



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, DC 20460

OFFICE OF CHEMICAL SAFETY
AND POLLUTION PREVENTION

October 24, 2016

Nina S. Rao
Regulatory Manager
BASF
26 Davis Drive
Research Triangle Park, NC 27709

Subject: Label Amendment – Incorporating supplemental label use for Atlantic white cedar into master label
Product Name: Arsenal Herbicide Applicators Concentrate
EPA Registration Number: 241-299
Application Date: 05/25/2016
Decision Number: 518010

Dear Ms. Rao:

The amended label referred to above, submitted in connection with registration under the Federal Insecticide, Fungicide and Rodenticide Act, as amended, is acceptable. This approval does not affect any conditions that were previously imposed on this registration. You continue to be subject to existing conditions on your registration and any deadlines connected with them.

A stamped copy of your labeling is enclosed for your records. This labeling supersedes all previously accepted labeling. You must submit one copy of the final printed labeling before you release the product for shipment with the new labeling. In accordance with 40 CFR 152.130(c), you may distribute or sell this product under the previously approved labeling for 18 months from the date of this letter. After 18 months, you may only distribute or sell this product if it bears this new revised labeling or subsequently approved labeling. “To distribute or sell” is defined under FIFRA section 2(gg) and its implementing regulation at 40 CFR 152.3.

Should you wish to add/retain a reference to the company’s website on your label, then please be aware that the website becomes labeling under the Federal Insecticide Fungicide and Rodenticide Act and is subject to review by the Agency. If the website is false or misleading, the product would be misbranded and unlawful to sell or distribute under FIFRA section 12(a)(1)(E). 40 CFR 156.10(a)(5) list examples of statements EPA may consider false or misleading. In addition, regardless of whether a website is referenced on your product’s label, claims made on the website may not substantially differ from those claims approved through the registration process. Therefore, should the Agency find or if it is brought to our attention that a website contains false or misleading statements or claims substantially differing from the EPA approved registration, the website will be referred to the EPA’s Office of Enforcement and Compliance.

Your release for shipment of the product constitutes acceptance of these conditions. If these conditions are not complied with, the registration will be subject to cancellation in accordance

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Decision No. 518010

with FIFRA section 6. If you have any questions, please contact Lisa Pahel by phone at (703) 347-0459, or via email at pahel.lisa@epa.gov.

Sincerely,

A handwritten signature in black ink, appearing to read "Erik Kraft for". The signature is cursive and somewhat stylized.

Erik Kraft, Acting Product Manager 24
Fungicide and Herbicide Branch
Registration Division (7505P)
Office of Pesticide Programs

Enclosure

[Note to PM: This is the Front Panel/First Page of Booklet]

ARSENAL®

herbicide

ACCEPTED

10/24/2016

Under the Federal Insecticide, Fungicide and Rodenticide Act as amended, for the pesticide registered under EPA Reg. No. 241-299

APPLICATORS CONCENTRATE

For the control of undesirable vegetation growing within specified aquatic sites, forestry sites, pasture/rangeland, and nonagricultural lands; and for the establishment and maintenance of wildlife openings, release of unimproved Bermudagrass and Bahiagrass, bareground weed control, and for use under certain paved surfaces

Active Ingredient:

isopropylamine salt of imazapyr: (2-[4,5-dihydro-4-methyl-4-(1-methylethyl)-5-oxo-1*H*-imidazol-2-yl]-3-pyridinecarboxylic acid)* 53.1%

Other Ingredients: 46.9%

Total: 100.0%

* Equivalent to 43.3% 2-[4,5-dihydro-4-methyl-4-(1-methylethyl)-5-oxo-1*H*-imidazol-2-yl]-3-pyridinecarboxylic acid or 4 pounds acid per gallon

EPA Reg. No. 241-299

EPA Est. No.

KEEP OUT OF REACH OF CHILDREN CAUTION/PRECAUCION

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle. (If you do not understand the label, find someone to explain it to you in detail.)

FIRST AID	
If swallowed	<ul style="list-style-type: none"> • Call a poison control center or doctor immediately for treatment advice. • Have person sip a glass of water if able to swallow. • DO NOT induce vomiting unless told to by a poison control center or doctor. • DO NOT give anything to an unconscious person.
If on skin or clothing	<ul style="list-style-type: none"> • Take off contaminated clothing. • Rinse skin immediately with plenty of water for 15 to 20 minutes. • Call a poison control center or doctor for treatment advice.
If inhaled	<ul style="list-style-type: none"> • Move person to fresh air. • If person is not breathing, call 911 or an ambulance; then give artificial respiration, preferably by mouth to mouth, if possible. • Call a poison control center or doctor for further treatment advice.
If in eyes	<ul style="list-style-type: none"> • Hold eyes open and rinse slowly and gently with water for 15 to 20 minutes. • Remove contact lenses, if present, after first 5 minutes; then continue rinsing eyes. • Call a poison control center or doctor for treatment advice.
HOTLINE NUMBER	
Have the product container or label with you when calling a poison control center or doctor or going for treatment. In case of an emergency endangering life or property involving this product, call BASF Corporation for emergency medical treatment information, day or night 1-800-832-HELP (4357).	

See inside booklet for complete **Precautionary Statements, Directions For Use, Conditions of Sale and Warranty**, and state-specific crop and/or use site restrictions.

Net Contents:

BASF Corporation
26 Davis Drive
Research Triangle Park, NC 27709



FIRST AID	
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Precautionary Statements

Hazards to Humans and Domestic Animals

CAUTION. Harmful if swallowed. Avoid contact with skin, eyes, or clothing. Avoid breathing spray mist.

Personal Protective Equipment (PPE)

Mixers, loaders, applicators, and other handlers must wear:

- Long-sleeved shirt and long pants
- Shoes plus socks
- Chemical-resistant gloves made of any waterproof material such as barrier laminate, butyl rubber ≥ 14 mils, nitrile rubber ≥ 14 mils, neoprene rubber ≥ 14 mils, natural rubber ≥ 14 mils, polyethylene, polyvinyl chloride ≥ 14 mils, or viton ≥ 14 mils

Follow manufacturer's instructions for cleaning and maintaining PPE. If no such instructions are given for washables, use detergent and hot water. Keep and wash PPE separately from other laundry. Discard clothing and other absorbent materials that have been drenched or heavily contaminated with this product's concentrate.

DO NOT reuse them.

Engineering Controls

Pilots must use an enclosed cockpit that meets the requirements listed in the Worker Protection Standard (WPS) for agricultural pesticides [40 CFR 170.240(d)(6)].

USER SAFETY RECOMMENDATIONS

Users should:

- Wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet.
- Remove clothing/PPE immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.
- Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

Physical and Chemical Hazards

Spray solutions of **Arsenal® herbicide Applicators Concentrate** must be mixed, stored and applied only in stainless steel, fiberglass, plastic and plastic-lined steel containers.

Thoroughly clean application equipment, including landing gear, immediately after use of this product. Prolonged exposure of this product to uncoated steel (except stainless steel) surfaces may result in corrosion and failure of the exposed part. The maintenance of an organic coating (paint) may prevent corrosion.

Environmental Hazards

This product is toxic to plants. Drift and runoff may be hazardous to plants in water adjacent to treated areas.

DO NOT apply to water except as specified in this label. Treatment of aquatic weeds may result in oxygen depletion or loss due to decomposition of dead plants. This oxygen loss may cause the suffocation of some aquatic organisms. **DO NOT** treat more than 1/2 of the surface area of the water in a single operation and wait at least 10 to 14 days between treatments. Begin treatment along the shore and proceed outward in bands to allow aquatic organisms to

move into untreated areas. **DO NOT** contaminate water when disposing of equipment washwaters or rinsate.

This pesticide is toxic to vascular plants and must be used strictly in accordance with the drift precautions on the label.

Directions For Use

It is a violation of federal law to use this product in a manner inconsistent with its labeling.

Arsenal® herbicide Applicators Concentrate must be used only in accordance with the instructions on the leaflet label attached to the container. Keep containers closed to avoid spills and contamination.

DO NOT apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application.

AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR part 170. This standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE) and restricted-entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

DO NOT enter or allow worker entry into treated areas during the restricted-entry interval (REI) of **48 hours**.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water, is:

- Coveralls
- Shoes plus socks
- Chemical-resistant gloves made of any waterproof material
- Protective eyewear

NONAGRICULTURAL USE REQUIREMENTS

The requirements in this box apply to uses of this product that are NOT within the scope of the Worker Protection Standard (WPS) for agricultural pesticides (40 CFR Part 170). The WPS applies when this product is used to produce agricultural plants on farms, forests, nurseries, or greenhouses.

DO NOT enter or allow others to enter treated areas until sprays have dried.

STORAGE AND DISPOSAL

DO NOT contaminate water, food or feed by storage or disposal.

Pesticide Storage

DO NOT store below 10° F.

Pesticide Disposal

Wastes resulting from the use of this product must be disposed of on-site or at an approved waste disposal facility.

Container Handling

Nonrefillable Container. DO NOT reuse or refill this container. Triple rinse or pressure rinse container

(or equivalent) promptly after emptying; then offer for recycling, if available, or reconditioning, if appropriate, or puncture and dispose of in a sanitary landfill, or by incineration, or by other procedures approved by state and local authorities.

Triple rinse containers small enough to shake (capacity ≤ 5 gallons) as follows: Empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container 1/4 full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank, or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times.

Triple rinse containers too large to shake (capacity > 5 gallons) as follows: Empty the remaining contents into application equipment or a mix tank. Fill the container 1/4 full with water. Replace and tighten closures. Tip container on its side and roll it back and forth, ensuring at least one complete revolution, for 30 seconds. Stand the container on its end and tip it back and forth several times. Turn the container over onto its other end and tip it back and forth several times. Empty the rinsate into application equipment or a mix tank, or store rinsate for later use or disposal. Repeat this procedure two more times.

Pressure rinse as follows: Empty the remaining contents into application equipment or mix tank and continue to drain for 10 seconds after the flow begins to drip. Hold container upside down over application equipment or mix tank, or collect rinsate for later use or disposal. Insert pressure rinsing nozzle in the side of the container and rinse at about 40 PSI for at least 30 seconds. Drain for 10 seconds after the flow begins to drip.

Refillable Container. Refill this container with pesticide only. **DO NOT** reuse this container for any other purpose. Triple rinsing the container before final disposal is the responsibility of the person disposing of the container. Cleaning before refilling is the responsibility of the refiller.

(continued)

STORAGE AND DISPOSAL *(continued)*

Container Handling *(continued)*

Triple rinse as follows: To clean the container before final disposal, empty the remaining contents from this container into application equipment or mix tank. Fill the container about 10% full with water. Agitate vigorously or recirculate water with the pump for 2 minutes. Pour or pump rinsate into application equipment or rinsate collection system. Repeat this rinsing procedure two more times.

