01.02.01	Develop a customer needs to identify methods to efficiently and professionally serve the needs of both internal and external customers.
NR 05.01.02.02	Develop and manage plans and budgets to accomplish organizational goals and objectives.
NR 05.01.02.03	Develop a plan to improve organizational performance including customer satisfaction and service/operations performance.
NR 05.01.02.04	Develop a plan(s) to maintain compliance with organizational policies and government laws and regulations.
NR 05.01.03	Identify the components of a natural resource systems to assess the system maintenance requirements.
NR 05.01.03.01	Develop a management plan to improve an agricultural or natural resource system in Oregon.
NR 05.01.03.02	Determine the goals and objectives for each system to manage organizational activities.

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Performance Indicators

Delivery Level

NR 05.01.03.03 Demonstrate the use of technical and system tools to access, manage, integrate, create and evaluate information.

Industry-based knowledge and skill

Skill Type

NR 05.02 Identify how utilization and management of renewable natural resources establishes the quality of life for the world.

Technical Career Skill

Performance Indicators

Delivery Level

NR 05.02.01 Examine the relationship between Carbon, Water, Photosynthesis and the sun as they establish and sustain life.

NR 05.02.01.01 Recognize renew and non renew resources

NR 05.02.01.02 Demonstrate multiple use concepts of natural resource management

NR 05.02.01.03 Apply sustained yield management

NR 05.02.02 Examine relationships and roles of business, government and society within the natural resource system.

NR 05.02.02.01 Identify and illustrate the consumerism triangle

NR 05.02.02.02 Describe the various grassroots community organizations that have utilize the natural resources as part of their core values / mission statement.

NR 05.02.02.03 Analyze the roles of the various grassroots community organizations in sustaining the natural resources.

NR 05.02.02.04 Examine the affect that special interest groups (SIGs), political action committees (PACs), and others have on the management of the natural resources.

Industry-based knowledge and skill

Skill Type

NR 06.01 demonstrate the importance of health, safety and environmental management systems and their significance to natural resource management organization performance and regulatory compliance.

Technical Career Skill

Performance Indicators

Delivery Level

NR 06.01.01 Explain how the regulations for health, safety and environmental care and protection are inter-related in a natural resources workplace.

NR 06.01.01.01 Identify major regulatory areas (e.g., personal protective equipment and government laws and regulations) related to a specific industry or workplace environment.

NR 06.01.01.02 Identify the health, safety and environmental management systems in natural resources and their impact on system components.

NR 06.01.01.03 Identify how government agencies promote compliance and improved health, safety and environmental performance using a measure or estimated benefits.

NR 06.01.01.04 Examine required government regulations that promote improved safety, health and environmental management systems and the resulting benefits to the industry or workplace.

NR 06.01.01.05 Examine logistics, distribution and transportation organizations and demonstrate understanding of their relevance and contributions to health, safety and the environment.

NR 06.01.02 Demonstrate the importance of safety, health and environmental compliance and performance in natural resources workplace for all employees.

NR 06.01.02.01 Define safety, health and environmental principles, guidelines and training, which promote personal commitment, ensure high level of performance, and a safe workplace.


NR 06.01.02.02 Develop a pollutions/waste prevention plan to contribute to the total productivity improvement and overall safety of the workplace.

NR 06.01.02.03 Summarize accident reports for a specific workplace and make recommendations for more effective procedures.

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Performance Indicators

Delivery Level

NR 06.01.02.04	Forecast the results of the implementation of improved safety procedures (e.g., reduction in employee and business insurance costs, reduction in time loss costs).
NR 06.01.03	Examine health risks associated with a particular skill or work assignment to develop workplace safety guidelines.
NR 06.01.03.01	Set personal safety priorities for a specific workplace.
NR 06.01.03.02	Identify and assess mental and physical stresses in the workplace.
NR 06.01.03.03	Identify how stress affects performance in the workplace.
NR 06.01.03.04	Identify risk levels for contamination and injury in a workplace (e.g., improper storage of pesticides, fertilizers, oils).
NR 06.01.03.05	Identify risk levels/factors for injury in a workplace (e.g., unstable stairs; poor lighting, machinery without proper working brakes).
NR 06.01.03.06	Identify how stress affects health in the workplace.

Industry-based knowledge and skill

Skill Type

NR 06.02 Identify health goals, emergency procedures for safety and first-aid for the natural resources workplaces and occupations. **Technical Career Skill**

Performance Indicators


Delivery Level

NR 06.02.01	Create safety/health precaution plans for participation in natural resources workplace projects.
NR 06.02.01.01	Develop goals and a plan to support safety, health and environmental policies and procedures.
NR 06.02.01.02	Develop a plan to improve health, safety and environmental management for a specific workplace.
NR 06.02.01.03	Create a personal professional development plan relating to health, safety and environmental procedures for a specific workplace.
NR 06.02.01.04	Arrange for and properly use personal protective clothing.
NR 06.02.01.05	Demonstrate specific actions to avoid hazardous work situations.
NR 06.02.02	Demonstrate current first-aid knowledge and procedures and show how they are used within natural resources work sites.
NR 06.02.02.01	Complete a recognized industry level first aid training program.
NR 06.02.02.02	Identify first aid responsibilities of trained employees in the event of workplace accidents.
NR 06.02.02.03	Acquire and maintain cardiopulmonary resuscitation (CPR) certification.
NR 06.02.02.04	Demonstrate knowledge of proper response procedures for medical emergencies in a natural resources workplace.
NR 06.02.03	Identify health and safety policies and procedures for natural resources.
NR 06.02.03.01	Attend safety training, and identify the policies and procedures for various natural resources occupations.
NR 06.02.03.02	Describe the health and safety policies and procedures relevant to specific worksites and assignments.
NR 06.02.04	Identify and implement appropriate management procedures for potential environmental hazards in the workplace.
NR 06.02.04.01	Identify general workplace safety hazards.
NR 06.02.04.02	Identify and demonstrate general workplace safety precautions/procedures.
NR 06.02.04.03	Explain the purpose of pollution control systems.
NR 06.02.04.04	Describe procedures to comply with environmental regulations.
NR 06.02.04.05	Demonstrate the handling of chemicals and safety equipment appropriately.
NR 06.02.04.06	Maintain environmental health and safety facilities.
NR 06.02.04.07	Handle chemicals and related safety equipment according to recommended protocols.
NR 06.02.05	Demonstrate knowledge and skills that prevent health and safety problems in the workplace.

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Performance Indicators

Delivery Level

- NR 06.02.05.01 Demonstrate ergonomic procedures for a specific job/workplace.
- NR 06.02.05.02 Develop an assessment tool to evaluate job/workplace safety.
- NR 06.02.05.03 Evaluate a safety-training plan; list its strengths, weakness, opportunities, and targets.
- NR 06.02.05.04 Demonstrate skills in observing all regulatory and safety standards.

Industry-based knowledge and skill

Skill Type

NR 06.03 demonstrate appropriate health and safety emergency procedures for natural resource management occupations. **Technical Career Skill**

Performance Indicators

Delivery Level

- NR 06.03.01 Develop a response plan to handle emergencies.
- NR 06.03.01.01 Identify the various requirements of an emergency response plan for a facility.
- NR 06.03.01.02 Develop an emergency response plan for natural disasters.
- NR 06.03.01.03 Develop an emergency response plan for a fire or explosion in a worksite.
- NR 06.03.01.04 Develop an emergency response plan for a flood affecting a natural resource region that incorporates the care and handling of animals.

Industry-based knowledge and skill

Skill Type

NR 07.01 Use leadership skills in collaborating with others to accomplish natural resource management organization goals and objectives. **Technical Career Skill**

Performance Indicators


Delivery Level

- NR 07.01.01 Demonstrate skills that represent key elements of leadership (e.g., empowerment, risk taking, communication, focusing on results, decision-making, problem-solving).
- NR 07.01.01.01 Demonstrate skill in working on projects both independently and in groups.
- NR 07.01.01.02 Identify desired outcomes and develop a plan of focus.
- NR 07.01.01.03 Develop a project plan, including activities, outcomes, timelines, budget and resources, etc.
- NR 07.01.01.04 Create a communication map and timeline.
- NR 07.01.01.05 Evaluate risks and incorporate risk elements after careful consideration.
- NR 07.01.01.06 Demonstrate confidence in others abilities through sharing tasks, considering their ideas and information and allowing them to work with minimum guidance and oversight.
- NR 07.01.01.07 Evaluate mistakes and indicate how these mistakes will influence future planning.
- NR 07.01.01.08 Evaluate action taken and make recommendations for improvements.
- NR 07.01.01.09 Identify methods for managing disappointments or failures.
- NR 07.01.01.10 Identify resources and potential sources.
- NR 07.01.02 Demonstrate human relations team building skills (e.g., empathy for others, service focus, listening, coaching).
- NR 07.01.02.01 Identify and practice key human relations skills in working with others (e.g., trustworthiness, reliability, listening, empathy, compassion).
- NR 07.01.02.02 Identify and practice a variety of communication skills to interact and work with others.
- NR 07.01.02.03 Research and identify methods to develop personal growth skills for all team members (e.g., respect and value others and their ideas, beliefs, cultural perspective, and their inter-generational perspective).
- NR 07.01.02.04 Identify barriers in building relationships and develop strategies to overcome these barriers and work cooperatively.
- NR 07.01.02.05 Demonstrate team building skills (e.g., empathy for others, service focus, listening, coaching).
- NR 07.01.02.06 Identify and practice methods to show appreciation to others for team member contributions.

