



# "SADDLE-LIGHT" USER'S GUIDE

## TABLE of CONTENTS



<b>Introduction</b>	<b>2</b>
<b>Horse Safety Considerations</b>	<b>3</b>
<b>Sprayer Operation</b>	<b>5</b>
<b>Sprayer Calibration</b>	<b>7</b>
<b>Tank Mix Based on Calibrated Application Volume</b>	<b>8</b>
<b>Canister Preparation</b>	<b>9</b>
<b>CO<sub>2</sub> Cylinder Safety</b>	<b>10</b>
<b>Principles of Integrated Weed Management</b>	<b>11</b>
<b>Choosing Herbicides Wisely</b>	<b>15</b>
<b>Pesticide Application Record</b>	<b>17</b>
<b>Noxious Weed Treatment/Monitoring Record</b>	<b>18</b>
<b>Monitoring and Mapping</b>	<b>19</b>
<b>Refilling Your CO<sub>2</sub> Bottle(s)</b>	<b>21</b>
<b>Horseback Sprayer Parts List</b>	<b>22</b>

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## USER'S GUIDE

for

### *"THE SADDLE-LIGHT"*

## HORSEBACK WEED MANAGEMENT SYSTEM

### Introduction

To insure maximum benefit and safe operation of this system, please read this information carefully, before operating. This system has been designed to provide efficient, safe and effective treatment of infestations of invasive weed populations. It was designed for use in the backcountry or in difficult terrain, where ATV's or other vehicles are not practical.

### Acknowledgements

Production of this unit is a non-profit venture, and involves the help of many people. We are particularly grateful to the following people:

First off, the "Saddle-Light" is based on a design by **Mr. Harley Bauer, of Corvallis, Montana.** The former Ravalli County Weed Supervisor shared his design with us, and was a pioneer in the use of this type sprayer.

**Tim Playford, Dow AgroSciences;** for financial assistance for the user guide.

**Dale and Donna, Champion Box Co. of Rifle, Colorado** worked tirelessly to help us design the ultra lightweight, extra strong panniers that allow you to haul "more whack per pack".

**Cathy Gould and Katie Day, White River Soil Conservation District** for all their help keeping the books straight.

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**Advantage Photo of Meeker, Colorado** for photography.



## Horse Safety Considerations

It is important that applicators using the "Saddle-Light" system should have a good working knowledge of horsemanship and packing. They need to also be familiar with the animals they intend to use with the system. Although the "Saddle-Light" was designed for maximum compatibility with horses, it is important to select the proper animals for use with the system. This unit can be operated by a person leading a packhorse on foot, or by a person riding a saddle horse, leading the packhorse, and spraying simultaneously. Regardless of how you plan to use this sprayer, here are some important horse safety considerations:

1) An ideal pack animal should have a quiet, gentle disposition, good stamina and be reliable under all conditions. Few of our equine friends have all of these qualities without considerable training. With this in mind we suggest a very sound, older horse that has been used to pack in a variety of situations, and has packed many different types of loads. If you do not have access to this kind of animal, any gentle horse can be conditioned to this equipment without too much trouble.



2) Prior to the spray season, condition your pack and saddle animals to this unit. Tie them up to the corral and operate the unit on the ground, before you put the system on your pack animal. Use water only in the cans. This will allow your stock to get used to the equipment, and the associated sounds. This spray system is practically noiseless during operation, but there are three sounds you will want to let your animals hear during this process:



- a) When first turning on the pressure from the CO<sub>2</sub> bottle, there will be a gurgling sound as the stainless steel cans are pressuring up.
- b) When you squeeze the trigger on the handgun, you and your horse or mule will hear an intermittent hissing sound until all air is out of the hose.
- c) When the cans are about empty, again you will hear the hissing noise as the last of the liquid is sprayed out of the gun.

**Note: This would be an excellent time to calibrate your spraying using the 18.5 square feet method, shown on page 7. Do this conditioning several times until your pack animal gets used to all of the sounds of the sprayer operating. A little extra time on the ground will really save some headaches later on.**

3) After your animals become conditioned to the sight and sounds of the system, continue to do the same conditioning, while the sprayer is on the pack animal. But first, read the section on "Sprayer Operation" page 5, which explains this process.

4) Always try to optimize loads on your pack stock in terms of weight and/or bulk. Horses and mules should pack approximately 20% of their body weight. For instance a 1000-pound horse can carry a 200-pound load. Your new CO<sub>2</sub> sprayer weighs around 200 pounds when all cans are fully filled with liquid, so you will need a good-sized pack animal. Or, if you have a smaller animal, you can adjust the weight by only filling four gallons total in each canister, instead of five gallons. This will reduce the total load by 32 pounds, which about any sound horse, or mule should be able to carry.

5) One other key to a successful load is to have it as balanced as possible from side to side. Your sprayer has been designed to discharge from two cans at a time, one on each side. So the weight remains balanced at all times. The CO<sub>2</sub> canister fits on one side, in the pocket between the two cans. It weighs about 10 pounds, so you can put your extra herbicide, surfactant, measuring cups, collapsible bucket, gloves, and other personal protective equipment on the other side as needed to balance your load.



