FINDING OF NO SIGNIFICANT IMPACT

Control of an Invasive Grass, Buffelgrass (*Pennisetum ciliare*), for the City of Tucson and University of Arizona Properties: "A" Mountain and Tumamoc Hill, Pima County, Arizona

The U.S. Fish and Wildlife Service (Service) proposes to provide funding to control invasive buffelgrass on the City of Tucson (City) and University of Arizona (U of A) properties. This work will help control the spread of the invasive plant buffelgrass (*Pennisetum ciliare*) in the Tucson area in Pima County, Arizona. The goal of this project is to control buffelgrass on "A" Mountain and Tumamoc Hill about 1 mile west of downtown Tucson, Arizona. The work will also mitigate the fire danger and allow for the natural recolonization of native Sonoran Desert vegetation. Currently, buffelgrass has formed large and dense colonies on the City and U of A properties that provides fuel and has the potential to quickly carry wildfires.

The Service has analyzed a number of alternatives for this project, including: 1) The No Action alternative. 2) Alternative 1, which would control buffelgrass through manual removal and/or mowing. Manual removal would be used in areas on "A" Mountain and Tumamoc Hill as a means of controlling some of the buffelgrass infestations, and would be applied to those infestations that are relatively small. Mowing would be used on the City and U of A properties where large infestations of buffelgrass occur. 3) The Preferred Alternative, which will control buffelgrass through the use of an herbicide, Glyphosate (e.g., Roundup Pro), in the form of a liquid spray applied with backpack spraying units, and where possible, a vehicle-mounted boom sprayer. The chemical would be applied to green and growing buffelgrass during periods of active growth. Active growth periods can occur from February to April and from July to November during the respective winter and summer monsoon rains.

Alternative 1 is not likely to be sufficiently effective in controlling the rapidly spreading and large acreages of buffelgrass because the manual and mowing removal methods are labor intensive, costly, and take more than one season to begin control.

The preferred alternative is most likely to succeed in controlling the large areas of invasive buffelgrass because the chemical control is most efficient in covering large acreages, provides an earlier time frame for the native Sonoran Desert habitat to recolonize, and reduces the threat of wildfire to native habitats as well as to City and private properties.

Public Comment

This document was made available for public review from June 22 to July 24, 2006. A City of Tucson media release announcing the availability of the draft EA was sent to newspapers in the Tucson area. The draft EA was available at the Tucson-Pima Main Library, 101 N. Stone, Tucson, Arizona, and posted at www.fws.gov/arizonaes and at www.tucsonaz.gov.

We received two electronic comments (June 21, 2006) from the City's Habitat Conservation Plan Technical Advisory Committee (TAC) on the draft EA before it was available for public review. We received one letter commenting on the draft EA during the public review. We

addressed all comments in the final EA, which lists and responds to all issues, concerns, and questions. The comments did not identify any significant new environmental impacts which were not addressed in the draft EA.

This Finding of No Significant Impact, with its attached Environmental Assessment (EA), will be available at www.fws.gov/arizonaes. All commenters on the draft EA will receive notice of this decision and information as to where it can be accessed.

Determination

It is my determination, based on information contained in the final EA, the proposal for chemical control of the invasive buffelgrass on City and U of A properties is not a major Federal action that would significantly affect the quality of the human environment within the meaning of section 102(2)(c) of the National Environmental Policy Act of 1969 (as amended). Accordingly, the preparation of an Environmental Impact Statement is not warranted.

It is my decision to proceed with the preferred alternative for chemical control of the invasive buffelgrass on the City's and U of A's properties.

Acting Nancy J. Gloman
Regional Director
Southwest Region
U.S. Fish and Wildlife Service

8-7-06
Date

Final Environmental Assessment

Control of an Invasive Grass,
Buffelgrass (*Pennisetum ciliare*)
For The City of Tucson and University of Arizona
Properties: "A" Mountain and Tumamoc Hill,
Pima County, Arizona

U.S. Fish and Wildlife Service
Arizona Ecological Services Office
Partners for Fish and Wildlife Program
2321 W. Royal Palm Road, Suite 103
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July 26, 2006

Section I. Purpose and Need for Action

A. Introduction

The City of Tucson (City) and the University of Arizona (U of A) are working together to control buffelgrass (*Pennisetum ciliare*) in the Tucson area. The U.S. Fish and Wildlife Service's Partners for Fish and Wildlife program will provide funding to both the City of Tucson for their "A" Mountain property and U of A for their Tumamoc Hill Property, with matching funds coming from Pima County to supplement control on the U of A's Tumamoc Hill property, to help control this highly invasive and noxious grass. The goal of this project is to control buffelgrass on "A" Mountain and Tumamoc Hill located about 1 mile west of downtown Tucson, Arizona. The project proposes to treat buffelgrass with a herbicide, Glyphosate (e.g. Roundup Pro or the generic equivalent) in the form of a liquid spray applied with backpack spraying units and vehicle-mounted boom sprayers along road sides where possible. Control efforts (chemical and/or physical) of buffelgrass are planned or currently implemented by adjacent property owners, such as Arizona Game and Fish Department, Pima Community College, Santa Cruz River (County) Park, and adjacent neighborhood and homeowner's associations. Longer-term efforts in Saguaro National Park West and Tucson Mountain Park are also near the proposed project location.

Should the treatment of buffelgrass not occur, its uncontrolled growth and constant threat as a fire hazard may result in the loss of native Sonoran Desert vegetation and the wildlife that depend on the Sonoran Desert ecosystem. Buffelgrass displaces native plants, animals, and habitat by competing for space, sunlight, moisture, and nutrients. Dry buffelgrass leaves produce tinder-dry fuels that quickly carry hot wildfires. Native Sonoran Desert plants and wildlife have not evolved with fire and are seriously damaged by it. Fires that kill native plants and damage wildlife habitat create even more space for buffelgrass, which not only survives the fire but thrives on fire. Currently, buffelgrass has formed large and dense colonies on the City and U of A properties, which provide fuel and have the potential to quickly carry wildfires.

If buffelgrass is not controlled on the City and U of A properties, it will continue to serve as a seed source for buffelgrass infestations on adjacent lands which include Tucson Mountain Park, Saguaro National Park West, the Santa Cruz River just below "A" Mountain, and numerous housing developments. Also, the concern and constant threat of fire from the buffelgrass creates a legal liability for the City and U of A.

B. Purpose of the Proposed Action

The purpose of the proposed action is for the City and the U of A to control about 1,143 acres of buffelgrass on "A" Mountain (273 acres), and Tumamoc Hill (870 acres), to mitigate the fire danger and allow for the natural recolonization of native Sonoran Desert vegetation. The project area is shown in Figure 1. The project area reflects actual boundaries of "A" Mountain and Tumamoc Hill properties.

Figure 1. Project area. Tumamoc Hill is shown in yellow and "A" Mountain in red.

The proposed action is a demonstration project to show that the invasive and noxious buffelgrass can be controlled at a relatively large scale across multiple jurisdictional boundaries. Additionally, the high visibility of this project in the City of Tucson, if successful, will raise the public's awareness of the buffelgrass problem. The goal of this project is to control buffelgrass, which should allow for the natural recolonization of native Sonoran Desert plant species in the project area. Information gained from this project will benefit the City's and other governments' future projects in controlling buffelgrass on their properties.

The term 'noxious' is a legal designation. Buffelgrass is an invasive exotic plant and is classified as a regulated and restricted noxious weed in Arizona. Transporting seed or parts of these plants, or allowing them to seed on one's property is prohibited by Arizona Law (R3-4-245). In 2004, a Habitat Conservation Plan (HCP) called the Sonoran Desert Conservation Plan (SDCP) was prepared for Pima County. In that document, the treatment of buffelgrass was addressed. The SDCP addresses biodiversity conservation and addresses control of buffelgrass in Pima County through implementing an adaptive management plan. Control of buffelgrass and establishment of beneficial native plant species on City and U of A properties will contribute to restoring Sonoran Desert ecosystem, increasing biodiversity, and decreasing risk of catastrophic fire in the area. The action proposed in this project supports this effort by controlling

buffelgrass, thus allowing natural re-establishment of beneficial native vegetation. Sufficient native seed sources exist in the project area to induce natural reseeding, therefore no supplemental re-seeding or planting will be performed on "A" Mountain and Tumamoc Hill.

C. Need for Taking the Proposed Action

The need for taking the proposed action is to take steps necessary to conserve native Sonoran Desert plants and the ecosystem by controlling buffelgrass. Buffelgrass was formally added to the Noxious Weed List for Arizona on December 6, 2005. It poses a threat to the Sonoran Desert ecosystem and increases the likelihood of fire and therefore steps to control the spread of buffelgrass are necessary. Conservation of Sonoran Desert plant species through control of invasive grasses is consistent with the SDCP. Current buffelgrass control efforts are underway at the Tucson Mountain Park, Saguaro National Park, Organ Pipe Cactus National Monument, Coronado National Forest, and along Interstate Highways 10 and 19, and Highway 86. Control methods are primarily chemical (application of the herbicide Round Up or equivalent) with minimal physical removal at Saguaro National Park and Coronado National Forest. Physical methods such as using volunteer labor to pull buffelgrass, is used at Tucson Mountain Park and Organ Pipe Cactus National Monument. The City's and U of A's involvement are an essential component to the larger regional control effort that includes ongoing activities of Pima County, Federal agencies such as Saguaro National Park and Coronado National Forest, and private individuals.

Section II: Alternatives Including the Proposed Action

Alternative 1. No Action

This alternative would not take direct action to control buffelgrass on the City or U of A properties. This alternative would continue with current actions that include limited use of herbicides and mapping locations of buffelgrass throughout the Tucson area. Under the no action alternative, only very small patches of buffelgrass would be controlled. The City and U of A would not be in compliance with state regulations regarding noxious weed removal.

Alternative 2. Physical Control and Removal

This alternative would implement the physical control of buffelgrass using several methods, including manual removal and/or mowing. Transportation of grass removed by either method would be in a manner that would minimize the possibility of plants "escaping." Disposal would be in City landfill sites where buffelgrass could be contained on site through continual removal of colonizing plants.

Manual removal would be used in areas on "A" Mountain and Tumamoc Hill as a means of controlling some of the buffelgrass infestations, and would be applied to those infestations that are relatively small. Manual control and removal is costly and labor intensive because of the

huge workforce involved. However, enlisting the help of volunteers could reduce the cost of physical control. The high cost and labor intensiveness of physical methods may preclude control of buffelgrass that is currently established as a large area of infestation and is rapidly spreading. Manual removal should not be practiced in archeologically sensitive areas or on steep slopes or in very thick stands of buffelgrass due to the high risk of soil erosion. Because of the huge extent of buffelgrass, physical control/removal may be insufficient to prevent its further spread, thus manual removal would not be practical on a large scale.

Mowing would be used on the City and U of A properties where large infestations of buffelgrass occur. Mowing and collecting the mowed grass on a large scale area would be labor intensive. Additionally, mowing, either with string trimmers in the mountain areas or mowing machines in level areas may cause sparking and poses fire risk, which could damage neighboring native plants. Mowing would not be practical on a large scale, and would potentially be counterproductive by assisting in seed dispersal.

Alternative 3. Chemical (Herbicide) Removal of Exotic, Noxious Species and Re-establishing Native Plants – Proposed Action

Under this alternative only the herbicide Glyphosate (e.g. Roundup Pro) [N-(phosphonomethyl) glycine, in the form of its isopropylamine salt] and other ingredients including surfactant (a chemical added to improve absorption on the leaf surface) would be used for control of buffelgrass, applied at a minimum spray solution rate of 2% Active Ingredient. Adding adjuvants, other than the surfactant already contained in the Roundup Pro or its generic equivalent would not be necessary. See Appendix A for label. The chemical would be applied to green and growing buffelgrass during periods of active growth. Active growth periods can occur from February to April and from July to November during the respective winter and summer monsoon rains. Glyphosate has an average half life in soil of 47 days. It rapidly and readily adheres to soil, making its mobility/leaching potential low. Since it is bound by the soil, it is generally not absorbed by non-target plants through their roots. Degradation of Glyphosate in the soil occurs through microbial metabolism. Rainfall within six hours of application may reduce this herbicide's effectiveness. It does not volatilize. The product is readily translocated to roots through the plants' leaves. It is considered to be relatively non-toxic to animals because the enzyme pathways for plants (through which the chemical operates) are not present in animals.

Glyphosate acts effectively on a wide range of plants; therefore care must be taken to limit adverse effects on non-target plants, overspray/drift being the primary concern during application. The herbicide mixture would include an inert marker dye, light blue, to ensure complete coverage and confirm that non-target species were not sprayed. Appropriate sized nozzles and tips would be used to minimize overspray onto native vegetation. All information and instructions on the herbicide label would be strictly followed. The herbicide would be mixed strictly according to labeled mixtures and uses. All herbicide containers would show the product label and would be leak- and spill- resistant. All application equipment and chemicals would be stored in appropriate storage facilities. Roundup Pro Material Safety Data Sheets (MSDS) would

be maintained on-site. The applicator(s) would have a State of Arizona pesticide applicator's certification obtained through the State Structural Pest Control Commission.