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Delivery Level

NR 07.01.02.07	Identify examples of stewardship in leadership and discuss how these examples relate to today's leaders.
NR 07.01.03	Identify the skills of dynamic leaders and develop a plan to acquire those skills which coordinate with personal goals.
NR 07.01.03.01	Research and identify the unique skills/attributes of key leaders within a natural resources business or industry.
NR 07.01.03.02	Identify and demonstrate skills of persuasion and securing a commitment (e.g., securing a commitment to perform the agreed upon tasks identified in a project planning group).
NR 07.01.03.03	Demonstrate skill in evaluating risks and making a plan of action.
NR 07.01.03.04	Identify skills/attributes that qualify a person to serve as an agent of change.
NR 07.01.03.05	Identify methods to evaluate and accommodate opportunities and obstacles.
NR 07.01.03.06	Identify the skills/attributes and circumstances needed to conceptualize ideas.
NR 07.01.03.07	Identify steps to create a personal network for occupational/career needs.
NR 07.01.03.08	Develop a library of current reading materials relating to innovation and leadership.
NR 07.01.03.09	Demonstrate understanding of essential social graces and courtesies (e.g., table etiquette, handshakes, introductions, thank-you notes).
NR 07.01.04	Use extended learning activities (e.g., educational competitions, club/volunteer activities and project teams, to demonstrate leadership and project team skills).
NR 07.01.04.01	Clarify roles for partners who serve as both leaders and followers.
NR 07.01.04.02	Identify team goals.
NR 07.01.04.03	Identify team values and cooperative work practices.
NR 07.01.04.04	Demonstrate negotiating/facilitation skills to determine work assignments.
NR 07.01.04.05	Develop a Gant Chart or other visual to identify timelines for completion of project or tasks.
NR 07.01.04.06	Identify communication procedures and protocol.
NR 07.01.04.07	Identify procedures for evaluation of progress and outcomes.
NR 07.01.05	Identify the personal skills and attributes important in personal life and career goals and demonstrate/practice/refine these skills in an educational, family, workplace or community setting.
NR 07.01.05.01	Identify personal skills/attributes to acquire and hone (e.g., coping skills, time management skills, life long learning, study skills, compassion, self confidence, integrity, self-reflection, managing anxiety, healthy diet and exercise management).
NR 07.01.05.02	Identify methods for teaching and practicing personal skills/ attributes in a variety of settings.
NR 07.01.05.03	Develop a self-assessment tool to monitor progress in skill/attribute improvement.
NR 07.01.05.04	Keep a journal of personal activities, decisions, outcomes and self-reflection.
NR 07.01.05.05	Participate in a learning style self-assessment and identify how these skills/attributes affect and influence daily performance.
NR 07.01.05.06	Conduct a self- assessment using associates and leaders in the school or the workplace in an effort to identify how others perceive personal leadership and team skills.
NR 07.01.06	Identify methods to consider and respect all partners in the larger natural resources global workplace.
NR 07.01.06.01	Contribute to solving issues important to the community (e.g., conduct research, distribute accurate information, submit letters to editors, facilitate discussion groups).

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NR 07.01.06.02	Perform leadership tasks associated with citizenship (e.g., voting, debate, public forums, community beautification/restoration projects).
NR 07.01.06.03	Research trends and issues and apply knowledge to a natural resources decision making project.
NR 07.01.06.04	Demonstrate understanding of key local, state, nation and global natural resources issues.
NR 07.01.06.05	Define methods and techniques that promote understanding of diversity (e.g., comparing similar customs and practices; learning a second language).

Industry-based knowledge and skill

Skill Type

NR 08.01 Know and demonstrate the importance of professional ethics and legal responsibilities in natural resource management careers.

Technical Career Skill

Performance Indicators


Delivery Level

NR 08.01.01	Demonstrate knowledge of professional and workplace ethics and legal responsibilities and develop guidelines for workplace conduct.
NR 08.01.01.01	Develop a list of legal responsibilities for different roles and functions within an organization.
NR 08.01.01.02	Access appropriate resources to recognize and verify differences in ethical and legal responsibilities
NR 08.01.02	Use reasoning and problem-solving skills to assess ethical behavior in the natural resources workplace.
NR 08.01.02.01	Use problem mapping to identify pros and cons/ risks and liabilities to develop skills in ethical/legal reasoning and decision-making.
NR 08.01.02.02	08.01.02.02 Identify strategies for responding to unethical or illegal actions of individuals and organizations.
NR 08.01.02.03	Develop a plan to manage a resolution to a specific legal or ethical workplace issue.
NR 08.01.02.04	Evaluate the outcome(s) and impact of the legal or ethical problem resolution.
NR 08.01.02.05	Create a guidebook for a natural resources workplace for legal and ethical decision-making.
NR 08.01.03	Identify the entities that regulate natural resources legal and ethical decisions in a natural resources career or business.
NR 08.01.03.01	Identify the legal bodies that regulate the desired career locally, state and nationally.
NR 08.01.03.02	Identify national and international regulations that affect day-to-day operations in a desired career using library and Internet resources.
NR 08.01.03.03	Review appropriate resources to identify national and international rules associated with a desired natural resources business or industry.
NR 08.01.04	Develop a tool to assess ethical behavior in the workplace and identify how this behavior plays an integral role in all business.
NR 08.01.04.01	Observe and evaluate an ethical problem solving event in a workplace environment.
NR 08.01.04.02	Identify personal guidelines for managing personal/client relationships in the workplace.
NR 08.01.05	Demonstrate stewardship and ethical behavior within a natural resources business or industry.
NR 08.01.05.01	Explain how personal choices impact natural resources systems sustainability.
NR 08.01.05.02	Identify personal habits and actions that demonstrate workplace ethics.
NR 08.01.05.03	Identify and assess personal behavior relating to legal and ethical issues in natural resources management.

Cluster Level Report

Including Knowledge and Skills, and Performance Indicators



 Career Area: Ag, Food and Natural Resource Systems

 Cluster: **Natural Resources Management**

Performance Indicators

Delivery Level

- NR 08.01.05.04 Identify key laws and regulations within a natural resources system that may appear contrary to the benefit of business, industry, landowner, etc. and identify the legal and ethical implications.
- NR 08.01.05.05 Locate three new laws or regulations affecting a business or industry and identify the stewardship or ethical dilemma(s) and/or opportunities.
- NR 08.01.05.06 Develop a matrix to illustrate the essential elements of the law/regulation, the key stakeholders, the potential effect on each stakeholder and the cause and effect relationships of decisions.
- NR 08.01.05.07 Develop a policy paper that proposes a new law/regulation that protects the general public's resources as well as a natural resources industry (e.g., management of Oregon's wilderness).

Industry-based knowledge and skill

Skill Type

NR 08.03 Compare and contrast issues that affect technical fields in an Oregon natural resource management industry (e.g., biotechnology, employment, safety, environmental quality). **Technical Career Skill**

Performance Indicators

Delivery Level

- NR 08.03.01 Identify, analyze and present solutions for different broad impact issues relating to a technical field in an Oregon natural resources business or industry.
- NR 08.03.01.01 Identify the key issues affecting the industry.
- NR 08.03.01.02 Research and document key history and policies related to the issue(s).
- NR 08.03.01.03 Identify the key stakeholders or players affected by the issue.
- NR 08.03.01.04 Compare and contrast conflicting points of view regarding the issue(s).
- NR 08.03.01.05 Forecast the effects of the issue on the industry.
- NR 08.03.01.06 Propose potential resolutions to the issue(s).

Industry-based knowledge and skill

Skill Type

NR 09.01 Know and demonstrate the importance of employability skills for careers in natural resources. **Technical Career Skill**

Performance Indicators

Delivery Level

- NR 09.01.01 Apply critical thinking skills and decision-making to demonstrate qualifications for entering a career.
- NR 09.01.01.01 Explain written organizational policies, rules and procedures to guide employees in workplace behavior.
- NR 09.01.01.02 Identify and demonstrate positive work behaviors and personal qualities desired by most employers.
- NR 09.01.01.03 Demonstrate the relevance of critical thinking skills in decision making, creativity and quality performance in the workplace.
- NR 09.01.02 Identify career opportunities to help develop career plans.
- NR 09.01.02.01 Research and identify career opportunities in one or more career focus areas to discover personal preferences.
- NR 09.01.02.02 Use the Oregon Comprehensive Guidance and Counseling Framework to identify skills, experiences and ultimately, a career plan.
- NR 09.01.02.03 Interview an employer to identify the employer perspective of skills needed for this specific occupation or industry.

Industry-based knowledge and skill

Skill Type

NR 10.01 Demonstrate knowledge and skills related to critical technological systems (e.g., design, operation and maintenance for use in natural resource businesses and industries). **Technical Career Skill**

Performance Indicators


Delivery Level

- NR 10.01.01 Identify the use of key technological systems including transportation.
- NR 10.01.01.01 Evaluate transportation needs and identify the critical role and function of transportation-related technological systems.

Cluster Level Report

Including Knowledge and Skills, and Performance Indicators



 Career Area: Ag, Food and Natural Resource Systems

 Cluster: **Natural Resources Management**

Performance Indicators

Delivery Level

NR 10.01.01.02	Assess the reliability and performance of technological equipment or system and its relationship to business efficiency and productivity.
NR 10.01.01.03	Use assessment information to establish maintenance and use guidelines for technical systems.
NR 10.01.01.04	Identify major health, safety and environmental risks that may affect technological systems.
NR 10.01.01.05	Develop and implement a plan to manage major risks to technological systems (e.g., health, safety or environmental).
NR 10.01.02	Select and improve utilization of technological systems to improve production.
NR 10.01.02.01	Develop acceptable criteria to evaluate and select technological systems.
NR 10.01.02.02	Provide evidence (e.g., plans or work record that demonstrate efforts to improve performance of technological systems).
NR 10.01.03	Identify the technical skills required to efficiently run a business or industry within the field of natural resources.
NR 10.01.03.01	Demonstrate correct operation of the tools associated with a specific skill(s) or task(s) (e.g., use a calibrator to manage spray flow in pesticide application).
NR 10.01.03.02	Identify the types of technical skills needed to succeed in a desired industry (e.g., use a GPS for identifying locations for timber cruising).
NR 10.01.03.03	Identify the focus areas/methods/avenues to develop technical skills.
NR 10.01.04	Establish criteria or methods to identify career areas within natural resources that have specific needs for technical skills.
NR 10.01.04.01	Classify workplace occupations to determine what types of skills are considered technical skills.
NR 10.01.04.02	Evaluate specific processes or products to determine what technical skills are most often required for employment.
NR 10.01.04.03	Identify avenues of education and/or methods necessary to achieve the industry specific technical skills.

