Code	Title
AHCARB613	Conduct complex tree hazard and health assessment post-fire unit

Modification history

Release	Comments
Release 1	This version released with AHC Agriculture, Horticulture, and Conservation and Land Management Training Package Version 10.0.

AHCARB613	Conduct complex tree hazard and health assessment post-fire
Application	This unit of competency describes the skills and knowledge required to conduct complex assessment of risks, health and values of fire affected or fire damaged trees post-early stages of bushfire recovery and make recommendations on tree treatment. The unit applies to professional arborists whose work involves complex hazard and health assessment of fire affected or fire damaged trees post-early stages of bushfire recovery. No licensing, legislative or certification requirements apply to this unit at the time of publication.
Prerequisite Unit	AHCARB513 Examine and assess trees AHCARB408 Perform a ground-based tree defect evaluation
Unit Sector	Arboriculture (ARB)

Elements	Performance Criteria
Elements describe the essential outcomes.	*Performance criteria describe the performance needed to demonstrate achievement of the element.*
1. Prepare to undertake assessment of fire damaged or fire affected tree	1.1 Determine job requirements from work plan or instruction and, where required, seek clarification from appropriate personnel 1.2 Follow environmental and safety procedures, including use of personal protective equipment, hazard and risk control measures for the work tasks 1.3 Assess and maintain up to date information on topography and weather conditions in areas where tree assessments are to be conducted 1.4 Confirm chain of command and communication protocols that apply in bushfire containment and recovery operations
2. Conduct hazard assessment of fire damaged or fire affected tree	2.1 Conduct hazard assessment for route to and areas around tree to determine it is safe to approach 2.2 Locate and determine tree species and tree position in relation to site topography and other hazards at site 2.3 Assess visually extent of fire damage to crown, trunk and root 2.4 Identify structural and physiological defects in tree 2.5 Assess external factors that may cause tree or its limbs and branches to fall 2.6 Determine risks posed by tree according to industry guidelines and agency approved procedures 2.7 Identify tree hazard class according to industry guidelines and agency approved procedures 2.8 Determine appropriate risk treatment to mitigate tree hazard according to industry guidelines and agency approved procedures
3. Conduct assessment of health and values of fire damaged or fire affected tree	3.1 Determine fire impact on soil and its properties, and subsequent effects of soil on tree root and sap function 3.2 Assess solid components of tree and determine whether there is adequate wood present to sustain tree 3.3 Assess post-fire survivability of tree based on its species, fire damage and estimated age and dimensions 3.4 Assess ecological, cultural and economic values of tree

Elements	Performance Criteria
Elements describe the essential outcomes.	*Performance criteria describe the performance needed to demonstrate achievement of the element.*
4. Assess options for treatment of fire damaged or fire affected tree	4.1 Determine treatment options for tree taking into account tree hazard, health and values assessment and according to industry guidelines and agency approved procedures 4.2 Mark tree for treatment according to industry guidelines and agency approved procedures 4.3 Record position of tree using Global Navigation Satellite System (GNSS) or manual mapping 4.4 Record and report outcomes of tree assessment including proposed treatment to appropriate personnel

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential for performance in this unit of competency but are not explicit in the performance criteria.

Skill	Description
Reading	• Interpret complex workplace documentation on post-bushfire survival indicators for different tree species
Oral Communication	• Use appropriate scientific and technical terminology when speaking to stakeholders

Unit Mapping Information

Code and title current version	Code and title previous version	Comments	Equivalence status
AHCARB613 Conduct complex tree hazard and health assessment post-fire	Not applicable	The unit has been created to address a skill or task required by industry that is not covered by an existing unit.	Newly created

Links	Companion Volumes, including Implementation Guides, are available at VETNet: https://vetnet.education.gov.au/Pages/TrainingDocs.aspx?q=0d96fe23-5747-4c01-9d6f-3509ff8d3d47

TITLE	Assessment requirements for AHCARB613 Conduct complex tree hazard and health assessment post-fire

Performance Evidence

An individual demonstrating competency must satisfy all of the elements and performance criteria in this unit.

There must be evidence that the individual has assessed the hazard, health and value status of five fire damaged or fire affected trees, which include at least two different species.

In performing each of these activities, the individual must have:

- complied with safety requirements, including use of personal protective equipment
- conducted a dynamic risk assessment of the route to and areas around the tree
- identified risks posed by the tree
- assessed post-fire survivability of tree
- assessed ecological, cultural and economic value of the tree
- determined treatment options for the tree
- reported on assessment and treatment options for the tree.