Application techniques would include using a backpack sprayer for the "A" Mountain and Tumamoc Hill, and using a vehicle-mounted boom sprayer along roadsides at "A" Mountain and Tumamoc Hill. A backpack sprayer would also be used for spot treatment in areas where buffelgrass occurs in close proximity to non-target species.

Within the action areas on "A" Mountain and Tumamoc Hill, an intact native flora exists in areas not infested with buffelgrass. These intact flora areas will provide a ready seed source for native re-vegetation in areas treated for buffelgrass control. Native species include: Palo verde, saguaro, mesquite, mixed native perennial grasses (three-awns, tanglehead, Arizona cottontop, tobosa, curly mesquite, etc), creosote bush, and a variety of cactus, ephemeral grasses, forbs, and wildflowers.

Section III: Affected Environment

"A" Mountain and Tumamoc Hill range in elevation from 2,375 feet to 3,110 feet, respectively and are adjacent to each other. "A" Mountain is about 273 acres that is comprised of open space and managed by the City as a park. Tumamoc Hill is 870 acres in size. It is managed by the U of A and houses the Desert Laboratory, a century old research facility, which studies the adaptations of desert plants to aridity. An observatory operated by the U of A's Department of Astronomy and the Steward Observatory houses a 21-inch reflector telescope on Tumamoc Hill. Residential and business developments surround the mountains (Figure 2).

The Santa Cruz River is located along the eastern portion of the mountains. The river has been channelized by soil cement bank armoring. The channel is a dry wash most of the year with occasional flows occurring in response to large rainfall events in the monsoon season and winter. There are no perennial waters or fish in the project area. Amphibians are known to occur in the Santa Cruz River.

Precipitation in Tucson including the project area is biseasonal with an annual average precipitation of 12 inches that falls during winter and summer months. The months of April, May, and June are the driest months and a time of great moisture stress for native vegetation. Temperatures frequently exceed 100° F in summer and occasionally drop below freezing in winter. Depth to groundwater is over 100 feet below land surface.

The dominate soil type on the mountains is loam to gravely sandy loam. There are large blocks of dark brown Tertiary basalt. Vegetation is characteristic of the Arizona Upland Subdivision of the Sonoran Desert. Dominant native species include foothills palo verde, *Cercidium micropohyllum*; Saguaro, *Carnegiea gigantea*; ocotillo, *Fouquieria splendens*; desert lavender, *Hyptis emoryi,* Prickly pear cactus, *Opuntia phaeacantha;* brittlebush, *Encelia farinose;* wolfberry, *Lycium berlandieri;* and whitethorn acacia, *Acacia constricta.* Refer to Bowers and Turner 1985, for a complete plant inventory on Tumamoc Hill. Research has shown that

saguaros established on the mountains prefer the southern and eastern slopes of the mountains which allow for good drainage. Buffelgrass also prefers these same features.

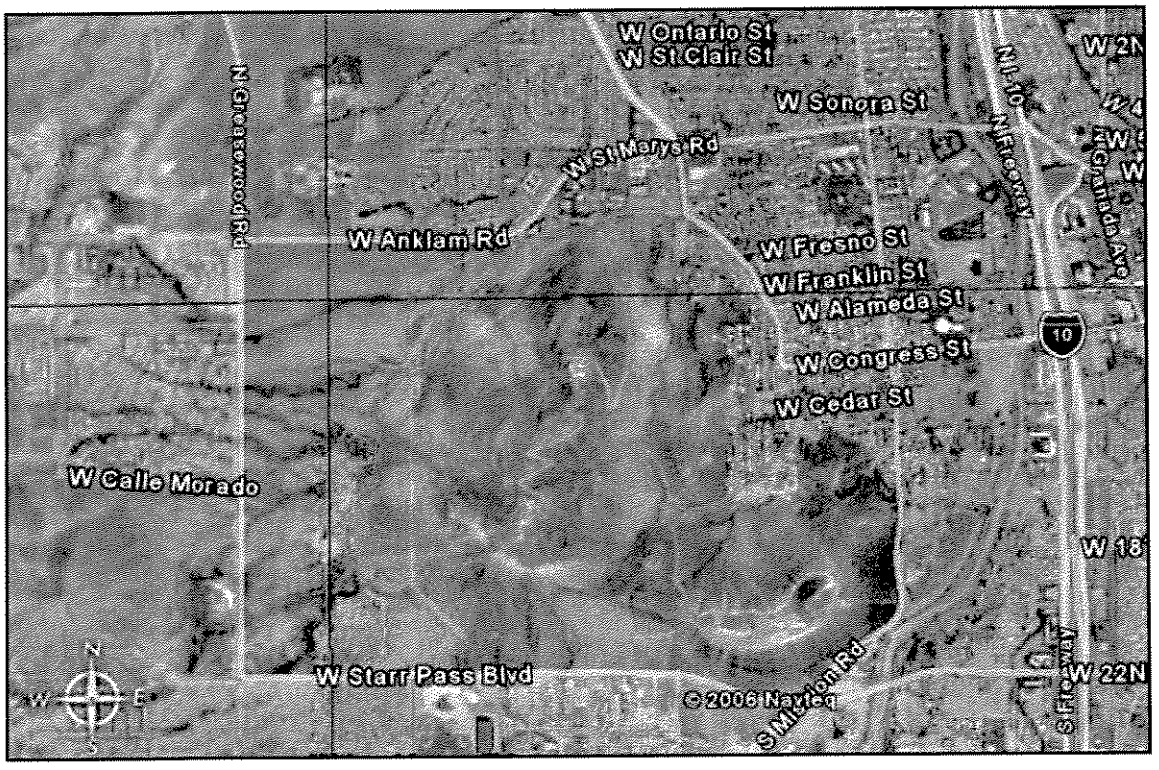

Figure 2. Project is located west of downtown Tucson near businesses and houses.

Wildlife species observed in the area include mule deer, javelina, ringtail cat, rocksquirrels, antelope squirrels, gray fox, bobcat, desert tortoise, diamondback rattlesnake, blacktail rattlesnake, tiger rattlesnake, gopher snake, whiptail lizards, red tailed hawk, turkey vulture, kestrel, Copper's hawk, western screech owl, Gambel's quail, dove, verdins, canyon wren, cactus wren, mockingbird, and curve billed thrasher. There are no listed endangered or threatened species in the project area.

Section IV: Environmental Consequences

Alternative 1: No Action

Impacts on Wildlife Habitat

The no action alternative, where existing buffelgrass infestations are not treated, would have major adverse and long-term impacts to native wildlife and their habitat through continued competition for space, water and nutrients, and a change in native habitat from the introduction and continued threat of fire. Without buffelgrass control, native vegetation would be replaced with buffelgrass and result in little or no beneficial native habitat for wildlife.

Impacts on Water Quantity and Quality
If no action is taken to control buffelgrass, the result would have a major adverse, long-term impact to water quantity and quality in the project area when compared to areas containing native vegetation. Large stands of buffelgrass would remain along with the continued threat of fire. During pre-monsoon periods, when conditions are the driest, buffelgrass may burn within the project area, which includes steep sided slopes. With burning soon followed by intense monsoon storms, the effect would be an increase in potentially devastating soil erosion from reduced infiltration and increased runoff.

Impacts on Aesthetic and Visual Resources
This alternative could have major adverse, long-term impacts on the aesthetic and visual resources of the Sonoran Desert ecosystem. Not treating buffelgrass would result the increased displacement of native Sonoran Desert vegetation by expanding areas of buffelgrass and potential removal of native vegetation by the constant threat of fire. Fire events would destroy the native habitat, and buffelgrass or other exotic plants would replace this desert ecosystem.

Impacts on Socioeconomic Resources
No action would have a major adverse, long-term impact on the socioeconomic resources of the City of Tucson and its citizens. The no action alternative would not control buffelgrass, therefore would continue to serve as a seed source for buffelgrass infestations on adjacent lands and create a legal liability for the City and U of A in the event of fires.

Alternative 2. Physical Control and Removal

Impacts on Wildlife Habitat
This alternative would have minor, beneficial, localized, short-term impacts to native wildlife and their habitat by reducing the competition for space, water and nutrients, and reducing the introduction of fire. These impacts would be localized and short-term because of the time and cost constraints of physical removal and limited area of treatment.

At locations where this alternative may be implemented, manual removal or mowing treatment will restore localized, small areas of native vegetation. This alternative may have negligible, localized, short-term adverse impacts when buffelgrass is pulled that is adjacent to native vegetation. Physical control and removal may also have a short-term, negligible adverse effect on vertebrate or invertebrate species inhabiting areas where buffelgrass would be removed. Short-term displacement of wildlife may occur during removal; however the impact is expected to be negligible.

Impacts on Water Quantity and Quality
This alternative would have major adverse, long-term impacts to water quantity and quality in the project area because buffelgrass infestations would not be effectively managed under this alternative. Large, contiguous stands of buffelgrass would remain because of the time and cost constraints of physical removal and the limited area receiving treatment. These stands would serve as a continued source of fire. The water quantity and quality in the treated areas may be reduced when compared to areas containing native vegetation. This impact could result from

exposure of bare ground due to manual buffelgrass removal or pre-monsoon fires, resulting in the potential for increased runoff during monsoon events and movement of sediment into the major drainages.

Impacts on Aesthetic and Visual Resources
The physical removal action alternative would have minor, beneficial, short-term impacts on the aesthetic and visual resources of the Sonoran Desert ecosystem. Physical removal methods would have minor, short-term impacts by removing some of the buffelgrass seed source and allowing localized, small areas of the native Sonoran Desert vegetation to reestablish.

Impacts on Socioeconomic Resources
This alternative would have minor, short-term impacts on City and U of A properties, by removing local, small areas of the seed source and reducing the potential for large, hot fires. Physical removal would have a beneficial impact on the socioeconomic resources of the City of Tucson and its citizens.

Alternative 3. Chemical (Herbicide) removal of exotic, noxious species and Re-establishing native plants – Proposed Action

Impacts on Wildlife Habitat
Herbicides can injure or kill non-target plants, with short-term, negligible, localized, adverse impacts. However, chemical control of buffelgrass would have long-term, moderate beneficial impacts on native vegetation and wildlife habitat. Roundup Pro acts on plant-specific enzyme pathways, thus its impact to wildlife habitat under normal application conditions would be negligible. Native plant communities and wildlife habitat would be restored by killing the buffelgrass and allowing the limited water and nutrients to become available to surrounding native vegetation and newly recruiting native vegetation. To the degree that Roundup Pro effectively removes buffelgrass, this alternative method will have moderate, long-term, beneficial impacts to native plant and wildlife habitat by reducing competition and reducing wildfire in plant and wildlife habitat communities not adapted to fire.

Impacts on Water Quantity and Quality
The use of chemical removal methods could have negligible, short-term, localized, adverse impacts on water quantity and quality. Killing buffelgrass with Roundup would lead to natural restoration of native plant communities. This would have positive effects on soil nutrient availability and cycling, water availability, and soil erosion. Overall the alternative will have negligible, short-term, adverse impacts and minor, long-term, beneficial impacts on the water quantity and quality.

Impacts on Aesthetic and Visual Resources
Chemical removal methods could have major direct impacts by killing the buffelgrass and its seed source, thus allowing the native Sonoran Desert vegetation to reestablish. The alternative would have major, direct, beneficial impacts on the aesthetic and visual resources of the Sonoran Desert ecosystem. Application of the chemical and the marker light blue dye would have minor,

short-term impact on the aesthetic and visual resources of both "A" Mountain and Tumamoc Hill because these areas will have a light blue color after application.

Impacts on Socioeconomic Resources
Application of a chemical herbicide could have a minor, short-term impact on City and U of A properties, by increasing the fuel threat during the next two to three years as a result of killing the new growth and adding to the existing stands of dead grass in the area. This would have a minor, short-term impact because dead and volatile fuels would break down within two to three years from rain and wind, therefore reducing and removing the threat of fire.

The minor, short-term impacts would be negligible and offset because the application of a chemical herbicide could have a major direct, long-term impact on City and U of A properties, by removing the seed source, reducing future infestations, and reducing the potential for large, hot wildfires. The preferred alternative would have a major direct, long-term, beneficial impact on the socioeconomic resources of the City of Tucson and its citizens. The threat of fire fuels near a highly urbanized area would be reduced. In addition, the aesthetic and visual resources would be improved by restoring the area to native Sonoran Desert vegetation.

Section V: Public Involvement

Agency Involvement
The development of this environmental assessment (EA) was coordinated with the City's Manger's Office and Parks and Recreation Department, and the U of A's Desert Laboratory.