Industry-based knowledge and skill

Skill Type

NR 10.02 **KSS Use tools, equipment, machinery and technology to work in areas related to natural resources.** **Technical Career Skill**

Performance Indicators


Delivery Level

NR 10.02.01	Select the appropriate tool to perform a given task.
NR 10.02.01.01	Select tools and equipment for a project.
NR 10.02.01.02	Identify standard tools, equipment and related safety procedures.
NR 10.02.01.03	Demonstrate use of operating instructions.
NR 10.02.01.04	Demonstrate the set up and adjustment of tools and equipment.
NR 10.02.01.05	Demonstrate proper tool storage.
NR 10.02.01.06	Demonstrate how to check tool(s) condition before use.
NR 10.02.02	Maintain tools for efficient work use.
NR 10.02.02.01	Describe the characteristics of a tool in need of maintenance.
NR 10.02.02.02	Demonstrate how to replace tool parts and components as needed.
NR 10.02.02.03	Develop and maintain a preventive maintenance schedule.
NR 10.02.02.04	Maintain equipment according to owner's manual specifications.
NR 10.02.02.05	Maintain and repair a pump or a similar piece of equipment.
NR 10.02.03	Demonstrate the safe use of tools, equipment and vehicles, including the use of protective clothing.
NR 10.02.03.01	Wear appropriate Personal Protective Equipment (PPE).
NR 10.02.03.02	Demonstrate proper spacing and distance from others when using tools.
NR 10.02.03.03	Demonstrate tool safety check for proper working order before using.
NR 10.02.03.04	Demonstrate the safe use of a tool or piece of equipment.

Cluster Level Report

Including Knowledge and Skills, and Performance Indicators



 Career Area: Ag, Food and Natural Resource Systems

 Cluster: **Natural Resources Management**

Performance Indicators

Delivery Level

NR 10.02.03.05	Describe the safety regulations associated with specific tools and equipment.
NR 10.02.03.06	Identify the proper and safe use of a variety of vehicles (e.g., pick-up trucks, four wheel drive vehicles, front-end loaders, excavators, cranes, watercraft).
NR 10.02.03.07	Operate selected vehicles demonstrating safety precautions (e.g., pick-up trucks, four-wheel drive vehicles, front-end loaders, excavators, cranes, watercraft).
NR 10.02.03.08	Demonstrate the appropriate use and safe operation of pumps (e.g., diesel and gas engines, centrifugal pumps, positive displacement pumps, air and gas compressors).
NR 10.02.03.09	Demonstrate the appropriate use and safe operation of applicable miscellaneous equipment (e.g., hoists, winches, pulleys, boilers, irrigation and drilling, and associated equipment).
NR 10.02.04	Use tools to demonstrate the use of technology to expand human capacity.
NR 10.02.04.01	Use appropriate tools correctly for lifting and handling (e.g., forklifts, cranes, come a longs, chain falls, jacks).
NR 10.02.04.02	Demonstrate the use of knots, lines and attachments for rigging and moving (e.g., equipment, products).
NR 10.02.04.03	Use geo-spatial and mapping techniques (GIS/GPS) for natural resources work (e.g., locating field coordinates for tree planting).
NR 10.02.05	Demonstrate the use of compass and map reading skills associated with natural resource industries.
NR 10.02.05.01	Identify scale of a map.
NR 10.02.05.02	Interpret slope using maps.
NR 10.02.05.03	Identify the symbols on a topo map.
NR 10.02.05.04	Demonstrate accurate distances through using strides / pacing in compass use.
NR 10.02.05.05	Demonstrate the use a compass in navigating a topo map.
NR 10.02.05.06	Illustrate the principle of triangulation to determine your current position using map and compass.
NR 10.02.05.07	Participate or develop an orienteering course.
NR 10.02.05.08	Read and write legal land description to establish location on map.

Industry-based knowledge and skill

Skill Type

NR 10.04 Forecast the influence of emerging technology on widespread natural resource markets. **Technical Content Skill**

Performance Indicators


Delivery Level

NR 10.04.01	Research new technologies and project their impact in a global based market.
NR 10.04.01.01	Identify global regulations related to new technology and explain how they impact system changes.
NR 10.04.01.02	Identify and discuss how new technologies (e.g., lasers and robotics, are impacting natural resources systems).
NR 10.04.02	Identify how advances in technology affect the need for continuing education and/or career development in natural resource related industries.
NR 10.04.02.01	Explain how technological advances have altered the production practices within the natural resource industries.
NR 10.04.02.02	List technology used in current production practices within the natural resource industries.
NR 10.04.02.03	Identify budding technology and their potential affect on natural resources.
NR 10.04.02.04	Compare and contrast the different training / educational opportunities that provides training and support for technology in the natural resource industries.

Cluster Level Report

Including Knowledge and Skills, and Performance Indicators



 Career Area: Ag, Food and Natural Resource Systems

 Cluster: **Natural Resources Management**

Industry-based knowledge and skill

Skill Type

NR 11.01 Use economic principles to manage natural resources and produce products.

Technical Content Skill

Performance Indicators


Delivery Level

NR 11.01.01	Identify key economic principles and relate them to natural resource systems (e.g., supply and demand, opportunity costs).
NR 11.01.01.01	Define compound interest and explain its effect on natural resource investments.
NR 11.01.01.02	Describe the economic impacts of natural resource preservation in contrast to use of the resource.
NR 11.01.01.03	Identify potential entrepreneurial opportunities in natural resources.
NR 11.01.01.04	Describe the impacts of significant natural resource management decisions on global markets.
NR 11.01.01.05	Describe key economic principles (e.g., supply and demand, and relate their effect on natural resources economic and workforce systems).
NR 11.01.02	Economic affect of regulation and policy in the natural resource setting
NR 11.01.02.01	Conduct a cost benefit analysis of utilization of natural resource.
NR 11.01.02.02	Examine the global issues associated with natural resource regulations
NR 11.01.02.03	Identify the federal, state and local regulation and their effect on your local natural resource
NR 11.01.02.04	Examine the potential affect of federal, state and local regulation and their effect on your local natural resource
NR 11.01.02.05	Examine a local conversation project and determine where the resources are coming from and determine the projected benefit to the natural resource
NR 11.01.03	Identity alternative production practices with consideration of Economic trade-offs
NR 11.01.03.01	Compare and contrast organic vs. non-organic.
NR 11.01.03.02	Compare and contrast energy resources such as fossil vs. bio fuel.
NR 11.01.03.03	Compare and contrast affects of alternative harvest methods .
NR 11.01.03.04	Analyze economic impact or potential of multiple use management principles used within the natural resources.
NR 11.01.03.05	Examine the principles and applications of conservation vs. utilization of our natural resources.

Focus Area Level Report

Including Knowledge and Skills, and Performance Indicators



 Career Area: Ag, Food and Natural Resource Systems

 Cluster: Natural Resources Management

 Focus Area: **Forestry and Forest Products**

Industry-based knowledge and skill

Skill Type

FOR 01.01 Describe the ecological concepts and principles; investigate and explain the relationships between these principles and forest development.

Performance Indicators

Delivery Level

FOR 01.01.01	Identify biotic and wildland components of a forest ecosystem and explain their inter-relations.
FOR 01.01.01.01	Identify the food chain / food web of a typical forest.
FOR 01.01.01.02	Identify renewable and non-renewable resources in a forest ecosystem.
FOR 01.01.02	Describe anatomical and physiological plant characteristics and processes.
FOR 01.01.02.01	Explain the nutrient uptake of a plant (xylem and phloem).
FOR 01.01.02.02	Describe the growth and development of a plant.
FOR 01.01.02.03	Explain the process of photosynthesis.
FOR 01.01.02.04	Chart the process of transpiration; include notes.
FOR 01.01.02.05	Explain and illustrate shade tolerances among different tree species.
FOR 01.01.02.06	Explain the basic anatomy of plants.
FOR 01.01.02.07	Apply characteristics in nursery system practices and propagation.
FOR 01.01.03	Use the taxonomic classification to identify trees and shrubs.
FOR 01.01.03.01	Describe external plant characteristics.
FOR 01.01.03.02	Develop and use a dichotomous key.
FOR 01.01.03.03	Explain/illustrate the taxonomic structure.
FOR 01.01.03.04	Identify common Oregon plants to species.
FOR 01.01.03.05	Create a plant collection of important local species.
FOR 01.01.04	Identify and describe natural cycles and inter-relationships affecting forest growth and development.
FOR 01.01.04.01	Describe how carbon, oxygen, water, nutrients (nitrogen) cycles relate to forest growth and development.
FOR 01.01.04.02	Explain the process of forest succession and forest stand development.
FOR 01.01.04.03	Describe site adaptations including invasive species.
FOR 01.01.04.04	Identify/explain a keystone species and examine interrelationship of subsequence species.
FOR 01.01.04.05	Explain ecological interactions (e.g., population dynamics, food webs).
FOR 01.01.04.06	Evaluate soil profiles, land capability classes and soil conservation practices.

Industry-based knowledge and skill

Skill Type

FOR 05.01 Illustrate Oregon's diverse forests including history, cultural uses, forest types, policies, and industry.