When this container is empty, replace the cap and seal all openings that have been opened during use; return the container to the point of purchase or to a designated location. This container must only be refilled with a pesticide product. Prior to refilling, inspect carefully for damage such as cracks, punctures, abrasions, worn-out threads and closure devices. Check for leaks after refilling and before transport. **DO NOT** transport if this container is damaged or leaking. If the container is damaged, or leaking, or obsolete and not returned to the point of purchase or to a designated location, triple rinse emptied container and offer for recycling, if available, or dispose of container in compliance with state and local regulations.

In Case of Emergency

In case of large-scale spillage regarding this product, call:

- CHEMTREC 1-800-424-9300
- BASF Corporation 1-800-832-HELP (4357)

In case of medical emergency regarding this product, call:

- Your local doctor for immediate treatment
- Your local poison control center (hospital)
- BASF Corporation 1-800-832-HELP (4357)

Steps to be taken in case material is released or spilled:

- Dike and contain the spill with inert material (sand, earth, etc.) and transfer liquid and solid diking material to separate containers for disposal.
- Remove contaminated clothing and wash affected skin areas with soap and water.
- Wash clothing before reuse.
- Keep the spill out of all sewers and open bodies of water.

Product Information

Arsenal® herbicide Applicators Concentrate is an aqueous solution to be mixed with water and a surfactant and applied as a spray solution to control undesirable vegetation growing within specified aquatic sites, forestry sites, pasture/rangeland and nonagricultural lands. Aquatic sites consist of standing and flowing water, estuarine/marine, wetland, and riparian areas. Nonagricultural lands include private, public and military lands as follows: uncultivated nonagricultural areas (including airports, highway, railroad and utility rights-of-way, sewage disposal areas, etc.); uncultivated agricultural areas - noncrop producing

(including farmyards, fuel storage areas, fence rows, nonirrigation ditchbanks, barrier strips, etc.); industrial sites - outdoor (including lumberyards, pipeline and tank farms, etc.); and natural areas (including wildlife management areas, wildlife openings, wildlife habitats, recreation areas, campgrounds, trailheads, and trails). **Arsenal herbicide Applicators Concentrate** may also be used for the release of unimproved Bermudagrass and Bahiagrass, for bareground weed control, and for use under certain paved surfaces.

Herbicidal Activity

Arsenal herbicide Applicators Concentrate will control most annual and perennial grass and broadleaf weeds in addition to many brush and vine species with some residual control of undesirable species that germinate above the waterline. **Arsenal herbicide Applicators Concentrate** is readily absorbed through emergent leaves and stems and is translocated rapidly throughout the plant with accumulation in the meristematic regions. For maximum activity, weeds should be growing vigorously at the time of application, and the spray solution should include a surfactant (see **Adjuvants** section for specific use directions). Treated plants stop growing soon after spray application. Chlorosis appears first in the newest leaves, and necrosis spreads from this point. In perennials, the herbicide is translocated into, and kills, underground or submerged storage organs, which prevents regrowth. Chlorosis and tissue necrosis may not be apparent in some plant species until 2 or more weeks after application. Complete kill of plants may not occur for several weeks. **Arsenal herbicide Applicators Concentrate** applications are rainfast 1 hour after treatment.

Use Information

Applications may be made for the control of undesirable vegetation growing within specified aquatic sites, forestry sites, pasture/rangeland and nonagricultural lands. Aquatic sites consist of standing and flowing water; estuarine/marine, wetland, and riparian areas; for control of most annual and perennial grass weeds, broadleaf weeds, vines and brambles, and hardwood brush and trees for forestry site preparation and release of conifers from woody and herbaceous competition. **Arsenal herbicide Applicators Concentrate** may be used for selective woody and herbaceous weed control in natural regeneration of certain conifers (see **Conifer Release Treatment**).

Nonagricultural lands include private, public and military lands as follows: uncultivated nonagricultural areas (including airports, highway, railroad and utility rights-of-way, sewage disposal areas, etc.); uncultivated agricultural areas - noncrop producing (including farmyards, fuel storage areas, fence rows, nonirrigation ditchbanks, barrier strips, etc.); industrial sites - outdoor (including lumberyards, pipeline and tank farms, etc.); and natural areas (including wildlife management areas, wildlife openings, wildlife habitats, recreation areas, campgrounds, trailheads, and trails).

Precautions

- Keep from contact with fertilizers, insecticides, fungicides and seeds.
- Clean application equipment after using this product by thoroughly flushing with water.

Restrictions

- **DO NOT** use on food crops.
- **DO NOT** apply this product within 1/2 mile upstream of an active potable water intake in flowing water (i.e. river, stream, etc.) or within 1/2 mile of an active potable water intake in a standing body of water, such as a lake, pond, or reservoir.
- **DO NOT** apply to water used for irrigation except as described in **Product Use Precautions and Restrictions** section of this label.
- **DO NOT** drain or flush equipment on or near desirable trees or other plants, or on areas where their roots may extend, or in locations where the treated soil may be washed or moved into contact with their roots.
- **DO NOT** use on lawns, walks, driveways, tennis courts, or similar areas.
- **DO NOT** side trim desirable vegetation with this product unless severe injury and plant death can be tolerated. Prevent drift of spray to desirable plants.

Site Specific Restrictions

Nonagricultural Lands and Forestry Sites

- **DO NOT** apply more than 1.5 lbs acid equivalent (ae) imazapyr (equivalent to 48 fl ozs of **Arsenal® herbicide Applicators Concentrate**) per acre per year.

Pasture/Rangeland Sites

- For spot treatment only.
- **DO NOT** treat more than 1/10 of the available area to be grazed or cut for hay.
- **DO NOT** apply more than 0.75 lb ae imazapyr (equivalent to 24 fl ozs of **Arsenal herbicide Applicators Concentrate**) per acre per year.

Aquatic Sites

- **DO NOT** apply more than 1.5 lbs ae imazapyr (equivalent to 48 fl ozs of **Arsenal herbicide Applicators Concentrate**) per acre per year.
- **Public waters** - Application of **Arsenal herbicide Applicators Concentrate** to water can only be made by federal or state agencies, such as Water Management District personnel, municipal officials, and the U.S. Army Corps of Engineers, or those applicators who are licensed or certified as aquatic pest control applicators and are authorized by the state or local government. Treatment to other than non-native invasive species is limited to only those plants that have been determined to be a nuisance by a federal or state government entity.
- **Aerial application** - Aerial application to aquatic sites is restricted to helicopter only.
- **Irrigation water** - Application to water used for irrigation that results in **Arsenal herbicide Applicators Concentrate** residue greater than 1.0 ppb **MUST NOT**

be used for irrigation purposes for 120 days after application or until **Arsenal herbicide Applicators Concentrate** residue levels are determined by laboratory analysis or other appropriate means of analysis to be 1.0 ppb or less. When applications are made within 500 feet of an active irrigation intake, **DO NOT** irrigate for at least 24 hours following application to allow for dissipation.

Recreational Use of Water in Treatment Area

There are no restrictions on the use of water in the treatment area for recreational purposes, including swimming and fishing.

Livestock Use of Water in/from Treatment Area

There are no restrictions on livestock consumption of water from the treatment area.

Potable Water Intakes

DO NOT apply **Arsenal herbicide Applicators Concentrate** directly to water within 1/2 mile upstream of an active potable water intake in flowing water (i.e. river, stream, etc.) or within 1/2 mile of an active potable water intake in a standing body of water such as a lake, pond, or reservoir. To make aquatic applications around and within 1/2 mile of active potable water intakes, the water intake **must** be turned off during application and for a minimum of 48 hours after the application. These aquatic applications may be made only in the cases where there are alternative water sources or holding ponds that would permit the turning off of an active potable water intake for a minimum period of 48 hours after the applications.

NOTE: Existing potable water intakes that are no longer in use, such as those replaced by connections to wells or a municipal water system, are not considered to be active potable water intakes. This restriction does not apply to intermittent, inadvertent overspray of water in terrestrial use sites.

Quiescent or Slow-moving Waters

In lakes and reservoirs, **DO NOT** apply **Arsenal herbicide Applicators Concentrate** within one (1) mile of an active irrigation water intake during the irrigation season. Applications less than one (1) mile from an active irrigation water intake may be made during the off-season, provided that the irrigation intake will remain inactive for a minimum of 120 days after application or until **Arsenal herbicide Applicators Concentrate** residue levels are determined by laboratory analysis or other appropriate means of analysis to be 1.0 ppb or less.

Avoiding Injury to Nontarget Plants

If treated vegetation is to be removed from the application site, **DO NOT** use the vegetative matter as mulch or compost on or around desirable species.

Precautions for Avoiding Injury to Nontarget Plants

Untreated desirable plants can be affected by root uptake of **Arsenal® herbicide Applicators Concentrate** from treated soil. Injury or loss of desirable plants may result if **Arsenal herbicide Applicators Concentrate** is applied on or near desirable plants, on areas where their roots extend, or in locations where the treated soil may be washed or moved into contact with their roots. When making application along shorelines where desirable plants may be present, use caution to avoid spray contact with their foliage or spray application to the soil in which they are rooted. Shoreline plants that have roots which extend into the water in an area where **Arsenal herbicide Applicators Concentrate** has been applied generally will not be adversely affected by uptake of the herbicide from the water.

Managing Off-target Movement

Aerial Application

- Applicators are required to use a coarse or coarser droplet size (ASABE S572) or, if specifically using a spinning atomizer nozzle, applicators are required to use a volume mean diameter (VMD) of 385 microns or greater for release heights below 10 feet. Applicators are required to use a very coarse or coarser droplet size or, if specifically using a spinning atomizer nozzle, applicators are required to use a VMD of 475 microns or greater for release heights above 10 feet. Applicators must consider the effects of nozzle orientation and flight speed when determining droplet size.
- Applicators are required to use upwind swath displacement.
- The boom length must not exceed 60% of the wingspan or 90% of the rotor blade diameter to reduce spray drift.
- Applications with wind speeds less than 3 mph and with wind speeds greater than 10 mph are prohibited.
- Applications into temperature inversions are prohibited.

Ground Boom Application

- Applicators are required to use a nozzle height below 4 feet above the ground or plant canopy and coarse or coarser droplet size (ASABE S572) or, if specifically using a spinning atomizer nozzle, applicators are required to use a volume mean diameter (VMD) of 385 microns or greater.
- Applications with wind speeds greater than 10 mph are prohibited.
- Applications into temperature inversions are prohibited.

Wind Erosion

Avoid treating powdery, dry or light sandy soils when conditions are favorable for wind erosion. Under these conditions, the soil surface should first be settled by rainfall or irrigation.

Adjuvants

Postemergence applications of **Arsenal herbicide Applicators Concentrate** require the addition of a spray adjuvant. When making aquatic applications, only spray adjuvants approved or appropriate for aquatic use must be utilized.

