



Australian Government

Department of Education, Employment and Workplace Relations

MSS024003A Apply an understanding of environmental principles to a site

Release: 1

MSS024003A Apply an understanding of environmental principles to a site

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers the ability to ‘read the landscape’ in terms of the physical and biological components of the environment and the ecological linkages in operation at a site. Personnel are required to apply basic principles of geomorphology, hydrology and ecology in a systematic, scientific appraisal of site condition. This requires sufficient knowledge of chemistry, physics, geology and biology to support a scientific approach to field ecology.

Application of the Unit

This unit of competency is applicable to environmental technicians in a range of industry sectors, such as:

- environmental services (e.g. sampling and monitoring of air quality, water, soil and noise)
- environmental compliance, auditing and inspection
- groundwater, clean water (e.g. catchments, supply and environmental flows)
- water treatment, storm and wastewater management
- solid and hazardous waste management, and site remediation
- management of contaminated sites
- geotechnical services and civil engineering
- natural resource management.
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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

Not applicable.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

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| 1 | Prepare for site inspection | 1.1 | Obtain and use maps, photos and related documentation to gain a preliminary understanding of site features |
| | | 1.2 | Collect site-specific or regional data on expected flora, fauna, soils and climate |
| | | 1.3 | Review site history and previous environmental or ecological studies, if available |
| | | 1.4 | Review all emergency plans, risk assessments, and safety and environmental management requirements associated with the field activities |
| | | 1.5 | Review legislative and planning instruments applicable to current and future site usage |
| | | 1.6 | Confirm site access requirements and identify potential site hazards |
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| 2 | Conduct initial site survey | 2.1 | Sketch, map and/or photograph the site |
| | | 2.2 | Observe and record the surface geology and geomorphology of the site |
| | | 2.3 | Observe and record hydrology of the site |
| | | 2.4 | Observe and record the major flora of the site |
| | | 2.5 | Observe and record evidence of site fauna |
| | | 2.6 | Observe and record infrastructure and other modifications to the site |
| | | 2.7 | Consider the potential for presence of cultural and indigenous heritage items and record, as necessary |
| | | 2.8 | Check for evidence of illegal or inappropriate activities |

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| 3 | Make an initial assessment of site condition | 3.1 Use geomorphological and hydrological observations to describe surface condition and infer potential future impacts |
| | | 3.2 Make inferences on apparent ecological health of the site to plan for an initial ecological study of the site |
| | | 3.3 Determine the physical, chemical and biological parameters that would need to be measured and/or sampled during subsequent ecological appraisal of the site |
| 4 | Prepare for field study | 4.1 Identify and describe the biological and chemical components of interest, sampling areas and field techniques to be used |
| | | 4.2 Identify, obtain and check required equipment and materials required for field study |
| | | 4.3 Securely stow all field equipment in vehicle to prevent damage in transit |
| | | 4.4 Safely transport all field equipment to site and prepare it for use |
| 5 | Perform a basic ecological field study of the site | 5.1 Perform ecological sampling for abundance and diversity parameters using the general techniques of transects and quadrats |
| | | 5.2 Record appropriate descriptions of the habitat structure |
| | | 5.3 Perform sampling for simple population, demographic and age structure parameters |
| | | 5.4 Perform simple sampling and measurements on abiotic components |
| | | 5.5 Perform simple targeted species sampling |
| | | 5.6 Ensure compliance with relevant legislation, policy, codes of practice and accepted enterprise procedures |

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| 6 | Finalise field study | 6.1 | Ensure all samples and data are stored safely |
| | | 6.2 | Rehabilitate sampling sites to render them safe and minimise environmental impacts |
| | | 6.3 | Clean all equipment, containers, work area and vehicles according to enterprise procedures |
| | | 6.4 | Pack and safely transport all samples, equipment and supplies back to home base |
| | | 6.5 | Ensure dispatch of collected samples for subsequent analysis, as necessary |
| | | 6.6 | Check serviceability of all equipment before storage |
| 7 | Process and present field data | 7.1 | Summarise field data using simple calculations, graphs, tables and/or maps |
| | | 7.2 | Provide reports that include simple conclusions and interpretations based on raw or summarised data |
| 8 | Maintain a safe work environment | 8.1 | Use defined safe work practices and personal protective equipment to ensure personal safety and that of others |
| | | 8.2 | Minimise the generation of waste |
| | | 8.3 | Ensure the safe collection of all hazardous wastes for appropriate disposal |

Required Skills and Knowledge

Required skills

Required skills include:

