

Mobile Suppression Units for Prescribed Burning of Rangelands

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Prescribed burning is becoming increasingly popular as a vegetation management tool for rangelands. Ignition and suppression equipment are required for successful operations. Ignition equipment is well developed and readily available. However, suppression equipment specifically for prescribed burning of rangelands is not easily obtained from commercial sources. Rangeland suppression equipment is usually made up of modified wildfire fighting equipment, herbicide sprayers, or home manufactured units. In this paper, we discuss our experiences in adapting a forest fire suppression unit and developing a fast, mobile, homemade suppression unit for rangeland prescribed burning in the Alberta aspen parkland.

A prescribed burning operation has 3 distinct phases, each with varying suppression requirements. The first phase of the operation consists of the development of firebreaks. One popular method is the burning out of firebreaks around the perimeter of the area. Suppression in this phase may require laying of wet lines and controlling and extinguishing head fires and back fires that are usually burning in light, fine fuels. In order to be effective, suppression equipment has to deliver a small volume of water over a long period of time. The second phase is the burning operation itself. Ideally, if firebreaks are well prepared and the prescription is followed, no suppression is required. The third phase of the burning operation is the post burn mop up and extinguishing of hot spots close to the perimeter of the burn. A low volume of water over a long time period is usually required during this phase. The ability to deliver a large volume of water to areas of intense heat such as smouldering brush piles or subsurface smouldering roots may also be desirable.

During any of the 3 phases, the fire can become uncontrolled. In the instance of a runaway fire, the key requirement of suppression equipment is mobility, with a secondary requirement being large water volumes. Mobility and water volume may be incompatible as larger water volumes inhibit mobility. The optimum balance between mobility and water volume will be determined by the topography of the areas to be burned. Different kinds of suppression equipment on each fire may be required to meet these needs. Personal preference of the fire boss and suppression crews will probably be a major factor in the design of suppression equipment.

During the 1970's, WajaxTM 5 gallon back pack units carried by personnel and a modified herbicide sprayer pulled by a tractor were our principal fire suppression tools. The equipment was labour intensive, tiring, slow



A 6-wheel all terrain vehicle fitted with fire suppression equipment. Photo by Barry Irving.

and cumbersome. Later, a 100-gallon homemade unit mounted on the 3 point hitch of a tractor provided more mobility but was limited by the slow tractor speed.

In 1981, 2 WajaxTM (Model TFG-201) Slip-on Tank fire fighting units were purchased. The factory-equipped units consisted of a 160-Imperial gallon holding tank, a WajaxTM Mark 3 pressure-volume pump, and a hose reel with 100 feet of 1.5-inch high pressure rubber hose. The factory equipment fulfilled most of the requirements for prescribed burning, but required 2 modifications. We installed a small hose reel (100 feet of 3/8 inch hose) and a return line from the pump to the tank. This enabled the delivery of much smaller volumes of water under continuous pumping. The 1.5-inch hose and reel was left intact for use on fires burning in heavy fuels.

In 1990 a Polaris Big BossTM 6-wheel all terrain vehicle was also purchased. A homemade suppression unit was constructed and placed on the rear deck. A 40-gallon holding tank with a 1.5-inch water pump was fitted and piped. Twenty feet of 1/2-inch water hose was used for discharge. A hose reel was not installed because of space limitations, but may be added later. The unit was equipped so that water filling could be accomplished by backing into a surface water source and dropping a suction hose. This adaptation enabled filling of the unit from intermittent wetlands that are common in central Alberta.

A high volume, light weight pump unit was purchased to provide rapid refill capability from nearby wet lands that dot the Alberta parklands during spring prescribed burning operations. The volume pump permits refill of the 160-gallon truck unit in about 4 minutes and the 40-gallon quad unit in about 1 minute.



*A slip-on fire suppression unit modified for rangeland burning.
Photos by Barry Irving.*

Field Use

The combination of the WajaxTM Slip-on tanks (placed into 4×4 trucks) and the PolarisTM unit provides effective suppression capabilities for rangeland fires. The WajaxTM units have the necessary water volumes and nozzle pressure for controlling fires in either light or heavy fuels while maintaining good mobility. The PolarisTM unit was excellent for rapidly patrolling the fire perimeter, extinguishing spot fires, or for establishing firebreaks in light fuels. The PolarisTM unit also allowed us to access areas of rough topography and wet soils that could not be crossed by a 4×4 pickup.

Our modifications to the WajaxTM unit were quite simple and could be done to almost any commercial slip-on or trailer type forest fire fighting unit. Our choice of a PolarisTM all terrain vehicle was dictated by availability. There are not many quads on the market with a payload sufficient to carry a 40-gallon water tank. Tandem wheels on the back add stability and reduce the risk of rollover (especially backwards). An alternative (for 4-wheeled quads) would be to build a small trailer unit (but this would reduce mobility) or to simply carry a smaller volume of water in custom built tanks.

Summary

The development and use of suitable rangeland fire suppression equipment has enabled us to more effectively and safely conduct prescribed burning research programs, often in cooperation with ranchers, throughout the Alberta aspen parkland. The equipment has resulted in a sharp reduction in crew size. It has also reduced the level of fatigue of our personnel following a long day of prescribed burning.

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