Public Review
This document was made available for public review from June 22 to July 24, 2006. A City of Tucson media release announcing the availability of the draft EA was sent to newspapers in the Tucson area. The draft EA was available at the Tucson-Pima Main Library, 101 N. Stone, Tucson, Arizona, and posted on our web site www.fws.gov/arizonaes and the City's web site www.tucsonaz.gov.

All comments received were considered in the final EA and accompanying decision. Individuals who submitted comments during the public comment period will receive a notice of the decision. Two comments were received from the Technical Advisory Committee (TAC) to the City's Habitat Conservation Plan Stakeholder Advisory Committee, dated June 21, 2006. These comments focused on clarification and were not addressed in the draft EA before the 30-day public review began. We addressed their comments in the final EA; however, they did not alter our decision on the preferred alternative. One comment letter was received, from Mr. C. David Bertelsen in Tucson, Arizona, dated June 26, 2006. Below, we summarize the comments and present our responses.

Comment a. TAC asked if the statement on page 6, referring to the amino acid pathway mechanism of the herbicide was correct when compared to the statement on page 11, referring to the enzyme pathway.

Response. The herbicide kills plants by inhibiting enzymes specific to plants that are not present in animals. Clarification was made on page 6 to reflect the herbicide's pathway is specific to plant enzymes.

Comment b. TAC asked about the volume and volatility of the buffelgrass fuel after applying the herbicide. If the action (spraying) kills the grass, then it could cause a greater fuel threat over the next two to three years. How long will it take the dead and very volatile fuel to break down with rain and/or wind before the threat of fires is indeed removed?

Response. Observations by U of A's desert laboratory staff on buffelgrass kills on Tumamoc Hill in late 2003 to early 2004 showed dead buffelgrass had largely disintegrated within one to two years and the remaining fuel (buffelgrass) was negligible. The action of spraying new buffelgrass shoots just after green up, will greatly reduce the current year's growth and in turn reduce the following year's fuel load.

Comment c. Mr. Bertelsen supports Alternative 3; however, he has concerns about spraying with a vehicle-mounted boom sprayer because over-spray to non-targeted species is much more likely, particularly if the individual operating the sprayer is unfamiliar with native plants.

Response. The City will contract with a State of Arizona pesticide applicator, certified through the Sate Structural Pest Control Commission. The contractor will have to clearly demonstrate their ability to use a boom sprayer without hitting non-target vegetation before the contractor is approved by the City. The contract conditions will hold the contractor responsible for damage to non-target vegetation.

Section VI: Consultation and Coordination

Document prepared by:

Denise Baker, Biologist, Partners for Fish and Wildlife Program, U.S. Fish and Wildlife Service, Phoenix, Arizona.

Agencies, individuals, and resources, consulted in the preparation of this document:

Travis Bean, Senior Research Specialist, University of Arizona Desert Laboratory, Tucson, Arizona

Glen Hicks, Parks and Recreation Planner, City of Tucson, Arizona

Leslie Liberti, Environmental Planning Manager, City Manager's Office, City of Tucson, Arizona

Technical Advisory Committee as part of the City of Tucson's Habitat Conservation Plan Stakeholder Advisory Committee

Marty Jakle, Biologist, Partners for Fish and Wildlife Program, U.S. Fish and Wildlife Service, Tucson, Arizona.

Kris Randall, State Coordinator, Partners for Fish and Wildlife Program, U.S. Fish and Wildlife Service, Phoenix, Arizona.

Steve Robertson, Chief Environmental Contaminants/NEPA Coordinator, U.S. Fish and Wildlife Service, Albuquerque, New Mexico.

Appendix A

Label for Glyphosate (e.g. Roundup Pro)

Material Safety Data Sheet

This sample label is current as of October 05, 2000. The product descriptions and recommendations provided in this sample label are for background information only. Always refer to the label on the product before using Monsanto or any other agrichemical product.

21203B2-1/CG

Roundup PRO Concentrate

The Complete Broad Spectrum Postemergence Professional Herbicide for Industrial Weed Control.

Complete Directions for Use

EPA Reg. No. 524-529

AVOID CONTACT OF HERBICIDE WITH FOLIAGE, GREEN STEMS, EXPOSED NON-WOODY ROOTS OR FRUIT OF CROPS, DESIRABLE PLANTS AND TREES, BECAUSE SEVERE INJURY OR DESTRUCTION IS LIKELY TO RESULT.

2003-1

Read the entire label before using this product.

Use only according to label instructions.

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

Not all products recommended on this label are registered for use in California. Check the registration status of each product in California before using.

Read the "LIMIT OF WARRANTY AND LIABILITY" statement at the end of the label before buying or using. If terms are not acceptable, return at once unopened.

THIS IS AN END-USE PRODUCT. MONSANTO DOES NOT INTEND AND HAS NOT REGISTERED IT FOR REFORMULATION. SEE INDIVIDUAL CONTAINER LABEL FOR REPACKAGING LIMITATIONS.

1.0 INGREDIENTS

ACTIVE INGREDIENT:

*Glyphosate, N-(phosphonomethyl)glycine, in the form of its isopropylamine salt 50.2%

OTHER INGREDIENTS: 49.8%

100.0%

*Contains 600 grams per liter or 5 pounds per U.S. gallon of the active ingredient glyphosate, in the form of its isopropylamine salt.

This product is protected by U.S. Patent Nos. 5,683,958; 5,703,015; 6,063,733; 6,121,199; and 6,121,200. No license granted under any non-U.S. patent(s).

2.0 IMPORTANT PHONE NUMBERS

1. FOR PRODUCT INFORMATION OR ASSISTANCE IN USING THIS PRODUCT, CALL TOLL-FREE,
   1-800-332-3111.
2. IN CASE OF AN EMERGENCY INVOLVING THIS PRODUCT, OR FOR MEDICAL ASSISTANCE, CALL COLLECT, DAY OR NIGHT,
   1-314-694-4000.

3.0 PRECAUTIONARY STATEMENTS

3.1 Hazards to Humans and Domestic Animals

Keep out of reach of children.

CAUTION!

CAUSES MODERATE EYE IRRITATION.
Avoid contact with eyes or clothing.

FIRST AID	
IF IN EYES	Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a poison control center or doctor for treatment advice.
HOT LINE NUMBER	
Have the product container or label with you when calling a poison control center or doctor, or going for treatment. This product is identified as **Roundup Pro® Concentrate herbicide, EPA Registration No. 524-529.** You may also contact **(314) 694-4000**, collect day or night, for emergency medical treatment information.	

DOMESTIC ANIMALS: This product is considered to be relatively nontoxic to dogs and other domestic animals; however, ingestion of this product or large amounts of freshly sprayed vegetation may result in temporary gastrointestinal irritation (vomiting, diarrhea, colic, etc.). If such symptoms are observed, provide the animal with plenty of fluids to prevent dehydration. Call a veterinarian if symptoms persist for more than 24 hours.

Personal Protective Equipment (PPE)

Applicators and other handlers must wear: long-sleeved shirt and long pants, shoes plus socks. Follow manufacturer's instructions for cleaning/maintaining Personal Protective Equipment (PPE). If there are no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

When handlers use closed systems, enclosed cabs or aircraft in a manner that meets the requirements listed in Worker Protection Standard (WPS) for agricultural pesticides [40 CFR 170.240 (d) (4-6)], the handler PPE requirements may be reduced or modified as specified in the WPS.

User Safety Recommendations

Users should:

- Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet.
- Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.

3.2 Environmental Hazards

Do not apply directly to water, to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwaters.

3.3 Physical or Chemical Hazards

Spray solutions of this product should be mixed, stored and applied using only stainless steel, aluminum, fiberglass, plastic or plastic-lined steel containers.

DO NOT MIX, STORE OR APPLY THIS PRODUCT OR SPRAY SOLUTIONS OF THIS PRODUCT IN GALVANIZED STEEL OR UNLINED STEEL (EXCEPT STAINLESS STEEL) CONTAINERS OR SPRAY TANKS. This product or spray solutions of this product react with such containers and tanks to produce hydrogen gas which may form a highly combustible gas mixture. This gas mixture could flash or explode, causing serious personal injury, if ignited by open flame, spark, welder's torch, lighted cigarette or other ignition source.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in any manner inconsistent with its labeling. 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. For any requirements specific to your State or Tribe, consult the agency responsible for pesticide regulations.

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 4 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 and waterproof gloves.

Non-Agricultural Use Requirements

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

Keep people and pets off treated areas until spray solution has dried to prevent transfer of this product onto desirable vegetation.

4.0 STORAGE AND DISPOSAL

Do not contaminate water, foodstuffs, feed or seed by storage or disposal.

Keep container closed to prevent spills and contamination.

Wastes resulting from the use of this product that cannot be used or chemically reprocessed should be disposed of in a landfill approved for pesticide disposal or in accordance with applicable Federal, state, or local procedures.

Emptied container retains vapor and product residue. Observe all labeled safeguards until container is cleaned, reconditioned, or destroyed.

FOR REFILLABLE PORTABLE CONTAINERS: Do not reuse this container except for refill in accordance with a valid Monsanto Repackaging or Toll Repackaging Agreement. If not refilled or returned to the authorized repackaging facility, triple rinse container, then puncture and dispose of in a sanitary landfill, or by incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

FOR METAL CONTAINERS (non-aerosol): Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or by other procedures approved by state and local authorities.

FOR BULK CONTAINERS: Triple rinse emptied bulk container. Then offer for recycling or reconditioning, or dispose of in a manner approved by state and local authorities.

FOR PLASTIC 1-WAY CONTAINERS & BOTTLES: Do not reuse container. Triple rinse container, then puncture and dispose of in a sanitary landfill, or by incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

FOR DRUMS: Do not reuse container. Return container per the Monsanto container return program. If not returned, triple rinse container, then puncture and dispose of in a sanitary landfill, or by incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

5.0 GENERAL INFORMATION

Product Description: This product is a postemergent, systemic herbicide with no soil residual activity. It gives broad spectrum control of many annual weeds, perennial weeds, woody brush and trees. It is formulated as a water-soluble liquid containing surfactant.

Environmental Fate: When this product comes in contact with the soil it is bound to soil particles. When used in accordance with label directions, once this product is bound it is not available for plant uptake and will not harm off-site vegetation where roots grow into the treatment area or if the soil is transported off-site. The strong affinity of this product to soil particles prevents this product from leaching out of the soil profile and entering ground water. The affinity between this product and soil particles remains until this product is degraded, which is primarily a biological degradation process carried out under both aerobic and anaerobic conditions by soil microflora.

Time to Symptoms: This product moves through the plant from the point of foliage contact to and into the root system. Visible effects on most annual weeds occur within 2 to 4 days, but on most perennial weeds may not occur for 7 days or more. Extremely cool or cloudy weather following treatment may slow activity of this product and delay development of visual symptoms. Visible effects are a gradual wilting and yellowing of the plant which advances to complete browning of above-ground growth and deterioration of underground plant parts.

Mode of Action in Plants: The active ingredient in this product inhibits an enzyme found only in plants that is essential to formation of specific amino acids.

Cultural Considerations: Reduced control may result when applications are made to annual or perennial weeds that have been mowed, grazed or cut, and have not been allowed to regrow to the recommended stage for treatment.

Rainfastness: Heavy rainfall soon after application may wash this product off of the foliage and a repeat application may be required for adequate control.

No Soil Activity: Weeds must be emerged at the time of application to be controlled by this product. Weeds germinating from seed after application will not be controlled. Unemerged plants arising from unattached underground rhizomes or root stocks of perennials will not be affected by the herbicide.

Volatility: Roundup Pro Concentrate herbicide is non-volatile. Therefore, it cannot move as a vapor after application to affect nearby vegetation.

Toxicology: Exposure to workers and other applicators generally is expected to pose minimal risks based on results of short-term toxicity studies. Glyphosate has been thoroughly tested and determined not to cause cancer or other adverse long-term health effects.

Tank Mixing: This product does not provide residual weed control. For subsequent residual weed control, follow a label-approved herbicide program. Read and carefully observe the cautionary statements and all other information appearing on the labels of all herbicides used. Use according to the most restrictive label directions for each product in the mixture.

Buyer and all users are responsible for all loss or damage in connection with the use or handling of mixtures of this product with herbicides or other materials that are not expressly recommended in this label. Mixing this product with herbicides or other materials not recommended on this label may result in reduced performance.

Grazing Restrictions for Utility Rights-of-Way: This product may be used to treat undesirable vegetation in rights-of-way that pass through pastures and rangeland and on forestry sites that are being grazed. For tank-mix applications, comply with all restrictions appearing on the tank-mix product label.

There are no grazing restrictions for the following applications of this product:

- Where the spray can be directed onto undesirable weeds, woody brush and trees, such as in handgun, spray-to-wet or low volume directed spray treatments.
- For tree injection or frill application and for cut stump treatments.