- site observational skills, including the ability to ‘step back’, question and interpret those observations
- researching and summarising existing data and reports
- communicating effectively
- planning and preparing for field activities
- field sampling and monitoring procedures, including labelling and traceability
- demonstrating correct and safe use of field instruments and/or equipment under laboratory and field conditions, including field calibration
- identifying and rectifying basic instrument faults
- writing/compiling concise and accurate reports
- responding effectively to changed or unforeseen circumstances
- seeking advice when issues/problems are beyond scope of competence/responsibility
- working safely for the protection of self and others

Required knowledge

Required knowledge includes:

- scientific terminology for environmental and ecological systems relevant to job role
- the structure of earth systems, including lithosphere, hydrosphere, atmosphere and biosphere (ecosphere)
- key concepts and principles of geomorphology, climate and hydrology
- fundamental concepts and principles in chemistry, physics, geology and biology to support a scientific approach to basic field ecology
- energy and material flows and cycles, including biogeochemical cycles
- the fundamentals of ecology, including:
 - ecosphere, biome and major ecosystem types
 - trophic structure of ecosystems, and hierarchies
 - organism, population, community, ecosystem hierarchy; habitat and biodiversity
 - abiotic and biotic components and their interrelationships and dependencies
 - ecological systems and dynamics; stability, succession and disruption
- specific legislation, policies and codes of practice related to ecological field activities
- ecological, chemical and physical field monitoring procedures relevant to job role
- procedures for maintaining, storing and transporting samples/specimens to ensure their wellbeing, viability and integrity

- relevant health, safety and environment requirements, including field safety/survival principles

Evidence Guide

Overview of assessment	Competency must be demonstrated in the ability to perform consistently at the required standard.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	<p>Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include:</p> <ul style="list-style-type: none"> • applying relevant aspects of environmental legislative and planning framework to site appraisal • researching, reviewing and summarising site environmental history • identifying key aspects of emergency, safety or environmental management plans that relate to a defined field activity • applying a working knowledge of relevant terminology, concepts and principles in geology, geomorphology, hydrology and ecology to provide a scientific, systematic appraisal of site environmental condition • planning and performing an ecological study and obtaining relevant, reliable data • demonstrating correct use of field instruments and/or equipment under laboratory and field conditions, including field calibration • applying sampling, testing and data quality procedures to accurately perform field tests • recording and reporting appraisal of site condition • working safely.
Context of and specific resources for assessment	<p>This unit of competency is to be assessed in the workplace or a simulated workplace environment. Assessment should emphasise a workplace context and procedures found in the candidate's workplace. This unit of competency may be assessed with:</p> <ul style="list-style-type: none"> • <i>MSL974007A Undertake environmental field-based monitoring</i>

	<ul style="list-style-type: none"> • field-based environmental monitoring units, such as: <i>MSS024009A Assist with assessing and monitoring stormwater systems or MSS025013A Assist with assessing and monitoring wetlands</i> • <i>MSS024004A Process and present environmental data.</i> <p>The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team.</p> <p>Resources may include:</p> <ul style="list-style-type: none"> • access to suitable sites and a vehicle • vehicles, survey equipment, sampling/monitoring equipment, cameras, consumables and manuals • work program, enterprise procedures, codes of practice and field protocols • information, such as maps and flora/fauna keys.
Method of assessment	<p>The following assessment methods are suggested:</p> <ul style="list-style-type: none"> • review of data, results and site reports prepared by the candidate • feedback from peers and supervisors that the candidate consistently follows enterprise procedures, survey, sampling/measurement methods, and works safely • oral/written questioning associated with appraisal of environmental site condition • observation of the candidate conducting site appraisals • review of records completed by the candidate. <p>In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly.</p> <p>Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.</p> <p>The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.</p>
Guidance information for assessment	

Range Statement

<p>Codes of practice</p>	<p>Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used</p>
<p>Legislation, standards, codes, procedures and/or enterprise requirements</p>	<p>Legislation, standards, codes, procedures and/or enterprise requirements may include:</p> <ul style="list-style-type: none"> • federal legislation, such as: • Environment Protection and Biodiversity Conservation Act 1999 • state/territory government legislation and regulations and local government by-laws, policies, and plans dealing with: • land use, acquisition, planning and protection • environmental protection • cultural/heritage protection • vegetation management • nature conservation, wildlife/plant protection, prevention of cruelty to animals and quarantine • water and water management • soil conservation • pollution and contaminated sites • fisheries, forestry and mining operations • codes of practice dealing with the care and use of animals for scientific purposes • national environment protection measures • government policy (e.g. sustainable development and impact assessment) • Australian and international standards, such as: • AS ISO 14050:1999 Environmental management - Vocabulary • AS/NZS ISO 14000 Basic Set:2007 Environmental management basic set • AS/NZS 2031:2001 Selection of containers and preservation of water samples for microbiological analysis • AS 1726:1993 Geotechnical site investigations • enterprise sampling and monitoring protocols • equipment manuals and warranties, supplier catalogue and handbooks • material safety data sheets (MSDS)