6) Gradually work your pack animal into shape before the spray season and then keep him in top shape all summer long. Remember your packhorse is as important as the spray equipment itself if you are going to have a successful season. At the end of each day, check for any signs that your load is not riding properly or your tack is not adjusted right. Adjust accordingly.

7) Make sure all pack pads are kept clean and straps properly adjusted in order to avoid crippling or making the horse sore.





## Sprayer Operation

**Visually inspect the entire system daily for signs of abnormal wear and tear or loose and worn fittings that might become a safety hazard.**

1) Saddle up your pack animal, making sure all your pack gear is in good condition and secure. The extended length pack pads are recommended.

2) Put the two empty panniers on the packsaddle. We prefer the Sawbuck saddle, but a Decker will work if you adjust the pannier straps so the panniers will ride at the proper height on the horse. Now you are ready to load the four filled beverage canisters, one on one side, then on the other.

**NOTE: do not attempt to add water or herbicide to cans after the can is in the pannier. Add your water, herbicide, surfactant, and dye while the can is on the ground. If you are dipping buckets of water from a stream or lake, move well away from the live water source when adding your other ingredients. If the can is pressurized, you will need to relieve pressure from the can using the pressure relief on the can's lid, in order to remove the lid.**



3) Place the cans, filled with spray mixture, onto the panniers, and secure.

4) Attach the pressure regulator (pre-set at 40 psi) with the two air lines, to the CO<sub>2</sub> bottle and load into the pannier bottle carrier pocket. We prefer the left side but that is not mandatory. The regulator requires a 1 1/8<sup>th</sup> wrench. Be sure to take one with you to the field.

5) You are now ready to attach the fittings (disconnects) to the canisters. The hoses from the CO<sub>2</sub> bottle will connect to the valve marked "IN". The liquid lines (going to the gun) will attach to the valve marked "OUT". You will connect two canisters at a time. When these two are empty you will reconnect to the other two canisters. It is recommended to hook to both front and/or both back at one time. (In other words, do not connect fittings to the front can on one side of the horse, and the rear can on the other). You will need to push on the connector hard until you hear the connector click on to the can's nozzle, otherwise it will come off when you open the pressure valve on the CO<sub>2</sub> bottle.

**NOTE: The CO<sub>2</sub> and liquid connectors are slightly different in diameter and should not interchange, but if you are unsure which is which, the liquid discharge has a dip tube connected that goes to the bottom of the inside of the canister. If you are experiencing problems attaching the disconnects, it is recommended to apply a small amount of silicone lubricant to the ball-lock connections.**

6) Take a last- minute look at all the connections to see if everything is tight and then slowly turn the black knob on the CO<sub>2</sub> bottle counter-clockwise to pressurize the cans. There will be a slight hissing/gurgling noise for about five seconds until the front two cans are pressured up. If the hissing does not stop, you must have a poor connection, faulty O-ring or gasket, or a damaged hose. Check all fittings and connections.

7) With the system pressured up you are now ready to apply your spray solution. A small amount of air will first be expelled until the liquid fills the hose and then your sprayer will be virtually noise free until the first two 5 gallon canisters become empty. At this time, you will hear hissing again as air mixes with your liquid. This means your two front cans are empty and it is time to move your fittings to the two rear canisters and start spraying out of them.

**It is because of these hissing noises that you need to condition your pack animal in the corral before going to the field.**

8) The recommended method to change canisters is as follows:

- a. Turn off the CO<sub>2</sub> valve (clockwise)
- b. Uncouple both CO<sub>2</sub> hose fittings from the empty cans
- c. Uncouple both liquid hose fittings from the empty cans
- d. Re-hook liquid hose fittings to the full cans
- e. Re-hook CO<sub>2</sub> hose fittings to the full cans.
- f. Turn on CO<sub>2</sub> valve and begin spraying from your second pair of canisters.



**NOTE: Be sure the valve on the CO<sub>2</sub> bottle is closed before you begin connecting the fittings to the cans. If there is live pressure, it will begin to force liquid from the first can you connect into the unconnected side, causing an unbalanced load. Also, one canister will run out before the other.**

**IMPORTANT NOTE!!! Take 5-gallon canisters off the pack animal before releasing the pressure relief valve found in the center of the lid. This is a fairly loud hissing noise and should be done away from the animal, unless he is used to it.**

## Sprayer Calibration

### Sprayer calibration made easy (No-Math Version)

- Step 1. Establish a calibration plot that is exactly 18.5 feet wide by 18.5 feet long.  
**Note: This is 1/128 acre and there are 128 ounces in a gallon**
- Step 2. Spray calibration plot uniformly with water. Note number of seconds required.  
**Time Required = \_\_\_\_\_ Seconds**
- Step 3. Spray into bucket or other container for the same number of seconds.
- Step 4. Measure the number of **ounces** of water collected in the bucket.  
**Volume Sprayed=\_\_\_\_\_ Ounces**
- Step 5. Ounces collected equal the number of **gallons per acre** the sprayer is delivering.  
**Gallons Per Acre = \_\_\_\_\_**