For broadcast applications, observe the following restrictions:

- For application rates of greater than 4.75 quarts but not to exceed 8 quarts per acre, no more than 15 percent of the available grazing area may be treated.
- For application rates that do not exceed 4.75 quarts per acre, no more than 25 percent of the available grazing area may be treated.
- All restrictions apply to lactating dairy animals. No other restrictions apply to lactating dairy animals.

These recommendations do not apply to rangeland outside of utility rights-of-way.

Annual Maximum Use Rate: The combined total of all treatments must not exceed 8.5 quarts of this product per acre per year.

ATTENTION

AVOID CONTACT OF HERBICIDE WITH FOLIAGE, GREEN STEMS, EXPOSED NON-WOODY ROOTS OR FRUIT OF CROPS, DESIRABLE PLANTS AND TREES, BECAUSE SEVERE INJURY OR DESTRUCTION MAY RESULT.

AVOID DRIFT. EXTREME CARE MUST BE USED WHEN APPLYING THIS PRODUCT TO PREVENT INJURY TO DESIRABLE PLANTS AND CROPS.

Do not allow the herbicide solution to mist, drip, drift or splash onto desirable vegetation since minute quantities of this product can cause severe damage or destruction to the crop, plants or other areas on which treatment was not intended. The likelihood of injury occurring from the use of this product increases when winds are gusty, as wind velocity increases, when wind direction is constantly changing or when there are other meteorological conditions that favor spray drift. When spraying, avoid combinations of pressure and nozzle type that will result in splatter or fine particles (mist) which are likely to drift. AVOID APPLYING AT EXCESSIVE SPEED OR PRESSURE.

NOTE: Use of this product in any manner not consistent with this label may result in injury to persons, animals or crops, or other unintended consequences. Keep container closed to prevent spills and contamination.

6.0 MIXING

Clean sprayer parts immediately after using this product by thoroughly flushing with water.

NOTE: REDUCED RESULTS MAY OCCUR IF WATER CONTAINING SOIL IS USED, SUCH AS VISIBLY MUDDY WATER OR WATER FROM PONDS AND DITCHES THAT IS NOT CLEAR.

Now More Concentrated

Use the following conversion table to help determine application rates of Roundup Pro Concentrate herbicide based on commonly used rates of Roundup Pro® herbicide:

Roundup Pro Concentrate (Ounces)	Roundup Pro (Ounces)	Roundup Pro (Pints)
20	24	1.5
26	32	2.0
32	40	2.5

6.1 Mixing With Water

This product mixes readily with water. Mix spray solutions of this product as follows: Fill the mixing or spray tank with the required amount of water. Add the recommended amount of this product near the end of the filling process and mix well. Use caution to avoid siphoning back into the carrier source. Use approved anti-back-siphoning devices where required by state or local regulations. During mixing and application, foaming of the spray solution may occur. To prevent or minimize foam, avoid the use of mechanical agitators, terminate by-pass and return lines at the bottom of the tank and, if needed, use an approved anti-foam or defoaming agent.

6.2 Tank Mixing Procedure

When tank mixing, read and carefully observe label directions, cautionary statements and all information on the labels of all products used. Add the tank-mix product to the tank as directed by the label. Maintain agitation and add the recommended amount of this product.

Maintain good agitation at all times until the contents of the tank are sprayed. If the spray mixture is allowed to settle, thorough agitation may be required to resuspend the mixture before spraying is resumed.

Keep by-pass line on or near the bottom of the tank to minimize foaming. Screen size in nozzle or line strainers should be no finer than 50 mesh.

Always predetermine the compatibility of labeled tank mixtures of this product with water carrier by mixing small proportional quantities in advance.

Refer to the "Tank Mixing" section of "GENERAL INFORMATION" for additional precautions.

6.3 Mixing for Hand-Held Sprayers

Prepare the desired volume of spray solution by mixing the amount of this product in water as shown in the following table:

Spray Solution

Desired Volume	Amount of Roundup Pro Concentrate herbicide 0.4%	0.8%	1.2%	1.6%	4%	8%
1 Gallon	0.5 oz	1 oz	1.6 oz	2.1 oz	5.2 oz	10.5 oz
25 Gallon	13 oz	0.8 qt	1.2 qt	1.6 qt	4 qt	8 qt
100 Gallon	1.6 qt	0.8 gal	1.2 gal	1.6 gal	4 gal	8 gal
2 tablespoons = 1 fluid ounce						

For use in backpack, knapsack or pump-up sprayers, it is suggested that the recommended amount of this product be mixed with water in a larger container. Fill sprayer with the mixed solution.

6.4 Colorants or Dyes

Agriculturally approved colorants or marking dyes may be added to this product. Colorants or dyes used in spray solutions of this product may reduce performance, especially at lower rates or dilution. Use colorants or dyes according to the manufacturer's recommendations.

7.0 APPLICATION EQUIPMENT AND TECHNIQUES

SPRAY DRIFT MANAGEMENT

AVOID DRIFT. EXTREME CARE MUST BE USED WHEN APPLYING THIS PRODUCT TO PREVENT INJURY TO DESIRABLE PLANTS AND CROPS.

Avoiding spray drift at the application site is the responsibility of the applicator. The interaction of many equipment-and weather-related factors determine the potential for spray drift. The applicator and the grower are responsible for considering all these factors when making decisions.

Do not apply this product through any type of irrigation system.

Apply these spray solutions in properly maintained and calibrated equipment capable of delivering desired volumes.

Do not allow the herbicide solution to mist, drip, drift or splash onto desirable vegetation since minute quantities of this product can cause severe damage or destruction to the crop, plants or other areas on which treatment was not intended.

7.1 Aerial Equipment

DO NOT APPLY THIS PRODUCT USING AERIAL SPRAY EQUIPMENT EXCEPT UNDER CONDITIONS AS SPECIFIED WITHIN THIS LABEL.

For aerial broadcast applications, unless otherwise specified, use this product at the rate of 0.8 to 1.6 quarts per acre for annual weeds, 1.6 to 4 quarts per acre for perennial weeds and 4 to 8 quarts per acre for woody brush and trees. Use the recommended rates of this herbicide in 3 to 25 gallons of water per acre. When used according to label directions this product will give control or partial control of herbaceous weeds, woody brush and trees listed in the "WEEDS CONTROLLED" section of this label.

FOR AERIAL APPLICATION IN CALIFORNIA, REFER TO THE FEDERAL SUPPLEMENTAL LABEL FOR AERIAL APPLICATIONS IN THAT STATE FOR SPECIFIC INSTRUCTIONS, RESTRICTIONS AND REQUIREMENTS. This product plus Banvel® tank mixtures may not be applied by air in California.

AERIAL SPRAY DRIFT MANAGEMENT

The following drift management requirements must be followed to avoid off-target drift movement from aerial applications to agricultural field crops. These requirements do not apply to forestry applications or to public health uses.

1. The distance of the outermost nozzles on the boom must not exceed 3/4 the length of the wingspan or rotor.
2. Nozzles must always point backward parallel with the airstream and never be pointed downwards more than 45 degrees. Where states have more stringent regulations, they should be observed.

Importance of droplet size

The most effective way to reduce drift potential is to apply large droplets. The best drift management strategy is to apply the largest droplets that provide sufficient coverage and control. Applying larger droplets reduces drift potential, but will not prevent drift if applications are made improperly, or under unfavorable environmental conditions (see the **"Wind"**, **"Temperature and Humidity"**, and **"Temperature Inversion"** sections of this label).

Controlling droplet size

- **Volume:** Use high flow rate nozzles to apply the highest practical spray volume. Nozzles with the higher rated flows produce larger droplets.
- **Pressure:** Use the lower spray pressures recommended for the nozzle. Higher pressure reduces droplet size and does not improve canopy penetration. When higher flow rates are needed, use higher flow rate nozzles instead of increasing pressure.
- **Number of nozzles:** Use the minimum number of nozzles that provide uniform coverage.
- **Nozzle orientation:** Orienting nozzles so that the spray is released backwards, parallel to the airstream, will produce larger droplets than other orientations. Significant deflection from the horizontal will reduce droplet size and increase drift potential.
- **Nozzle type:** Use a nozzle type that is designed for the intended application. With most nozzle types, narrower spray angles produce larger droplets. Consider using low-drift nozzles. Solid stream nozzles oriented straight back produce larger droplets than other nozzle types.
- **Boom length:** For some use patterns, reducing the effective boom length to less than 3/4 of the wingspan or rotor length may further reduce drift without reducing swath width.
- **Application height:** Applications should not be made at a height greater than 10 feet above the top of the largest plants unless a greater height is required for aircraft safety. Making applications at the lowest height that is safe reduces the exposure of the droplets to evaporation and wind.

Swath Adjustment

When applications are made with a crosswind, the swath will be dis-

placed downward. Therefore, on the up and downwind edges of the field, the applicator must compensate for this displacement by adjusting the path of the aircraft upwind. Swath adjustment distance should increase, with increasing drift potential (higher wind, smaller droplets, etc.).

Wind

Drift potential is lowest between wind speeds of 2 to 10 miles per hour. However, many factors, including droplet size and equipment type determine drift potential at any given speed. Application should be avoided below 2 miles per hour due to variable wind direction and high inversion potential. **NOTE:** Local terrain can influence wind patterns. Every applicator should be familiar with local wind patterns and how they affect drift.

Temperature and Humidity

When making applications in low relative humidity, set up equipment to produce larger droplets to compensate for evaporation. Droplet evaporation is most severe when conditions are both hot and dry.

Temperature Inversions

Applications should not occur during a temperature inversion because drift potential is high. Temperature inversions restrict vertical air mixing, which causes small, suspended droplets to remain in a concentrated cloud. This cloud can move in unpredictable directions due to the light variable winds common during inversions. Temperature inversions are characterized by increasing temperatures with altitude and are common on nights with limited cloud cover and light to no wind. They begin to form as the sun sets and often continue into the morning. Their presence can be indicated by ground fog; however, if fog is not present, inversions can also be identified by the movement of smoke from a ground source or an aircraft smoke generator. Smoke that layers and moves laterally in a concentrated cloud (under low wind conditions) indicates an inversion, while smoke that moves upward and rapidly dissipates indicates good vertical air mixing.

Sensitive Areas

The pesticide should only be applied when the potential for drift to adjacent sensitive areas (e.g., residential areas, bodies of water, known habitat for threatened or endangered species, non-target crops) is minimal (e.g., when wind is blowing away from the sensitive areas).

Avoid direct application to any body of water.

Drift control additives may be used. When a drift control additive is used, read and carefully observe the cautionary statements and all other information appearing on the additive label.

Ensure uniform application—To avoid streaked, uneven or overlapped application, use appropriate marking devices.

PROLONGED EXPOSURE OF THIS PRODUCT TO UNCOATED STEEL SURFACES MAY RESULT IN CORROSION AND POSSIBLE FAILURE OF THE PART. The maintenance of an organic coating (paint) which meets aerospace specification MIL-C-38413 may prevent corrosion. To prevent corrosion of exposed parts, thoroughly wash aircraft after each day of spraying to remove residues of this product accumulated during spraying or from spills. Landing gear are most susceptible.

7.2 Ground Broadcast Equipment

For broadcast ground applications, unless otherwise specified use this product at the rate of 0.8 to 1.6 quarts per acre for annual weeds, 1.6 to 4 quarts per acre for perennial weeds and 4 to 8 quarts per acre for woody brush and trees. When used according to label directions this product will give control or partial control of herbaceous weeds, woody brush and trees listed in the "WEEDS CONTROLLED" section of this label.

Use the recommended rates of this product in 3 to 40 gallons of water per acre as a broadcast spray unless otherwise specified. As density of weeds increases, spray volume should be increased within the recom-mended range to ensure complete coverage. Carefully select proper nozzles to avoid spraying a fine mist. For best results with ground application equipment, use flat-fan nozzles. Check for even distribution of spray droplets.

7.3 Hand-Held and High-Volume Equipment

Apply to foliage of vegetation to be controlled. For applications made on a spray-to-wet basis, spray coverage should be uniform and complete. Do not spray to the point of runoff. Use coarse sprays only.

For control of weeds listed in the "Annual Weeds" section of "WEEDS CONTROLLED", apply a 0.4 percent solution of this product to weeds less than 6 inches in height or runner length. For annual weeds over 6 inches tall, or unless otherwise specified, use a 0.8 percent solution. Apply prior to seedhead formation in grass or bud formation in broadleaf weeds.

For best results, use a 1.6 percent solution on harder-to-control perennials, such as Bermudagrass, dock, field bindweed, hemp dogbane, milkweed and Canada thistle.

For low volume directed spray applications, use a 4 to 8 percent solution of this product for control or partial control of annual weeds, perennial weeds, or woody brush and trees. Spray coverage should be uniform with at least 50 percent of the foliage contacted. Coverage of the top one-half of the plant is important for best results. To ensure adequate spray coverage, spray both sides of large or tall woody brush and trees, when foliage is thick and dense, or where there are multiple sprouts.