	<ul style="list-style-type: none">• occupational health and safety (OHS) national standards and codes of practice• site-specific requirements• specific environmental standards
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Ecological principles and concepts	<p>Ecological principles and concepts may include:</p> <ul style="list-style-type: none"> • ecosphere, biome and major ecosystem types • ecological niche and biogeography • trophic dynamics, autotrophs, heterotrophs and detritivores, and food webs • distribution and abundance of organisms, populations and communities, and biodiversity • abiotic and biotic components and their interrelationships and dependencies • energy and material flows and cycles, including biogeochemical cycles • population ecology: <ul style="list-style-type: none"> • distribution, abundance and dispersion • growth rates and age structures • migration and dispersal in space and time • behavioural ecology (communication and learning, aggression and territoriality, and social group dynamics) • community ecology (ecological interactions): <ul style="list-style-type: none"> • intra/interspecific competition • concepts of coexistence, adaptive and competitive, including mimicry, coevolution, parasitism, mutualism, commensalism and predator/prey systems • species diversity in time and space
Earth science principles and concepts	<p>Earth science principles and concepts may include:</p> <ul style="list-style-type: none"> • geology: <ul style="list-style-type: none"> • earth structure and plate tectonics • classification of rocks (e.g. igneous, sedimentary, volcanic and stratigraphy) • weathering • geomorphology: <ul style="list-style-type: none"> • erosion and mass wasting • transportation and deposition, and sedimentation • fluvial, aeolian, hillslope and weathering processes • soil science: <ul style="list-style-type: none"> • soil classification • soil formation and soil profiles • pedology • edapology
Hydrological principles and concepts	<p>Hydrological principles and concepts may include:</p> <ul style="list-style-type: none"> • the hydrologic cycle:

	<ul style="list-style-type: none">• run-off• infiltration• subsurface flow• water quality• ecohydrology• hydrogeology• water resources• hydrologic measurement:• surface flows (stream gauging)• groundwater (infiltration and flow)• precipitation and evaporation
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Enterprise procedures for field activities	<p>Enterprise procedures for field activities may include:</p> <ul style="list-style-type: none"> • field notebooks or log books • standard operating procedures covering fieldwork, sampling and testing • equipment operating manuals, calibration procedures, instrument fault-finding procedures and general maintenance and repair procedures • emergency, first aid and survival procedures • requirements related to protection of the environment • incident/accident/injury report forms
Equipment	<p>Equipment may include:</p> <ul style="list-style-type: none"> • navigation and communication equipment (e.g. compass, maps, global positioning system (GPS), two-way radio and mobile phone) • survey equipment • sampling equipment and containers, and animal cages • parameter specific meter or multi-probes (e.g. dissolved oxygen, electrical conductivity, pH, turbidity, nitrates, phosphates and temperature) • field test kits to determine such parameters as dissolved gases, chemical anions and cations, heavy metals, E. coli and biological oxygen demand (BOD) • portable colourimeters and field microscopes • filters and sieves • soil monitoring kits • data loggers • first aid equipment
Field monitoring activities and skills	<p>Field monitoring activities and skills may include:</p> <ul style="list-style-type: none"> • sample collection, preservation, labelling, storage, and transportation according to enterprise procedures • correct use and calibration of field instruments according to written instructions • correct and accurate performance of field tests for specific parameters • clear and accurate recording of data • safe operation of motor vehicles and boats
Hazards	<p>Hazards may include:</p> <ul style="list-style-type: none"> • solar radiation, dust and noise • personnel getting lost • accidents, emergencies and incidents, such as snake,

	<p>insect or animal bites</p> <ul style="list-style-type: none"> • exposure to severe weather conditions • manual handling of heavy objects • vehicle and boat handling in rough/remote conditions
<p>OHS and environmental management requirements</p>	<p>OHS and environmental management requirements:</p> <ul style="list-style-type: none"> • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Environmental

Custom Content Section

Not applicable.