Nonionic Surfactant

Use a nonionic surfactant (NIS) at the rate of 0.25% volume/volume (v/v) or higher (see manufacturer's label) of the spray solution (0.25% v/v is equivalent to 1 quart in 100 gallons). For best results, select a nonionic surfactant with an HLB (hydrophilic to lipophilic balance) ratio between 12 and 17 with at least 70% surfactant in the formulated product. Alcohols, fatty acids, oils, ethylene glycol or diethylene glycol should not be considered as surfactants to meet the above requirements.

Methylated Seed Oil or Vegetable Oil Concentrate

Instead of a surfactant, a methylated seed oil (MSO) or vegetable-based seed oil concentrate may be used at the rate of 1.5 to 2 pints per acre. When using spray volumes greater than 30 gallons per acre, methylated seed oil or vegetable-based seed oil concentrates should be mixed at a rate of 1% of the total spray volume, or alternatively use a nonionic surfactant as described above. Research indicates that these oils may aid in **Arsenal herbicide Applicators Concentrate** deposition and uptake by plants under moisture or temperature stress.

Silicone-based Surfactant

See manufacturer's label for specific rates. Silicone-based surfactants may reduce the surface tension of the spray droplet allowing greater spreading on the leaf surface as compared to conventional nonionic surfactants. However, some silicone-based surfactants may dry too quickly, limiting herbicide uptake.

Invert Emulsions

Arsenal herbicide Applicators Concentrate can be applied as an invert emulsion. The spray solution results in an invert (water-in-oil) spray emulsion designed to minimize spray drift and spray runoff, resulting in more herbicide on the target foliage. The spray emulsion may be formed in a single tank (batch mixing) or injected (in-line mixing). Consult the invert chemical label for proper mixing directions.

Other

An antifoaming agent, spray pattern indicator, or drift-reducing agent may be applied at the product labeled rate if necessary or desired.

Tank Mixes

Arsenal® herbicide Applicators Concentrate may be tank mixed with other herbicides.

Consult manufacturer's labels for specific rate restrictions and weeds controlled. Always follow the more restrictive label restrictions and precautions for all products used when making an application involving tank mixes.

Application Methods

Arsenal herbicide Applicators Concentrate may be selectively applied using low-volume directed application techniques or may be broadcast-applied using ground equipment, watercraft, or aircraft. Aerial applications to aquatic sites must be made by helicopter. In addition, **Arsenal herbicide Applicators Concentrate** may also be applied using cut-stump, cut-stem, and frill or girdle treatment techniques within nonagricultural lands, pasture/rangeland, and aquatic sites (see **Aerial Application** and **Ground Application** sections for additional details).

Aerial Application

All precautions must be taken to minimize or eliminate spray drift. Both fixed-wing aircraft and helicopters can be used to apply **Arsenal herbicide Applicators Concentrate** on nonagricultural lands, but only helicopters can be used for aquatic applications. **DO NOT** make applications by fixed-wing aircraft or helicopter unless appropriate buffer zones can be maintained to prevent spray drift out of the target area, or when treating open tracts of land, spray drift as a result of fixed-wing aircraft application can be tolerated. Aerial equipment designed to minimize spray drift, such as a helicopter equipped with a **Microfoil™ boom**, **Thru-Valve™ boom**, or raindrop nozzles, must be used and calibrated. Except when applying with a **Microfoil boom**, a drift control agent may be added at the specified label rate. **DO NOT** side trim with **Arsenal herbicide Applicators Concentrate** unless death of treated tree can be tolerated.

Uniformly apply the specified amount of **Arsenal herbicide Applicators Concentrate** in 2 to 30 gallons of water per acre. A foam-reducing agent may be added at the specified label rate, if needed.

Thoroughly clean application equipment, including landing gear, immediately after use of this product. Prolonged exposure of this product to uncoated steel (except stainless steel) surfaces may result in corrosion and failure of the exposed part. The maintenance of an organic coating (paint) may prevent corrosion.

Ground Application

Foliar Application

Low-volume Foliar Application

Use equipment calibrated to deliver 5 to 20 gallons of spray solution per acre. To prepare the spray solution, thoroughly mix in water 0.25% to 2.50% **Arsenal herbicide Applicators Concentrate** plus surfactant (see the **Adjuvants** section of this label for specific use directions). A foam-reducing agent may be applied at the specified label rate, if needed. For control of difficult species (see **Aquatic Weeds Controlled** section and the **Terrestrial Weeds Controlled** section for relative susceptibility of weed species), use the higher concentrations of herbicide and/or spray volumes, but **DO NOT** apply more than 3 pints of **Arsenal herbicide Applicators Concentrate** per acre in aquatic sites and nonagricultural lands and 1.5 pints per acre in pasture/rangeland. Excessive wetting of foliage is not necessary.

For low-volume foliar application, select proper nozzles to avoid overapplication. Proper application is critical to ensure desirable results. Best results are achieved when the spray covers the crown and approximately 70 percent of the plant. The use of an even, flat-fan tip with a spray angle of 40 degrees or less will aid in proper deposition.

Appropriate tip sizes include 4004E or 1504E. For a straight-stream and cone pattern, adjustable cone nozzles, such as 5500 X3 or 5500 X4, may be used. Attaching a rollover valve onto a Spraying Systems Model 30 gunjet or other similar spray gun allows for the use of both flat-fan and cone tips on the same gun.

Moisten, but **DO NOT** drench target vegetation causing spray solution to run off.

Low-volume Foliar Application with Backpack. For low-growing species, spray down on the crown, covering crown and penetrating approximately 70% of the plant.

For target species 4 to 8 feet tall, swipe the sides of target vegetation by directing spray to at least 2 sides of the plant in smooth vertical motions from the crown to the bottom. Make sure to cover the crown whenever possible.

For target species over 8 feet tall, lace sides of the target vegetation by directing spray to at least 2 sides of the target in smooth zigzag motions from crown to bottom.

Low-volume Foliar Application with Hydraulic Handgun Application Equipment. Use the same technique as described above for **Low-volume Foliar Application with Backpack**.

For broadcast applications, simulate a gentle rain near the top of target vegetation allowing spray to contact the crown and penetrate the target foliage without falling to the understory. Herbicide spray solution that contacts the understory may result in severe injury or death of plants in the understory.

High-volume Foliar Application

For optimum performance when spraying medium-density to high-density vegetation, use equipment calibrated to deliver up to 100 gallons of spray solution per acre (GPA). Spray solutions exceeding 100 GPA may result in excessive spray runoff, causing increased ground cover injury and injury to desirable species. To prepare the spray solution, thoroughly mix **Arsenal® herbicide Applicators Concentrate** in water and add a surfactant (see **Adjuvants** section for specific use directions and rates for surfactants). A foam-reducing agent may be added at the specified label rate, if needed. For control of difficult species (see **Aquatic Weeds Controlled** chart and the **Terrestrial Weeds Controlled** section for relative susceptibility of weed species), use the higher concentrations of herbicide and/or spray volumes, but **DO NOT** apply more than 3 pints of **Arsenal herbicide Applicators Concentrate** per acre in aquatic sites and nonagricultural lands and 1.5 pints per acre in pasture/rangeland. Uniformly cover the foliage of the vegetation to be controlled, but **DO NOT** apply to runoff. Excessive wetting of foliage is not necessary.

Side Trimming

DO NOT side trim with **Arsenal herbicide Applicators Concentrate** unless severe injury or death of the treated tree can be tolerated. **Arsenal herbicide Applicators Concentrate** is readily translocated and can result in death of the entire tree.

Cut-surface Treatment

Arsenal herbicide Applicators Concentrate may be used to control undesirable woody vegetation by applying the **Arsenal herbicide Applicators Concentrate** solution to the cambium area of freshly cut stump surfaces or to fresh cuts on the stem of the target woody vegetation. Applications can be made at any time of the year except during periods of heavy sap flow in the spring. **DO NOT** overapply solution causing runoff from the cut surface.

Injury may occur to desirable woody plants if the shoots extend from the same root system or their root systems are grafted to those of the treated tree.

Cut-surface Application with Dilute and Concentrate Solutions

Arsenal herbicide Applicators Concentrate may be mixed as either a concentrate or dilute solution. The dilute solution may be used for applications to the cut surface of the stump or to cuts on the stem of the target woody vegetation. Concentrate solutions may be used for applications to cuts on the stem. Use of the concentrate solution permits application to fewer cuts on the stem, especially for large-diameter trees. Follow the application instructions for proper application techniques for each type of solution.

- To prepare a dilute solution, mix 4 to 6 fluid ounces of **Arsenal herbicide Applicators Concentrate** with

1 gallon of water. A surfactant or penetrating agent may improve uptake through partially callused cambiums.

- To prepare a concentrate solution, mix 1 quart of **Arsenal herbicide Applicators Concentrate** with no more than 1 pint of water.

Cut-stump Treatment

Dilute Solution. Spray or brush the solution onto the cambium area of the freshly cut stump surface. Ensure that the solution thoroughly wets the entire cambium area (the wood next to the bark of the stump).

Cut-stem Treatment (injection, hack-and-squirt)

Dilute Solution. Using standard injection equipment, apply 1 milliliter of solution at each injection site around the tree with no more than 1-inch intervals between cut edges. Ensure that the injector completely penetrates the bark at each injection site.

Concentrate Solution. Using standard injection equipment, apply 1 milliliter of solution at each injection site. Make at least 1 injection cut for every 3 inches of diameter at breast height (DBH) on the target tree. For example, a 3-inch DBH tree will receive 1 injection cut, and a 6-inch DBH tree will receive 2 injection cuts. On trees requiring more than 1 injection site, place the injection cuts at approximately equal intervals around the tree.

Frill or Girdle Treatment

Using a hatchet, machete, or chainsaw, make cuts through the bark and completely around the tree to expose the cambium. The cut should angle downward extending into the cambium enough to expose at least 2 growth rings. Using a spray applicator or brush, apply a 12.5% to 50.0% solution of **Arsenal herbicide Applicators Concentrate** into each cut until thoroughly wet. Avoid applying so much herbicide that runoff to the ground or water occurs.