7.4 Selective Equipment

This product may be applied through recirculating spray systems, shielded applicators, hooded sprayers, wiper applicators or sponge bars after dilution and thorough mixing with water to listed weeds growing in any noncrop site specified on this label.

A recirculating spray system directs the spray solution onto weeds growing above desirable vegetation, while spray solution not intercepted by weeds is collected and returned to the spray tank for reuse.

A shielded or hooded applicator directs the herbicide solution onto weeds, while shielding desirable vegetation from the herbicide.

A wiper or sponge applicator applies the herbicide solution onto weeds by rubbing the weed with an absorbent material containing the herbicide solution.

AVOID CONTACT OF HERBICIDE WITH DESIRABLE VEGETATION.

Applicators used above desired vegetation should be adjusted so that the lowest spray stream or wiper contact point is at least 2 inches above the desirable vegetation. Droplets, mist, foam or splatter of the herbicide solution settling on desirable vegetation is likely to result in discoloration, stunting or destruction.

Better results may be obtained when more of the weed is exposed to the herbicide solution. Weeds not contacted by the herbicide solution will not be affected. This may occur in dense clumps, severe infestations or when the height of the weeds varies so that not all weeds are contacted. In these instances, repeat treatment may be necessary.

Shielded and Hooded Applicators

Use nozzles that provide uniform coverage within the treated area. Keep shields on these sprayers adjusted to protect desirable vegetation. EXTREME CARE MUST BE EXERCISED TO AVOID CONTACT OF HERBICIDE WITH DESIRABLE VEGETATION.

Wiper Applicators and Sponge Bars

Equipment must be designed, maintained and operated to prevent the herbicide solution from contacting desirable vegetation. Operate this equipment at ground speeds no greater than 5 miles per hour. Performance may be improved by reducing speed in areas of heavy weed infestations to ensure adequate wiper saturation. Better results may be obtained if 2 applications are made in opposite directions.

Avoid leakage or dripping onto desirable vegetation. Adjust height of applicator to ensure adequate contact with weeds. Keep wiping surfaces clean. Be aware that, on sloping ground, the herbicide solution may migrate, causing dripping on the lower end and drying of the wicks on the upper end of a wiper applicator.

Do not use wiper equipment when weeds are wet.

Mix only the amount of solution to be used during a 1-day period, as reduced activity may result from use of leftover solutions. Clean wiper parts immediately after using this product by thoroughly flushing with water.

For Rope or Sponge Wick Applicators—Solutions ranging from 33 to 75 percent of this product in water may be used.

For Porous-Plastic Applicators and Pressure-Feed Systems—Solutions ranging from 33 to 100 percent of this product in water may be used.

When applied as recommended, this product CONTROLS the following weeds:

Corn, volunteer	Sicklepod
Panicum, Texas	Spanishneedles
Rye, common	Starbur, bristly
Shattercane	

When applied as recommended, this product SUPPRESSES the following weeds:

Beggarweed, Florida	Ragweed, common
Bermudagrass	Ragweed, giant
Dogbane, hemp	Smutgrass

Dogfennel	Sunflower
Guineagrass	Thistle, Canada
Johnsongrass	Thistle, musk
Milkweed	Vaseygrass
Nightshade, silverleaf	Velvetleaf
Pigweed, redroot	

7.5 Injection Systems

This product may be used in aerial or ground injection spray systems. It may be used as a liquid concentrate or diluted prior to injecting into the spray stream. Do not mix this product with the undiluted concentrate of other products when using injection systems unless specifically recommended.

7.6 CDA Equipment

The rate of this product applied per acre by controlled droplet application (CDA) equipment must not be less than the amount recommended in this label when applied by conventional broadcast equipment. For vehicle-mounted CDA equipment, apply 3 to 15 gallons of water per acre.

CDA equipment produces a spray pattern which is not easily visible. Extreme care must be exercised to avoid spray or drift contacting the foliage or any other green tissue of desirable vegetation, as damage or destruction is likely to result.

8.0 SITE AND USE RECOMMENDATIONS

Detailed instructions follow alphabetically, by site.

Unless otherwise specified, applications may be made to control any weeds listed in the annual, perennial and woody brush tables. Refer also to the "Selective Equipment" section.

8.1 Cut Stumps

Cut stump treatments may be made on any site listed on this label. This product will control many types of woody brush and tree species, some of which are listed below. Apply this product using suitable equipment to ensure coverage of the entire cambium. Cut trees or resprouts close to the soil surface. Apply a 50 to 100 percent solution of this product to the freshly-cut surface **immediately** after cutting. Delays in application may result in reduced performance. For best results, applications should be made during periods of active growth and full leaf expansion.

Alder	Saltcedar
Eucalyptus	Sweetgum
Madrone	Tan oak
Oak	Willow
Reed, giant	

DO NOT MAKE CUT STUMP APPLICATIONS WHEN THE ROOTS OF DESIRABLE WOODY BRUSH OR TREES MAY BE GRAFTED TO THE ROOTS OF THE CUT STUMP. INJURY RESULTING FROM ROOT GRAFTING IS LIKELY TO OCCUR IN ADJACENT WOODY BRUSH OR TREES.

8.2 General Noncrop Areas and Industrial Sites

Use in areas such as airports, ditch banks, dry ditches, dry canals, fencerows, industrial sites, lumber yards, ornamental nurseries, parking areas, petroleum tank farms and pumping installations, railroads, roadsides, sod and turf farms, storage areas, warehouse areas, and similar industrial and noncrop sites.

General Weed Control, Trim-and-Edge and Bare Ground

This product may be used in general noncrop areas. It may be applied with any application equipment described in this label. This product may be used to trim-and-edge around objects in noncrop sites. This product may be used prior to laying asphalt or beginning construction projects.

Repeated applications of this product may be used, as weeds emerge, to maintain bare ground.

This product may be tank mixed with the following products. Refer to these products' labels for approved noncrop sites and application rates.

ARSENAL®	DIURON
BANVEL	ENDURANCE®
BARRICADE® 65WG	ESCORT®
GARLON® 3A	PRINCEP® DF
GARLON 4	PRINCEP LIQUID
KARMEX® DF	RONSTAR® 50WP
KROVAR® I DF	SAHARA®
MANAGE®	SIMAZINE
OUST®	SURFLAN®
PENDULUM® 3.3 EC	TELAR®
PENDULUM WDG	VANQUISH®
PLATEAU®	2,4-D

Banvel tank mixtures may not be applied by air in California.

When applied as a tank mixture for bare ground, this product provides control of the emerged annual weeds and control or partial control of emerged perennial weeds, woody brush and trees.

For control or partial control of the following perennial weeds, apply 0.8 to 1.6 quarts of this product plus 2 to 4 ounces of Oust per acre.

Bahiagrass	Fescue, tall
Bermudagrass	Johnsongrass
Broomsedge	Poorjoe
Dallisgrass	Quackgrass
Dock, curly	Vaseygrass
Dogfennel	Vervain, blue

Chemical Mowing—Perennials

This product will suppress perennial grasses listed in this section to serve as a substitute for mowing. Use 6.4 fluid ounces of this product per acre when treating tall fescue, fine fescue, orchardgrass or quackgrass covers. Use 5 fluid ounces of this product per acre when treating Kentucky bluegrass. Apply treatments in 10 to 40 gallons of spray solution per acre.

Use only in areas where some temporary injury or discoloration of perennial grasses can be tolerated.

Chemical Mowing—Annuals

For growth suppression of some annual grasses, such as annual ryegrass, wild barley and wild oats growing in coarse turf on roadsides or other industrial areas, apply 3 to 4 fluid ounces of this product in 10 to 40 gallons of spray solution per acre. Applications should be made when annual grasses are actively growing and before the seedheads are in the boot stage of development. Treatments may cause injury to the desired grasses.

8.3 Habitat Management

Habitat Restoration and Management

This product may be used to control exotic and other undesirable vegetation in habitat management and natural areas, including rangeland and wildlife refuges. Applications can be made to allow recovery of native plant species, prior to planting desirable native species, and for similar broad spectrum vegetation control requirements. Spot treatments can be made to selectively remove unwanted plants for habitat management and enhancement.

Wildlife Food Plots

This product may be used as a site preparation treatment prior to planting wildlife food plots. Any wildlife food species may be planted after applying this product, or native species may be allowed to repopulate the area. If tillage is needed to prepare a seedbed, wait 7 days after application before tillage to allow translocation into underground plant parts.

8.4 Injection and Frill (Woody Brush and Trees)

This product may be used to control woody brush and trees by injection or frill applications. Apply this product using suitable equipment which must penetrate into the living tissue. Apply the equivalent of 1 milliter of this product per each 2 to 3 inches of trunk diameter at breast height (DBH). This is best achieved by applying a 50 to 100 percent concentration of this product either to a continuous frill around the tree or as cuts evenly spaced around the tree below all branches. As tree diameter increases in size, better results are achieved by applying diluted material to a continuous frill or more closely spaced cuttings. Avoid application techniques that allow runoff to occur from frilled or cut areas in species that exude sap freely. In species such as this, make the frill or cuts at an oblique angle to produce a cupping effect and use a 100 percent concentration of this product. For best results, application should be made during periods of active growth and after full leaf expansion. This product will control many species, some of which are listed below:

Control	Partial Control
Oak	Black gum
Poplar	Dogwood
Sweetgum	Hickory
Sycamore	Maple, red

8.5 Ornamental and Plant Nurseries, Christmas Trees

Post-Directed, Trim-and-Edge

This product may be used as a post-directed spray around established woody ornamental species such as arborvitae, azalea, boxwood, crabapple, euonymus, fir, douglas fir, jojoba, hollies, lilac, magnolia, maple, oak, privet, pine, spruce and yew. This product may also be used to trim-and-edge around trees, buildings, sidewalks and roads, potted plants and other objects in a nursery setting.

Desirable plants may be protected from the spray solution by using shields or coverings made of cardboard or other impermeable material. THIS PRODUCT IS NOT RECOMMENDED FOR USE AS AN OVER-THE-TOP BROADCAST SPRAY IN ORNAMENTALS AND CHRISTMAS TREES. Care must be exercised to avoid contact of spray, drift or mist with foliage or green bark of established ornamental species.

Site Preparation

This product may be used prior to planting any ornamental, nursery or Christmas tree species.

Greenhouse/Shadehouse

This product may be used to control weeds growing in and around greenhouses and shadehouses. Desirable vegetation must not be present during application and air circulation fans must be turned off.

8.6 Railroads

All of the instructions in the "General Noncrop Areas and Industrial Sites" section apply to railroads.

Bare Ground, Ballast and Shoulders, Crossings, and Spot treatment

This product may be used to maintain bare ground on railroad ballast and shoulders. Repeat applications of this product may be used, as weeds emerge, to maintain bare ground. This product may be used to control tall-growing weeds to improve line-of-sight at railroad crossings and reduce the need for mowing along rights-of-way. For crossing applications, up to 80 gallons of spray solution per acre may be used. This product may be tank-mixed with the following products for ballast, shoulder, spot, bare ground and crossing treatments:

ARSENAL	KROVAR I DF
BANVEL	OUST
DIURON	SAHARA
ESCORT	SPIKE®
GARLON 3A	TELAR
GARLON 4	VANQUISH
HYVAR®X	2,4-D

Brush Control

This product may be used to control woody brush and trees on railroad rights-of-way. Apply 3 to 8 quarts of this product per acre as a broadcast spray, using boom-type or boomless nozzles. Up to 80 gallons of spray solution per acre may be used. Apply a 2/3 to 1.6 percent solution of this product when using high-volume spray-to-wet applications. Apply a 4 to 8 percent solution of this product when using low volume directed sprays for spot treatment. This product may be mixed with the following products for enhanced control of woody brush and trees:

ARSENAL	GARLON 4
ESCOR	TORDON® K
GARLON 3A	

Bermudagrass Release

This product may be used to control or partially control many annual and perennial weeds for effective release of actively growing Bermudagrass. Apply 13 to 38 fluid ounces of this product in up to 80 gallons of spray solution per acre. Use the lower rate when treating annual weeds below 6 inches in height (or runner length). Use the higher rate as weeds increase in size or as they approach flower or seedhead formation. These rates will also provide partial control of the following perennial species:

Bahiagrass	Johnsongrass
Bluestem, silver	Trumpetcreeper
Fescue, tall	Vaseygrass

This product may be tank-mixed with Oust. If tank-mixed, use no more than 13 to 38 fluid ounces of this product with 1 to 2 ounces of Oust per acre. Use the lower rates of each product to control annual weeds less than 6 inches in height (or runner length) that are listed in this label and the Oust label. Use the higher rates as annual weeds increase in size and approach the flower or seedhead stages. These rates will also provide partial control of the following perennial weeds:

Bahiagrass	Fescue, tall
Blackberry	Johnsongrass
Bluestem, silver	Poorjoe
Broomsedge	Raspberry
Dallisgrass	Trumpetcreeper
Dewberry	Vaseygrass
Dock, curl	Vervain, blue
Dogfennel	

Use only on well-established Bermudagrass. Bermudagrass injury may result from the treatment, but regrowth will occur under moist conditions. Repeat applications in the same season are not recommended, since severe injury may occur.