Knowledge Evidence

An individual must be able to demonstrate the knowledge required to perform the tasks outlined in the elements and performance criteria of this unit. This includes knowledge of

- safe work procedures as they apply to bushfire containment and recovery operations
- tree species and effects of fire on different tree species
- workplace hazards and associated risks and controls in bushfire containment, recovery and controlled burning operations, including those associated with fire affected and fire damaged trees
- effects of fire on trees including:
  - first order effects including foliage and bud necrosis, cambium and phloem necrosis, xylem hydraulic impairments, fine root necrosis
  - second order effects including photosynthesis and carbohydrate supply limitations, water uptake and transport restrictions, biotic attacks
- external factors that increase potential tree hazard including:
  - wind exposure
  - drought
  - stress and insect infestation
  - excessive drainage problems from land management operations
  - exposure to vibration from heavy plant or machinery
- other hazards at the site that increase potential tree hazard including:
  - gas supplies
  - water supplies
  - powerlines (above and below ground)
  - adjacent buildings
  - features of adjacent trees
  - terrain features
- characteristics of hazardous trees including:
  - dead and/or decaying tree and/or major branches
  - evidence of previous damage, including burn or mechanical processes
  - suspected loose or broken branches
  - evidence of longitudinal or torsion fractures
  - evidence of roots lifting or disturbed root system
  - significant lean with indicators of failure
  - cavities and hollows in the main trunk and root buttress area
  - xylem dysfunction in the trunk and stems impacting on distribution of water and minerals from the roots to leaves
  - root plate damage
  - presence of fungi
- techniques for assessing fire damage to trees including:
  - crown damage

Knowledge Evidence

- trunk damage
- root damage
- factors influencing fire impact on soil and its properties, including:
  - fire spread
  - fire direction
  - fire intensity
  - fuel load
- fire effects on soil and its properties, including:
  - increased soil hydrophobicity
  - increased soil erosion
  - changes in properties such as pH, organic carbon and microbial community
- techniques for testing soil properties, including pH, organic carbon and microbial community
- techniques for assessing post fire survivability and tree health, including:
  - fire impact on soil
  - signs and symptoms of disease
  - methods of detecting decay and structural defects in trees
  - use of basic diagnostic tools
  - testing equipment to detect decay, disease and scope of tree problems
  - factors affecting the likelihood of tree failure
  - use of diagnostic tools including Sonic Tomography and Resistance Drills
  - assessment of the xylem in the trunk and stems to ensure distribution of water and minerals from the roots to leaves
  - assessment of feeder and structural roots to determine health and structure
- factors affecting tree damage and mortality including:
  - heat including temperature and duration
  - tree morphology including size, bark thickness, branch and bud size, root system
  - site characteristics
  - interval between successive fires
- techniques for identifying culturally significant trees, including Aboriginal scarred trees, and procedures for managing culturally significant trees, including who to contact if a culturally significant tree is identified
- tree valuation methods including techniques for identifying ecological and economic value of fire damaged or fire affected trees and procedures for managing such trees, including who to contact if ecologically and economically valuable trees are identified
- industry guidelines and agency approved policies and procedures for tree hazard management in bushfire recovery regarding:
  - tree hazard marking and mapping symbols
  - tree hazard classes - clear and present danger tree (CPD), potential clear and present danger trees (potential CPD)
  - tree hazard treatment - no action required, removal, pruning and trimming, habitat pruning, conservation and follow up assessment, salvage
- techniques for recording position of trees using Global Navigation Satellite System (GNSS)
- techniques for use of Global Information Systems (GIS) and maps to produce survey plans
- methods, timeframes and costs of determining options for mitigating levels of risks associated with fire damaged and fire affected trees
- reporting procedures associated with tree hazard, health and valuation assessment.

Assessment Conditions

Assessment of the skills in this unit of competency must take place under the following conditions:

- physical conditions:
  - skills must be demonstrated in a work environment or an environment that accurately represents workplace conditions
- resources, equipment and materials:
  - fire damaged or fire affected trees
  - communications systems relevant to work activity
  - equipment and materials relevant to work activity
  - personal protective equipment relevant to work activity

Assessment Conditions
• GNSS • GIS • diagnostic tools for assessment of the xylem and root plate and feeder and structural roots • specifications: • workplace health, safety and environmental policies and procedures relevant to work activity • workplace documentation for recording information relevant to work activity. Assessors of this unit must satisfy the requirements for assessors in applicable vocational education and training legislation, frameworks and/or standards.

Links	Companion Volume implementation guides are found in VETNet - https://vetnet.education.gov.au/Pages/TrainingDocs.aspx?q=0d96fe23-5747-4c01-9d6f-3509ff8d3d47