

## *Establishing Noxious Weed Demonstration Plots*

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*This Resource Note is adapted from the December 2000 issue of TechLine, (published by Ag West Communications.) summarizing several studies and successful post-fire management programs.*

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The purpose of this article is to outline procedures for designing demonstration plots on noxious weeds. These plots can be utilized to answer questions you or the public may have regarding effectiveness of various management tools such as herbicides, physical, mechanical, or biological treatments. These plots can also be used during tours and meetings to show the public and others how different management techniques compare under "field" conditions.

### **Establish Objectives:**

The most important step in establishing any demonstration plot is to develop a clear objective for the study, such as "Compare the effectiveness of various biological and mechanical treatments on cover and density of spotted knapweed."

In developing your study objectives, you should contact Extension Weed Specialists to determine whether studies have been completed that address your questions, or if there are demonstration plots already established in your area.

You may want to modify your study design and objectives based on previously conducted or on-going research.

### **Site Location:**

Once your objectives are established, you need to find a location that best fits the study. The site should be selected based on the following criteria:

1. Sites that will be utilized for "demonstration" purposes should be easily accessible to the public.
2. The demonstration area should be located no more than a 30-minute drive from a community or convenient meeting location (such as FS or BLM district office).
3. Weed cover and density should be uniform in the plot area to compare various treatments.
4. The site should be large enough so various treatments can be applied adjacent to each other.
5. The site should be typical of areas that are infested with the target weed.

### **Plot Size:**

Plot size is dependent on the objectives of the study, treatments that are being applied, size of the application equipment, and sampling methods. In general, individual plots for demonstration purposes of herbicide, mechanical, or manual treatments should be about 20 by 30 feet with a minimum plot size of 10 by 25 feet. Buffer zones of 3 to 4 feet may be needed between treatments to minimize seed contamination, reduce the potential for drift between plots, and allow for good visual observation of the plot without walking through treatments.

### **Plot Arrangement:**

Demonstration plots should be arranged so that various treatments can be viewed easily and treatments

are on similar slope, aspect, soil, and vegetation type. Be sure to include an untreated control plot with the treated plots so that visual comparisons or quantitative measurements can be determined. Untreated plots should be located upwind and up-slope from treated plots to minimize possibility of drift or movement of seed from other plot treatments.

### **Plot Identification:**

This is critical once the site is located. Individual plot corners should be marked with wooden or metal stakes. Metal rebar can be buried level with the ground on the four outside corners to ensure that the plot area will be permanently marked (metal detectors can be utilized to find the corners if necessary). Treatments should be marked on metal tags and placed on the left corner stake of each plot (see diagram). If possible, the distance from two plot corners to a permanent fixture (telephone pole, building corner, section corner, fence line, etc) should be recorded in a field notebook in case plot stakes are destroyed by wildlife, livestock, or fire. On sites that have high livestock or wildlife use, metal pins and large metal washers can be buried flush with the ground to mark plot corners. This will minimize disturbance by animals, but it also makes the markers difficult to locate in tall vegetation.

### **Application Equipment:**

Use commercial application equipment or equipment that simulates commercial application, such as experimental plot sprayers for herbicide treatments. Seed drills or herbicide sprayers must be calibrated prior to application so that the rate that is being applied is accurate. In most situations, single nozzle backpack sprayers should not be used for applying herbicides to demonstration



plots because of difficulty in maintaining a consistent pattern throughout the plot area. Proper application of all treatments is essential to maintaining integrity of the study.

### Record Keeping:

Accurate records must be kept during all aspects of the study. This includes site location and directions to the site, plot layout and design, and application and monitoring information. A treatment list including application rates, date of application, and conditions during application are essential to the study. Application records that must be recorded include:

1. Name of applicator
2. Date and time of day application was made
3. Make and model of application equipment
4. Equipment calibration records (speed traveled, output)

5. Total output in gallons per acre for herbicide application equipment
6. Application rates (this includes herbicide rate, number of biological agents released, number of people hand pulling, seeding rates, etc).

### *Environmental conditions to record at application include:*

1. Air temperature
2. Soil temperature [at 3 or 4 inches]
3. Wind speed and direction
4. Percent relative humidity
5. Percent cloud cover
6. Soil moisture (dry, moist, or wet)
7. Soil texture (series name if possible), slope, and aspect
8. Soil organic matter and pH if relevant to the study
9. Date to first precipitation event
10. Vegetative growth stage of key species including the target weed

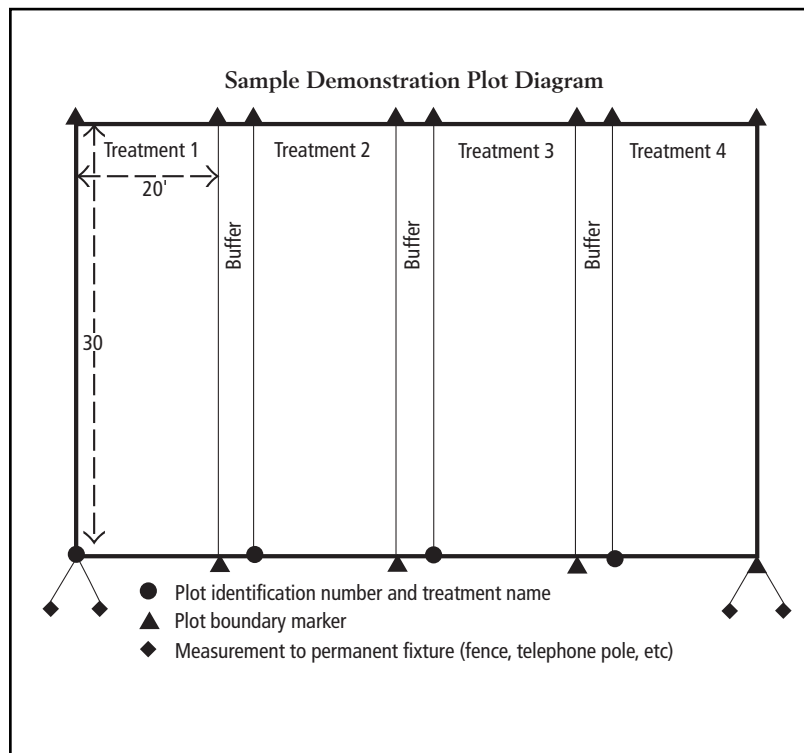
### Monitoring:

Monitoring results is critical to the success of demonstration areas.

Visual percent control (compared to untreated plots), density, cover, and/or frequency are often used to evaluate differences between various treatments. Data collection should be consistent between years, and for most noxious weed species should be conducted for at least 3 years to determine long-term effectiveness of treatments.

### Summary:

Demonstration plots are an excellent method to evaluate new weed management methods on a small scale to determine their application to your area. They also serve as an effective tool for educating the public about various management methods. However, their success is based on the accuracy with which the treatments are applied and annual monitoring of results. Be sure to maintain accurate detailed records so that someone else can continue monitoring efforts if you move or transfer to another position.





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