**Note: Each individual's spraying habits will be enough different that everyone's Gallons Per Acre (GPA) will be slightly different. This makes it imperative that everyone using the sprayer calibrates individually in order to determine the proper rate of herbicide in the spray mixture.**

## Tank Mix Based on Calibrated Application Volume

*Procedure: Determine the ratio of total spray volume for 1 acre of land.  
(Amount of herbicide: gallons of spray per acre)*

Example 1: An herbicide label says to apply **3 quarts** of product per acre. Through the 18.5 square feet calibration method you have determined how many gallons per acre (GPA) **you** apply with this sprayer.  
**Note: Each individual will be different for each apparatus. This is why it is extremely important for everyone to calibrate on every piece of spray equipment they use.**

For our example we'll say you apply 60 GPA. This means for every 60 gallons of total spray solution you apply, you need 3qt. (96 oz.) in that mix. Our sprayer utilizes four 5-gallon canisters. 5 divided by 60 equals .083 acres per can. You need 96 oz. per acre times .083 acres per can equals 8 (7.999968) ounces of herbicide in each 5-gallon can. Thus you put 8 oz. of herbicide in your 5 gallon can and then top it off with water or what ever you are using as a carrier.

Example 2: One commonly used mix for Leafy Spurge is 2 qt. Tordon 22K, 1 lb. 2,4-D Low Vol, and 20 oz. of Surfactant per acre. This would come out on a per canister basis at 60 GPA as follows:

64 oz (2 qt) Tordon times .083 equals 5.3 oz.  
21.3 oz. (1 lb) 2,4-D times .083 equals 1.8 oz.  
20 oz. Surfactant times .083 equals 1.7 oz.

**Total amount of product for each 5 gallons of spray: 8.8 oz.**

**You should check your calibration periodically as the season progresses to make sure your spraying habits have not changed, thus throwing off your application rate.**

**Fluid Measure  
Conversion Table**

1/6 fluid ounce	= 1 teaspoon (tsp.)		
1/2 fluid ounce	= 1 tablespoon (tbs.)	= 3 teaspoons	
1 fluid ounce	= 2 tablespoons	= 1/8 cup	
8 fluid ounces	= 1 cup	= 1/2 pint	
16 fluid ounces	= 2 cups	= 1 pint	
32 fluid ounces	= 4 cups	= 2 pints	= 1 quart
64 fluid ounces	= 8 cups	= 4 pints	= 2 quarts = 1/2 gallon
128 fluid ounces	= 16 cups	= 8 pints	= 4 quarts = 1 gallon



## Canister Preparation

It is recommended that you take the 5-gallon canisters off the pack animal during the filling process. Take them down near the creek or other clean water supply and with the collapsible bucket and a filter/sieve, fill the canister to near full. Remember you must leave enough room for the herbicide, as it is a total 5-gallon mix you want. **Take the canister with water away from the creek before you add the herbicide and dye.**



The amount of herbicide you add will depend entirely upon the calibrated gallons per acre you apply and the rate of herbicide per acre you wish to treat the area with. In our example 2, in the calibration section, a person would need 8.8 oz. of ingredients and 4 gallons 119.2 ounces of water for the 5-gallon mix. **Note:** read carefully the "Calibration Sections" (pages 7 & 8) remembering that each person applies at their own rate of water per acre, therefore the amount of herbicide will entirely depend upon each individuals spraying habits.

One other suggestion is the use of dye in your mixture. This is highly recommended on dispersed patches or especially large ones that you will need to reload and come back to. A dye such as HI-LIGHT WSP, which is a non-toxic material that will turn the mixture and ultimately the weeds you spray blue, will work quite well. This blue color will stay visible for a few days so you don't accidentally spray the same place twice or miss an area that you thought you treated earlier. Dye helps provide the most uniform treatment possible with the handgun.



After you have prepared your mix, load them onto your pack animal, hook up your disconnects and you are ready for your next load. **If you are experiencing problems attaching the disconnects, it is recommended to apply a small amount of silicone lubricant to the ball-lock connections.**

In our studies with this type of unit we could spray 14 to 16 of the five-gallon canisters with one 5 pound bottle of CO<sub>2</sub>. We did get as high as 18 depending on leaks and other unnecessary losses of CO<sub>2</sub>. With this in mind, one 5 pound bottle of CO<sub>2</sub> would get you through most days without needing to carry a second bottle as a spare and in widely scattered infestations, one bottle could last for several days. Keep track of how many cans you have dispensed with your current CO<sub>2</sub> bottle so you will know when your pressure is about gone.

