

## Wildland Fire Sprinkler Design

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### Background

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This project was supported by members at the 2010 Fall Advisory Committee Meeting and a project plan was developed in March 2011.<sup>1</sup> The project aims to identify sprinkler design improvements that could provide wildland firefighters with more options for deployment during wildfire or prescribed burn events.

### Objectives Update

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Researchers have modified the project objectives originally specified in the project plan. The new project objectives are:

1. Design a wildland fire sprinkler prototype that can distribute water higher into the tree canopy than the standard sprinkler currently used by Alberta Environment and Sustainable Resource Development (AESRD).
2. Assemble a full wildland fire sprinkler kit containing the new prototype and conduct comparison tests with the current AESRD sprinkler kit.

### Product Investigation Update

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The first step in this study was to determine the type and variety of sprinklers used for wildfire suppression. In April 2011, researchers conducted an internet search and found that agencies commonly used over-the-counter lawn care sprinklers in their sprinkler kits. Most sprinkler systems were used for structural protection, although these systems were also used to reinforce control lines on wildfires and prescribed burns. These findings support the need for a sprinkler designed to meet the specific needs of wildfire suppression.

In the summer of 2011, researchers conducted field observations of sprinklers used in two prescribed burns in Alberta for control line reinforcement. The standard AESRD sprinkler kit was used, supported by multiple Wajax Mark3 pumps. Figure 1 illustrates the maximum arc achieved with the sprinklers.

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<sup>1</sup> <http://wildfire.fpinnovations.ca/10/WildfireSprinklerDesignProjectPlan.pdf>



**Figure 1. AESRD sprinkler kit at the Evan Thomas prescribed burn.**

## Design Update

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In September 2011, FPInnovations worked with a fourth-year student design team from the University of Alberta Mechanical Engineering Department (Mec E 460) to engineer a sprinkler that would address the unique needs of wildfire suppression operations. In March 2012, the design team (Alberta Genuine Design) submitted three design concepts<sup>2</sup> based on the requirements specified by FPInnovations researchers. The design team recommended the 'Fire Cobra' (Figure 2) for further development.<sup>3</sup> In April 2012, the design team submitted the final design report with detailed drawings and calculations.<sup>4</sup>



**Figure 2. Fire Cobra prototype by Alberta Genuine Design (AGD).**

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<sup>2</sup> [http://wildfire.fpinnovations.ca/10/Ph2\\_Report\\_AGD\\_Wildland\\_Fire\\_Sprinkler\\_GDMWL.pdf](http://wildfire.fpinnovations.ca/10/Ph2_Report_AGD_Wildland_Fire_Sprinkler_GDMWL.pdf)

<sup>3</sup> [http://wildfire.fpinnovations.ca/10/Presentation\\_AGD\\_Wildfire\\_Sprinkler\\_System.pdf](http://wildfire.fpinnovations.ca/10/Presentation_AGD_Wildfire_Sprinkler_System.pdf)

<sup>4</sup> <http://wildfire.fpinnovations.ca/10/Mec%20E%20460%20-%20Phase%203.pdf>

## Prototype Construction Update

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Researchers had hoped that the design team would be able to construct a prototype of the selected design; however, due to time constraints the design team was unable to complete construction. In June 2012, FPIinnovations engaged MYAC Consulting Ltd. to construct an operational prototype for testing. Construction will begin in the fall of 2012.

## Timeline Update

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- Fall 2012 - prototype construction & preliminary testing
- Winter 2012 - assemble a full Fire Cobra sprinkler kit
- Spring 2013 - comparison test of a Fire Cobra sprinkler kit and AESRD sprinkler kit
- Fall 2013 - final report and presentation to Advisory Committee