8.7 Roadsides

All of the instructions in the "General Noncrop Areas and Industrial Sites" section apply to roadsides.

Shoulder Treatments

This product may be used on road shoulders. It may be applied with boom sprayers, shielded boom sprayers, high-volume off-center nozzles, hand-held equipment, and similar equipment.

Guardrails and Other Obstacles to Mowing

This product may be used to control weeds growing under guardrails and around signposts and other objects along the roadside.

Spot Treatment

This product may be used as a spot treatment to control unwanted vegetation growing along roadsides.

Tank Mixtures

This product may be tank-mixed with the following products for shoulder, guardrail, spot and bare ground treatments:

BANVEL	PRINCEP DF
DIURON	PRINCEP LIQUID
ENDURANCE	RONSTAR 50WP
ESCORT	SAHARA
KROVAR I DF	SIMAZINE
OUTRIDER®	SURFLAN
OUST	TELAR
PENDULUM 3.3 EC	VANQUISH
PENDULUM WDG	2,4-D

See the "General Noncrop Areas and Industrial Sites" section of this label for general instructions for tank mixing.

Release of Bermudagrass or Bahiagrass

Dormant Applications

This product may be used to control or partially control many winter annual weeds and tall fescue for effective release of dormant Bermudagrass or bahiagrass. Treat only when turf is dormant and prior to spring greenup. This product may also be tank-mixed with Outrider herbicide or Oust for residual control. Tank mixtures of this product with Oust may delay greenup.

For best results on winter annuals, treat when plants are in an early growth stage (below 6 inches in height) after most have germinated. For best results on tall fescue, treat when fescue is at or beyond the 4- to 6-leaf stage.

Apply 6.4 to 51 fluid ounces of this product in a tank mixture with .75 to 1.33 ounces Outrider herbicide per acre. Read and follow all label directions for Outrider herbicide.

Apply 6.4 to 51 fluid ounces of this product per acre alone or in a tank mixture with .25 to 1 ounce per acre of Oust. Apply the recommended rates in 10 to 40 gallons of water per acre. Use only in areas where Bermudagrass or bahiagrass are desirable ground covers and where some temporary injury or discoloration can be tolerated. To avoid delays in greenup and minimize injury, add no more than 1 ounce of Oust per acre on Bermudagrass and no more than 0.5 ounce of Oust per acre on bahiagrass and avoid treatments when these grasses are in a semi-dormant condition.

Actively Growing Bermudagrass

This product may be used to control or partially control many annual and perennial weeds for effective release of actively growing Bermudagrass. Apply 13 to 38 fluid ounces of this product in 10 to 40 gallons of spray solution per acre. Use the lower rate when treating annual weeds below 6 inches in height (or runner length). Use the higher rate as weeds increase in size or as they approach flower or seedhead formation. These rates will also provide partial control of the following perennial species:

Bahiagrass	Johnsongrass
Bluestem, silver	Trumpetcreeper
Fescue, tall	Vaseygrass

This product may be tank-mixed with Outrider herbicide for control or partial control of Johnsongrass and other weeds listed in the Outrider herbicide label. Use 6.4 to 26 fluid ounces of this product with .75 to 1.33 ounces of Outrider herbicide. Use the higher rates of both products for control of perennial weeds or annual weeds greater than 6 inches in height.

This product may be tank-mixed with Oust. If tank-mixed, use no more than 13 to 26 fluid ounces of this product with 1 to 2 ounces of Oust per acre. Use the lower rates of each product to control annual weeds less than 6 inches in height (or runner length) that are listed in this label and the Oust label. Use the higher rates as annual weeds increase in size and approach the flower or seedhead stages. These rates will also provide partial control of the following perennial weeds:

Bahiagrass	Fescue, tall
Bluestem, silver	Johnsongrass
Broomsedge	Poorjoe
Dallisgrass	Trumpetcreeper
Dock, curly	Vaseygrass
Dogfennel	Vervain, blue

Use only on well-established Bermudagrass. Bermudagrass injury may result from the treatment, but regrowth will occur under moist conditions. Repeat applications of the tank-mix in the same season are not recommended, since severe injury may occur.

Actively Growing Bahiagrass

For suppression of vegetative growth and seedhead inhibition of bahiagrass for approximately 45 days, apply 5 fluid ounces of this product in 10 to 40 gallons of water per acre. Apply 1 to 2 weeks after full greenup or after mowing to a uniform height of 3 to 4 inches. This application must be made prior to seedhead emergence.

For suppression up to 120 days, apply 3 fluid ounces of this product per acre, followed by an application of 1.5 to 3 fluid ounces per acre about 45 days later. Make no more than 2 applications per year.

This product may be used for control or partial control of Johnsongrass and other weeds listed on the Outrider herbicide label in actively growing bahiagrass. Apply 1.25 to 4 ounces of this product with .75 to 1.33 ounces of Outrider herbicide per acre. Use the higher rates for control of perennial weeds or annual weeds greater than 6 inches in height. Use only on well-established bahiagrass.

A tank mixture of this product plus Oust may be used. Apply 5 fluid ounces of this product plus 0.25 ounce of Oust per acre 1 to 2 weeks following an initial spring mowing. Make only one application per year.

9.0 WEEDS CONTROLLED

Always use the higher rate of this product per acre within the recommended range when weed growth is heavy or dense or weeds are growing in an undisturbed (noncultivated) area.

Reduced results may occur when treating weeds heavily covered with dust. For weeds that have been mowed, grazed or cut, allow regrowth to occur prior to treatment.

Refer to the following label sections for recommended rates for the control of annual and perennial weeds and woody brush and trees. For difficult to control perennial weeds and woody brush and trees, where plants are growing under stressed conditions, or where infestations are dense, this product may be used at 4 to 8 quarts per acre for enhanced results.

9.1 Annual Weeds

Use 26 fluid ounces per acre if weeds are less than 6 inches in height or runner length and 1.2 to 3.2 quarts per acre if weeds are over 6 inches in height or runner length or when weeds are growing under stressed conditions.

For spray-to-wet applications, apply a 0.4 percent solution of this product to weeds less than 6 inches in height or runner length. Apply prior to seedhead formation in grass or bud formation in broadleaf weeds. For annual weeds over 6 inches tall, or for smaller weeds growing under stressed conditions, use a 0.8 to 1.6 percent solution. Use the higher rate for tough-to-control species or for weeds over 24 inches tall.

WEED SPECIES

Annoda, spurred	Lamb's-quarters*
Barley*	Little barley*
Barnyardgrass*	London rocket*
Bittercress*	Mayweed
Black nightshade*	Medusahead*
Bluegrass, annual*	Morningglory
Bluegrass, bulbous*	*(Ipomoea spp.)*
Bassia, fivehook	Mustard, blue*
Brome, downy*	Mustard, tansy*
Brome, Japanese*	Mustard, tumble*
Browntop panicum*	Mustard, wild*
Buttercup*	Oats
Carolina foxtail*	Pigweed*
Carolina geranium	Plains/Tickseed
Castor bean	coreopsis*
Cheatgrass*	Prickly lettuce*
Cheeseweed	Puncturevine
(Malva parviflora)	Purslane, common
Chervil*	Ragweed, common*
Chickweed*	Ragweed, giant
Cocklebur*	Red rice
Copperleaf, hophornbeam	Russian thistle
Corn*	Rye*
Corn speedwell*	Ryegrass*
Crabgrass*	Sandbur, field*
Dwarfdandelion*	Shattercane*
Eastern mannagrass*	Shepherd's-purse*
Eclipta*	Sicklepod
Fall panicum*	Signalgrass, broadleaf*
Falsedandelion*	Smartweed, ladysthumb*
Falseflax, smallseed*	Smartweed,
Fiddleneck	Pennsylvania*
Field pennycress*	Sowthistle, annual
Filaree	Spanishneedles
Fleabane, annual*	Speedwell, purslane*
Fleabane, hairy	Sprangletop*
*(Conyza bonariensis)**	Spurge, annual
Fleabane, rough*	Spurge, prostrate*
Florida pusley	Spurge, spotted*
Foxtail*	Spurry, umbrella*
Goatgrass, jointed*	Starthistle, yellow
Goosegrass	Stinkgrass*
Grain sorghum (milo)*	Sunflower*
Groundsel, common*	Teaweed/Prickly sida
Hemp sesbania	Texas panicum*
Henbit	Velvetleaf
Horseweed/Marestail	Virginia copperleaf
(Conyza canadensis)	Virginia pepperweed*
Itchgrass*	Wheat*
Johnsongrass, seedling	Wild oats*
Junglerice	Witchgrass*
Knotweed	Woolly cupgrass*
Kochia	Yellow rocket

*When using field broadcast equipment (aerial applications or boom sprayers using flat-fan nozzles) these species will be controlled or partially controlled using 13 fluid ounces of this product per acre. Applications must be made using 3 to 10 gallons of carrier volume per acre. Use nozzles that ensure thorough coverage of foliage and treat when weeds are in an early growth stage.

9.2 Perennial Weeds

Best results are obtained when perennial weeds are treated after they reach the reproductive stage of growth (seedhead initiation in grasses and bud formation in broadleaves). For non-flowering plants, best results are obtained when the plants reach a mature stage of growth. In many situations, treatments are required prior to these growth stages. Under these conditions, use the higher application rate within the recommended range.

Ensure thorough coverage when using spray-to-wet treatments using hand-held equipment. When using hand-held equipment for low volume directed spot treatments, apply a 4 to 8 percent solution of this product.

Allow 7 or more days after application before tillage.

WEED SPECIES	RATE (OT/A)	HAND-HELD % SOLUTION
Alfalfa*	0.8	1.6
Alligatorweed*	3.2	1.2
Anise (fennel)	1.6-3.2	0.8-1.6
Bahiagrass	2.4-4	1.6
Beachgrass, European *(Ammophila arenaria)*	—	4

WEED SPECIES	RATE (QT/A)	HAND-HELD % SOLUTION
Bentgrass*	1.2	1.6
Bermudagrass	4	1.6
Bermudagrass, water (knotgrass)	1.2	1.6
Bindweed, field	3.2-4	1.6
Bluegrass, Kentucky	1.6	1.6
Blueweed, Texas	3.2-4	1.6
Brackenfern	2.4-3.2	0.8-1.2
Bromegrass, smooth	1.6	1.6
Bursage, woolly-leaf	—	1.6
Canarygrass, reed	1.6-2.4	1.6
Cattail	2.4-4	1.6
Clover; red, white	2.4-4	1.6
Cogongrass	2.4-4	1.6
Dallisgrass	2.4-4	1.6
Dandelion	2.4-4	1.6
Dock, curly	2.4-4	1.6
Dogbane, hemp	3.2	1.6
Fescue (except tall)	2.4-4	1.6
Fescue, tall	0.8-2.4	1.6
German ivy	1.6-3.2	0.8-1.6
Guineagrass	2.4	0.8
Horsenettle	2.4-4	1.6
Horseradish	3.2	1.6
Iceplant	1.6	1.2-1.6
Jerusalem artichoke	2.4-4	1.6
Johnsongrass	1.6-2.4	0.8
Kikuyugrass	1.6-2.4	1.6
Knapweed	3.2	1.6
Lantana	—	0.8-1
Lespedeza	2.4-4	1.6
Milkweed, common	2.4	1.6
Muhly, wirestem	1.6	1.6
Mullein, common	2.4-4	1.6
Napiergrass	2.4-4	1.6
Nightshade, silverleaf	1.6	1.6
Nutsedge; purple, yellow	2.4	0.8-1.6
Orchardgrass	1.6	1.6
Pampasgrass	2.4-4	1.2-1.6
Paragrass	2.4-4	1.6
Pepperweed, perennial	3.2	1.6
Phragmites*	2.4-4	0.8-1.6
Poison hemlock	1.6-3.2	0.8-1.6
Quackgrass	1.6-2.4	1.6
Redvine*	1.6	1.6
Reed, giant	3.2-4	1.6
Ryegrass, perennial	1.6-2.4	0.8
Smartweed, swamp	2.4-4	1.6
Spurge, leafy*	—	1.6
Sweet potato, wild*	—	1.6
Thistle, artichoke	1.6-2.4	0.8-1.6
Thistle, Canada	1.6-2.4	1.6
Timothy	1.6-2.4	1.6
Torpedograss*	3.2-4	1.6
Trumpetcreeper*	1.6-2.4	1.6
Vaseygrass	2.4-4	1.6
Velvetgrass	2.4-4	1.6
Wheatgrass, western	1.6-2.4	1.6

*Partial control

9.3 Woody Brush and Trees

Apply this product after full leaf expansion, unless otherwise directed. Use the higher rate for larger plants and/or dense areas of growth. On vines, use the higher rate for plants that have reached the woody stage of growth. Best results are obtained when application is made in late summer or fall after fruit formation.