## CO<sub>2</sub> Cylinder Safety

All compressed gas cylinders or cryogenic containers should be adequately secured in the vehicle before transporting. Adequately secured means the cylinder or container is not free to move while the vehicle is in motion. An unsecured or improperly secured cylinder could become dislodged during transport creating a hazard to the vehicle occupants. This is also true while the cylinder is in the pack rig. It must be secured down so it cannot come out the top of the CO<sub>2</sub> cylinder pocket.



While transporting in a vehicle you must allow for adequate ventilation. In the back of an open pickup properly secured is best. If you must transport in an enclosed vehicle, windows must be opened for ventilation in the event of a product leak. While CO<sub>2</sub> is very safe in regards to flammability, it does pose an asphyxiation threat in an enclosed environment. Maintain adequate ventilation where you store the CO<sub>2</sub> cylinders when not in use.

Be aware that environmental conditions (e.g., heat exposure) may cause the temperature of the cylinder to rise to excessive levels (even if the ambient temperature is relatively low), which could lead to a release of product. Do not leave your CO<sub>2</sub> cylinder in a vehicle parked in the sun, to avoid excessive heat. Do not expose a filled cylinder to any heat source, flame or condition where the temperature may exceed 130 degrees Fahrenheit. Cylinders exposed to fire or heat in excess of 350 degrees must be condemned and not refilled.

Listen for leaks. Visually inspect the cylinder for dents, gouges or pits. Ensure that valve protection, where provided, remains in place until the cylinder is ready for use.

# **Principles of Integrated Weed Management**

*Barbra Mullin, Weed Specialist*

The goal of an effective weed management program is to replace undesirable plants that are causing resource, economic, habitat, or aesthetic losses, with a plant or plants that are beneficial to the environment.

An integrated and coordinated approach to weed management should have two primary goals. First development of a long-term plan that encompasses all land in a designated area, with all landowners and managers working together toward effective management. Second, implementation of the most economical and effective weed control methods for the target weed. Integrated weed management (IWM) is a systems approach to management of undesirable plants. IWM is defined in the federal noxious weed act as "a system for the planning and implementation of a program, using an interdisciplinary approach, to select a method for containing or controlling an undesirable plant species or group of species using all available methods; biological control agents; herbicide methods; and general land management practices." It is a multidisciplinary, ecological approach to managing unwanted plant species.

## **Weed Management Techniques**

Integrated weed management involves the use of the best control techniques described for the target weed species in a planned, coordinated program, to limit the impact and spread of the weed. The control methods selected should be determined by the control objectives for the land, the effectiveness of the control technique on the target species, environmental factors, land use, economics, and the extent and nature of the weed infestation.

Factors that must be assessed prior to making a management decision include: 1) Inventory and assessment to identify the target weed species and determine the size of infestation: 2) Assessment of non-target vegetation in the management area: 3) Determination of soil types, climatic conditions, and important water resources: and 4) determination of the limitations of the control method chosen.

An accurate assessment of the target infestation will help determine the most appropriate control method or methods for the weed species. A small patch of leafy spurge could be economically and easily controlled with a residual herbicide application and continued vigilance of the landowner. A large, dense infestation of leafy spurge may require establishment of a grazing program or biocontrol agent, combined with a herbicide containment program. All control options have some limitations. If complete eradication of a weed is necessary, biocontrol agents would not be a good choice. If soils preclude use of a herbicide, mechanical or biological may be the next choice.

## **Specific Weed Control Methods**

Prevention: Preventing the spread of the weed by seed or vegetative propagules should be the first line of defense in developing a weed program. There are many potential weed threats to lands and land managers need to be aware of the threat and identify unknown species and implement effective controls immediately.

Quarantines and embargoes can be effective in isolating and preventing the spread of weeds into new areas. Weed-free hay programs and certification programs for agronomic crops are designed to stop movement of new species into new areas. A program of this type is critical for protection of wilderness areas, where other control methods may be limited.

State seed laws are enacted to insure the purity of seed for planting, thus preventing the spread of weeds. An embargo of the sale and use of purple loosestrife (purple lythrum) targets the sale of the commonly used ornamental that has escaped into many wetland areas.

### **Education**

Weed identification and early detection of new invader species is crucial to any prevention program, and on-going education of land managers and owners about weed identification is needed to make early detection possible. Publications and computer programs give excellent information and color plates of important weed species in the west.

New weed management techniques and proper methods are a key part of any weed program. This includes yearly training seminars for land managers and support of the state pesticide applicator certification programs.

Educational efforts targeting the general public emphasize what weeds are of concern and why they are a threat. These programs have included development of brochures to show hunters what spotted knapweed looks like in the fall, so they can report new infestations; calendars, brochures and other handouts, coloring books for kids, etc. Bumper stickers, radio announcements and weed tours all emphasize the importance of noxious weed prevention and management.

### **Physical or Mechanical**

The use of physical methods to eliminate weeds can be effective on small infestations. Hand pulling using gloves and hoeing is most effective in areas where there is a limited weed infestation and soil types allow for complete removal of plant material. Spotted knapweed has been effectively pulled in areas of loose soil near water, where other methods were unacceptable and the infestation was small. It is not recommended in high-density infestations where there is not native vegetation to replace pulled plants.

