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Region



# **Low-Impact, Selective Herbicide Application for Control of Desert Shrubs and Trees**

**A Field Guide by Max Williamson  
and Doug Parker**



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# Low-Impact, Selective Herbicide Application for Control of Desert Shrubs and Trees

## Background

The Upper Sonoran Desert and Desert Grasslands covers over 10 million acres in southern Arizona. The environment is erratic with daily temperatures reaching over 100 degrees F in the summer and occasional freezing in the winter. Precipitation ranges from ten to about sixteen inches annually, depending on elevation. Winter and summer rainy seasons are usually well defined, and prolonged droughts are common. The harshness of this climate poses special problems for native plants and they have had to develop various strategies to survive. Woody plants are xerophytic, having various means of protection against loss of water by excessive transpiration. Strategies that work in some years fail in others, although significant shifts in species composition usually occurred over long periods. These strategies also affect the success of various herbicide treatments. Several species have few leaves and rely on photosynthesis in stems; thus, foliar applied herbicides have not proven effective.

In recent history, environmental conditions have been significantly altered by humans allowing some woody species, several which are considered to be undesirable, to significantly increase in density in a short period. The exclusion of natural wildfires has had a significant effect, but several other events are also important. Where plant densities are too high, the results have been a loss of soil and site productivity, a deterioration of watershed conditions, including gully formation, and other adverse effects. Without intervention, densities of woody shrubs and trees are expected to continue to increase and damages to the ecosystem will continue.

The difference between a tree and a shrub in this region, where trees rarely exceed 30 to 40 feet, is qualitative rather than quantitative. Generally, we considered trees as being single stemmed plants in excess of 8 feet in height with a diameter at ground level of 2 inches or greater, while shrubs are many stemmed plants that are 8 feet or less in height. Some species, however, such as velvet mesquite, are arborescent, or treelike, even though they often have multiple stems.

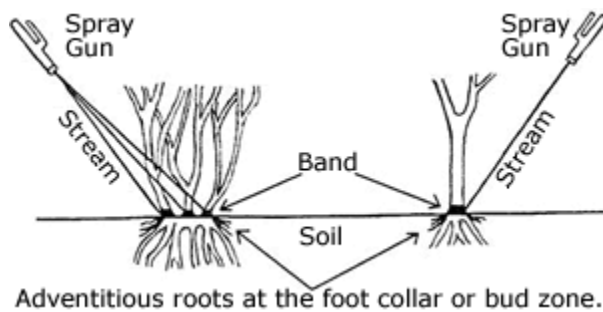
## Management Options

Knowledgeable managers choose vegetation management methods that are environmentally compatible effective, and economical. It has become increasingly obvious that the use of controlled fire is an important action that must be taken on selected sites as one means to help restore a more natural and healthy condition, which is a grassland savanna with scattered patches of woody vegetation. Firewood harvesting is another practical approach where trees, such as mesquite, are sufficiently large. Mechanical methods are used, even though they are very expensive, tend to be non-selective, and may be unacceptable due to archaeological concerns and/or T&E species on the area. It has been found that many of the woody species are able to sprout after burning or cutting; thus, the benefits of these treatments may last for only a few years. Recently, two new approaches, involving low-impact, selective application of a herbicide have been developed to control sprouting woody plants in conjunction with controlled burning and firewood harvesting. Also, these approaches can be used individually to control selected shrub and tree species when other alternatives are not viable. It must be emphasized that these herbicide options are in the early stages of development and it will take another year or two before complete treatment results can be fully assessed. Nevertheless, treatment effectiveness has

been sufficient with some species to enable us to make specific recommendations for immediate use.

## Application Techniques

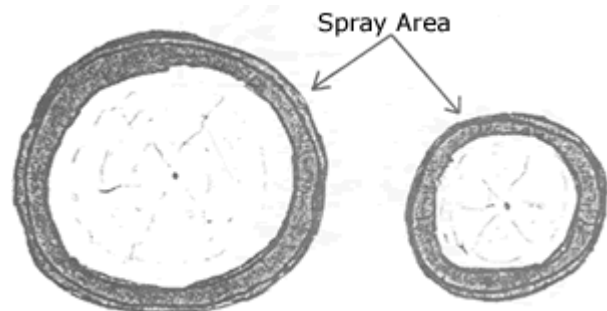
Two application techniques were evaluated using a 20 percent mixture of the herbicide picloram (Tordon 22K<sup>\*</sup>) in water: (1) basal treatment of shrubs and small trees and (2) cut stump basal treatment for large trees. Picloram was selected for testing because (1) grasses are not killed at the recommended application rate; (2) it is registered for range and pasture, and wildlife management; (3) it can be applied to be target specific and not affect untreated woody plants within 2 to 3 feet; and (4) it has produced the best results. A discussion of the two treatment approaches follows:



