



Alternative Methods for Vegetation Control at ARRC: Evaluation & Implementation

PROGRAM RECAP

The Alaska Railroad Corporation (ARRC) has spent considerable time and resources to aggressively evaluate alternative methods for vegetation control in the ballast and tie area, particularly throughout the 1990s.

1993: CP Steam Machine

In 1993, ARRC borrowed a prototype “Steam Machine” from Canadian Pacific (CP) Rail to evaluate its effectiveness as a weed control method. Configured as a train – including a control car, steam / boiler car, fuel tanker, water tanker and locomotive – the Steam Machine moved along the rail at about one mile per hour. Boxes folded down over the track shoulders to enclose the area between the rails. Steam released into this confined area heated the vegetation, and weeds above the ground were wilted. Because roots remained, additional passes were required every two weeks in order to knock down re-growth.

The Steam Machine covered about 114 miles (Anchorage to Seward) in 13 work days during July. Cost was about \$115,000 (1993 dollars). While steam showed potential as a vegetation control method, it had costly drawbacks:

- High fuel consumption
- High water consumption
- Large operating crew (about six)
- Repeated applications

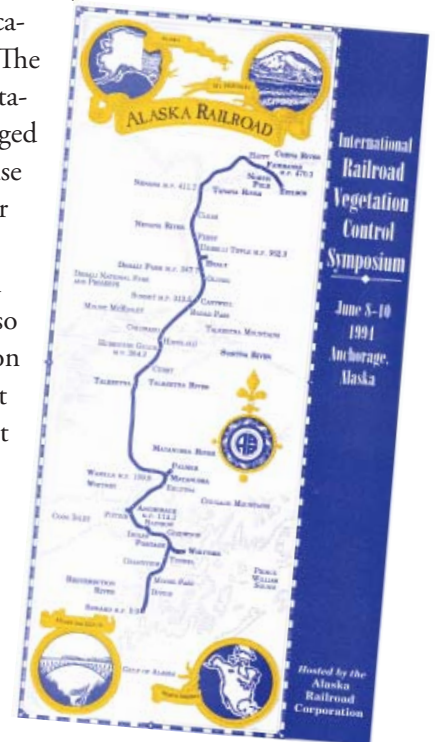
In 1998, the CP mothballed the Steam Machine due to poor performance.



The CP Steam Machine control car.

1994: International Vegetation Management Symposium

ARRC sponsored a vegetation symposium following a trip to Europe to evaluate European vegetation control methods. Representatives from Germany, Sweden and the United Kingdom (UK) participated and a representative from the Northwest Coalition Against Pesticides also presented. The UK and Swedish presentations focused on herbicide application methods. The German presentation acknowledged the prevailing use of herbicides for vegetation control on German railways, but also focused attention on development of a radiant heat prototype.



The CP Steam Machine steam / boiler car.

1998: Contractor Bids and Three Evaluations

In 1998, the ARRC requested bids from any party with an alternative vegetation method. Bid terms would pay each successful contractor with up to \$100,000. In return, the contractor had to mobilize equipment to Alaska and operate the system on the Alaska Railroad for two weeks. Three contractors and methods were selected for evaluation:

- **Hot Water:** A truck-mounted machine upoured scalding water on the tracks to kill vegetation.
- **Flaming:** A vehicle outfitted with weed-burner like nozzles to direct flames down at the track to sear vegetation.
- **Radiant Heat:** Panels with propane-fired radiant heat were used to cook vegetation.

Evaluations revealed that the radiant heat method had the most potential.

1999: Radiant Heat Prototype Machine

The ARRC contracted with the successful demonstrator to deliver a prototype radiant heat machine. After substantial development costs and delays, a prototype machine was placed in service. The prototype included a large truck equipped with special drop down axles to remain on the tracks. Articulating arms held three radiant heaters. The truck carried a large supply of propane and required a three-person crew.

This machine was used for two seasons, but was retired because of low productivity and high operating costs.