Forestry Use

Site Preparation Treatment

Arsenal® herbicide Applicators Concentrate may be used to control labeled grass weeds, broadleaf weeds, vines and brambles, and woody brush and trees on forest sites in advance of regeneration for the following conifer crop species:

Common Name	Scientific Name	Rate (fl ozs/A)
Loblolly pine	<i>Pinus taeda</i>	24 to 40
Loblolly X pitch hybrid		
Longleaf pine	<i>Pinus palustris</i>	
Shortleaf pine	<i>Pinus echinata</i>	
Virginia pine	<i>Pinus virginiana</i>	
Slash pine	<i>Pinus elliotii</i>	20 to 32
Coastal redwood	<i>Sequoia sempervirens</i>	12 to 24
Douglas fir	<i>Pseudotsuga menziesii</i>	
Western hemlock	<i>Tsuga heterophylla</i>	
California red fir	<i>Abies magnifica</i>	12 to 20
California white fir	<i>Abies concolor</i>	
Jack pine	<i>Pinus banksiana</i>	12 to 16
Lodgepole pine	<i>Pinus contorta</i>	
Pitch pine	<i>Pinus rigida</i>	
Ponderosa pine	<i>Pinus ponderosa</i>	
Sugar pine	<i>Pinus lambertiana</i>	
White pine	<i>Pinus strobus</i>	
Black spruce	<i>Picea mariana</i>	
Red spruce	<i>Picea rubens</i>	
White spruce	<i>Picea glauca</i>	

Use the label rate of **Arsenal herbicide Applicators Concentrate** per acre applied as a broadcast foliar spray for long-term control of labeled woody plants and residual control of herbaceous weeds. Within 4 to 6 weeks of treatment, grass and other herbaceous weeds will be controlled and may provide fuel to facilitate a site preparation burn, if desired, to control conifers or other species tolerant to the herbicide.

Apply the label rate of **Arsenal herbicide Applicators Concentrate** per acre in 5 to 30 gallons total spray solution for helicopter applications or 5 to 100 gallons total spray solution for mechanical ground spray and backpack applications. Use a minimum of 1/2 percent by volume nonionic surfactant (NIS). Use the higher label rates of **Arsenal herbicide Applicators Concentrate** and higher spray volumes when controlling particularly dense or multi-layered canopies of hardwood stands, or difficult-to-control species.

In certain cases, tank mixes may be necessary for chemical control of conifers and other species tolerant to **Arsenal herbicide Applicators Concentrate**. Observe all precautions and restrictions on the product labels.

Always follow the most restrictive label. Combinations with other products labeled for forest site preparation may kill certain plants such as legumes and blackberry, which are desirable for wildlife habitat.

Where quick initial brownout (deadening of foliage) is desired for burning, apply a tank mixture of 16 fl ozs to 32 fl ozs **Arsenal herbicide Applicators Concentrate** with 16 ozs to 64 ozs glyphosate or 16 ozs to 48 ozs triclopyr ester per acre. For control of seedling pines, apply 16 fl ozs to 32 fl ozs **Arsenal herbicide Applicators Concentrate** with 3 to 4 quarts glyphosate. For site preparation, rates less than 24 fl ozs **Arsenal herbicide Applicators Concentrate** will provide suppression of hardwood brush and trees; some resprouting may occur.

DO NOT plant seedlings of black spruce (*Picea mariana*) or white spruce (*Picea glauca*) on sites that have been broadcast-treated with **Arsenal herbicide Applicators Concentrate** or into the treated zone of spot or banded applications for three months following application or injury may occur.

Herbaceous Weed Control

Use **Arsenal herbicide Applicators Concentrate** for selective weeding in the following conifers:

Common Name	Scientific Name	Rate (fl ozs/A)
Loblolly pine	<i>Pinus taeda</i>	6 to 10
Loblolly X pitch hybrid		
Virginia pine	<i>Pinus virginiana</i>	
Longleaf pine ¹	<i>Pinus palustris</i>	4 to 6
Slash pine ¹	<i>Pinus elliotii</i>	
Douglas fir ¹	<i>Pseudotsuga menziesii</i>	

¹ Use of surfactant is not recommended.

Arsenal herbicide Applicators Concentrate may be applied as a broadcast treatment, banded over tree rows, or as a directed spray for release of young conifers from herbaceous weeds. To prevent possibility of conifer injury, **DO NOT** apply **Arsenal herbicide Applicators Concentrate** when conifers are under stress from drought, disease, animal or winter injury, planting shock, or other stresses reducing conifer vigor. Broadcast applications may be made by helicopter, ground, or backpack sprayer. For difficult-to-control weeds, use the higher labeled rates. Where herbaceous weeds have overtopped conifer seedlings, a nonionic surfactant may be added to improve weed control (except for slash pine, long-leaf pine, and Douglas fir), at a rate not to exceed 1/4 percent of spray solution volume. Some minor conifer growth inhibition may be observed when herbaceous weed control treatments are made during periods of active conifer growth.

Arsenal herbicide Applicators Concentrate may also be applied using backpack or handheld sprayers to control herbaceous weeds around individual conifer seedlings. Mix 0.4 fl oz to 0.6 fl oz **Arsenal herbicide Applicators Concentrate** and 0.2 oz nonionic surfactant per gallon of

water. Direct the spray to the weeds and minimize the amount applied to conifer foliage for best conifer tolerance. Ensure that maximum labeled rates per acre for previously listed crop species are not exceeded.

Arsenal® herbicide Applicators Concentrate may be tank mixed with sulfometuron to broaden the spectrum of weeds controlled. For loblolly pine, apply 4 fl ozs to 6 fl ozs **Arsenal herbicide Applicators Concentrate** plus 1 oz to 2 ozs sulfometuron per acre. The application of **Arsenal herbicide Applicators Concentrate** plus sulfometuron on other conifer species may cause growth suppression.

Conifer Release Treatment

Arsenal herbicide Applicators Concentrate may be applied as a broadcast or directed spray application for suppression of labeled brush, tree, and herbaceous weed species. Directed spray applications may be made with low-volume applications in conifer stands of all ages by targeting the unwanted vegetation and avoiding direct application to the conifer. Ensure that maximum labeled rates per acre listed for the following crop species are not exceeded.

Broadcast Applications for release of the following conifers from hardwood competition:

Common Name	Scientific Name	Rate (fl ozs/A)
Loblolly pine ³	<i>Pinus taeda</i>	12 to 20
Loblolly X pitch hybrid ³		
Virginia pine ³	<i>Pinus virginiana</i>	
Atlantic white cedar ⁴	<i>Chamaecyparis thyoides</i>	12 to 16
Longleaf pine	<i>Pinus palustris</i>	
Pitch pine	<i>Pinus rigida</i>	
Shortleaf pine	<i>Pinus echinata</i>	
Slash pine	<i>Pinus elliotii</i>	
White pine ¹	<i>Pinus strobus</i>	8 to 16
California red fir	<i>Abies magnifica</i>	8 to 12
California white fir	<i>Abies concolor</i>	
Lodgepole pine ²	<i>Pinus contorta</i>	
Douglas fir ²	<i>Pseudotsuga menziesii</i>	
Jack pine ²	<i>Pinus banksiana</i>	6 to 12
Black spruce ²	<i>Picea mariana</i>	
Red spruce ²	<i>Picea rubens</i>	
White spruce ²	<i>Picea glauca</i>	

¹ **DO NOT** make applications to white pine stands younger than three years old. To minimize potential white pine injury, release treatments should not be made prior to July 15.

² Applications should be made after formation of final conifer resting buds in the fall or height growth inhibition may occur.

³ **Mid-rotation release:** For broadcast applications below the pine canopy in established stands of loblolly pine, loblolly X pitch hybrid, and Virginia pine, use 16 fl ozs to 32 fl ozs product per acre. For mid-rotation release of other species, use rates listed in chart above.

⁴ Apply **Arsenal herbicide Applicators Concentrate** after July 15 and before hardwood defoliation in the fall. The use of rates below 16 ozs/A are intended for hardwood growth suppression and some hardwood resprouting should be expected.

For slash pine and longleaf pine, broadcast release treatments over the top of pines for the purpose of woody plant control must be made after August 15 and only in stands 2 through 5 years old. For applications over the top of slash pine and longleaf pine, DO NOT add surfactant and use lower labeled rates on sandy soils.

Apply the label rate of **Arsenal herbicide Applicators Concentrate** per acre when making broadcast applications with helicopter or ground spray equipment. Refer to mixing and application instructions for proper spray volumes. A nonionic surfactant may be added at no more than 1/4 percent by volume.

Use the higher label rates of **Arsenal herbicide Applicators Concentrate** when controlling particularly dense stands or difficult-to-control species.

Some minor conifer growth inhibition may be observed when release treatments are made during periods of active conifer growth. To minimize potential conifer height growth inhibition, **DO NOT** make broadcast applications to conifer stands except loblolly pine before the end of the second growing season. To minimize potential conifer height growth inhibition, broadcast release treatments may be made late in the growing season. To prevent possibility of conifer injury, **DO NOT** apply **Arsenal herbicide Applicators Concentrate** when conifers are under stress from drought, disease, animal or winter injury, or other stresses reducing conifer vigor.

Arsenal herbicide Applicators Concentrate may be used to release loblolly pine seedlings during the first growing season following planting or for one-year-old natural loblolly pine regeneration. For one-year-old loblolly pine release, apply 12 fl ozs to 20 fl ozs/A of **Arsenal herbicide Applicators Concentrate** after July 15. Rates below 16 fl ozs/A are intended for hardwood growth suppression; some hardwood resprouting should be expected.

Spot Treatment of Undesirable Hardwood Vegetation

Arsenal herbicide Applicators Concentrate may be used as a directed foliar or cut-stem application to control undesirable brush and hardwoods in the management of stands of all ages for the conifer species listed in the broadcast application section above. Refer to mixing and application instructions in the directed foliar or cut-stem sections above for proper use rates, equipment, and application techniques. **DO NOT** exceed maximum labeled rates per acre listed for crop species. Cut-stem applications may be used for spot treatment of undesirable hardwoods in Ponderosa pine stands using 12 fl ozs or less of product per acre.

Avoid direct application to desired plant species or injury may occur. Injury may occur to nontarget or desirable hardwoods or conifers if they extend from the same root system, or their root systems are grafted to those of the treated tree, or their roots extend into the treated zone.

Late Rotation Vegetation Control in Western Conifer

In California, the Pacific Northwest and Inland Northwest, broadcast aerial applications of **Arsenal® herbicide Applicators Concentrate** up to 24 fl ozs/A are permissible in conifer stands that are targeted for harvesting the year following treatment. Use minimum spray volume of 15 gallons per acre. Significant conifer injury or mortality must be expected. **DO NOT** use this treatment if conifer injury or mortality cannot be tolerated.

Bag and Spray Application for Conifer Release

In Douglas fir and Ponderosa pine stands, broadcast applications of **Arsenal herbicide Applicators Concentrate** up to 16 fl ozs/A are permissible when the trees are covered by bags prior to the application. The bags must prevent the spray mix from contacting the conifer foliage. On sites with coarse textured soils (e.g. decomposed granite, pumice, sandy or rocky sites) or low levels of soil organic matter (generally 5% or less), significant conifer growth inhibition and mortality is possible. **DO NOT** use this treatment on these types of sites if conifer growth inhibition and mortality cannot be tolerated.