Performance Indicators


Delivery Level

FOR 05.01.01	Describe or map forest types of Oregon.
FOR 05.01.01.01	Locate and describe the Spruce-hemlock forests and relevant facts.
FOR 05.01.01.02	Locate and describe the Douglas fir forests and relevant facts.
FOR 05.01.01.03	Locate and describe the mixed-conifer forests and relevant facts.
FOR 05.01.01.04	Locate and describe the sub alpine forests and relevant facts.
FOR 05.01.01.05	Locate and describe Juniper woodlands and relevant facts.
FOR 05.01.01.06	Locate and describe the Lodgepole Pine forests and relevant facts.
FOR 05.01.01.07	Locate and describe the Ponderosa Pine forests and relevant facts.
FOR 05.01.01.08	Explain the meaning of urban forests and identify where they are located.

Focus Area Level Report

Including Knowledge and Skills, and Performance Indicators



 Career Area: Ag, Food and Natural Resource Systems

 Cluster: Natural Resources Management

 Focus Area: **Forestry and Forest Products**

Performance Indicators


Delivery Level

FOR 05.01.02	Describe major trends in forest policy and associated socio-economic effect.
FOR 05.01.02.01	Explain the meaning of sustainability.
FOR 05.01.02.02	Compare and contrast the interpretations of “healthy” forests.
FOR 05.01.02.03	Identify global forestland trends.
FOR 05.01.02.04	Identify current state and federal legislation and map the trends over time.
FOR 05.01.02.05	Identify the affect of policy trends on timber harvests in Oregon in the last 50-80 years.
FOR 05.01.03	Identify land ownership and the corresponding management objectives.
FOR 05.01.03.01	Identify the owners.
FOR 05.01.03.02	Identify the long term goals and purpose.
FOR 05.01.03.03	Identify the key management strategies.
FOR 05.01.03.04	Forecast the long term effect(s) of these strategies.
FOR 05.01.04	Describe local, state and national historical individuals, events and the impact they had on forestry.
FOR 05.01.04.01	Research and document major events that had a significant effect on forest management at a local level.
FOR 05.01.04.02	Research and document major events that had a significant effect on forest management in Oregon.
FOR 05.01.04.03	Research and document major events that had a significant effect on forest management in the U.S. level.
FOR 05.01.04.04	Prepare a presentation to identify key figures who played a major role in forest management.
FOR 05.01.04.05	Identify the impact that the Tillamook Burn had on Oregon forestry policy and practices.
FOR 05.01.04.06	Identify the impact that Ed Schroeder had on Oregon forestry practices.
FOR 05.01.04.07	Develop an illustration that documents the historical use and management of forest systems. (e.g. native American, 1800’s to present)
FOR 05.01.05	Describe geographical, cultural, regional production uses of Oregon forest products.
FOR 05.01.05.01	Using an Oregon map, illustrate the dollar impact of lumber and wood products and employment by region or county.
FOR 05.01.05.02	Using an Oregon map, illustrate where various forest products are produced (e.g., lumber and engineered wood products, panel products/millwork, pulp paper and chemical products, playground equipment, wood crafts).
FOR 05.01.07	Identify a human impact on a natural resource.
FOR 05.01.07.01	Compare and contrast past activities vs. current practice with reference to soil compaction.
FOR 05.01.07.02	Compare and contrast past activities vs. current practice with reference to water management.
FOR 05.01.07.03	Compare and contrast past activities vs. current practice with reference to air quality.
FOR 05.01.07.04	Compare and contrast past activities vs. current practice with reference to fish and wildlife populations.
FOR 05.01.07.05	Compare and contrast past activities vs. current practice with reference to fire.

Focus Area Level Report

Including Knowledge and Skills, and Performance Indicators



 Career Area: Ag, Food and Natural Resource Systems

 Cluster: Natural Resources Management

 Focus Area: **Forestry and Forest Products**

Performance Indicators

Delivery Level

FOR 05.01.07.06	Compare and contrast past activities vs. current practice with reference to erosion.
FOR 05.01.08	Assess the social, ecological/environmental and economic effects of a forest management activity.
FOR 05.01.08.01	Discuss an impact(s) of the increased demand for forest products.
FOR 05.01.08.02	Examine and discuss the human pressure(s) on forestry systems.
FOR 05.01.08.03	Examine sustained yield of forest products in a green area.
FOR 05.01.09	Identify the historical use and management of forest systems. (e.g. native American, 1800's to present)
FOR 05.01.09.01	Identify the various historical tools used in forestry and explain / demonstrate their use.
FOR 05.01.09.02	Explain the use of fire as a management tool from a historical perspective.
FOR 05.01.09.03	Examine the different forestry management policies that have been enacted over and identify their affect.
FOR 05.01.09.04	Identify private and public land use practices and explain their impact on forest management.
FOR 05.01.09.05	Identify the various historical harvesting and processing techniques.
FOR 05.01.09.06	Explain how transportation and distribution of final forestry products have changed over time.

Industry-based knowledge and skill

Skill Type

FOR 05.02 Explain the human/natural resources relationships when implementing forest management activities.

Performance Indicators

Delivery Level

FOR 05.02.01	Describe a forest management activity.
FOR 05.02.01.01	Describe/illustrate reforestation techniques.
FOR 05.02.01.02	Identify different harvesting methods (past and present); explain where each method is most effective.
FOR 05.02.01.03	Investigate and evaluate different forest access methods.
FOR 05.02.01.04	Demonstrate techniques used for stream protection and riparian management.
FOR 05.02.01.05	Identify and recommend wildlife habitat enhancement techniques.
FOR 05.02.01.06	Develop a vegetative plan for improving wildlife habitat in urban areas.
FOR 05.02.01.07	Describe the procedure for an urban tree inventory.
FOR 05.02.01.08	Demonstrate proper tree planting/transplanting trees in the urban landscape.
FOR 05.02.01.09	Demonstrate proper tree pruning, trimming and fertilization techniques.
FOR 05.03.01	Identify the role of fire in the forest ecosystem.
FOR 05.03.01.01	Identify the different perspectives that have been held concerning forest fire policy.
FOR 05.03.01.02	Examine the concepts of prescribed fire in forest management practices.
FOR 05.03.01.03	Identify the techniques of prescribe fire in forest management practices.
FOR 05.03.01.04	Illustrate the concept of ecological succession in post forest fire regeneration.
FOR 05.04.01	Identify other uses of forest land
FOR 05.04.01.01	Explain the concept of eco-systems service (carbon banking, air quality)
FOR 05.04.01.02	Compare and contrast the multiple use principles of management (grazing, recreation, habitat)


Industry-based knowledge and skill

Skill Type

Focus Area Level Report

Including Knowledge and Skills, and Performance Indicators



 Career Area: Ag, Food and Natural Resource Systems

 Cluster: Natural Resources Management

 Focus Area: **Forestry and Forest Products**

FOR 07.01 Demonstrate skills essential for leadership and citizenship responsibilities.

Performance Indicators

Delivery Level

FOR 07.01.01	Know and apply the essential elements of leadership and citizenship.
FOR 07.01.01.01	Identify different models of leadership; recommend the best model for a project, program or systemic change.
FOR 07.01.01.02	Identify the differences between systematic change and systemic change.
FOR 07.01.01.03	Demonstrate knowledge of a local, state and national political processes which affect change management.
FOR 07.01.01.04	Lead a team to accomplish an authentic community project.
FOR 07.01.01.05	Demonstrate the use of facilitation and consensus building techniques in resolving issues.
FOR 07.01.01.06	Identify legal and ethical issues relating to leading an authentic project.
FOR 07.01.01.07	Analyze a topic, present both pros and cons in written format.
FOR 07.01.01.08	Demonstrate the ability to speak in public in both extemporaneous and prepared situations using a forestry related topic.
FOR 07.01.01.09	Create a web page to present and interpret a forestry related topic area or phenomenon.
FOR 07.01.01.10	Adapt an interpretive program or site to accommodate people.
FOR 07.01.01.11	Develop an operational plan for an interpretive center.
FOR 07.01.01.12	Set up and staff a display booth during a community event.
FOR 07.01.01.13	Develop a public use area to explain forestry (display board, interpretive signs, brochures, ect, ect).
FOR 07.01.01.14	Participate as a facilitator during a public meeting.
FOR 07.01.01.15	Volunteer in a forestry management area.

Industry-based knowledge and skill

Skill Type

FOR 09.01 Demonstrate skills in career research, planning, and preparation.

Performance Indicators


Delivery Level

FOR 09.01.01	Identify potential careers in the field of forestry and the workforce projections for that career.
FOR 09.01.01.01	Conduct a search on sites such as Oregon Labor Market Information, Oregon's Career Information System (CIS), Oregon Forest Resources Institute (OFRI), etc.
FOR 09.01.01.02	Research and identify the knowledge, skills proficiencies and educational requirements to enter a specific career.
FOR 09.01.01.03	Prepare a personal index and opportunities of essential knowledge and skills relative to career needs.
FOR 09.01.02	Identify the educational venues where knowledge and skills can be developed in preparation for an identified career; assess potential costs, loans and scholarships for education at these venues.
FOR 09.01.02.01	Develop an index of scholarships and grants that may be available to support education and training.
FOR 09.01.02.02	Identify a career(s) to target in a personal/career plan.
FOR 09.01.02.03	Update and enhance the personal education/career plan with information as acquired.
FOR 09.01.02.04	Develop an extended learning activity to gain knowledge and skills in a career area of interest.
FOR 09.01.02.05	Develop a career related project that supports the acquisition of a skill or credential requirement for a specific career.

Focus Area Level Report

Including Knowledge and Skills, and Performance Indicators



 Career Area: Ag, Food and Natural Resource Systems

 Cluster: Natural Resources Management

 Focus Area: **Forestry and Forest Products**

Performance Indicators

Delivery Level

FOR 09.01.02.06 Examine the different Professional organizations lead to induction into the forestry profession.