Tillage is generally limited to cropland situations. Canada thistle has been effectively controlled when tilled every 21 days during the growing season. Some rhizomatous noxious weeds, such as leafy spurge, are not effectively controlled by tillage.

Mulches can be effective against many annual weeds, but generally only allow better competition when the target weed is a perennial plant.

Burning has been shown to be an effective set-up treatment for herbicide applications by removing old stand vegetation that would tie-up herbicides as they are applied. Burning should be timed properly to minimize damage to non-target species.

### **Biological**

Biological control involves the use of living organisms, such as insects, pathogens or grazing animals, to manage a weed infestation. Biological management attempts to recreate a balance of plant species with predators. Since many noxious weeds that are of the most serious concern in rangeland are exotic species, they have few established natural predators. Research focused on introduction of natural predators from the weed's area of origin on to local plant populations. Biocontrol methods generally suppress host weed populations, but will not contain or eradicate them. It is most effective on dense weed infestations over large areas.

Leafy Spurge currently has seven insect species cleared for release in the United States. A number of other species are currently undergoing host specificity testing and additional research. Flea beetles (*Aphthona* spp.) seem to be showing the most promise at this time.

Research on plant pathogens includes limiting the host range of a commonly found *Sclerotinia* fungus to attack close relatives to the knapweed species; determining the pathogenicity of soil born fungi that have shown some impact on leafy spurge in the field, and screening of weeds in their native areas for potential pathogens. Grazing animals have been used to decrease the density of leafy spurge and limit spread by reducing seed production.

### **Chemical**

Herbicides are important tools for controlling noxious weeds. It is important to understand the effects and limitations of those used for control of noxious weeds. Herbicides are categorized as selective or non-selective. Selective herbicides kill a specific type of plant, for example, 2,4-D kills only broadleaf plants. Herbicides are also selective based on the rate used. Spotted Knapweed generally is controlled using lower rates than Leafy Spurge, thus causing less potential impact on non-target broadleaf species. The most commonly used herbicides on noxious weeds are: 2,4-D, Picloram(Tordon), dicamba(Banvel), clopyalid(Transline, Stinger), and glyphosate(Roundup, Rodeo). All of these compounds except glyphosate will damage only broadleaf plants, making them effective tools for control of noxious weeds while maintaining valuable grass forage species.

There are important licensing and training requirements to be aware of when using herbicides. Environmental concerns make it critical to follow all label instructions.



## Cultural

Cultural methods of weed control that enhance the growth of desired vegetation may help slow invasion onto a site. The use of plant competition, smother crops, crop rotation and allelopathy are methods often most suited to cropland agriculture. When dealing with noxious weeds, it is important to maintain the native or desirable vegetation in a healthy condition to allow competition once the weeds have been controlled.

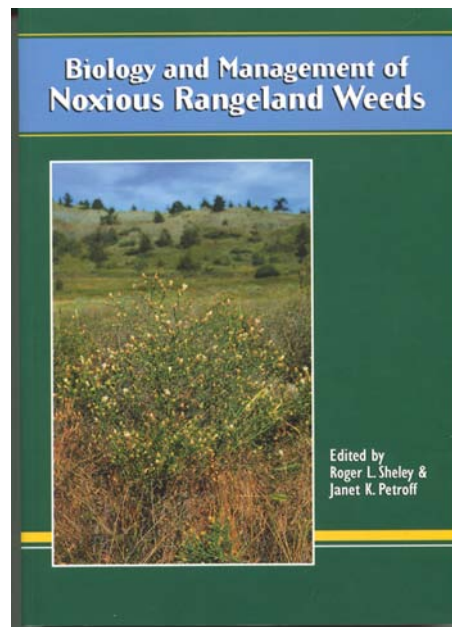
In some forest sites, improving brush and tree canopy cover can reduce spotted knapweed density and slow invasion. Fertilization and reseeding with competitive, adapted species may be necessary in some areas.

## Land Management

Follow-up management is especially important on range and pasture lands. It determines the longevity of control obtained by the methods used. Because noxious weeds have persistent growth characteristics and seed can remain viable in the soil for years. Long-term control must be implemented. Long-term management includes re-treatment with herbicides or continue cultural, mechanical or biological control practices to maintain low weed populations. Range improvements such as grazing systems, cross fencing, and water developments, will retard reinvasion of many weed species. Sites with no desirable species should be reseeded to a competitive plant species as a part of the total management program.

## Conclusion

Integrated weed management practices will work when land managers understand all the methods available for use; evaluate the site and choices for restrictions; implement the management plan and then implement follow-up management in the area to prevent re-invasion.



## Choosing Herbicides Wisely

Before you purchase any herbicide, you should answer some important questions...

- \* What is the positive identification of your target weed(s)?
- \* What herbicides are effective on your particular weed species?
- \* What herbicide is compatible with your site conditions?