In arid areas, best results are obtained when applications are made in the spring to early summer when brush species are at high moisture content and are flowering.

Ensure thorough coverage when using spray-to-wet treatments using hand-held equipment. When using hand-held equipment for low volume directed-spray spot treatments, apply a 4 to 8 percent solution of this product.

Symptoms may not appear prior to frost or senescence with fall treatments.

Allow 7 or more days after application before tillage, mowing or removal. Repeat treatments may be necessary to control plants regenerating from underground parts or seed. Some autumn colors on undesirable deciduous species are acceptable provided no major leaf drop has occurred. Reduced performance may result if fall treatments are made following a frost.

WEED SPECIES	BROADCAST RATE (QT/A)	HAND-HELD SPRAY-TO-WET % SOLUTION
Alder	2.4-3.2	0.8-1.2
Ash*	1.6-4	0.8-1.6
Aspen, quaking	1.6-2.4	0.8-1.2
Bearclover (Bearmat)*	1.6-4	0.8-1.6
Beech*	1.6-4	0.8-1.6
Birch	1.6	0.8
Blackberry	2.4-3.2	0.8-1.2
Blackgum	1.6-4	0.8-1.6
Bracken	1.6-4	0.8-1.6
Broom; French, Scotch	1.6-4	1.2-1.6
Buckwheat, California*	1.6-3.2	0.8-1.6
Cascara*	1.6-4	0.8-1.6
Catsclaw*	—	0.8-1.2
Ceanothus*	1.6-4	0.8-1.6
Chamise*	1.6-4	0.8
Cherry; bitter, black, pin	1.6-2.4	0.8-1.2
Coyote brush	2.4-3.2	1.2-1.6
Deerweed	1.6-4	0.8
Dogwood*	1.6-4	0.8-1.6
Elderberry	1.6	0.8
Elm*	1.6-4	0.8-1.6
Eucalyptus	—	1.6
Gorse*	1.6-4	0.8-1.6
Hasardia*	1.6-3.2	0.8-1.6
Hawthorn	1.6-2.4	0.8-1.2
Hazel	1.6	0.8
Hickory*	1.6-4	0.8-1.6
Honeysuckle	2.4-3.2	0.8-1.2
Hornbeam, American*	1.6-4	0.8-1.6
Kudzu	3.2	1.6
Locust, black*	1.6-3.2	0.8-1.6
Madrone resprouts*	—	1.6
Manzanita*	1.6-4	0.8-1.6
Maple, red	1.6-3.2	0.8-1.2
Maple, sugar	—	0.8-1.2
Monkey flower*	1.6-3.2	0.8-1.6
Oak; black, white*	1.6-3.2	0.8-1.6
Oak, post	2.4-3.2	0.8-1.2
Oak; northern, pin	1.6-3.2	0.8-1.2
Oak, Scrub*	1.6-3.2	0.8-1.2
Oak; southern red	1.6-2.4	0.8-1.2
Peppertree, Brazilian (Florida holly)*	1.6-4	0.8-1.6
Persimmon*	1.6-4	0.8-1.6
Pine	1.6-4	0.8-1.6
Poison ivy	3.2-4	1.6
Poison oak	3.2-4	1.6
Poplar, yellow*	1.6-4	0.8-1.6
Redbud, eastern	1.6-4	0.8-1.6
Rose, multiflora	1.6	0.8
Russian olive*	1.6-4	0.8-1.6
Sage, black	1.6-3.2	0.8
Sage, white*	1.6-3.2	0.8-1.6
Sage brush, California	1.6-3.2	0.8
Salmonberry	1.6	0.8
Saltcedar*	1.6-4	0.8-1.6
Sassafras*	1.6-4	0.8-1.6
Sourwood*	1.6-4	0.8-1.6
Sumac; laurel, poison, smooth, sugarbush, winged*	1.6-3.2	0.8-1.6
Sweetgum	1.6-2.4	0.8-1.2
Swordfern*	1.6-4	0.8-1.6
Tallowtree, Chinese	—	0.8
Tan oak resprouts*	—	1.6
Thimbleberry	1.6	0.8
Tobacco, tree*	1.6-3.2	0.8-1.6
Toyon*	—	1.6
Trumpetcreeper	1.6-2.4	0.8-1.2
Vine maple*	1.6-4	0.8-1.6
Virginia creeper	1.6-4	0.8-1.6
Waxmyrtle, southern*	1.6-4	0.8-1.6
Willow	2.4	0.8
Yerbasenta*	—	1.6

*Partial control

10.0 LIMIT OF WARRANTY AND LIABILITY

Monsanto Company warrants that this product conforms to the chemical description on the label and is reasonably fit for the purposes set forth in the Complete Directions for Use label booklet ("Directions") when used in accordance with those Directions under the conditions described therein. NO OTHER EXPRESS WARRANTY OR IMPLIED WARRANTY OF FITNESS FOR PARTICULAR PURPOSE OR MERCHANTABILITY IS MADE. This warranty is also subject to the conditions and limitations stated herein.

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EPA Reg. No. 524-529

In case of an emergency involving this product,
Call Collect, day or night, (314) 694-4000.

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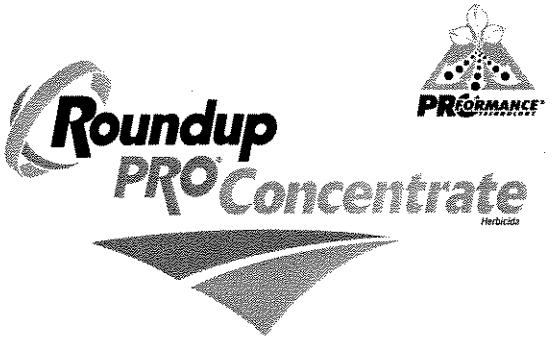

El herbicida profesional completo de postemergencia y de amplia efectividad, para el control de malezas en zonas industriales.

Instrucciones completas para el uso

Registro en la EPA Nº 524-529

EVITE EL CONTACTO DEL HERBICIDA CON EL FOLLAJE, TALLOS VERDES, RAICES NO LEÑOSAS EXPUESTAS O FRUTOS EXPUESTOS DE LAS COSECHAS, PLANTAS Y ARBOLES DESEABLES. EN CASO CONTRARIO ES PROBABLE QUE SUFRAN GRAVES DAÑOS O SEAN DESTRUIDOS TOTALMENTE.

2003-1

Antes de usar este producto, lea la etiqueta en su totalidad.

Uselo solamente de acuerdo con las instrucciones de la etiqueta.

El uso de este producto de cualquier manera contraria a las indicaciones contenidas en este libreto se considera una violación de las leyes federales.

No todos los productos recomendados en esta etiqueta han sido registrados para su uso en California. Verifique el estado de registro de cada producto en California antes de utilizarlo.

Antes de comprar o usar el producto, lea "LIMITES EN LA GARANTIA Y EN LA RESPONSABILIDAD" en la última sección de la etiqueta. Si las condiciones son inaceptables para usted, devuelva el producto inmediatamente sin abrir el recipiente.

ESTE ES UN PRODUCTO PARA USARSE TAL Y COMO ESTA PREPARADO. MONSANTO NO LO HA DISEÑADO NI LO HA REGISTRADO PARA QUE SEA REFORMULADO. VEA LA ETIQUETA DEL ENVASE INDIVIDUAL PARA ENTERARSE DE LAS LIMITACIONES DE REEMPAQUE.

1.0 INGREDIENTES

INGREDIENTE ACTIVO:

*Glifosato, N-(fosfonometil)glicina, en forma de su sal de isopropilamina	50.2%
OTROS INGREDIENTES:	49.8%
	100.0%

*Contiene 600 gramos por litro o 5 libras por galón americano del ingrediente activo glifosato, en forma de su sal de isopropilamina.

Este producto está protegido por la patente de los Estados Unidos Nos. 5,683,958; 5,703,015; 6,063,733; 6,121,199, y 6,121,200. No se han otorgado licencias bajo ninguna patente que no sea de los Estados Unidos.

2.0 TELEFONOS IMPORTANTES

1. PARA INFORMACION SOBRE EL PRODUCTO O AYUDA PARA UTILIZAR ESTE PRODUCTO, LLAME GRATIS AL

   1-800-332-3111.

2. EN CASO DE QUE SE PRESENTE UNA EMERGENCIA RELACIONADA CON ESTE PRODUCTO, O PARA OBTENER AYUDA MEDICA, LLAME POR COBRAR A CUALQUIER HORA DEL DIA O DE LA NOCHE, AL TELEFONO (314)-694-4000.

3.0 ADVERTENCIAS

3.1 Riesgos para seres humanos y animales domésticos

Manténgase fuera del alcance de los niños.

¡PRECAUCION!

CAUSA IRRITACION MODERADA EN LOS OJOS.

Evite el contacto con los ojos y con la ropa.

PRIMEROS AUXILIOS	
SI ENTRA EN CONTACTO CON LOS OJOS	Mantenga abiertos los ojos y enjuague lenta y cuidadosamente con agua durante 15 a 20 minutos. Si usa lentes de contacto, quíteselos después de los primeros 5 minutos, y continúe enjuagando los ojos. Llame al centro de envenenamientos o a un médico para que le indique el tratamiento.
NÚMERO DE LA LÍNEA DIRECTA	
Tenga a mano el envase o la etiqueta del producto cuando llame al centro de envenenamientos o al médico, o cuando vaya a procurarse tratamiento. También puede llamar por cobrar al teléfono (314) 694-4000, las 24 horas, para obtener información sobre el tratamiento médico de urgencia. Este producto está identificado como herbicida Roundup Pro Concentrate, Registro de la EPA Nº 524-529.	

ANIMALES DOMESTICOS: Este producto se considera relativamente no tóxico para los perros y otros animales domésticos; sin embargo, la ingestión de este producto o de grandes cantidades de vegetación recientemente tratada puede resultar en una irritación gastrointestinal temporal (vómito, diarrea, cólico, etc.). Si se observan dichos síntomas, dé al animal suficiente cantidad de líquidos para evitar la deshidratación. Si los síntomas continúan por más de 24 horas, llame al veterinario.

Equipo de protección personal

Las personas que aplican o manejan este producto deben usar camisas de manga larga, así como pantalones largos, zapatos y calcetín. Siga las instrucciones del fabricante para limpiar y mantener el Equipo de Protección Personal (PPE). En caso de no tener dichas instrucciones para piezas lavables, use detergente y agua muy caliente. Mantenga y lave el equipo de protección personal separado de las demás piezas a lavarse.

En los casos en los cuales el personal encargado de manejar el producto lo hace en ambientes cerrados, cabinas cerradas o aviones, de manera tal que se cumplan los requisitos listados en "Worker Protection Standard (WPS) for agricultural pesticides" (Normas para la Protección de los Trabajadores que trabajan con pesticidas usados en la agricultura) [40 CFR 170.240 (d) (4-6)], los requisitos para el equipo de prote-cción personal del trabajador pueden ser reducidos o modificados de acuerdo a lo que se especifica en las normas WPS.

Recomendaciones de seguridad para el usuario:

El usuario debe:

- Lavarse las manos antes de comer, beber, mascar goma, usar tabaco o de usar el servicio higiénico.
- Quitarse la ropa inmediatamente en caso de que el pesticida entre dentro de ésta. Luego debe lavarse muy bien y ponerse ropa limpia.

3.2 Riesgos al medio ambiente

No aplique directamente al agua, en áreas donde el agua superficial esté presente o en áreas donde haya mareas altas y bajas por debajo del nivel medio de mareas altas. No con-tamine el agua cuando deseche el agua con la cual lavó el equipo.

3.3 Riesgos de orden físico o químico

Para mezclar, almacenar y aplicar la solución de este producto, se deben usar solamente recipientes de acero inoxi-dable, aluminio, fibra de vidrio, plástico o recipientes de acero recubiertos internamente con plástico.

NO MEZCLE, ALMACENE O APLIQUE ESTE PRODUCTO O SUS SOLUCIONES PARA ROCIAR EN RECIPIENTES O TANQUES ROCIADORES DE ACERO GALVANIZADO O DE ACERO NO RECUBIERTO (EXCEPTO SI ES ACERO INOXIDABLE). Este producto o la solución para rociar reaccionan con el material de dichos recipientes y tanques, lo cual produce hidrógeno, que puede formar una mezcla de gases altamente combustibles. Si esta mezcla de gases entra en contacto con llamas, chispas, el soplete de un soldador, un cigarrillo encendido o cualquier otra fuente de encendido, puede inflamarse o explotar y causar heridas graves a personas.