Industry-based knowledge and skill

Skill Type

FOR 10.01 Document and describe forest production practices and timber processing procedures.

Performance Indicators

Delivery Level

FOR 10.01.01 Observe and investigate and explain silviculture processes including regeneration, tending and harvesting.

FOR 10.01.01.01 Compare and contrast the silvicultural practices of even and uneven aged tree stands.

FOR 10.01.01.02 Describe silvicultural techniques (e.g., thinning, cleaning, weeding and other intermediate treatments).

FOR 10.01.01.03 Describe harvesting systems (e.g., aerial, cable, ground based).

FOR 10.01.01.04 Describe the history of harvest system development in Oregon.

FOR 10.01.01.05 Discuss the process of regeneration including seed genetics, and free to grow.

FOR 10.01.02 Prepare presentations to describe how forest products are produced, harvested, processed and used.

FOR 10.01.02.01 Observe and document a working mill and a harvest site.

FOR 10.01.02.02 Describe historical utilization of wood (e.g., the early importance of spruce in WWI, Douglas-fir and Ponderosa Pine).

FOR 10.01.02.03 10.01.02.03 Describe the shift in forest products utilization to engineered and composite products.

FOR 10.01.02.04 Compare and contrast disadvantage and/advantage of wood products to alternatives (e.g., steel).

FOR 10.01.03 Compare and contrast technology, policy, social and market driven forces that affect forestry practices.

FOR 10.01.03.01 Describe how silviculture is science-based integration of social, economic, ecological and technological concerns.

FOR 10.01.03.02 Describe historical utilization of wood (e.g., the early importance of spruce in World War I, Douglas-fir and Ponderosa Pine).

FOR 10.01.03.03 Describe a market shift due to state and federal government policy/regulation changes (NAFTA, taxation, laws).

FOR 10.01.03.04 Describe the market shift due to changes in oil prices.

Industry-based knowledge and skill

Skill Type

FOR 10.02 Summarize and explain applications of appropriate forest health practices.

Performance Indicators

Delivery Level

FOR 10.02.01 Identify a forest protection issue and describe the relationship between forest protection and forest health.

FOR 10.02.01.01 Identify a significant forest protection issue in Oregon.

FOR 10.02.01.02 Select an interpretation of the term "forest health".

FOR 10.02.01.03 Describe the relationship between the issues and this specific definition of forest health.

FOR 10.02.02 Identify symptoms of threatening pest and disease infestations.

FOR 10.02.02.01 Identify the five (5) most potentially economically devastating insects and the symptoms of these infestations in Oregon.


FOR 10.02.02.02 Define native vs non-native (invasive species) and list examples.

FOR 10.02.02.03 Describe insect detection methods.

Focus Area Level Report

Including Knowledge and Skills, and Performance Indicators



 Career Area: Ag, Food and Natural Resource Systems

 Cluster: Natural Resources Management

 Focus Area: **Forestry and Forest Products**

Performance Indicators

Delivery Level

FOR 10.02.02.04	Discuss acceptable methods of controlling potential insect and pathogen infestations, including Integrated Pest Management.
FOR 10.02.03	Identify control measures for pest and disease infestations.
FOR 10.02.03.01	List control measures for insect and pathogen infestations.
FOR 10.02.03.02	Apply a recommended control measure to an infestation.
FOR 10.02.03.03	Monitor the outcomes of the treatment including record maintenance.
FOR 10.02.04	Identify and implement appropriate fire suppression tools and techniques.
FOR 10.02.04.01	Identify basic wildland fire suppression tools.
FOR 10.02.04.02	Demonstrate safe use of tools and equipment.
FOR 10.02.04.03	Describe the basic tactics used for fire suppression (mechanical direct attack) and the fire triangle.
FOR 10.02.04.04	Explain the difference between wildland fire suppression tactics and strategies.
FOR 10.02.04.05	Describe wildland fire firefighting safety concepts including standards for survival (e.g., LCES, standard fire orders and fire watch out situations).
FOR 10.02.04.06	Demonstrate personal fire prevention precautions while working in forest environments.
FOR 10.02.04.07	Participate in a wildfire prevention project.
FOR 10.02.04.08	Meet industry standards for fire suppression training (e.g., National Wildfire Coordinating Group Firefight Certification Standards).
FOR 10.02.05	List timber stand improvement strategies (silviculture methods) to address a forest health issues.
FOR 10.02.05.01	Identify a situation where there is an affect from a stand improvement strategy.
FOR 10.02.05.02	Discuss when and how to implement salvage.
FOR 10.02.05.03	Discuss when and how to implement thinning.
FOR 10.02.05.04	Discuss when and how to implement restorations.
FOR 10.02.05.05	Discuss when and how to implement weeding.
FOR 10.02.05.06	Discuss when and how to implement spraying.
FOR 10.02.05.07	Discuss when and how to implement fertilizer application.
FOR 10.02.05.08	Discuss when and how to implement pesticide application.
FOR 10.02.05.09	When and how to implement a controlled burn?
FOR 10.02.06	Develop a plan to address a forest health issue.
FOR 10.02.06.01	Identify the threat.
FOR 10.02.06.02	Identify forest landowner objectives.
FOR 10.02.06.03	Determine possible treatments and assess the social, economic and environmental outcomes.
FOR 10.02.06.04	Develop a list of actions, timelines, benchmarks and costs.
FOR 10.02.06.05	Create a method to evaluate the success of the project.

Industry-based knowledge and skill

Skill Type

FOR 10.03 Identify multi-use principles to forests and associated lands (to include wild life, fish, recreation, water, energy, air, carbon and ect).

Performance Indicators


Delivery Level

FOR 10.03.01	Demonstrate an awareness of forest recreation management.
FOR 10.03.01.01	Identify types of land ownership and ownership rights.
FOR 10.03.01.02	Discuss legal responsibilities for private and public land owners when land is used by the public.

Focus Area Level Report

Including Knowledge and Skills, and Performance Indicators



 Career Area: Ag, Food and Natural Resource Systems

 Cluster: Natural Resources Management

 Focus Area: **Forestry and Forest Products**

Performance Indicators

Delivery Level

FOR 10.03.01.03	Discuss the loss and benefit of multiple uses.
FOR 10.03.01.04	Develop forest recreation management plan (e.g., user conflict, carrying capacity, impact).
FOR 10.03.01.05	Describe how recreational opportunities vary with ownership.
FOR 10.03.01.06	Develop an interpretation plan to describe a natural resource area (e.g., trail, materials signage).
FOR 10.03.02	Demonstrate an awareness of range land habitats, plants and animals, ecological succession, human uses.
FOR 10.03.02.01	Describe the relationships between rangeland plants and animals.
FOR 10.03.02.02	List plant requirements for optimum nutritional value (e.g., water, soil, and nutrients).
FOR 10.03.02.03	Explain over grazing and its effects on succession.
FOR 10.03.02.04	Develop a range management plan.
FOR 10.03.03	Demonstrate an awareness of water resources.
FOR 10.03.03.01	Diagram a local watershed location, boundaries and users.
FOR 10.03.03.02	Test and sample local water resource for water quality, etc.
FOR 10.03.03.03	Demonstrate stream enhancement techniques.
FOR 10.03.03.04	Use a stream classification system.
FOR 10.03.03.05	Describe the influence of weather and climatic factors.
FOR 10.03.03.06	Identify potential water pollution sources.
FOR 10.03.04	Demonstrate an awareness of special forest products.
FOR 10.03.04.01	Define/identify special forest products.
FOR 10.03.04.02	Identify specialty markets for forest products in the local area.
FOR 10.03.04.03	Identify local processors and wholesalers.
FOR 10.03.04.04	Evaluate historical consumer trends related to specialty products.
FOR 10.03.04.05	Forecast future demand of a specific special product.
FOR 10.03.04.06	Identify methods of harvesting of a special product.
FOR 10.03.04.07	Discuss the effects of special product harvesting on the eco-system.

Industry-based knowledge and skill

Skill Type

FOR 10.04 Apply cartographic (map) skills to forest management activities.

Performance Indicators

Delivery Level

FOR 10.04.01	Utilize map, compass reading, and related skills associated with forestry applications.
FOR 10.04.01.01	Monitor forest resource status and apply cartographic skills to obtain planning data to create a management plan.
FOR 10.04.01.02	Describe different types of maps.
FOR 10.04.01.03	Interpret map features and legend.
FOR 10.04.01.04	Determine map scale and actual distance.
FOR 10.04.01.05	Determine direction from a map.
FOR 10.04.01.06	Use directional tools with map to locate position.
FOR 10.04.01.07	Use land survey and coordinate system; determine percent (%) slope.
FOR 10.04.01.08	Use Geographic Information System (GIS) to interface and analyze resource data.
FOR 10.04.01.09	Conduct resource inventory and sample population studies.
FOR 10.04.01.10	Use sample plots and points.
FOR 10.04.01.11	Collect data concerning resource availability and health.
FOR 10.04.01.12	Prepare a technical report.


Industry-based knowledge and skill

Skill Type

Focus Area Level Report

Including Knowledge and Skills, and Performance Indicators



 Career Area: Ag, Food and Natural Resource Systems

 Cluster: Natural Resources Management

 Focus Area: **Forestry and Forest Products**

FOR 10.05 Apply forest mensuration techniques.

Performance Indicators

Delivery Level

FOR 10.05.01	Identify and use appropriate forestry tools used in mensuration (biltmore, clinometers, increment bore, foresters tape, ect, ect)
FOR 10.05.01.01	Monitor forest resource status and apply cartographic skills to obtain planning data to create a management plan.
FOR 10.05.01.02	Conduct resource inventory and sample population studies.
FOR 10.05.01.03	Use sample plots and points.
FOR 10.05.01.04	Conduct growth and volume yield analysis
FOR 10.05.01.05	Collect and interpret data concerning resource availability and health.
FOR 10.05.01.06	Prepare a technical report concerning data collected through forest mensuration..