Choosing the appropriate herbicide, rate and application method will ensure the control of the problem plants while minimizing the effects on desirable plants and wildlife habitat.

If you determine a herbicide is needed, read the labels carefully. You must choose a product that is specifically labeled for use on the plants you wish to control.

### WHICH HERBICIDE IS BEST FOR YOUR SITUATION?

Avoid problems by taking time to carefully study your herbicide needs. Your County Weed Specialist, Extension Agent or other agency personnel, actively engaged in weed control, can help you with herbicide recommendations. With their experience of past successes and failures they will be able to help tailor your needs to your specific situation.

Is it desirable or undesirable to use a herbicide on this site that has a longer residual in the soil? Picloram is an excellent choice for managing deep-rooted species such as leafy spurge or toadflax, as it will continue to provide control through the growing season. An herbicide with short residual life in the soil may be the best if you plan to re-plant with broadleaf species, or expect the site to be inundated with water during the next spring's high water period. Such a site would not be suitable for Picloram.

**Consider the site.** Read the label of each product under consideration to be sure that it can be used in the place and the manner you intend. Herbicide users are legally bound to follow label directions. You should read the label thoroughly before purchase, before each use, and prior to storage or disposal.

**What application equipment and protective equipment does the label require?** Do you have the gear?



**Minimize waste.** You should purchase only the amount of herbicide you anticipate using in one season. Some herbicides have a limited shelf life. If herbicides are stored, they must be protected from extreme heat and cold, and must be kept in a secure, locked place.

**Choose the least toxic product.** Compare herbicides based on how hazardous they are. The signal word on the label indicates a product's toxicity. For example, products marked CAUTION are less toxic than those marked WARNING, and should be considered first.

**Environmental hazards are reported on the label.** Be especially cautious with herbicides containing warnings regarding impact on water.

**Carefully read the disposal directions.** Be sure you can properly dispose of any unused or unwanted herbicide and the herbicide's container according to the manufacturer's recommended method.

**Special considerations.** Some herbicides have some unique considerations that need to be addressed. Roundup, for instance, cannot be used with stream water. Any dirt particles, or even the negative ions, in stream water will begin to break down Roundup and render it harmless. The sulfa-urea family of herbicides such as Escort and Telar are affected by the pH of the water. The higher the pH the more persistent the herbicide will be in the soil. This may or may not be a problem depending on the circumstance you are applying the herbicide in but it must be considered.

**Herbicides can be valuable tools, but they must be selected with personal and environmental safety in mind. As with other tools, it is important to use the right herbicide for the job. Care and planning before herbicides are purchased and used can ensure safe and proper results.**



**NOTE: Always read and follow label directions.**

# Pesticide Application Record

Ranger District: \_\_\_\_\_ Date: \_\_\_\_\_

## Location of Application

Drainage: \_\_\_\_\_ Specific location: \_\_\_\_\_  
Township: \_\_\_\_\_ Range: \_\_\_\_\_ Section(s): \_\_\_\_\_

## Application

Time: Start \_\_\_\_\_ End \_\_\_\_\_ Start \_\_\_\_\_ End \_\_\_\_\_  
Initial treatment  Re-treatment   
Weather conditions: Clear  Cloudy  Partly cloudy   
Wind speed \_\_\_\_\_ from \_\_\_\_\_ Temperature \_\_\_\_\_

Target weeds: \_\_\_\_\_

Stage of growth: Bud  Flowering  Seedling

Site of application: Rangeland  Pasture  Campground  Trailhead  Right of Way   
Other: \_\_\_\_\_

## Herbicides Used:

Name: _____	EPA Number: _____	Rate (AI) per Acre: _____
Name: _____	EPA Number: _____	Rate (AI) per Acre: _____
Name: _____	EPA Number: _____	Rate (AI) per Acre: _____
Name: _____	EPA Number: _____	Rate (AI) per Acre: _____

Dilutant Used: \_\_\_\_\_ Gallons per Acre: \_\_\_\_\_  
Application Method: \_\_\_\_\_ Actual Acres Treated: \_\_\_\_\_

Disposal: Empty Containers Triple Rinsed Yes:  No:   
Disposal Site: \_\_\_\_\_

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Applicator's Signature: \_\_\_\_\_

Certified Applicator's Signature: \_\_\_\_\_

**Noxious Weed Treatment/Monitoring Record**

**INFESTATION NUMBER:** \_\_\_\_\_

**RANGER DISTRICT:** \_\_\_\_\_

**LOCATION:**      Drainage \_\_\_\_\_ Latitude \_\_\_\_\_  
Longitude \_\_\_\_\_ Township \_\_\_\_\_ Range \_\_\_\_\_ Section \_\_\_\_\_