**Water Basal** — This approach can be used for shrubs and small trees less than eight feet in height. Tordon 22K is a liquid formulation which is mixed with water and a silicone wetting agent as follows: 26 ounces of Tordon 22K formulation plus water to make a gallon and 5ml of a silicon wetting agent gives a 20 percent mixture. This mixture is applied to the base of selected shrubs and small trees with a

backpack sprayer having a diaphragm pump. Sprayers with piston pumps are not recommended because of their tendency to leak. Swissmex SPI and Solo Model 475 are inexpensive backpack sprayers that are commonly used. A Model 30 Gunjet or CCI Tiggerjet spray gun should be used with a TP-0002 tip or a DE-2 disc. The spray mixture is applied as a solid stream to the base of stem(s) just above the soil. The key is to cover the entire circumference of the stem(s) and allow the mixture to spread down the stem(s) under the soil to the root system as shown in the diagram above.

**Cut Stump Water Basal** — This approach is appropriate for treating large mesquite trees. Freshly cut stumps should be treated as soon as possible after cutting, preferably within a minute or two to achieve maximum treatment effectiveness. A delay of more than 2 hours between cutting and herbicide treatment will significantly reduce effectiveness. Again, a 20 percent mixture of Tordon 22K (26 ounces of product) per gallon of water is recommended. The silicone wetting agent is not needed for this technique.



Application can be done with a pressurized backpack sprayer or a hand held spray bottle. The treatment surface is from the bark into the stump for 1 to 2 inches. This area must be thoroughly sprayed as shown above.

<sup>\*</sup> Trademark of DowElanco

Treatment effectiveness can be improved if stumps are level and free of bark tears, sawdust, or other debris.

## Selective Management Recommendations

Although more time is needed to evaluate the overall treatment effectiveness for the various field tests begun in 1994, treatment results have been sufficient, over 90 percent topkill, to allow treatment recommendations to be made for the following woody shrubs and trees:

### Water Basal

(20 percent Tordon 22K)

Burro weed, *Isocoma tenuisecta*  
Catclaw, *Acacia greggii*

Creosote bush, *Larrea tridentate*  
Desert broom, *Baccharis sarothroides*  
Graythorn, *Ziziphus obtusifolia* var. *canescens*  
Turpentine bush, *Haplopappus larcifolius*  
Wait-a-minute bush, *Mimosa biuncifera*  
White thorn, *Acacia constricta*

The best timing for application is when the summer or winter rainy seasons have begun. The herbicide must be absorbed and translocated in treated plants to be effective.

Initial control of the mesquites (*Prosopis velutina* and *P. glandulosa*) sprouts or cut stumps appears promising, but we cannot recommend this treatment for anything other than small scale projects.

A 10 percent mixture of picloram also has been tested for these shrubs and trees, but we can only recommend the 20 percent mixture at this time.

### Cut Stump Water Basal

(20 percent Tordon 22K)

This technique is an option for possible control of stump sprouting for honey mesquite (*Prosopis glandulosa*) and velvet mesquite (*P. velutina*). Since there is no other alternative to control sprouts on cut stumps, we are recommending that this approach be tried on an operational basis. However, we suggest that the treatments be done on a small scale and follow up evaluations be made to determine if satisfactory results can be achieved.

## Assistance

If you have questions or need assistance, contact any of the following individuals: Max Williamson, 1-800241-8070 ext. 571; Doug Parker, USDA Forest Service, (50S) 842-3280; or your local Natural Resources Conservation Service office in Arizona.

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Pesticides used improperly can be injurious to human, animals, and plants. Follow the directions and heed all precautions on the labels. Store pesticides in original containers under lock and key — out of the reach of children and animals — and away from food and feed.



Apply pesticides so that they do not endanger humans, livestock, crops, beneficial insects, fish, and wildlife. Do not apply pesticides when there is danger of drift, when honey bees or other pollinating insects are visiting plants, or in ways that may contaminate water or leave illegal residues.

Avoid prolonged inhalation of pesticide sprays or dusts; wear protective clothing and equipment if specified on the container.

If your hands become contaminated with a pesticide, do not eat or drink until you have washed. In case a pesticide is swallowed or gets in the eyes, follow the first-aid treatment given on the label, and get prompt medical attention. If a pesticide is spilled on your skin or clothing, remove clothing immediately and wash skin thoroughly.

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NOTE: Some states have restrictions on the use of certain pesticides. Check your State and local regulations. Also, because registrations of pesticides are under constant review by the U.S. Environmental Protection Agency, consult your local forest pathologist, county agriculture agent, or State extension specialist to be sure the intended use is still registered.