



## Development and Testing of Fire Engines

1950s



2002



1970s



## Development and Testing of Fire Shelters

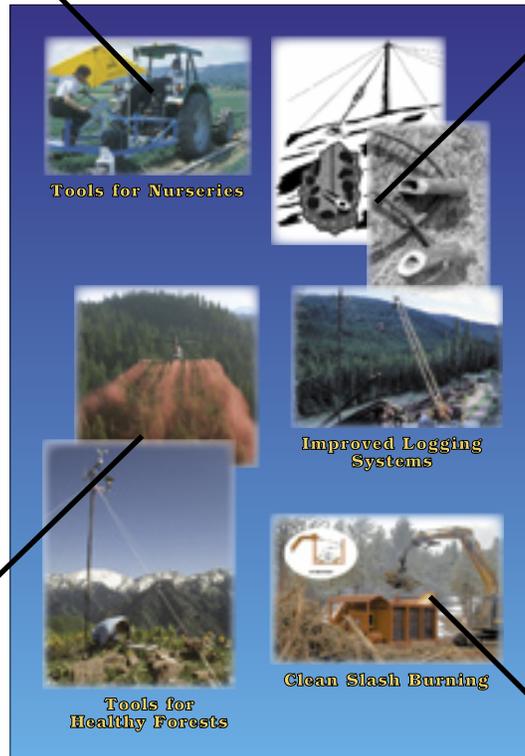
## Tools for Nurseries

Trees grown in USDA Forest Service nurseries help reforest lands. The Technology and Development Program uses new technology, such as the electronic seedling counter pictured, to increase production and reduce the labor required for repetitive tasks.

## Improved Logging Systems

Cable systems can reduce the environmental impacts of logging in steep terrain. These systems require sturdy anchors, such as large stumps, or, if they are not available, special anchors developed by the Technology and Development Program.

Unlike most commercial yarders, the Bitterroot Miniyarder is small enough to be hauled in the bed of a pickup truck. The Technology and Development Program developed the miniyarder to allow loggers to pull small-diameter logs from the forest more economically.



## Tools for Healthy Forests

Aerial spraying is one of the tools used to control bug or weed infestations in forests. The Technology and Development Program's careful studies of spray technology and meteorological conditions allow forest managers to reduce spray drift outside the intended target area.

## Clean Slash Burning

Thinning unhealthy forests generates a lot of slash. Piling and burning slash can create lots of smoke. Burning slash in an air-curtain burner increases combustion efficiency, dramatically reducing the amount of smoke.



**Tools for Nurseries**



**Improved Logging Systems**



**Tools for Healthy Forests**



**Clean Slash Burning**

## Smokeyumping Equipment

Smokeyumpers parachute into the forest after fires are first spotted. They can get closer to their target and have softer landings using the new parachute developed by the Technology and Development Program and a private contractor. All the equipment used by USDA Forest Service smokeyumpers and by firefighters who rappel from helicopters is tested and certified by the Technology and Development Program.

## Aerial Ignition

The USDA Forest Service needs effective ways to start fires as well as to put them out. In some cases, it's safer and less expensive to start fires with gelled gasoline dispensed from a helitorch hanging below a helicopter than to have firefighters on the ground start the fires.



## Tools to Limit Invasive Species

A portable power washer developed by the Technology and Development Program helps remove weed seeds and spores from vehicles entering or leaving fire camps and other remote locations. The washer can be pulled behind a ¾-ton pickup truck.

The washer conserves water by filtering and reusing wash water.

## Evaluation and Testing of Wildland Fire Chemicals

Carefully conducted tests determine how much fire retardant, foam, or water enhancers will retard or suppress fires when helicopters (bottom left photo) and airtankers make their drops. All chemical products (such as retardants, foams, and water enhancers) for wildland firefighting must be proven safe and effective (bottom center photo) before the USDA Forest Service qualifies them for use. Special meters (bottom right photo) were developed to determine exactly how much retardant is loaded onto planes. These meters help ensure that planes will not be overloaded.