Inmate Crews

The ARRC has contracted with State of Alaska Department of Corrections (DOC) to use inmate labor to clear vegetation along the railroad. A crew of approximately 10 inmates, supervised by a DOC representative and an ARRC track foreman, are transported by highway to the railroad work sites. Crews return each night to the DOC facility. Inmates have come from correctional institutions in Seward, Anchorage, Palmer and Fairbanks.

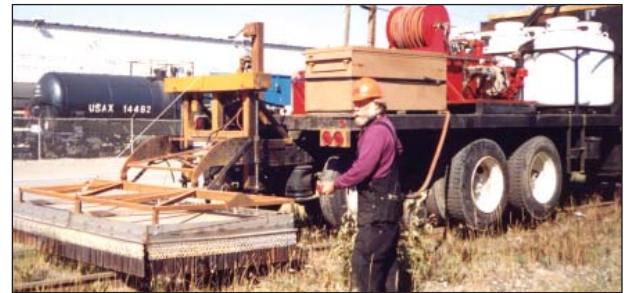
Hot Water “Aqua Heat” Machine



Flaming Equipment



Radiant Heat Prototype



The inmate crews clear brush along the tracks, especially in areas where the on-track equipment cannot reach, cannot easily maneuver around, or is simply not available. This includes areas with railroad/highway crossing signals, signals and signs beside the track, the inside of track curves, and within rail yards.

ARRC pays DOC and the inmates, and provides the transportation and tools. For brush-cutting, crews use chainsaws, weed whackers, pruners and similar tools. For hand-pulling, typical gardening hand tools are used, such as trowels and forks.

The manual brush-cutting work has always been a bigger job than railroad resources can handle, and for this reason, the inmate program has successfully augmented ARRC maintenance of way (MOW) labor. The use of inmate crews is subject to ARRC labor agreements. The inmate crew has been used every year since the early 1990s, until 2009 when the ARRC was not able to gain labor union consent. Manual control continues with ARRC personnel.

Current Methods of Control

Currently, the ARRC attempts to control vegetation in the track area with a ballast regulator (BR). These machines are the railroad equivalent of the highway grader. On the back is a large rotating broom normally used to distribute ballast along the tracks. The BR also has wings normally used to dress the track outside the tie area (shoulders).

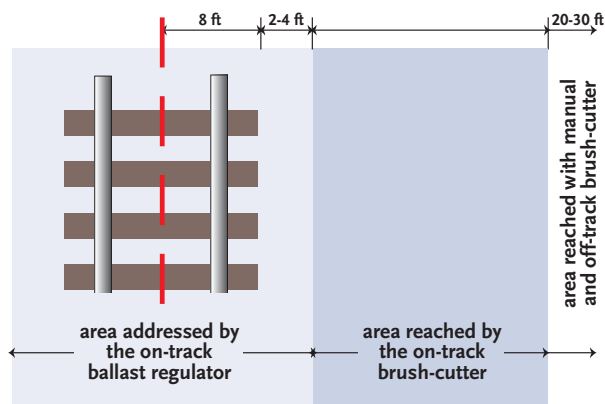
The ARRC has modified the broom by peeling back the rubber on the bristles to expose underlying wires. Instead of distributing and dressing the ballast, the rotating wires strip vegetation of leaves and scrape plant tops from the track surface. This method is partially effective, but it does not kill the plant, remove root structure, or prevent re-growth.

In addition, the wings can groom the ballast to plow under existing vegetation. This does not remove the vegetation, but essentially buries it by bringing fresh shoulder ballast material to the surface. Although not a perfect solution, this method has proved to be the best of the alternatives to herbicides for the following reasons:

- Uses standard railroad maintenance equipment and operators
- Less costly than other alternatives
- Standardized maintenance
- As effective in the track area as any other alternative method

On-track brush-cutters are used to mow vegetation in the area beyond the rails and ties. The brush-cutter blade can reach no closer than 2 to 4 feet and no further than 20-30 feet from the end of the ties.

In 2010, a permit to use a glyphosate-based herbicide was approved and AquaMaster was applied along on a portion of the railroad's south end.



Above and right: The ballast regulator's bristles are normally covered with rubber. The rubber is stripped to expose the wire when the ballast regulator is used for vegetation management.



On-track brush-cutter.