Nonagricultural Land Use

Arsenal herbicide Applicators Concentrate may be used for woody and herbaceous weed control in nonagricultural lands including private, public and military lands as follows: uncultivated nonagricultural areas (including airports, highway, railroad and utility rights-of-way, sewage disposal areas, etc.); uncultivated agricultural areas - non-crop producing (including farmyards, fuel storage areas, fence rows, nonirrigation ditchbanks, barrier strips, etc.); industrial sites - outdoor (including lumberyards, pipeline and tank farms, etc.); and natural areas (including wildlife management areas, wildlife openings, wildlife habitats, recreation areas, campgrounds, trailheads, and trails).

Applications to nonagricultural lands are not applicable to treatment of commercial timber or other plants being grown for sale or other commercial use, or for commercial seed production, or for research purposes.

Brush Control

Use the specified rate of **Arsenal herbicide Applicators Concentrate** with the preferred application technique for the control of undesirable brush.

Tank Mixes and Application Rates for Low-volume Foliar Brush Control*

Target Vegetation	Arsenal herbicide Applicators Concentrate Rate (by volume)	Tank Mix
Mixed hardwoods without elm, locust, or pine	0.50 to 0.75%	Surfactant
Mixed hardwoods containing elm, locust, and pine	0.25 to 0.50%	Accord® at 2% to 3% by volume plus surfactant
Mixed hardwoods with locust and pine but no elm	0.25 to 0.50%	Krenite® at 2% to 5% by volume plus surfactant
Mixed hardwoods with locust and elm but no pine	0.25 to 0.50%	Escort® at 2 ozs/A or 2.3 grams/gal plus surfactant

* Tank mixes with 2,4-D or products containing 2,4-D have resulted in reduced **Arsenal herbicide Applicators Concentrate** efficacy.

Backpack and Handheld Spray Mixing Guide

% Solution	Product per gallon of mix (fl ozs)	Product per 4-gallon backpack (fl ozs)
0.25%	0.3	1.3
0.5%	0.6	2.6
1.0%	1.3	5.1
2.0%	2.6	10.2
3.0%	3.8	15.4
5.0%	6.4	25.6

Measuring Chart

128 ounces	=	1 gallon
16 ounces	=	1 pint
8 pints	=	1 gallon
4 quarts	=	1 gallon
2 pints	=	1 quart

Selective Control of Undesirable Weeds in Unimproved Bermudagrass and Bahiagrass

Arsenal® herbicide Applicators Concentrate may be used on unimproved Bermudagrass and Bahiagrass turf such as roadsides, utility rights-of-way, and other nonagricultural lands. The application of **Arsenal herbicide Applicators Concentrate** on established common and coastal Bermudagrass and Bahiagrass provides control of labeled broadleaf and grass weeds. Competition from these weeds is eliminated, releasing the Bermudagrass and Bahiagrass. Treatment of Bermudagrass with **Arsenal herbicide Applicators Concentrate** results in a compacted growth habit and seedhead inhibition.

Uniformly apply with properly calibrated ground equipment using at least 10 gallons of water per acre.

Temporary yellowing of grass may occur when treatment is made after growth commences.

Restrictions

- **DO NOT** add surfactant in excess of the specified rate (1 fl oz per 25 gallons of spray solution).
- **DO NOT** apply to grass during its first growing season.
- **DO NOT** apply to grass that is under stress from drought, disease, insects, or other causes.

Dosage Rate and Timing

Bermudagrass. Apply **Arsenal herbicide Applicators Concentrate** at 3 fl ozs to 6 fl ozs per acre when the Bermudagrass is dormant. Apply **Arsenal herbicide Applicators Concentrate** at 3 fl ozs to 4 fl ozs per acre after the Bermudagrass has reached full greenup. Applications made during greenup will delay greenup. Include a surfactant in the spray solution.

For additional preemergence control of annual grass and small-seeded broadleaf weeds, add **Pendulum® AquaCap™ herbicide** at the rate of 3.1 to 6.3 pints per acre. Consult the **Pendulum AquaCap** label for weeds controlled and for other use directions and precautions.

For control of Johnsongrass in Bermudagrass turf, apply **Arsenal herbicide Applicators Concentrate** at 4 fl ozs per acre, plus **Roundup® herbicide** at 12 ozs per acre, plus surfactant. For additional control of broadleaves and vines, **Garlon® 3A herbicide** may be added to the above mix at the rate of 1 to 2 pints per acre. Observe all precautions and restrictions on the **Garlon 3A** and **Roundup** labels.

Bahiagrass. Apply **Arsenal herbicide Applicators Concentrate** at 2 fl ozs to 4 fl ozs per acre when the Bahiagrass is dormant or after the grass has initiated greenup but has not exceeded 25% greenup. Include a surfactant in the spray solution (see **Adjuvants** section for specific use directions for surfactants).

Weeds Controlled in Unimproved Bermudagrass and Bahiagrass

Common Name	Scientific Name
Bedstraw*	<i>Galium</i> spp.
Bishopweed*	<i>Ptilimnium capillaceum</i>
Buttercup*	<i>Ranunculus parviflorus</i>
Carolina geranium	<i>Geranium carolinianum</i>
Fescue	<i>Festuca</i> spp.
Foxtail	<i>Setaria</i> spp.
Little barley	<i>Hordeum pusillum</i>
Seedling Johnsongrass	<i>Sorghum halepense</i>
White clover	<i>Trifolium repens</i>
Wild carrot	<i>Daucus carota</i>
Yellow woodsorrel	<i>Oxalis stricta</i>

* Use not permitted in California unless otherwise directed by supplemental labeling.

Grass Growth and Seedhead Suppression

Arsenal herbicide Applicators Concentrate may be used to suppress growth and seedhead development of certain turfgrass in unimproved areas. When **Arsenal herbicide Applicators Concentrate** is applied to desirable turf, it may result in temporary turf damage and/or discoloration. Effects to the desirable turf may vary with environmental conditions. For optimum performance, application should be made prior to culm elongation. Applications may be made before or after mowing. If applied prior to mowing, allow at least 3 days of active growth before mowing. If applied following a mowing, allow sufficient time for the grasses to recover before applying this product or injury may be amplified.

DO NOT APPLY to turf under stress (drought, cold, insect damage, etc.) or severe injury or death may occur.

Bermudagrass. Apply **Arsenal herbicide Applicators Concentrate** at 3 fl ozs to 4 fl ozs per acre from early greenup to prior to seedhead initiation. **DO NOT** add a surfactant for this application.

Cool-season Unimproved Turf. Apply **Arsenal herbicide Applicators Concentrate** at 1 fl oz per acre plus 0.25% nonionic surfactant. For increased suppression, **Arsenal herbicide Applicators Concentrate** may be tank mixed with such products as **Campaign® herbicide** (24 ozs per acre) or **Embark® growth regulator** (8 ozs per acre). Tank mixes may increase injury to desired turf. Consult each product label for labeled turf species and other use directions and precautions. Tank mixes with 2,4-D or products containing 2,4-D may decrease the effectiveness of **Arsenal herbicide Applicators Concentrate**.

Total Vegetation Control where Bare Ground is Desired

Arsenal® herbicide Applicators Concentrate is an effective herbicide for preemergence or postemergence control of many annual and perennial broadleaf and grass weeds where bare ground is desired. **Arsenal herbicide Applicators Concentrate** is particularly effective on hard-to-control perennial grasses. **Arsenal herbicide Applicators Concentrate** at 0.75 to 3 pints per acre can be used alone or in tank mix with herbicides approved for use in bare ground. The degree and duration of control are dependent on the rate of **Arsenal herbicide Applicators Concentrate** used, tank mix partner, the volume of carrier, soil texture, rainfall, and other conditions.

Consult manufacturer's labels for specific rates and weeds controlled. Always follow the more restrictive label restrictions and precautions for all products used when making an application involving tank mixes.

Applications of **Arsenal herbicide Applicators Concentrate** may be made any time of the year. Use equipment calibrated to deliver desired gallons per acre spray volume and uniformly distribute the spray pattern over the treated area.

Postemergence Application. Always use a spray adjuvant (see **Adjuvants** section of this label) when making a postemergence application. For optimum performance on tough-to-control annual grass weeds, apply at a total volume of 100 gallons per acre or less. For quicker burndown or brownout of target weeds, **Arsenal herbicide Applicators Concentrate** may be tank mixed with **Roundup® herbicide**. Tank mixes with 2,4-D or products containing 2,4-D may reduce the performance of **Arsenal herbicide Applicators Concentrate**. Always follow the more restrictive label restrictions and precautions for all products used when tank mixing.

Spot Treatment. Arsenal herbicide Applicators Concentrate may be used as a follow-up treatment to control escapes or weed encroachment in a bareground situation. To prepare the spray solution, thoroughly mix in each gallon of water 0.25% to 2.5% **Arsenal herbicide Applicators Concentrate** plus an adjuvant. For increased burndown, include **Roundup** as a tank mixture. For added residual weed control or to increase the weed spectrum, add **Pendulum® AquaCap™ herbicide**, **Overdrive® herbicide**, or diuron. Always follow the more restrictive label restrictions and precautions for all products used when tank mixing.

Control of Undesirable Weeds under Paved Surfaces

Arsenal herbicide Applicators Concentrate can be used under asphalt, pond liners and other paved areas, **ONLY** in industrial sites or where the pavement has a suitable barrier along the perimeter that prevents encroachment of roots of desirable plants.

Use **Arsenal herbicide Applicators Concentrate** only where the area to be treated has been prepared according to good construction practices. If rhizomes, stolons, tubers or other vegetative plant parts are present in the site, remove them by scalping with a grader blade to a depth sufficient to ensure their complete removal.

Follow **Arsenal herbicide Applicators Concentrate** applications with paving as soon as possible. **DO NOT** apply where the chemical may contact the roots of desirable trees or other plants.

This product is not to be used under pavement on residential properties, such as driveways or parking lots, or for use in recreational areas, such as under bike or jogging paths, golf cart paths, or tennis courts, or where landscape plantings could be anticipated.

Injury or death of desirable plants may result if this product is applied where roots are present or where roots may extend into the treated area. Roots of trees and shrubs may extend a considerable distance beyond the branch extremities (drip line).

Apply to the soil surface only when final grade is established. **DO NOT** move soil following **Arsenal herbicide Applicators Concentrate** application.

Apply **Arsenal herbicide Applicators Concentrate** in sufficient water (at least 100 gals per acre) to ensure thorough and uniform wetting of the soil surface, including the shoulder areas. Add **Arsenal herbicide Applicators Concentrate** at a rate of 3 pints per acre (1.1 fluid ounces per 1000 square feet) to clean water in the spray tank during the filling operation. Agitate before spraying.

If the soil is not moist prior to treatment, incorporation of **Arsenal herbicide Applicators Concentrate** is needed for herbicide activation. Incorporate **Arsenal herbicide Applicators Concentrate** into the soil to a depth of 4 to 6 inches using a rototiller or disc. Rainfall or irrigation of 1 inch will also provide uniform incorporation. **DO NOT** allow treated soil to wash or move into untreated areas.