Date \_\_\_\_\_

**TARGET SPECIES:**

Stage of Growth: Bud \_\_\_\_\_ Flowering \_\_\_\_\_ Seeding \_\_\_\_\_

Initial Treatment \_\_\_\_\_ Re-treatment \_\_\_\_\_

Weed Density: Light \_\_\_\_\_ Moderate \_\_\_\_\_ Heavy \_\_\_\_\_

**WEATHER AND SITE CONDITIONS:**

Clear \_\_\_\_\_ Cloudy \_\_\_\_\_ Partly Cloudy \_\_\_\_\_ Temperature \_\_\_\_\_

Soil Moisture: Dry \_\_\_\_\_ Moderately Moist \_\_\_\_\_ Muddy \_\_\_\_\_

General Site Description: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**HERBICIDE TREATMENT USED:**

Name: \_\_\_\_\_ Application Rate per Acre: \_\_\_\_\_

Name: \_\_\_\_\_ Application Rate per Acre: \_\_\_\_\_

Name: \_\_\_\_\_ Application Rate per Acre: \_\_\_\_\_

Name: \_\_\_\_\_ Application Rate per Acre: \_\_\_\_\_

Acres Treated \_\_\_\_\_ Application Method \_\_\_\_\_

**RESEEDING INFORMATION:**

Seed Species \_\_\_\_\_ Pounds per Acre \_\_\_\_\_

Seed Species \_\_\_\_\_ Pounds per Acre \_\_\_\_\_

Seed Species \_\_\_\_\_ Pounds per Acre \_\_\_\_\_

Seed Species \_\_\_\_\_ Pounds per Acre \_\_\_\_\_

Miscellaneous Planting/Seeding Information: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Comments:**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Applicators Signature:** \_\_\_\_\_



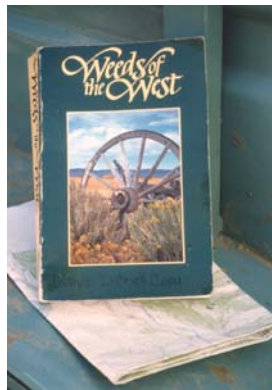
## Monitoring and Mapping

Monitoring and mapping programs vary greatly. They range from very sophisticated GIS systems with in-depth range analysis to a point on a map with a photo. Both systems can be effective. The important thing is that you develop a system that works for your situation and then do it.

### MAPPING

Mapping is extremely important for two main reasons. First, you need to have an idea of what the infestations are and how extensively they are spread. Second, and maybe of even greater importance, you need to have a location mapped so the next person treating weeds can find the spot. GIS systems are great, but if this technology is unavailable an accurate location on a topo map will also work quite well.

By having your weed populations accurately identified you will be able to better develop, implement and evaluate your weed management plan. You will be more able to predict those areas potentially subject to weed invasion and have a better understanding of the invasion process and determine the means by which weeds spread. With proper mapping you will be able to assess the economic impact of your noxious weed invasion. It will also help greatly with increasing public awareness, education and gaining support for your weed management efforts.



### MONITORING

There are three basic kinds of monitoring: Implementation monitoring, Effectiveness monitoring, and Validation monitoring.

**Implementation monitoring:** Did the treatment get carried out as planned? While this is often overlooked, it's important to establish exactly what treatment was applied. Often this must be done as the work is being accomplished. This is quality control for your program. Are your field personnel actually applying the correct treatment with respect to timing, rates, etc?

**Effectiveness monitoring:** This is a way of determining how well your treatment worked, and should involve at least some baseline data, to give you an idea of the "Before treatment" situation. This is the most important type of monitoring in weed management. Not only does it tell you if you are successful in your treatment, but it gives you something to show people what you have accomplished. It is a tool you can use to market your program. If your treatment program is successful in a given area, you have nothing to show but a piece of healthy rangeland (which is wonderful), but what if nobody else knew there were weeds there to begin with? Thus, the importance of the "Before" picture. This is just common sense, but often overlooked.

**Validation monitoring:** Does it appear that the assumptions used in planning the project are still valid and accurate? Are the objectives of the overall program being met, (are they attainable?). Have there been changes in the situation, which warrant an adjustment of the program or its objectives? Is it a viable project? Validation monitoring is an ongoing process, and often requires looking at an area larger than the affected acres of your project.

Weed management is a long-term process. With a sound monitoring program you can evaluate your successes as well as your failures to guide your decisions for future noxious weed treatments.

It is important to carry a good quality camera and establish photo points that can be found year after year. Mark them on a map or aerial photo, as well as on the ground. On your pesticide application record you could put this location in the comments column. Also you need to comment on the severity of the infestation, including density, remnant native vegetation, and any other pertinent vegetative or site-specific information which could be of importance in the success of the treatment.

File your photographs in an organized system and keep all information about the site and treatment with it. This way when you go back a year later you will have all the treatment data as well as the site information in one place, including how to re-locate the site.

A good monitoring program is essential to long term effectiveness and overall success of your program.



## Refilling Your CO<sub>2</sub> Bottle(s)

There are only a few places in the area that have the capability to fill the 5 pound cylinders. Most of us will have to go to a welding supply store and exchange an empty cylinder for a full one. With this in mind you will need to contact the welding supply company in advance to see if you will need to supply your own replacement cylinders or if they will simply exchange a full one for your empty. If they will do it in this manner, you won't need to purchase extra CO<sub>2</sub> bottles.

