

# **AQUATIC WEED CONTROL - EMERGED - PENNYWORT**

## General Information

## 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.

#### Product Use Precautions and Restrictions

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).

#### Restrictions and Limitations

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

#### 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.

- 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.
- 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.

#### Precautions for 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.

### 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. 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.

### 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.

#### 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 driftreducing agent may be applied at the product labeled rate if necessary or desired.

### 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 lowgrowing 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.

### Limitations, Restrictions, and Exceptions

### 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.

#### 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.

#### Application Direction

Ensure 100% coverage of actively growing emergent foliage.

#### Method

[Broadcast/Foliar Air](#)

[Broadcast/Foliar Ground](#)

[Spot treatment](#)

[Directed](#)

#### Rates

[field\\_rates 0](#)

[field\\_rates 1](#)

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#### Restricted Entry Interval

48 hours

Timings

To actively growing emergent foliage.