Industry-based knowledge and skill

Skill Type

FOR 11.01 Prepare a business plan using accepted business management principles used in the production, processing, marketing and transportation of forest project / products.

Performance Indicators


Delivery Level

FOR 11.01.01	Incorporate economic principles to address the market structure and supply and demand of forest project / products.
FOR 11.01.01.01	Identify and develop value-added products.
FOR 11.01.01.02	Develop marketing and public relations campaigns.
FOR 11.01.01.03	Examine the entire cycle of production associated with forestry project / products.
FOR 11.01.02	Perform a cost benefit analysis for evaluation of a forest project / products.
FOR 11.01.02.01	Project income and expenses for production of a product.
FOR 11.01.02.02	Forecast economic trends that could affect the economic viability of the product.
FOR 11.01.03	Employ industry concepts and practices to manage inventory.
FOR 11.01.03.01	Maintain optimum inventory levels.
FOR 11.01.03.02	Apply just-in-time concepts.
FOR 11.01.03.03	Calculate costs of carrying inventory.
FOR 11.01.03.04	Perform logistics management.
FOR 11.01.03.05	Use technology and tools (e.g., word processors, spread sheets, data bases to keep accurate records for inventory).
FOR 11.01.04	Prepare accepted record keeping and accounting principles to accomplish business objectives.
FOR 11.01.04.01	Define and interpret financial statements.
FOR 11.01.04.02	Budget resources (e.g., capital, human, financial, time).
FOR 11.01.04.03	Manage assets for optimum utilization.
FOR 11.01.04.04	Evaluate credit uses and options.
FOR 11.01.04.05	Prepare and interpret financial statements (e.g., balance sheet, profit loss statement, cash flow statement).
FOR 11.01.04.06	Prepare tax forms (e.g., W-4, 19, Depreciation, 1099, Workers Compensation).
FOR 11.01.04.07	Determine cost of conducting business.
FOR 11.01.04.08	Compare and examine advantages and disadvantages of banking procedures (e.g., buy, lease, finance, risk).
FOR 11.01.04.09	Analyze investment options (e.g., buy, lease, finance, risks).
FOR 11.01.04.10	Manage risk of liabilities.

Focus Area Level Report

Including Knowledge and Skills, and Performance Indicators



 Career Area: Ag, Food and Natural Resource Systems

 Cluster: Natural Resources Management

 Focus Area: **Fish and Wildlife Resources**

Industry-based knowledge and skill

Skill Type

FW 01.01 Demonstrate the application of current science knowledge, concepts, principles and methodologies in management of fish and wildlife resources and businesses.

Performance Indicators


Delivery Level

FW 01.01.01	Research and describe the North American Biomes.
FW 01.01.01.01	Present the biomes and explain how they are classified and relate to Oregon.
FW 01.01.02	Research and describe the Ecological Regions of Oregon.
FW 01.01.02.01	Map and identify the regions specific to the state of Oregon
FW 01.01.02.02	Identify the fish and wildlife typically found in each region.
FW 01.01.03	Identify the essential disciplines related to the field of fish and wildlife resource management.
FW 01.01.03.01	Discuss the key principles of the science of ecology.
FW 01.01.03.02	Compare and contrast preservation and conservation.
FW 01.01.03.03	Demonstrate understanding of key principles of wildlife zoology.
FW 01.01.03.04	Demonstrate understanding of key principles of aquatic zoology.
FW 01.01.04	Use taxonomy to identify and classify biological and physical characteristics to identify and classify fish and wildlife resources.
FW 01.01.04.01	Identify and classify rodent and gnawing mammals.
FW 01.01.04.02	Identify and classify ungulate or hoofed mammals.
FW 01.01.04.03	Identify and classify predators
FW 01.01.04.04	Identify and classify scavengers
FW 01.01.04.05	Identify and classify waterfowl species.
FW 01.01.04.06	Identify and classify game birds.
FW 01.01.04.07	Identify and classify raptors.
FW 01.01.04.08	Identify and classify perching birds and songbirds.
FW 01.01.04.09	Identify and classify shore birds, egrets and herons
FW 01.01.04.10	Identify anadromous, diadromous and catadromous fish.
FW 01.01.04.11	Identify and classify fresh water reptiles and amphibians.
FW 01.01.04.12	Identify and classify fresh water mollusks and crustaceans.
FW 01.01.04.13	Identify and classify tree species and other woody vegetation.
FW 01.01.04.14	Identify and classify grass and forb species.
FW 01.01.04.15	Identify and classify rocks, minerals and soil types.
FW 01.01.05	Examine the natural cycles and related phenomena to describe ecologic concepts and principles.
FW 01.01.05.01	Describe the hydrologic, nitrogen, carbon and nutrient cycles. Examine how they relate to fish or wildlife management issue.
FW 01.01.05.02	Describe succession and relate it to a fish or wildlife management issue
FW 01.01.05.03	Describe population dynamics and relate to a fish or wildlife management issue.
FW 01.01.05.04	Compare the interdependence between producers and consumer (primary, secondary and ect).
FW 01.01.05.05	Describe a predator-prey relationship and relate it to a fish or wildlife management issue.
FW 01.01.05.06	Describe the influence of weather and climatic factors on a fish or wildlife issue.
FW 01.01.06	Collect and analyze qualitative and quantitative data using scientific methods.

Focus Area Level Report

Including Knowledge and Skills, and Performance Indicators



 Career Area: **Ag, Food and Natural Resource Systems**

 Cluster: **Natural Resources Management**

 Focus Area: **Fish and Wildlife Resources**

Performance Indicators


Delivery Level

FW 01.01.06.01	Assemble data for reports, plot test data, prepare analytical tabulations, statistical tables, charts and graphs and interpret test data.
FW 01.01.06.02	Properly collect, label and transport field samples.
FW 01.01.06.03	Survey land owners for changes in natural patterns, animal population, events (e.g., summarize in a matrix format).
FW 01.01.06.04	Prepare report on an on-site inspection or field investigation.
FW 01.01.06.05	Prepare reports on test findings.
FW 01.01.06.06	Use simple drafting procedures (mapping).
FW 01.01.06.07	Plot distances and elevations.
FW 01.01.06.08	Sketch contours.
FW 01.01.06.09	Plot cross-sections and profiles.
FW 01.01.06.10	Draw layout from survey field notes.
FW 01.01.06.11	Prepare a technical report on the status of fish and wildlife.
FW 01.01.07	Develop a plan to monitor or protect fish and wildlife resource.
FW 01.01.07.01	Conduct fish and wildlife inventory and population studies.
FW 01.01.07.02	Establish sample plots and photo points.
FW 01.01.07.03	Collect data concerning fish and wildlife health.
FW 01.01.07.04	Maintain databases of fish and wildlife health.
FW 01.01.07.05	Maintain an accurate field journal of surveys and observations.
FW 01.01.07.06	Use a Geographic Information System to analyze fish and wildlife resource data.
FW 01.01.07.07	Prepare a technical report using technology.
FW 01.01.07.08	Adjust strategies based on results of data and recommend changes in actions, if required.
FW 01.01.07.09	Describe the relationship of harvest levels to long-term availability of resources.
FW 01.01.08	Apply cartographic (map) skills to fish and wildlife activities.
FW 01.01.08.01	Interpret different types of maps, features and legend.
FW 01.01.08.02	Determine map scale, actual distance and direction.
FW 01.01.08.03	Determine elevation and terrain features from topographic maps.
FW 01.01.08.04	Use directional tools with map to locate position.
FW 01.01.08.05	Use land survey and coordinate system.
FW 01.01.08.06	Use GIS system to interface with geospatial data.
FW 01.01.08.07	Interpret photos and images.
FW 01.01.09	Identify water rights / policy associated with local area, state, region and national setting.
FW 01.01.09.01	Compare and contrast riparian rights to prior appropriation doctrine .
FW 01.01.09.02	Investigate the role of local water conservation groups such as your local watershed council.
FW 01.01.09.03	Examine the various laws that affect water rights (Clean water act, wetlands act and ect.).
FW 01.01.09.04	Identify local water rights in your community.
FW 01.01.09.05	Identify and quantify the role of the water master and state division of lands and how they interact with public and private entities.
FW 01.01.09.06	Describe regulating organizations, authorities, regions of coverage as it relates to water rights.
FW 01.01.10	Identify inter- stakeholders / organizations in the water management system and their roles.
FW 01.01.10.01	

Focus Area Level Report

Including Knowledge and Skills, and Performance Indicators



 Career Area: *Ag, Food and Natural Resource Systems*

 Cluster: *Natural Resources Management*

 Focus Area: ***Fish and Wildlife Resources***

Performance Indicators

Delivery Level

FW 01.01.10.02	Compare and contrast the philosophies and mission statements of the various water management groups.
FW 01.01.11	Identify issues related to water rights / policy (socio economic policies, endangered species and water rights)
FW 01.01.11.01	Compare the various national and regional water projects (Klamath, Columbia, municipalities) and their affect on local economies and resource utilization.
FW 01.01.11.02	Examine the Oregon Plan for Salmon Recovery
FW 01.01.11.03	Identify the interaction of endangered species and water priorities.
FW 01.01.11.04	Describe the water rights of Native American Tribes and groups.
FW 01.01.11.05	Compare and contrast the various uses of water resources (Transportation (navigation) , recreation, irrigation, municipalities and ect).
FW 01.01.11.06	Examine various issues associated with waste water.

Industry-based knowledge and skill

Skill Type

FW 01.02 Demonstrate knowledge of water management as it relates to fish and wildlife management (e.g., commercial and non-commercial, hydro power, irrigation, domestic water, ocean water).