Prices generally average around \$10.00 to get a CO<sub>2</sub> cylinder filled. A few phone calls in your local area before the spraying season should get you a reliable supplier of CO<sub>2</sub> for the coming summer.

The following is a list of suppliers who provide CO<sub>2</sub> or may be able to suggest someone closer to your area. This is not a complete list, and there are probably more in your area.

### Direct Filling Capability, will fill while you wait:

Company	City	State	Telephone #
Air Gas Intermountain	Canon City	CO	719/275-5625
	Glenwood Springs	CO	970/945-9200
	Grand Junction	CO	970/243-1944
B & B Welder's Supply Inc	Craig	CO	970/824-1057
Four Corners Welding Supply	Cortez	CO	970/565-6547

### Exchange Empty Canister for a Full One:

Company	City	State	Telephone #
Air Gas Intermountain	Alamosa	CO	719/589-5810
	Montrose	CO	970/240-4777
	Craig	CO	970/824-8158
Western Slope Connection	Gunnison	CO	970/641-5171
Hartman Brothers Inc.	Montrose	CO	970/249-6651
B & F Welding Supply	Durango	CO	970/247-1466
Four Corners Welding Supply	Durango	CO	970/247-1854
Wright's Welding Supply	Rifle	CO	970/625-9330
Kemp & Company	Edwards	CO	970/949-5167
Salida Medical & Respiratory	Salida	CO	719/539-2704
Steamboat Rentals	Steamboat Springs	CO	970/879-2468

All of the exchange places we talked to only had a truck coming in once a week except for Four Corners in Durango, which had two day, a week service. With this in mind you will need to have enough cylinders on hand to last all week long. The best source we found for extra cylinders was Foxx Equipment Company in Denver. Their telephone number is:

1-800-525-2484. The 5-pound cylinder is part number *01F05-103* empty and *01F05-104* filled. They cost around \$60.00.

## Horseback Sprayer Parts List

Quantity	Description
2	Custom Panniers with Straps
4	5-Gallon canisters for spray mixture (Ball Lock Type)
1	5 Pound CO <sub>2</sub> Bottle (#01F05-104)
1	Pre-Set Regulator With Two Product Manifold (40 psi) (#03D03-200/#03G07-233)
2	Stainless Steel Ball Lock Disconnects (Gas) (#07E04-294) (white ring) <b>OR</b> Large Collar Plastic Disconnects (Gas) (#07C07-115) (gray)
2	Stainless Steel Ball Lock Disconnects (Liquid) (#07E04-295) (black ring) <b>OR</b> Large Collar Plastic Disconnects (Liquid) (#07C07-116) (black)
1	Double Canister Pressure Hose assembly
1	Double canister spray hose assembly
1	Spray Handgun (#GES-505) or (#JD9-C)
1	Collapsible bucket/Filter for refilling
2	Rubber Straps for securing cans into the pannier
1	Maintenance and Repair kit (packet of extra gaskets and washers)
1	User's Guide



**Not furnished:** Horse, pads, packsaddle, and personal protective equipment. You will also need to furnish a cinch rigging to keep the panniers from flopping when empty. D-rings have been provided on the bottom of the panniers.

## Maintenance and Repair Kit

This bag contains the gaskets and o-rings that you will need to check regularly and keep in place to ensure proper operation. New ones have been installed on your spray unit but keep this kit with you in the field in case you lose one or one wears out.

### DESCRIPTION:

- 1) The large black rubber o-ring is for sealing the lid on the five-gallon canisters. This part is needed to maintain pressure in the canister and prevent leaks. Your canisters have been fitted with new gaskets and should last for several years.
- 2) The ½-inch yellow, black or blue o-rings are required to maintain an airtight seal on the two nozzles on the five-gallon canisters. Check these on your canisters before each operation. This kit provides two as spares. **Important: store your canisters out of the direct sunlight.** Ultraviolet sunrays are extremely hard on the rubber gaskets and o-rings.

**Note: If you are experiencing problems attaching the disconnects, it is recommended to use a small amount of silicone lubricant to the ball-lock connection.**

- 3) The 3/8 inch white plastic flare washer, (frog eye), goes inside the four hose disconnect fittings and in the two fittings on the regulator manifold. These should not wear out but can be easily lost if the fittings are unscrewed. In the daily operation and the switching to different canisters these fittings do not need to be taken apart.
- 4) The 3/4 inch red plastic gasket/washer goes in the fitting between the CO<sub>2</sub> bottle and the regulator. This part is very important to prevent CO<sub>2</sub> leakage during operation. **Caution: This gasket/washer can easily fall out when you change CO<sub>2</sub> cylinders.**



For more information about parts or the general operation of your SADDLE-LIGHT unit, call Tom or Hal at the Blanco Ranger District. **Phone: 970/878-4039**