Spot Treatment and Crack-and-crevice Treatment

Use **Arsenal herbicide Applicators Concentrate** as an initial or follow-up treatment to control weed escapes or weed encroachment in a bareground situation, including cracks and crevices in paved surfaces such as roadways, runways, and parking areas.

Grass Pasture and Rangeland Spot Treatment Weed Control

For the control of undesirable vegetation in grass pasture and rangeland, **Arsenal herbicide Applicators Concentrate** may be applied as a spot treatment at a rate of 1 to 24 fluid ounces of product per treated acre using any of the described ground application methods. Spot applications to grass pasture and rangeland may not exceed more than 1/10 of the area to be grazed or cut for

hay. See appropriate sections of this label for specific use directions for the application method and vegetation control desired. **DO NOT** apply more than 24 fluid ounces per acre per year.

Grazing and Haying Restrictions

- There are no grazing restrictions following **Arsenal® herbicide Applicators Concentrate** application.
- **DO NOT** cut forage grass for hay for 7 days after **Arsenal herbicide Applicators Concentrate** application.

Rangeland Use Instructions

Arsenal herbicide Applicators Concentrate may be applied to rangeland for the control of undesirable vegetation to achieve one or more of the following vegetation management objectives:

- Control of undesirable (nonnative, invasive and noxious) plant species
- Control of undesirable vegetation to aid in the establishment of desirable rangeland plant species
- Control of undesirable vegetation to aid in the establishment of desirable rangeland vegetation following a fire
- Control of undesirable vegetation to reduce wildfire fuel
- Release of existing desirable rangeland plant communities from the competitive pressure of undesirable plant species
- Control of undesirable vegetation for wildlife habitat improvement

To ensure the protection of threatened and endangered plants when applying **Arsenal herbicide Applicators Concentrate** to rangeland:

- Federal agencies must follow NEPA regulations to ensure protection of threatened and endangered plants.
- State agencies must work with the Fish and Wildlife Service or the Service's designated state conservation agency to ensure protection of threatened and endangered plants.
- Other organizations or individuals must operate under a habitat conservation plan if threatened or endangered plants are known to be present on the land to be treated.

See the appropriate section(s) of this label for specific use directions for the desired rangeland vegetation management objective.

Arsenal herbicide Applicators Concentrate must only be applied to a given rangeland acre as specific weed problems arise. Long-term control of undesirable weed species ultimately depends on the successful use of land management practices that promote the growth and sustainability of desirable rangeland plant species.

Rotational Crop Instructions

Rotational crops may be planted 12 months after applying **Arsenal herbicide Applicators Concentrate** at the specified pasture and rangeland rate. Following 12 months after an **Arsenal herbicide Applicators Concentrate**

application and before planting any crop, a successful field bioassay must be completed. The field bioassay consists of a test strip of the intended rotational crop planted in the previously treated area in the grass pasture/rangeland and grown to maturity. The test strip should include low areas and knolls and include variations in soil type and pH within the treated area. If no crop injury is evident in the test strip, the intended rotational crop may be planted the following year.

Use of **Arsenal herbicide Applicators Concentrate** in accordance with label directions is expected to result in normal growth of rotational crops in most situations; however, various environmental and agronomic factors make it impossible to eliminate all risks associated with the use of this product and, therefore, rotational crop injury is always possible.

Aquatic Weed Control

Arsenal herbicide Applicators Concentrate may be applied for the control of floating and emergent undesirable vegetation (see the **Aquatic Weeds Controlled** and the **Terrestrial Weeds Controlled** section) in or near bodies of water that may be flowing, nonflowing, or transient.

Arsenal herbicide Applicators Concentrate may be applied to aquatic sites that include lakes, rivers, streams, ponds, seeps, drainage ditches, canals, reservoirs, swamps, bogs, marshes, estuaries, bays, brackish water, transitional areas between terrestrial and aquatic sites, riparian sites, and seasonal wet areas. See **Product Use Precautions and Restrictions** section of this label for precautions, restrictions, and instructions on aquatic uses.

Read and observe the following directions if aquatic sites are present in nonagricultural lands and are part of the intended treatment area.

Arsenal herbicide Applicators Concentrate must be applied to the emergent foliage of the target vegetation and has little-to-no activity on submerged aquatic vegetation.

Arsenal herbicide Applicators Concentrate concentrations resulting from direct application to water are not expected to be of sufficient concentration nor duration to provide control of target vegetation. Application should be made in such a way as to maximize spray interception by the target vegetation while minimizing the amount of overspray that enters the water.

Arsenal herbicide Applicators Concentrate does not control plants that are completely submerged or have a majority of their foliage under water.

Arsenal herbicide Applicators Concentrate may be applied with surface or helicopter application equipment in a minimum of 2 gallons of water per acre. When applying by helicopter, follow directions under the **Aerial Application** section of this label; otherwise, refer to the **Ground Application** section when using surface equipment.

Applications to moving bodies of water should be made while traveling upstream to prevent concentration of this

herbicide in water. **DO NOT** apply to bodies of water or portions of bodies of water where emergent and/or floating weeds do not exist.

When application is to be made to target vegetation that covers a large percentage of the surface area of impounded water, treating the area in strips may avoid oxygen depletion due to decaying vegetation. Oxygen depletion may result in the suffocation of some sensitive aquatic organisms. If oxygen depletion is a concern, treat no more than 1/2 of the surface area of the water in a single operation and wait at least 10 to 14 days between treatments. Begin treatment along the shore and proceed outward in bands to allow aquatic organisms to move into untreated areas.

Avoid washoff of sprayed foliage by spray boat or recreational boat backwash for 1 hour after application.

Apply **Arsenal® herbicide Applicators Concentrate** at 1 to 3 pints per acre depending on species present and weed density. **DO NOT** exceed the maximum label rate of 3 pints per acre (1.5 lbs ae/A) per year. Use the higher labeled rates for heavy weed pressure. Consult the **Aquatic Weeds Controlled** section and the **Terrestrial Weeds Controlled** section of this label for specific rates.

Arsenal herbicide Applicators Concentrate may be applied as a draw-down treatment in areas described above. Apply **Arsenal herbicide Applicators Concentrate** to weeds after water has been drained and allow 14 days before reintroduction of water.

Permitting - Consult local state fish and game agency and water control authorities before applying this product to public water. Permits may be required to treat such water.

Private waters - Applications may be made to private waters that are still, such as ponds, lakes, and drainage ditches where there is minimal or no outflow to public waters.

Weeds Controlled

Aquatic Weeds Controlled

Arsenal® herbicide Applicators Concentrate will control the following target species as specified in the **Use Rates and Application Directions** column of the table. Rates are expressed in terms of product volume for broadcast applications and as a % solution for directed applications including spot treatments. **For % solution applications, DO NOT apply more than the equivalent of 3 pints of Arsenal herbicide Applicators Concentrate per acre.**

Common Name	Scientific Name	Use Rates and Application Directions
Floating		
*Floating heart	<i>Nymphodes</i> spp.	1 to 2 pints/A (0.25 to 0.50% solution) applied in 100 GPA water mix. Ensure 100% coverage of actively growing emergent foliage.
*Frogbit	<i>Limnobium spongia</i>	0.5 to 1.0 pint/A (0.25% solution) applied in 100 GPA water mix. Ensure 100% coverage of actively growing emergent foliage.
*Spatterdock	<i>Nuphar luteum</i>	Apply a tank mix of 1 to 2 pints/A Arsenal herbicide Applicators Concentrate + 4 to 6 pints/A glyphosate (0.25% Arsenal herbicide Applicators Concentrate + 1.5% glyphosate) in 100 GPA water for best control. Ensure 100% coverage of actively growing emergent foliage.
*Water hyacinth	<i>Eichhornia crassipes</i>	0.5 to 1.0 pint/A (0.25% solution) applied in 100 GPA water to actively growing foliage.
*Water lettuce	<i>Pistia stratiotes</i>	0.5 to 1.0 pint/A (0.25% solution) applied in 100 GPA water mix. Ensure 100% coverage of actively growing emergent foliage.
Emerged		
*Alligatorweed	<i>Alternanthera philoxeroides</i>	0.5 to 2.0 pints/A (0.25% solution) applied in 100 GPA water mix. Ensure 100% coverage of actively growing emergent foliage.
*Arrowhead, duck-potato	<i>Sagittaria</i> spp.	0.5 to 1.0 pint/A (0.25% solution) applied in 100 GPA water mix. Ensure 100% coverage of actively growing emergent foliage.
*Bacopa, lemon	<i>Bacopa</i> spp.	0.5 to 1.0 pint/A (0.25% solution) applied in 100 GPA water mix. Ensure 100% coverage of actively growing emergent foliage.
*Parrot feather	<i>Myriophyllum aquaticum</i>	Must be foliage above water for sufficient Arsenal herbicide Applicators Concentrate uptake. Apply 1 to 2 pints/A to actively growing emergent foliage.
*Pennywort	<i>Hydrocotyle</i> spp.	0.5 to 1.0 pint/A (0.25% solution) applied in 100 GPA water mix. Ensure 100% coverage of actively growing emergent foliage.
*Pickerelweed	<i>Pontederia cordata</i>	1.0 to 1.5 pints/A (0.5% solution) applied in 100 GPA water mix. Ensure 100% coverage of actively growing emergent foliage.
*Taro, wild Dasheen Elephant's ear Coco yam	<i>Colocasia esculentum</i>	2 to 3 pints/A (0.75% solution) applied in 100 GPA with a high quality sticker adjuvant. Ensure good coverage of actively growing emergent foliage.

*Use not permitted in California unless otherwise directed by supplemental labeling.

