PROJECT PLAN

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Comparing the canopy penetration of airtanker drops between forest fuel treatments and untreated stands

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BACKGROUND

Convincing the public to support forest fuel treatments around their community can sometimes be a challenge for wildfire managers. Understandably, communities just want some assurance that what they are committing to will make a difference. One of the many benefits of forest fuel treatments is thought to be an increase the effectiveness of airtanker drops. Wildfire managers believe that airtanker drops produce the best results when surface fuels are coated, and an open canopy should allow more of an airtanker's load to reach the surface fuels.

Managers from Alberta Environment and Sustainable Resource Development (ESRD) in Slave Lake have asked FPInnovations to demonstrate that an open canopy in a forest fuel treatment will allow more of an airtanker's load to reach the forest floor.

ISSUE

Demonstrate for ESRD that an open canopy in a forest fuel treatment will allow more of an airtanker's load to reach the forest floor.

OBJECTIVE

Measure and compare the amount of water that reaches the forest floor in a forest fuel treatment and in an adjacent untreated stand.

METHODS

Location

Since the request for this project was from wildfire managers in Slave Lake, Alberta, we will be conducting the field trials within their fire district. The site will need to be flat and easily accessible, and there needs to be a relatively large open area ahead of it with a distinct timber edge. The site will need to be about 200 m long x 200 m wide and contain two stand types: a forest fuel treatment and an adjacent untreated stand that represents the typical forest type in the area.

Data Collection

Stand Descriptions

We will record a detailed description of the stand structure in each stand type, including stand density (stems/ha). We will use three fixed-area circular plots with a 3.99 m radius. In addition, the Air Attack Officer will take a photo of the site from the air, to show the difference in canopy cover between the stand types.

Canopy Penetration

We will set up a grid of cup holders in each stand type (Figure 1). The grids will be 60 m x 30 m with the front edge of the grid (Row 1) starting at 60 m from the timber edge. We will be using a CL-215 airtanker to make the drops and the grid size is based on that aircraft's historical open-grid drop pattern data.[1] We will place the cup holders 3 m apart.

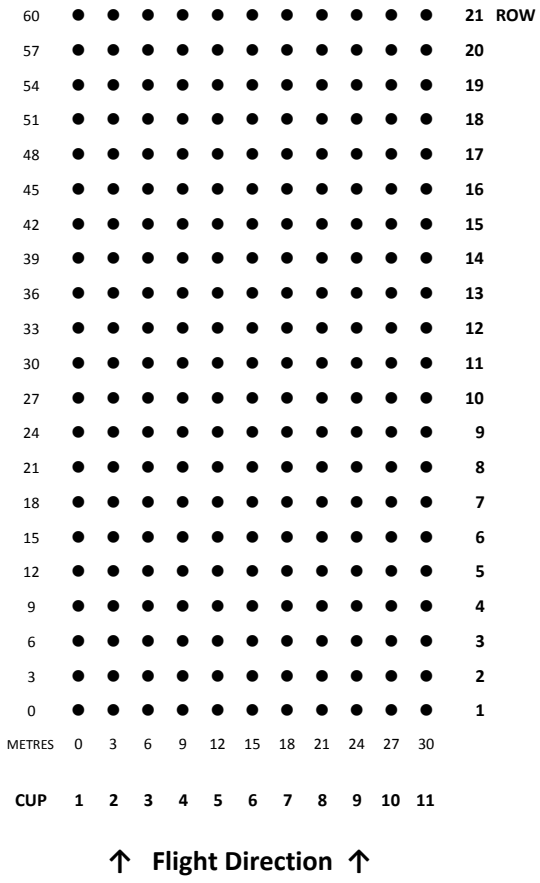

Figure 1. Grid layout for Slave Lake drop tests.

[1] Coverage level 4 is believed by many in the industry to be the level needed to penetrate the canopy of standing timber. Historical drop data suggests that the maximum length of coverage level 4 from a CL-215 is 60 m (average was 50 m) and the maximum width is 24 m. The data also suggests that coverage level 4 typically begins 60 m into a CL-215's drop pattern.

To help guide the pilot to the centre of the grids, we will place large orange markers in the open area ahead of each grid that will indicate the grid's centerline and its edges. We will direct the pilot to release the load at the timber edge.

We anticipate one and a half to two days to lay out the grids, place the cup holders, and position the markers. Prior to each drop, plastic cups will be placed and secured in the cup holders.

ESRD wildland firefighters will help us collect the data from each drop. We will use the procedure described by Thomasson (2012) to measure the volume in each cup. We will coordinate three 3-person teams each consisting of a cup measurer, a recorder, and a cup drier.

We will use either water or 0.3% Class-A foam, and the aircraft will be ground-loaded at the airtanker base to make sure the same volume is used for each drop.

A researcher will roam the grid after each drop and capture images of the surface fuels.

Drop Test Schedule

We plan to have six drops: two in the morning and four in the afternoon (Table 1). The timing between the drops should provide the grid workers enough time to collect the cup data and move to the next grid, and should also allow the grids to dry before the next drop.

Table 1. Schedule for the Slave Lake drop tests.

Grid A	Grid B
10:00	11:00
14:00	15:00
16:00	17:00

All drops will be set at maximum flow, with 0.3% foam added by the pilots. The drop height will be determined by the Air Attack Officer and will be the same for all drops. The drop speed will be 120 knots.

SAFETY

Before we begin the drops, we will describe the scope of the project and give a tour of the grids to the pilot and the grid workers. We will take special care in coordinating these drops to ensure the safety of the pilots and everyone on the ground.

DELIVERABLES

We will produce a report with images that summarizes the drop results in each stand type, and we will post it to our website.

We will also produce a short video that describes the methods and our results.

PARTICIPATING MEMBERS/COLLABORATORS

Alberta Environment and Sustainable Resource Development – Slave Lake

BUDGET

See attached.

REFERENCES

Thomasson, Jim. 2012. Improving the visual assessment method of measuring cup amounts in airtanker drops. FPInnovations Wildfire Operations Research. Project Note September 2012.