

SERDP 2007 Partners in Environmental Technology Symposium and Technical Workshop November 27th 2007, Washington DC.

Lisa J Rew, Balbach H, Fleming J, Taylor R and Gonzales R.

Preventing the spread of invasive species: evaluating plant propagule transport by vehicles.

Invasion by non-indigenous plant species (NIS) is a global-scale problem that threatens the ecological integrity of native plant communities and ecosystems. NIS are introduced to areas by a variety of natural and anthropogenic means, and the number of anthropogenic introductions has increased in recent decades. Roads are dispersal vectors for NIS due to transport of NIS propagules by vehicles and by natural population expansion in the more-disturbed environments along the right of way. Plant propagules (seeds and other reproductive parts) have been observed on vehicles, but the number of studies is limited. Transporting equipment, materiel, and personnel between sites, conducting off-road maneuvers, and simply driving on unpaved roads pose a measurable risk of transferring NIS within and between sites. More propagules are likely to be collected by vehicles driven off-road than on paved roads, and by tracked or all-terrain vehicles than civilian pattern vehicles, but there are no quantitative data to support this hypothesis. In the execution of SI-1545, our first objective was to quantify the potential of different vehicles to transport soil which could include NIS propagules. This was accomplished simultaneously with execution of our second objective, which was to evaluate the efficacy of commercially available relocatable vehicle washing units. These systems are designed to clean vehicles and contain the (NIS contaminated) waste. During the summer of 2007, five commercially available vehicle washing units were evaluated for effectiveness and efficiency of cleaning three different types of vehicles. Vehicles were cleaned meticulously prior to driving at a set speed around a predefined course, and then washed by the wash unit, this being replicated 18 times for light 4-wheel drive vehicles, 18 times for heavier all-wheel-drive trucks and once for tracked vehicles. At the end of each cycle, the vehicles were stripped down and cleaned meticulously again to quantify the amount of debris missed by the commercial wash units. To quantify how much seed was lost in the wash and filtering system process a known amount of soil and seed were placed in a tank bath and taken into the wash unit's filtering system. Samples were filtered using the individual unit's protocol. Waste samples (greater than 75 μ) were saved, placed in a greenhouse and germination recorded. These data, and those from future experiments will be used to develop protocols which will aim to reduce the movement of non-indigenous plant propagules, within and between Department of Defense installations.

Preventing the Spread of Invasive Species: Evaluating Plant Propagule Transport by Vehicles

Lisa J. Rew, Montana State University; Hal Balbach, USA ERDC; Joseph Fleming, Ralph Gonzales and Ralph Taylor, USDA Forest Service

Introduction:

Invasion by non-indigenous plant species (NIS) is a global-scale problem that threatens the ecological integrity of native plant communities and ecosystems. NIS are introduced to areas by a variety of natural and anthropogenic means, and roads are often regarded as dispersal vectors for NIS, and vehicles as dispersal agents. However, the quantity of plant propagules transported by vehicles, and how this varies with road surface, soil type and vehicle type is poorly understood. More propagules are likely to be collected by vehicles driven off-road than on paved roads, and by tracked or all-terrain vehicles than civilian pattern vehicles, but there are no quantitative data to support this hypothesis.

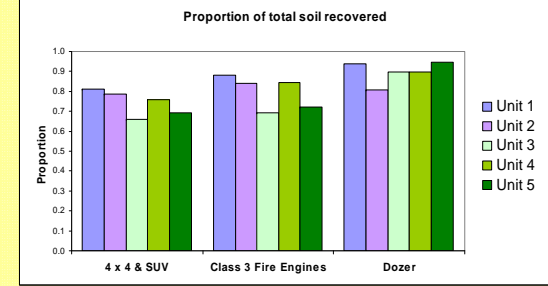
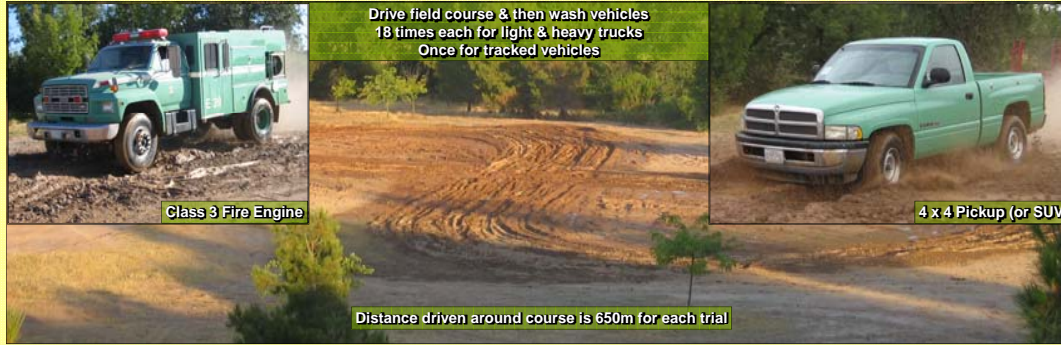
Five commercially available vehicle washing units were evaluated during the summer of 2007 to determine how well their use might assist Federal land managers to comply with Executive Order 13112.

Objectives, Phase 1:

- Evaluate the potential of 3 different types of military vehicles to transport NIS propagules
- Assess the effectiveness of commercially available relocatable vehicle washing units to clean the vehicles
- Quantify the proportion of seeds retained by each vehicle wash unit's filtration system

Approach, Phase 1:

- Initially, work with the US Forest Service San Dimas Technology Development Center to study soiling and soil removal under controlled conditions
- Utilize three types of vehicles of interest to the USFS in wildfire management activities
 - Class 3 fire engine, used for brush fires
 - 4 x 4 vehicles used for personnel and support
 - Dozer, as used to prepare firebreaks



Known quantity of seed & soil placed in a tank mix before being pumped into each wash contractor's settling & filtering system & left overnight (normal procedure)

Filtering completed & final samples placed in cold storage for transport to greenhouse

Samples planted in greenhouse

Count germinating seedlings to calculate proportion of each species recovered

Species	Mean Germination (%)
Poa annua	35
Agrostis nuttalliana	45
Avena sativa	10
Koeleria gracilis	35
Malva stricta	35
Limonium carolinianum	10
Echinochloa polystachya	15
Setaria fabii	25
Fragaria virginiana	15

Acknowledgement:

The vehicle washing studies reported here were performed at the facilities of the California Department of Forestry fire training academy, Lone, CA. We are deeply grateful for the facilities and equipment which they made available to us at no cost. We would also like to thank numerous technicians and vehicle wash unit contractors for their assistance.