(continued)

Aquatic Weeds Controlled *(continued)*

Common Name	Scientific Name	Use Rates and Application Directions
Emerged <i>(continued)</i>		
*Water chestnut	<i>Trappa natans</i>	2 to 3 pints/A (0.75% solution) applied in 100 GPA with a high quality sticker adjuvant. Ensure good coverage of actively growing emergent foliage.
*Water lily	<i>Nymphaea odorata</i>	1.0 to 1.5 pints/A (0.5% solution) applied in 100 GPA water mix. Ensure 100% coverage of actively growing emergent foliage.
*Water primrose	<i>Ludwigia uruguayensis</i>	2 to 3 pints/A (0.75% solution). Ensure 100% coverage of actively growing emergent foliage.
Terrestrial/Marginal		
*Soda apple, Aquatic nightshade	<i>Solanum tampicense</i>	1 pint/A applied to foliage
*Bamboo, Japanese	<i>Phyllostachys</i> spp.	1.5 to 2.0 pints/A applied to the foliage when plant is actively growing; before setting seedhead. More foliage will result in greater herbicide uptake, resulting in greater root kill.
Beach, vitex	<i>Vitex rotundifolia</i>	2.5% solution + 1% MSO foliar spray. 8.5% solution stem injection (hack and squirt)
Brazilian pepper Christmasberry	<i>Schinus terebinthifolius</i>	1 to 2 pints/A applied to foliage
Cattail	<i>Typha</i> spp.	1 to 2 pints/A (0.5% solution) applied to actively growing green foliage after full leaf elongation. Lower rates will control cattail in the North; higher rates are needed in the South.
Chinese tallow tree	<i>Sapium sebiferum</i>	8 to 12 fl ozs/A applied to foliage
Cogongrass	<i>Imperata cylindrica</i>	Burn foliage, till area; then fall-spray 1 quart/A Arsenal® herbicide Applicators Concentrate + MSO applied to new growth.
Cordgrass, prairie	<i>Spartina</i> spp.	2 to 3 pints/A applied to actively growing foliage
*Cutgrass	<i>Zizaniopsis miliacea</i>	2 to 3 pints/A applied to actively growing foliage
*Elephant grass Napier grass	<i>Pennisetum purpureum</i>	1.5 pints/A applied to actively growing foliage
*Flowering rush	<i>Butomus umbellatus</i> L.	1.0 to 1.5 pints/A applied to actively growing foliage
Giant reed Wild cane	<i>Arundo donax</i>	2 to 3 pints/A applied in spring to actively growing foliage
*Golden bamboo	<i>Phyllostachys aurea</i>	1.5 to 2.0 pints/A applied to foliage when plant is actively growing; before setting seedhead. More foliage will result in greater herbicide uptake, resulting in greater root kill.
Junglerice	<i>Echinochloa colonum</i>	1.5 to 2.0 pints/A applied to actively growing foliage
Knapweed	<i>Centaurea</i> spp.	Russian knapweed: 1.0 to 1.5 pints + 1 quart/A MSO fall-applied after senescence begins
Knotweed, Japanese	<i>Polygonum cuspidatum</i> <i>Fallopia japonica</i>	1.5 to 2.0 pints/A applied postemergence to actively growing foliage

*Use not permitted in California unless otherwise directed by supplemental labeling.

(continued)

Aquatic Weeds Controlled *(continued)*

Common Name	Scientific Name	Use Rates and Application Directions
Terrestrial/Marginal <i>(continued)</i>		
Melaleuca Paperbark tree	<i>Melaleuca quinquenervia</i>	<p>For established stands, apply 3 pints/A Arsenal® herbicide Applicators Concentrate + 6 pints/A glyphosate + spray adjuvant. For best results, use 4 quarts/A methylated seed oil as an adjuvant.</p> <p>For ground foliar application, uniformly apply to ensure 100% coverage.</p> <p>For broadcast foliar control, apply aerially in a minimum of 2 passes at 10 gallons/A applied cross treatment.</p> <p>For spot treatment, use a 12.5% Arsenal herbicide Applicators Concentrate + 25% solution of glyphosate + 1.25% MSO in water applied as a frill or stump treatment.</p>
*Nutgrass Kili'p'opu	<i>Cyperus rotundus</i>	1 pint Arsenal herbicide Applicators Concentrate + 1 quart/A MSO applied early postemergence
*Nutsedge	<i>Cyperus</i> spp.	1.0 to 1.5 pints postemergence to foliage or preemergence incorporated, nonincorporated, preemergence applications will not control.
Phragmites Common reed	<i>Phragmites australis</i>	2 to 3 pints/A applied to actively growing green foliage after full leaf elongation. Ensure 100% coverage. If stand has a substantial amount of old stem tissue, mow or burn, allow to regrow to approximately 5 feet tall before treatment. Lower rates will control phragmites in the North; higher rates are needed in the South.
*Poison hemlock	<i>Conium maculatum</i>	1 pint Arsenal herbicide Applicators Concentrate + 1 quart/A MSO applied preemergence to early postemergence to rosette prior to flowering
Purple loosestrife	<i>Lythrum salicaria</i>	0.5 pint/A applied to actively growing foliage
Reed canarygrass	<i>Phalaris arundinacea</i>	1.5 to 2.0 pints/A applied to actively growing foliage
Rose, swamp	<i>Rosa palustris</i>	1.0 to 1.5 pints/A applied to actively growing foliage
Russian olive	<i>Elaeagnus angustifolia</i>	1 to 2 pints/A or a 0.5% solution applied to foliage
Saltcedar Tamarisk	<i>Tamarix</i> spp.	Aerial apply 1 quart Arsenal herbicide Applicators Concentrate + 0.25% v/v NIS to actively growing foliage during flowering. For spot spraying, use 0.5% solution of Arsenal herbicide Applicators Concentrate + 0.25% v/v NIS and spray to wet foliage. After application, wait at least 2 years before disturbing treated saltcedar. Earlier disturbance can reduce overall control.
Smartweed	<i>Polygonum</i> spp.	1 pint/A applied early postemergence
Sumac	<i>Rhus</i> spp.	1.0 to 1.5 pints/A applied to foliage
Swamp morningglory Water spinach Kangkong	<i>Ipomoea aquatica</i>	0.5 to 1.0 pint/A Arsenal herbicide Applicators Concentrate + 1 quart/A MSO applied early postemergence

*Use not permitted in California unless otherwise directed by supplemental labeling.

(continued)

Aquatic Weeds Controlled *(continued)*

Common Name	Scientific Name	Use Rates and Application Directions
Terrestrial/Marginal <i>(continued)</i>		
Torpedo grass	<i>Panicum repens</i>	2 pints/A (0.50 to 0.75% solution); ensure good coverage to actively growing foliage
*White top Hoary cress	<i>Cardaria draba</i>	0.5 to 1.0 pint/A applied in spring to foliage during flowering
Willow	<i>Salix</i> spp.	1.0 to 1.5 pints/A Arsenal® herbicide Applicators Concentrate applied to actively growing foliage. Ensure good coverage

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Terrestrial Weed Control

In terrestrial sites, **Arsenal® herbicide Applicators Concentrate** will provide preemergence or postemergence control with residual control of the following target vegetation species at the rates listed. Residual control refers to control of newly germinating seedlings in both annuals and perennials. In general, annual weeds may be controlled by preemergence or postemergence applications of **Arsenal herbicide Applicators Concentrate**. For established biennials and perennials, postemergence applications of **Arsenal herbicide Applicators Concentrate** will provide the best control.

The rates shown below pertain to broadcast applications and indicate the relative sensitivity of these weeds. The relative sensitivity should be referenced when preparing low-volume spray solutions (see **Low-volume Foliar Application** section of **Ground Application**); low-volume applications may provide control of the target species with less **Arsenal herbicide Applicators Concentrate** per acre than is shown for the broadcast treatments. Use **Arsenal herbicide Applicators Concentrate** only in accordance with the specific use directions on this label and the leaflet label.

The relative sensitivity of the species listed following can also be used to determine the relative risk of causing non-target plant injury if any of the species listed following are considered to be desirable within the area to be treated.

Resistant Biotypes. Naturally occurring biotypes (a plant within a given species that has a slightly different but distinct genetic makeup from other plants of the same species) of some weeds listed on this label may not be effectively controlled. If naturally occurring, resistant biotypes are present in an area, **Arsenal herbicide Applicators Concentrate** should be tank mixed or applied sequentially with an appropriate registered herbicide having a different mode of action to ensure control.

Grass Weeds

Common Name	Scientific Name	Growth Habit ²
Apply 1.0 to 1.5 pts/A¹		
Annual bluegrass	<i>Poa annua</i>	A
Broadleaf signalgrass	<i>Brachiaria platyphylla</i>	A
Canada bluegrass	<i>Poa compressa</i>	P
Downy brome	<i>Bromus tectorum</i>	A
Fescue	<i>Festuca</i> spp.	A/P
Foxtail	<i>Setaria</i> spp.	A
Italian ryegrass	<i>Lolium multiflorum</i>	A
Johnsongrass ⁴	<i>Sorghum halepense</i>	P
Kentucky bluegrass	<i>Poa pratensis</i>	P
Napier grass ⁵	<i>Pennisetum purpureum</i>	P
Orchardgrass	<i>Dactylis glomerata</i>	P
Paragrass	<i>Brachiaria mutica</i>	P
Quackgrass	<i>Agropyron repens</i>	P

(continued)

Grass Weeds (continued)

Common Name	Scientific Name	Growth Habit ²
Apply 1.0 to 1.5 pts/A¹ (continued)		
Sandbur	<i>Cenchrus</i> spp.	A
Smooth brome	<i>Bromus inermis</i>	P
Vaseygrass	<i>Paspalum urvillei</i>	P
Wild oats	<i>Avena fatua</i>	A
Witchgrass	<i>Panicum capillare</i>	A
Apply 1.5 to 2.0 pts/A¹		
Barnyardgrass	<i>Echinochloa crus-galli</i>	A
Beardgrass	<i>Andropogon</i> spp.	P
Bluegrass, annual	<i>Poa annua</i>	A
Bulrush ⁵	<i>Scirpus validus</i>	P
Cogongrass	<i>Imperata cylindrica</i>	P
Cheat	<i>Bromus secalinus</i>	A
Crabgrass	<i>Digitaria</i> spp.	A
Crowfootgrass	<i>Dactyloctenium aegyptium</i>	A
Fall panicum	<i>Panicum dichotomiflorum</i>	A
Goosegrass	<i>Eleusine indica</i>	A
Itchgrass	<i>Rottboellia exaltata</i>	A
Lovegrass ⁴	<i>Eragrostis</i> spp.	P
Maidencane ⁵	<i>Panicum hemitomon</i>	A
Panicum, browntop	<i>Panicum fasciculatum</i>	A
Panicum, Texas	<i>Panicum texanum</i>	A
Prairie threeawn	<i>Aristida oligantha</i>	P
Sandbur, field	<i>Cenchrus incertus</i>	A
Signalgrass	<i>Brachiaria platyphylla</i>	A
Wild barley	<i>Hordeum</i> spp.	A
Woolly cupgrass	<i>Eriochloa villosa</i>	A

Apply 2 to 3 pts/A¹

Bahiagrass	<i>Paspalum notatum</i>	P
Bermudagrass ^{3, 4}	<i>Cynodon dactylon</i>	P
Big bluestem	<i>Andropogon gerardii</i>	P
Dallisgrass	<i>Paspalum dilatatum</i>	P
Feathertop	<i>Pennisetum villosum</i>	P
Guineagrass	<i>Panicum maximum</i>	P
Saltgrass ³	<i>Distichlis stricta</i>	P
Sand dropseed	<i>Sporobolus cryptandrus</i>	P
Sprangletop	<i>Leptochloa</i> spp.	A
Timothy	<i>Phleum pratense</i>	P
Wirestem muhly	<i>Muhlenbergia frondosa</i>	P

¹ Use higher rates where heavy or well-established infestations occur.

² Growth Habit: A = Annual, B = Biennial, P = Perennial

³ Use a minimum of 75 GPA.