Performance Indicators

Delivery Level

FW 01.02.02	Use the stream classification system in a problem/application.
FW 01.02.02.01	List stream classification systems
FW 01.02.02.02	Examine streams in your local area and classify it according to the accepted classification system.
FW 01.02.02.03	Analyze stream flow and determine is potential to support fish / wildlife and other uses

Industry-based knowledge and skill

Skill Type

FW 02.01 Communicate information about fish and wildlife using venues, methods and language appropriate for the target audience.

Performance Indicators

Delivery Level

FW 02.01.01	Clearly and accurately communicate verbally and in writing, scientific concepts, research findings and ideas to the general public and professionals.
FW 02.01.01.01	Prepare signage for a group to self-guide through an interpretative area.
FW 02.01.01.02	Conduct a workshop, activity, hike or program to interpret an example of fish and wildlife conservation.
FW 02.01.01.03	Develop an interpretive trail to describe a fish and wildlife habitat.
FW 02.01.01.04	Produce printed material that interprets a fish and wildlife area or phenomenon.
FW 02.01.01.05	Create a web page to present and interpret a fish and wildlife related topic, area or phenomenon.
FW 02.01.01.06	Adapt an interpretive program or site to accommodate people with special needs (ADA) (e.g., a tour, trail, slide show).
FW 02.01.01.07	Develop an operational plan for an interpretive center.
FW 02.01.01.08	Set up and staff a display booth during a community event.
FW 02.01.01.09	Develop a public use area to explain fish and wildlife resources.

Industry-based knowledge and skill


Skill Type

FW 03.02 Access relevant resources to identify public policies, issues and regulations impacting natural resource management.

Focus Area Level Report

Including Knowledge and Skills, and Performance Indicators



 Career Area: *Ag, Food and Natural Resource Systems*

 Cluster: *Natural Resources Management*

 Focus Area: ***Fish and Wildlife Resources***

Performance Indicators

Delivery Level

FW 03.02.01	Review federal, state and local laws regulating natural resources management.
FW 03.02.01.01	Identify key information resources for changes to existing regulations, major laws and new laws.
FW 03.02.01.02	Describe the major regulations that impact the management of an individual resource (e.g., a timber stand).
FW 03.02.01.03	Identify business or farming practices that support or violate regulations.
FW 03.02.01.04	Based on current information sources, list significant issues that impact a natural resources business or industry.
FW 03.02.02	Research current issues related to natural resources management; identify resources (e.g., professional journals, research).
FW 03.02.02.01	Determine if resources and information are biased toward a particular objective or outcomes.
FW 03.02.02.02	Develop a list of priority issues that affect natural resources management.
FW 03.02.03	Gather public input for natural resources management decision-making.
FW 03.02.03.01	Conduct a local survey of public perceptions and desires concerning a natural resources issue(s).
FW 03.02.03.02	Analyze the results of a survey.
FW 03.02.03.03	Organize the results of the survey for a report.
FW 03.02.04	Synthesize information to evaluate public policy issues related to fish and wildlife and examine the soci-economic cost of application .
FW 03.02.04.01	Identify alternatives to an issue's potential solution.
FW 03.02.04.02	Evaluate alternatives for strengths, weakness and risk.
FW 03.02.04.03	Recommend a solution based on research and analysis.

Industry-based knowledge and skill

Skill Type

FW 05.01 Summarize the history and the development, utilization and the protection of Oregon fish and wildlife resources.

Performance Indicators


Delivery Level

FW 05.01.01	Illustrate the importance of fish and wildlife resources to society.
FW 05.01.01.01	Create a product that illustrates the development of fish and wildlife resources in Oregon (display board, collage, ect).
FW 05.01.01.02	Display key highlights through a selection of pictures and text, and using correct grammar.
FW 05.01.02	Create a timeline to illustrate the key history of the development of Oregon fish and wildlife resources.
FW 05.01.02.01	Identify key highlights in sequence.
FW 05.01.02.02	Create a product that is visually appealing and reproducible.
FW 05.01.03	Create a video to illustrate the development of fish and wildlife resources in Oregon.
FW 05.01.03.01	Identify key highlights for Oregon.
FW 05.01.03.02	Create a product that is informative and accurate using correct grammar.
FW 05.01.03.03	Create a product that can be used for a variety of audiences.
FW 05.01.04	Conduct research of Oregon's fish and wildlife resources (e.g., the locations, purpose, usage, maintenance costs and revenues earned).
FW 05.01.04.01	Use research and technology skills to identify key resources.
FW 05.01.04.02	Develop a matrix that identifies key resources and components.
FW 05.01.04.03	Provide a web-ready summary.

Focus Area Level Report

Including Knowledge and Skills, and Performance Indicators



 Career Area: Ag, Food and Natural Resource Systems

 Cluster: Natural Resources Management

 Focus Area: **Fish and Wildlife Resources**

Performance Indicators

Delivery Level

FW 05.01.06	Describe the impact of emerging technologies on the development, utilization and protection of resources.
FW 05.01.06.01	Access libraries, internet resources, business or science journals to identify emerging technologies.
FW 05.01.06.02	Describe emerging technologies and the proposed impact on the development, utilization or protection of resources.

Industry-based knowledge and skill

Skill Type

FW 05.02 Illustrate the inter-relationships between human and natural resources in fish and wildlife habitat management in both captive and controlled environments in both captive and controlled environments.

Performance Indicators

Delivery Level

FW 05.02.01	Prepare a visual that illustrates the balance and interrelatedness of human and natural resources.
FW 05.02.01.01	Use creativity and technology skills to create a visual.
FW 05.02.01.02	Present the visual with a supporting written summary.
FW 05.02.01.03	Present the visual in a web-ready format.
FW 05.02.01.04	Orally present the ecological principles which support the visual.
FW 05.02.02	Compare and contrast the positive and negative consequences of outdoor enthusiasts and organizations.
FW 05.02.02.01	Discuss the pros and cons of outdoor enthusiasts and organizations.
FW 05.02.02.02	Prepare a written brief (paper) discussing the pros and cons.
FW 05.02.02.03	Conduct an informal debate or a seminar to evaluate the proposed pros and cons.
FW 05.02.03	Identify land zones and riparian zones and explain how they affect fish and wildlife habitat.
FW 05.02.03.01	Describe and locate riparian zones; identify purposes and impact, both positive and negative.
FW 05.02.03.02	Describe and locate a land zone; identify its purposes and impact, both positive and negative.
FW 05.02.03.03	Map and chart water flow and disposition.
FW 05.02.04	Identify key conservation issues in a fish and wildlife management area.
FW 05.02.04.01	Identify potential pollution sources and discuss the human/environmental effects.
FW 05.02.04.02	Define watershed boundaries and relate to a fish or wildlife issue.
FW 05.02.04.03	Identify both Point and non-point source pollution
FW 05.02.04.04	Examine the issue of domestic fish stock resources in international waters (foreign harvesting).
FW 05.02.04.05	Compare and contrast the various conservation issues (endangered species, hunting, recreation vehicles, road building, urbanization and ect).
FW 05.02.05	Identify how land management practices differ across a watershed and its effect on fish and wildlife habitat
FW 05.02.05.01	Define cumulative affect as it relates to watershed systems.
FW 05.02.05.02	Define and illustrate the Upstream vs down stream concept of management.
FW 05.02.05.03	Identify major land stakeholders and their potential impact on the watershed.

Industry-based knowledge and skill


Skill Type

FW 06.01

Focus Area Level Report

Including Knowledge and Skills, and Performance Indicators



 Career Area: **Ag, Food and Natural Resource Systems**

 Cluster: **Natural Resources Management**

 Focus Area: **Fish and Wildlife Resources**

Demonstrate knowledge of health, safety and risk management as related to fish and wildlife resources.

Performance Indicators


Delivery Level

FW 06.01.01	Analyze and apply state and federal guidelines for safety and health in fish and wildlife occupations.
FW 06.01.01.01	Review and apply OSHA guidelines.
FW 06.01.01.02	Review and apply HAZMAT guidelines.
FW 06.01.02	Recognize fundamental elements of accident prevention.
FW 06.01.02.01	Explain the statement "All accidents can be prevented."
FW 06.01.02.02	Demonstrate the characteristics of alert behavior.
FW 06.01.02.03	Demonstrate visual scanning.
FW 06.01.02.04	Identify "pinch points".
FW 06.01.02.05	Demonstrate lock out and tag out procedures.
FW 06.01.02.06	Prepare a list of emergency phone numbers, emergency exits, and emergency equipment locations.
FW 06.01.03	Recognize, assess and initiate safety precautions for hazardous situations where equipment, tools and technology are being used.
FW 06.01.03.01	Demonstrate safe use and maintenance practices for basic hand tools, and other equipment (e.g., electro fishing, radio telemetry, wildlife capture equipment, GPS, survey equipment, forestry equipment).
FW 06.01.03.02	Identify slick floors, overhead obstructions, and electrical hazards.
FW 06.01.03.03	Use blueprints to identify conduits
FW 06.01.03.04	Locate potential fire hazards.
FW 06.01.03.05	Use burning and flame permits and fire watch procedures.
FW 06.01.03.06	Assemble necessary personal protective clothing for specific tasks.
FW 06.01.03.07	Complete/renew CPR and First Aid Certification.
FW 06.01.04	Demonstrate knowledge of legal restrictions or chemical storage, use and application.
FW 06.01.04.01	Review and apply MSDS sheet instructions.
FW 06.01.04.02	Develop a plan for the safe use of a hazardous chemical.
FW 06.01.04.03	Create a safe storage check list for chemicals or bio-hazards.
FW 06.01.04.04	Determine what protective clothing is required for the safe application of a chemical.
FW 06.01.04.05	Create a database log of chemical inventory, use and application.
FW 06.01.05	Identify and demonstrate safe principles and practices in wildfire management.
FW 06.01.05.01	Demonstrate personal fire prevention precautions when working in fish and wildlife habitats.
FW 06.01.05.02	Participate in a wildlife prevention community service project.
FW 06.01.05.03	Use wildfire suppression techniques to demonstrate abilities in firefighting and control.
FW 06.01.05.04	Demonstrate application of industry standards for fire suppression and training (e.g., National Wildfire Coordinating Group Firefighter Certification Standards).
FW 06.01.06	Implement safety procedures when working with the public.
FW 06.01.06.01	Demonstrate precautions to use when interfacing with the public concerning regulations and law enforcement.
FW 06.01.06.02	Describe security issues for closed and restricted areas.
FW 06.01.06.03	Recognize potential threat situations to the public and other resource users.

