EuroFire

Unit EF5:	**Control vegetation fires using pumped water**
Element 1.1:	**Prepare pumps, hoses and other ancillary equipment for use at vegetation fires**
Element 1.2:	**Set up and operate a pump in a vegetation fire situation**
Element 1.3:	**Deliver water through hoses and nozzles to control vegetation fire**

About this unit:

This unit deals with the competence required by individuals who are involved in managing vegetation fires in rural areas, either in fire suppression or prescribed burning operations using a simple water pump.

It has been developed so that it can be applied to any area of vegetation: forest, shrub, grass or peat.

This unit is aimed at those who work in fire services, farming, forestry, game management, conservation, range land and recreation management who have a role managing vegetation fires, either on a full or part-time basis.

To achieve it you must show that you are able to:

- Prepare and use a pump competently
- Select, prepare and reconstitute a pump site
- Lay out and relocate hoses
- Use water delivered through nozzles to extinguish the fire in both initial attack and mop-up situations
- Operate safely on the fireground

Education and Culture
Leonardo da Vinci
CTIF

Key words and phrases:	For you to fully understand the content of the unit, and the activities it describes, it is important that you are able to understand the terms used within the unit. The definitions at the back of this unit should help you with this.
Cavitation	Formation of air bubbles in the pump either through air entering the suction through a vortex or by suction strainer becoming clogged with debris
Head	The downward pressure of water in a hose where one end is higher than the other
Hose Clamp	Tool to cut-off water flow to connect additional hose.
Jet reaction	Nozzle moves in opposite direction to water flow due to excess pressure
Loss	The resistance to the flow of water inside hose, measured in kPa per length of hose
Nozzle pressure	The pressure remaining at the end of the hose after head and friction losses
Pressure	The force exerted against an opposing body
Strainer	Filter, often metal, at the end of the suction hose
Silt	Very small loose material of found at the bottom of streams, also known as mud
Suction (lift)	Lifting water from a lower level to the pump, to prime the pump
Suction Hose	Hose from strainer to pump for priming, designed to withstand high internal water pressure (back pressure)
Seal	Rubber or canvas material used to prevent the entrance or return of gas or air into a pipe; usually placed at the point where two or more pieces of metal, plastic or rubber pipe or hoses are joined together. Often called an “O” ring.
Volume	The amount of water that a pump can deliver
Vortex	Whirling and spiralling, or eddying of water as it enters the pumps suction hose. This becomes very evident in shallow water.
Water Hammer	Pressure shock when water moving through the hose is stopped abruptly.
Water Relay (relay pumping)	The linking of more than one pump, in series or by using portable dams, to deliver water uphill or over long distances to overcome pressure losses

Element 1.1: Prepare pumps, hoses and ancillary equipment for use at vegetation fires

What you must be able to do:

1 Carry out daily maintenance, fuelling and pre-start checks as per manufacturers recommendations

2 Load and secure pumps, hoses and fuel safely onto transport

3 Maintain the safety and security of equipment and supplies

4 Prepare and check personal protective equipment

5 Maintain safety and health of self and others throughout

6 Manage resources and materials in accordance with relevant legal, organisational and environmental requirements.

7 Recover and sort out, pumps, hoses and ancillary equipment, reporting any defects, after use

This element covers:

A Preparing and maintaining pumps, hoses and ancillary equipment using:

- (i) Hand tools
- (ii) Other maintenance tools
- (iii) Seals and “O” rings

B In the following situations:

- (i) A workshop
- (ii) In the field / on operations

C Personal protective equipment:

- (i) Helmet/Face shield/Goggles
- (ii) Fire resistant clothing
- (iii) Gloves
- (iv) Heat resistant boots
- (v) Drinking water
- (vi) Hearing protection

What you must know and understand:

a. Safe use of maintenance tools

b. How to maintain simple pumps according to manufacturers requirements

c. Techniques for securing equipment in a variety of situations

d. How to roll up hoses prior to storage

e. Fuelling and re-fuelling techniques, including environmental requirements

What you must be able to do:

1 Assess the fire environment logically and predict local fire behaviour

2 Deliver water to points determined by your supervisor

3 Identify water supplies in the area and assess their suitability

4 Select a pump site that allows access to water supply and a secure working area for the pumping operation

5 Establish a safe access route to and from the pump site.

6 Situate the suction inlet so as to minimise damage to pump, or restriction to the water flow from debris and improve the quality and quantity of water available to the pump.

7 Prime, start, operate and shut down pump in accordance with the manufacturer's instructions.

8 Control volume and pressure of water delivery to allow effective and safe discharge of water through nozzle

9 Fuel, oil and water supplies are monitored to maintain continuous operation.

10 Set up a water relay

11 Ensure communication is maintained with nozzle operator(s), team members and supervisor throughout the operation

12 Reinstate pump site after use

This element covers:

A Water supply issues:

- (i) Accessibility
- (iii) Quality
- (iv) Quantity
- (v) Usage rate
- (vi) Efficient use of water

What you must know and understand:

a. How a light weight portable pump operates including, setting up, priming, developing pressure, and delivery through hoses and nozzles.

b. How to improve water supplies from natural sources including: quantity, quality and efficiency of use and the use of a portable dam

Element 1.2 cont.:

c. How to monitor the pump in operation for delivery of water and continuous operations, including how to solve basic pumping problems

d. How to set up a relay pumping system

e. How to communicate pumping instructions using radios and hand signals

f. The role of lookouts, the importance of being aware of the fire situation and being able to communicate with team members and your supervisor at all times. Knowing where your escape routes are, as well as when to use them and how long it will take to reach your designated safety zones (LACES)

Element 1.3: **Deliver water through hoses and nozzles to control vegetation fire**

What you must be able to do:

1 Control the delivery of water to control fires through nozzles within organisational procedures

2 Carry out mop-up operations effectively, safely and within organisational procedures

3 Lay hose to delivery points as directed by your supervisor and within organisational procedures

4 Uncharged and charged hose is relocated within organisational procedures

5 Communications is maintained with the pump operator, team members and supervisor

This element covers:

A Delivery of water from nozzles:

(i) Jet

(ii) Spray

B The use of water in fire management operations:

(i) Direct and flanking attack

(ii) Indirect attack

(iii) Knock down and mop-up and patrol

(iv) Water conservation

C The type and amount of hose and pumps to use:

(i) Distance

(ii) Elevation

(iii) Hose Size

(iv) Pressure

D The use and re-use of hoses:

(i) Hose lays

(ii) Laying methods

(iii) Recovery methods

E Communications methods:

(i) Radio

(ii) Hand Signals

(iii) Runner

What you must know and understand:

a. How water puts out the different types of vegetation fire, including ground, surface and crown fires

b. The methods of using portable pumps, nozzles, laying and recovering hoses within organisational procedures

c. The capabilities and limitations of portable pumps used individually and in combination, with other hand tools, ignition devices, pumps and aircraft as part of a fire control team

d. How to select the correct tools for the type and height of vegetation, flame length and other aspects of fire behaviour likely to be encountered

e. The role of lookouts, the importance of being aware of the fire situation and being able to communicate with team members and your supervisor at all times. Knowing where your escape routes are, as well as when to use them and how long it will take to reach your designated safety zones (LACES)

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