⁴ Use higher labeled rates.

⁵ Use not permitted in California unless otherwise directed by supplemental labeling.

Broadleaf Weeds

Common Name	Scientific Name	Growth Habit ²
Apply 1.0 to 1.5 pts/A¹		
Burdock	<i>Arctium</i> spp.	B
Carolina geranium	<i>Geranium carolinianum</i>	A
Carpetweed	<i>Mollugo verticillata</i>	A
Clover	<i>Trifolium</i> spp.	A/P
Common chickweed	<i>Stellaria media</i>	A
Common ragweed	<i>Ambrosia artemisiifolia</i>	A
Dandelion	<i>Taraxacum officinale</i>	P
Dogfennel	<i>Eupatorium capillifolium</i>	A
Filaree	<i>Erodium</i> spp.	A
Fleabane	<i>Erigeron</i> spp.	A
Hoary vervain	<i>Verbena stricta</i>	P
Indian mustard	<i>Brassica juncea</i>	A
Kochia	<i>Kochia scoparia</i>	A
Lambsquarters	<i>Chenopodium album</i>	A
Lespedeza ³	<i>Lespedeza</i> spp.	P
Miner's lettuce	<i>Montia perfoliata</i>	A
Mullein	<i>Verbascum</i> spp.	B
Nettleleaf goosefoot	<i>Chenopodium murale</i>	A
Oxeye daisy	<i>Chrysanthemum leucanthemum</i>	P
Pepperweed	<i>Lepidium</i> spp.	A
Pigweed	<i>Amaranthus</i> spp.	A
Puncturevine	<i>Tribulus terrestris</i>	A
Russian thistle	<i>Salsola kali</i>	A
Smartweed	<i>Polygonum</i> spp.	A/P
Sorrell	<i>Rumex</i> spp.	P
Sunflower	<i>Helianthus</i> spp.	A
Sweet clover	<i>Melilotus</i> spp.	A/B
Tansymustard	<i>Descurainia pinnata</i>	A
Western ragweed	<i>Ambrosia psilostachya</i>	P
Wild carrot	<i>Daucus carota</i>	B
Wild lettuce	<i>Lactuca</i> spp.	A/B
Wild parsnip	<i>Pastinaca sativa</i>	B
Wild turnip	<i>Brassica campestris</i>	B
Woollyleaf bursage	<i>Franseria tomentosa</i>	P
Yellow woodsorrel	<i>Oxalis stricta</i>	P

Apply 1.5 to 2.0 pts/A¹

Broom snakeweed ⁴	<i>Gutierrezia sarothrae</i>	P
Bull thistle	<i>Cirsium vulgare</i>	B
Burclover	<i>Medicago</i> spp.	A
Chickweed, mouseear	<i>Cerastium vulgatum</i>	A
Clover, hop	<i>Trifolium procumbens</i>	A
Cocklebur	<i>Xanthium strumarium</i>	A
Cudweed	<i>Gnaphalium</i> spp.	A
Desert camelthorn	<i>Alhagi pseudalhagi</i>	P
Dock	<i>Rumex</i> spp.	P
Fiddleneck	<i>Amsinckia intermedia</i>	A
Goldenrod	<i>Solidago</i> spp.	P
Henbit	<i>Lamium amplexicaule</i>	A
Knotweed, prostrate	<i>Polygonum aviculare</i>	A/P

(continued)

Broadleaf Weeds (continued)

Common Name	Scientific Name	Growth Habit ²
Apply 1.5 to 2.0 pts/A¹ (continued)		
Pokeweed	<i>Phytolacca americana</i>	P
Purslane	<i>Portulaca</i> spp.	A
Pusley, Florida	<i>Richardia scabra</i>	A
Rocket, London	<i>Sisymbrium irio</i>	A
Rush skeletonweed ⁴	<i>Chondrilla juncea</i>	B
Saltbush	<i>Atriplex</i> spp.	A
Shepherdspurse	<i>Capsella bursa-pastoris</i>	A
Spurge, annual	<i>Euphorbia</i> spp.	A
Stinging nettle ⁴	<i>Urtica dioica</i>	P
Velvetleaf	<i>Abutilon theophrasti</i>	A
Yellow starthistle	<i>Centaurea solstitialis</i>	A

Apply 2 to 3 pts/A¹

Arrowwood	<i>Pluchea sericea</i>	A
Canada thistle	<i>Cirsium arvense</i>	P
Giant ragweed	<i>Ambrosia trifida</i>	A
Gray rabbitbrush	<i>Chrysothamnus nauseosus</i>	P
Little mallow	<i>Malva parviflora</i>	B
Milkweed	<i>Asclepias</i> spp.	P
Primrose	<i>Oenothera kunthiana</i>	P
Silverleaf nightshade	<i>Solanum elaeagnifolium</i>	P
Sowthistle	<i>Sonchus</i> spp.	A
Texas thistle	<i>Cirsium texanum</i>	P

¹ Use higher rates where heavy or well-established infestations occur.

² Growth Habit: A = Annual, B = Biennial, P = Perennial

³ Use not permitted in California unless otherwise directed by supplemental labeling.

⁴ For best results, early postemergence applications are required.

Vines and Brambles

Common Name	Scientific Name	Growth Habit ²
Apply 0.5 pt/A		
Field bindweed	<i>Convolvulus arvensis</i>	P
Hedge bindweed	<i>Calystegia sepium</i>	A
Apply 1.0 to 1.5 pts/A¹		
Wild buckwheat	<i>Polygonum convolvulus</i>	P
Apply 1.5 to 2.0 pts/A¹		
Greenbriar	<i>Smilax</i> spp.	P
Honeysuckle ³	<i>Lonicera</i> spp.	P
Morningglory	<i>Ipomoea</i> spp.	A/P
Poison ivy	<i>Rhus radicans</i>	P
Redvine	<i>Brunnichia cirrhosa</i>	P
Wild rose ³	<i>Rosa</i> spp.	P
including:		
Multiflora rose	<i>Rosa multiflora</i>	P
Macartney rose	<i>Rosa bracteata</i>	P

Apply 2 to 3 pts/A¹

Trumpet creeper	<i>Campsis radicans</i>	P
Virginia creeper	<i>Parthenocissus quinquefolia</i>	P
Wild grape	<i>Vitis</i> spp.	P

¹ Use higher rate where heavy or well-established infestations occur.

² Growth Habit: A = Annual, B = Biennial, P = Perennial

³ Use higher labeled rates.

Brush Species

Common Name	Scientific Name	Growth Habit ²
Apply 1 to 2 pts/A¹		
Brazilian peppertree	<i>Schinus terebinthifolius</i>	P
Chinese tallow tree	<i>Sapium sebiferum</i>	P
Popcorn tree		
Russian olive	<i>Elaeagnus angustifolia</i>	P
Sumac	<i>Rhus</i> spp.	P
Willow	<i>Salix</i> spp.	P
Apply 2 to 3 pts/A¹		
Alder	<i>Alnus</i> spp.	P
American beech	<i>Fagus grandifolia</i>	P
Ash ³	<i>Fraxinus</i> spp.	P
Aspen	<i>Populus</i> spp.	P
Autumn olive	<i>Elaeagnus umbellata</i>	P
Bald cypress	<i>Taxodium distichum</i>	P
Bigleaf maple	<i>Acer macrophyllum</i>	P
Birch ³	<i>Betula</i> spp.	P
Black gum ⁴	<i>Nyssa sylvatica</i>	P
Black locust ⁵	<i>Robinia pseudoacacia</i>	P
Black oak	<i>Quercus kelloggii</i>	P
Boxelder	<i>Acer negundo</i>	P
Ceanothis	<i>Ceanothis</i> spp.	P
Cherry ^{3,4}	<i>Prunus</i> spp.	P
Chinaberry	<i>Melia azedarach</i>	P

(continued)

Brush Species (continued)

Common Name	Scientific Name	Growth Habit ²
Apply 2 to 3 pts/A¹ (continued)		
Chinquapin	<i>Castanopsis chrysophylla</i>	P
Cottonwood	<i>Populus trichocarpa</i> <i>P. deltoides</i>	P
Cypress	<i>Taxodium</i> spp.	P
Dogwood ³	<i>Cornus</i> spp.	P
Elm ⁶	<i>Ulmus</i> spp.	P
Eucalyptus	<i>Eucalyptus</i> spp.	P
Hawthorn	<i>Crataegus</i> spp.	P
Hickory ³	<i>Carya</i> spp.	P
Honeylocust ⁵	<i>Gleditsia triacanthos</i>	P
Huckleberry	<i>Gaylussacia</i> spp.	P
Lyonia spp.		
including:		
Fetterbush	<i>Lyonia lucida</i>	
Staggerbush	<i>Lyonia mariana</i>	P
Madrone	<i>Arbutus menziesii</i>	P
Maple	<i>Acer</i> spp.	P
Melaleuca	<i>Melaleuca quinquenervia</i>	P
Mulberry ^{3,7}	<i>Morus</i> spp.	P
Oak ⁸	<i>Quercus</i> spp.	P
Persimmon ⁴	<i>Diospyros virginiana</i>	P
Pine ^{5,10}	<i>Pinus</i> spp.	P
Poison oak	<i>Rhus diversiloba</i>	P
Poplar	<i>Populus</i> spp.	P
Privet	<i>Ligustrum vulgare</i>	P
Red alder	<i>Alnus rubra</i>	P
Red maple	<i>Acer rubrum</i>	P
Saltcedar	<i>Tamarix pentandra</i>	P
Sassafras	<i>Sassafras albidum</i>	P
Sourwood ⁴	<i>Oxydendrum arboreum</i>	P
Sweetgum	<i>Liquidambar styraciflua</i>	P
Sycamore	<i>Platanus occidentalis</i>	P
Tanoak ³	<i>Lithocarpus densiflorus</i>	P
Titi ⁹	<i>Cyrilla racemiflora</i>	P
Tree of heaven	<i>Ailanthus altissima</i>	P
Vaccinium spp.		
including:		
Blueberry	<i>Vaccinium</i> spp.	
Sparkleberry	<i>Vaccinium arboreum</i>	P
Water willow ¹⁰	<i>Justicia americana</i>	P
Yellow poplar ³	<i>Liriodendron tulipifera</i>	P

¹ Use the higher rates where heavy or well-established infestations occur.

² Growth Habit: A = Annual, B = Biennial, P = Perennial

³ Use higher labeled rates.

⁴ Best control with applications prior to formation of fall leaf color

⁵ Tank mix with glyphosate or triclopyr

⁶ Tank mix with glyphosate

⁷ Degree of control may be species dependent.

⁸ For water oak (*Quercus nigra*), laurel oak (*Q. lauriflora*), willow oak (*Q. phellos*) and live oak (*Q. virginiana*), use higher labeled rates.

⁹ Suppression only

¹⁰ Use not permitted in California unless otherwise directed by supplemental labeling.

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