Focus Area Level Report

Including Knowledge and Skills, and Performance Indicators



 Career Area: Ag, Food and Natural Resource Systems

 Cluster: Natural Resources Management

 Focus Area: **Fish and Wildlife Resources**

Performance Indicators

Delivery Level

FW 06.01.06.04 Describe solutions to issues concerning public protection; suggest management solutions.

FW 06.01.06.05 Identify appropriate law enforcement authority in Oregon.

Industry-based knowledge and skill

Skill Type

FW 07.01 Demonstrate skills essential for leadership and citizenship responsibilities.

Performance Indicators

Delivery Level

FW 07.01.01 Know and apply the essential elements of leadership and citizenship.

FW 07.01.01.01 Identify different models of leadership; recommend the best model for a project, program or systemic change.

FW 07.01.01.02 Identify the differences between systematic change and systemic change.

FW 07.01.01.03 Demonstrate a knowledge of local, state and national political processes which affect change management.

FW 07.01.01.04 Lead a team to accomplish an authentic community project.

FW 07.01.01.05 Demonstrate the use of facilitation and consensus building techniques in resolving issues.

FW 07.01.01.06 Identify legal and ethical issues relating to leading an authentic project.

FW 07.01.01.07 Analyze a topic, present both pros and cons in written format.

FW 07.01.01.08 Demonstrate the ability to speak in public in both extemporaneous and prepared situations using a fish and wildlife related topic.

Industry-based knowledge and skill

Skill Type

FW 09.01 Demonstrate skills in career research and planning, and preparation.

Performance Indicators

Delivery Level

FW 09.01.01 Identify potential careers and training in the field of fish and wildlife resources management and the workforce projections for that career.

FW 09.01.01.01 Conduct a personal search on sites such as Oregon Labor Market Information, Oregon's Career Information System, etc.

FW 09.01.01.02 Research specific careers of interest and prepare a personal index of essential knowledge and skills relative to career needs.

FW 09.01.01.03 Identify community colleges, private programs, universities and workforce training where knowledge and skills can be attained; identify potential costs.

FW 09.01.01.04 Develop an index of scholarships and grants.

FW 09.01.01.05 Locate an internship or volunteer opportunity to develop and hone necessary skills.

FW 09.01.01.06 Review data from employment sites, federal government sites, etc., and identify the wage progression for potential careers.

FW 09.01.01.07 Update and enhance the Oregon Education Plan and Profile with the information acquired.

FW 09.01.01.08 Develop an extended learning activity that supports the Oregon diploma requirements and a career target.

Industry-based knowledge and skill

Skill Type

FW 10.01 Demonstrate skills needed for a career fish and wildlife related occupations.

Performance Indicators

Delivery Level


FW 10.01 Demonstrate skills needed for a career fish and wildlife related occupations.

FW 10.01.01 Investigate production methods for non-commercial fish/wildlife species.

Focus Area Level Report

Including Knowledge and Skills, and Performance Indicators



 Career Area: Ag, Food and Natural Resource Systems

 Cluster: Natural Resources Management

 Focus Area: **Fish and Wildlife Resources**

Performance Indicators

Delivery Level

FW 10.01.01.01	Describe capture and transport techniques for fish and wildlife species.
FW 10.01.01.02	Explain techniques for marking fish and wildlife for research and monitoring (e.g., attaching radio transmitters, ear tags, fin tags).
FW 10.01.01.03	Determine the age and sex of fish and wildlife.
FW 10.01.01.04	Take various measurements of captured fish and wildlife species (e.g., weight, length, appendage length).
FW 10.01.01.05	Record and maintain accurate field notes and data forms.
FW 10.01.01.06	Interpret aerial photographs.
FW 10.01.01.07	Take various measurements of captured fish and wildlife species (e.g., weight, length, appendage length).

Industry-based knowledge and skill

Skill Type

FW 11.01 Apply accepted economic and business principles and practices to the management of production, processing, marketing, and transportation of fish and wildlife.

Performance Indicators


Delivery Level

FW 11.01.01.01	Demonstrate a knowledge of the different policies for designation of wilderness, primitive, and road less areas.
FW 11.01.01.02	Demonstrate a knowledge of the policies for protection of streams, rivers and watersheds.
FW 11.01.01.03	Demonstrate a knowledge of the policies for protection of estuaries, beaches and ocean waters.
FW 11.01.01.04	Demonstrate an understanding of the Northwest Power Act.
FW 11.01.01.05	Describe regulations which protect threatened and endangered species.
FW 11.01.01.06	Demonstrate knowledge of the National Environmental Policy Act and the Oregon Forest Protection Act.
FW 11.01.02	Research the economic issues which impact fish and wildlife management.
FW 11.01.02.01	Describe the essential elements and the impact of the Oregon Plan.
FW 11.01.02.02	Identify, contrast, and compare recreation issues as they relate to public, private, and sovereign land (e.g., hunting, fishing).
FW 11.01.02.03	Identify changes in environmental quality and natural resources, and discuss their potential positive and negative consequences to outdoor recreation (e.g., loss of anadromous fish runs, old growth forest).
FW 11.01.02.04	Explain the role of cultural and spiritual values in fish and wildlife issues.
FW 11.01.02.05	Explain the importance of ground water and surface water quality in relation to fish and wildlife.
FW 11.01.02.06	Explain land use issues related to the withdrawal of land into national parks, national monuments, wildlife preserves, wilderness, wetlands, and road less areas, dams, etc.
FW 11.01.02.07	Demonstrate an understanding of the Endangered Species Act and its relation to "endangered species" in ecosystem management.
FW 11.01.02.08	Demonstrate an understanding of the Marine Mammal Protection Act.
FW 11.01.02.09	Describe the impact of introduced species on native populations.
FW 11.01.02.10	Demonstrate a knowledge of range reform issues.
FW 11.01.02.11	Describe private landowner zoning issues and stewardship responsibilities for natural resources.
FW 11.01.02.12	Describe the relationship between marine mammals and salmon runs.
FW 11.01.02.13	Describe the impact of environmental contaminants on fish and wildlife resources.

Focus Area Level Report

Including Knowledge and Skills, and Performance Indicators



 Career Area: **Ag, Food and Natural Resource Systems**

 Cluster: **Natural Resources Management**

 Focus Area: **Fish and Wildlife Resources**

Performance Indicators

Delivery Level

FW 11.01.02.14	Demonstrate a knowledge of treaties with Indian tribes and the U.S. Government, and their relationships with fish and wildlife management, harvest management, protection, and restoration.
FW 11.01.03	Identify the economic impact of production, harvesting and transportation a commercial and/or non-commercial fish and wildlife commodity for the state of Oregon.
FW 11.01.03.01	Describe the basic economic factors that affect management decisions in the use of fish and wildlife resources.
FW 11.01.03.02	Explain the importance of fish and wildlife resource impacts on the local and regional economy.
FW 11.01.03.03	Use economic decision-making tools to increase the profitability of fish and wildlife enterprises (e.g., commercial fishing or sport fishing).
FW 11.01.03.04	Calculate the estimated fixed cost and variable costs for a fish and wildlife enterprise, such as commercial fishing or sport fishing.
FW 11.01.04	Document and describe Oregon production, harvesting and transportation practices and procedures related to fish and wildlife activities.
FW 11.01.04.01	Describe the process of gill netting and catching of non-commercial species and discuss its use in Oregon.
FW 11.01.04.02	Discuss impact of hatchery-raised fish on native species in Oregon.
FW 11.01.04.03	Identify wildlife that are harvested in Oregon; describe the purpose and impact to the environment and economy.
FW 11.01.04.04	Document laws that apply to the transporting of fish and wildlife within and across state lines.
FW 11.01.04.05	Identify and implement currently recommended practices that ensure the protection of fish and wildlife resources and support the maximum sustainable yield.
FW 11.01.04.06	Describe how public recreation is used as a product.
FW 11.01.05	Explain the components of healthy animal systems.
FW 11.01.05.01	Apply industry standards and practices to captive and non-captive environments.
FW 11.01.05.02	Apply industry standards in monitoring animal care.
FW 11.01.05.03	Identify healthy, physically compromised animals and abnormal animal behavior.
FW 11.01.06	Investigate production methods for commercial fish/wildlife species.
FW 11.01.06.01	Maintain, analyze, diagnose and repair life support systems and their components.
FW 11.01.06.02	Explain various concepts associated with fish and wildlife habitat relationship (e.g., habitat components and concepts, habitat management).
FW 11.01.06.03	Explain the aspects of fish hatcheries (e.g., hatchery boxes, installation of fish ladders and the effect on native species).
FW 11.01.06.04	Describe the differences in short plant processing and processing at sea.
FW 11.01.06.05	Explain the principles of harvesting fish and wildlife populations, and the role it plays in management.
FW 11.01.06.06	Discuss industries' recognition of their role in the management of resources for the continued harvest of fish stocks.
FW 11.01.06.07	Discuss environmental impacts on fish reds (e.g., logging, oil spills, sedimentation, and numbers of returning fish).