INSTRUCCIONES PARA EL USO

El uso de este producto de cualquier manera que sea inconsistente con las instrucciones dadas en la etiqueta es una violación de las leyes federales. No aplique este producto de alguna manera que entre en contacto con los trabajadores u otras personas, ya sea directamente o por medio de alguna corriente de aire. Solamente las personas que los manipulen y que usen equipo protector podrán estar en el área durante su aplicación. Para verificar requisitos específicos de su tribu o estado, consulte con la agencia responsable de la regulación del uso de pesticidas.

Requisitos para el uso en la agricultura

Use este producto siguiendo estrictamente las instrucciones de la etiqueta y de acuerdo con "Worker Protection Standard", 40 CFR sección 170. Estas normas contienen los requisitos para proteger a los trabajadores agrícolas en haciendas, bosques, viveros e invernaderos, así como a aquellos trabajadores que manejan pesticidas usados en la agricultura. Las normas contienen los requisitos para entrenar, descontaminar, para dar aviso y para asistencia de emergencia. También contienen instrucciones específicas y excepciones que tienen que ver con el contenido de esta etiqueta en lo relacionado con el Equipo para la Protección Personal (PPE) e intervalos de entrada restringida. Los requisitos mencionados en esta sección se aplican únicamente a los usos de este producto que están regulados por las Normas para la Protección de los Trabajadores (WPS).

No entre ni permita la entrada de personal al área tratada durante el intervalo de entrada restringida (REI) de 4 horas.

Para entrar antes de que haya terminado el intervalo de entrada restringida, a las áreas que hayan sido tratadas y cuando ello implique contacto con cualquier cosa que haya sido tratada, como plantas, tierra o agua, se debe usar: coverals, guantes impermeables, zapatos y calcetines.

Requisitos para usos no agrícolas

Los requisitos en esta sección son para los usos de este producto que NO están cubiertos por WPS (40 CFR Sección 170) para el uso de pesticidas en la agricultura. Las regulaciones del WPS se aplican cuando el producto se usa para obtener productos agrícolas en haciendas, bosques, viveros e invernaderos.

Mantenga a las personas y a los animales domésticos fuera del área tratada hasta que la solución rociada se haya secado completamente para evitar que este producto sea transferido a la vegetación deseable.

4.0 ALMACENAMIENTO Y DESECHO

Cuando almacene o deseche el producto no contamine el agua, los productos alimenticios, el alimento para animales o las semillas.

Mantenga los recipientes bien cerrados para evitar derramamientos y contaminación.

Los desechos que resulten del uso de este producto que no puedan utilizarse o reprocesarse químicamente deben eliminarse en un vertedero de basura aprobado para la eliminación de pesticidas o de acuerdo con los procedimientos locales, estatales y federales aplicables.

El recipiente vacío retiene vapores y residuos del producto. Observe todas las precauciones de la etiqueta hasta que el recipiente esté limpio, reacondicionado, o destruido.

PARA RECIPIENTES PORTÁTILES RELLENABLES: No reutilice este recipiente nada más que para rellenar de acuerdo con un Reempaque válido de Monsanto o una Tarifa de Acuerdo de Reempaque. Si no se rellena o se devuelve a la instalación reempaquetadora autorizada, enjuague el recipiente tres veces, luego perfórelo y deséchelo en un vertedero de basura sanitario, o por incineración, ó, si lo permiten las autoridades estatales y locales, quemándolo. Si se quema, permanezca lejos del humo.

PARA RECIPIENTES METÁLICOS (no en aerosol): Enjuague tres veces (o su equivalente). Luego ofrézcalo para reciclarlo o reacondicionarlo, o perfórelo y deséchelo en un vertedero de basura sanitario, o por otros procedimientos aprobados por autoridades estatales y locales.

PARA RECIPIENTES DE MAGNITUD: Enjuague tres veces el recipiente de magnitud vacío. Luego ofrézcalo para reciclarlo o reacondicionarlo, o deséchelo de una manera aprobada por autoridades estatales y locales.

PARA RECIPIENTES Y BOTELLAS PLÁSTICAS DE UNA VÍA: No reutilice el recipiente. Enjuague tres veces el recipiente, luego perfórelo y deséchelo en un vertedero de basura sanitaria o por incineración, ó, si lo permiten las autoridades estatales y locales, quemándolos. Si se queman, permanezca lejos del humo.

PARA TAMBORES: No reutilice el recipiente. Devuelva el recipiente según el programa de devolución de recipientes de Monsanto. Si no se devuelve, enjuague el recipiente tres veces, luego perfórelo y deséchelo en un vertedero de basura sanitaria, o por incineración, ó, si lo permiten las autoridades estatales y locales, quemándolos. Si se queman, permanezca lejos del humo.

5.0 INFORMACION GENERAL

Descripción del producto: Este producto es un herbicida postemergente sistémico sin actividad residual sobre la tierra. Controla con amplia efectividad muchas malezas anuales, malezas perennes, matorrales leñosos y árboles. Es un líquido soluble en agua y contiene surfactante.

Consecuencias para los alrededores: Cuando este producto entra en contacto con la tierra, se adhiere a las partículas de la tierra. Cuando es usado de acuerdo con las instrucciones de la etiqueta, una vez que este producto queda adherido en la tierra no está disponible para su absorbción por parte de las plantas y no dañará la vegetación ubicada fuera del lugar del tratamiento cuyas raíces crezcan en dicha área o si la tierra es transportada a otro lugar. La gran afinidad de este producto con las partículas en la tierra evitan la lixiviación de este producto fuera del perfil la tierra y su entrada en las aguas subterráneas. La afinidad entre este producto y las partículas de la tierra permanecen hasta que este producto se degrada, el cual es principalmente un proceso de degradación biológica que es llevado a cabo por la microflora de la tierra bajo condiciones aeróbicas y anaeróbicas.

Aparición de los síntomas: Este producto se mueve dentro de la planta desde el punto de aplicación sobre el follaje, hasta las raíces. Los efectos visibles en la mayor parte de las malezas anuales se pueden apreciar entre los 2 ó 4 días después de la aplicación, pero en la mayoría de las malezas perennes, los efectos no se ven hasta después de 7 días o más. El frío extremo o el cielo muy nublado después de la aplicación pueden retardar la actividad del producto y hacer que el efecto visual se retarde. Los efectos visibles incluyen que la planta se marchite y se vuelva amarilla en forma gra-dual, hasta que la parte exterior de ésta se torne completamente color café; mientras tanto, las partes de la planta que están bajo tierra se deterioran completamente.

Modo de acción en las plantas: El ingrediente activo de este producto inhibe una enzima hallada sólo en las plantas que es esencial para la formación de aminoácidos específicos.

Prácticas culturales: Se podrá observar una reducción en el efecto si se aplica el producto a malezas anuales o perennes que hayan sido segadas, que hayan servido de alimento para animales o hayan sido cortadas, y que no hubiesen crecido nuevamente hasta el nivel recomendado para el tratamiento.

Resistencia a la lluvia: La lluvia torrencial poco después de la aplicación lavará el producto del follaje y se requerirá una nueva aplicación para obtener un control adecuado.

Sin actividad sobre la tierra: Las malezas deben haber emergido en el momento de la aplicación para poder ser controladas por este producto. Las malezas que germinen de semillas después de la aplicación no serán controladas. Las plantas no emergidas con rizomas o raíces subterráneas de malezas perennes no conectadas no se verán afectadas por el herbicida.

Volatilidad: Roundup Pro Concentrate herbicida no es volátil. Por lo tanto, no puede dispersarse en forma de vapor después de su aplicación y, por ende, no afecta la vegetación de las cercanías.

Toxicología: En general, no se prevee que la exposición a los trabajadores y otros aplicadores presente mayores riesgos en base a los resultados de los estudios sobre toxicidad a corto plazo. Se ha estudiado a fondo el glifosato y se ha determinado que no produce cáncer ni tiene otros efectos adversos a largo plazo para la salud.

Mezclas de tanque: Este producto no proporciona control residual de malezas. Para lograr un control residual subsecuente, utilice un herbicida que esté aprobado en la etiqueta.

Lea y siga cuidadosamente todas las precauciones indicadas y toda la información que aparezca en las etiquetas de los herbicidas que use. Uselos según las instrucciones más restrictivas de la etiqueta de cada producto usado en la mezcla.

El comprador y todos los usuarios son responsables por todas las pérdidas o daños que resulten del uso o manejo de las mezclas de este producto con herbicidas u otros mate-riales que no estén expresamente recomendados en este libreto. La mezcla de este producto con herbicidas u otros materiales que no estén recomendados en este libreto puede reducir la eficacia de este producto.

Restricciones de pastoreo para servidumbres de paso de servicios públicos: Este producto se puede usar para tratar la vegetación indeseable en servidumbres de paso que atraviesan pastizales y tierras de pastoreo y en terrenos forestales donde se practica el pastoreo. Para utilizar en aplicaciones de mezcla de tanque, cumpla con todas las restricciones que se indican en la etiqueta del producto para mezcla de tanque.

No hay restricciones para el pastoreo en las siguientes aplicaciones de este producto.

- Donde el rociado se puede dirigir sobre las malezas, matorrales leñosos y árboles indeseables, como en tratamientos con pistola, de rociado para mojar o de rociado dirigido de bajo volumen.
- Para la inyección de árboles o aplicaciones bajo la corteza en la capa exterior viva y para tratamientos de tocón.

Para aplicaciones por difusión, cumpla con las siguientes restricciones:

- **No se puede tratar más del 15 por ciento del área de pastoreo aprovechable con dosis entre 4.75 cuartos de galón y 8 cuartos de galón por acre.**
- No se puede tratar más del 25 por ciento del área de pastoreo aprovechable con dosis que no superen los 4.75 cuartos de galón por acre.
- Todas las restricciones se aplican al ganado lechero en período de lactancia. No se aplica ninguna otra restricción al ganado lechero en período de lactancia.

Estas recomendaciones no se aplican a la tierra de pastoreo fuera de las servidumbres de paso de servicios públicos.

Cantidad máxima de uso anual: El total combinado de todos los tratamientos no debe superar los 8.5 cuartos de galón de este producto por acre y por año.

ATENCION

EVITE EL CONTACTO DEL HERBICIDA CON EL FOLLAJE, TALLOS VERDES, RAICES NO LEÑOSAS EXPUESTAS O FRUTOS EXPUESTOS DE LAS COSECHAS, PLANTAS Y ARBOLES DESEABLES. EN CASO CONTRARIO ES PROBABLE QUE SUFRAN GRAVES DAÑOS O SEAN DESTRUIDOS TOTALMENTE.

EVITE EL ACARRREO. CUANDO EL PRODUCTO SE APLIQUE, SE DEBE TENER MUCHO CUIDADO PARA PREVENIR EL DAÑO A PLANTAS Y CULTIVOS DESEABLES.

No permita que la solución del herbicida se nebulice, gotee, sea acarreada o salpique sobre la vegetación deseable. Una cantidad pequeña puede ser suficiente para causar daños graves o destruir las cosechas, plantas u otras áreas que no se desea tratar. La probabilidad de que ocurran daños por el uso de este producto aumenta cuando hay muchas ráfagas de viento, a medida que aumenta la velocidad del viento, cuando la velocidad del viento cambia constantemente o cuando existen otras condiciones meteorológicas que favorecen la dispersión del rociado. Cuando se esté aplicando el producto con un rociador, evite la combinación de presiones y tipos de boquilla que puedan dar como resultado salpicaduras o partículas finas (niebla), que tienen muchas probabilidades de que el producto sea acarreado. EVITE LA APLICACION A ALTA VELOCIDAD O PRESION EXCESIVAS.

NOTA: El uso de este producto de cualquier manera contraria a las indicaciones contenidas en este libreto, puede resultar en lesiones a personas, animales o cosechas o pueden ocurrir otras consecuencias no deseadas. Mantenga los recipientes bien cerrados para evitar derramamientos y contaminación.

6.0 MEZCLA

Limpie las piezas del rociador inmediatamente después de su utilización lavándolas bien con agua.

NOTA: PUEDE OCURRIR UNA DISMINUCION DE LOS RESULTADOS SI SE UTILIZA AGUA QUE CONTENGA TIERRA, TAL COMO AGUA CON BARRO VISIBLE O AGUA DE CHARCAS O ACEQUIAS QUE NO ESTE CLARA.

Ahora más concentrado

Utilice la tabla de conversión siguiente como ayuda para determinar las dosis del herbicida Roundup Pro Concentrate con base en las dosis del herbicida Roundup Pro® que se utilizan habitualmente.

Roundup Pro Concentrate (Onzas)	Roundup Pro (Onzas)	Roundup Pro (Pintas)
20	24	1.5
26	32	2.0
32	40	2.5

6.1 Mezcla con agua

Este producto se mezcla fácilmente con agua. La solución para rociar se debe mezclar de la siguiente manera: ponga la cantidad correcta de agua en el tanque en el cual se va a preparar la mezcla. Agregue la cantidad necesaria de este producto cuando ya está cerca de completarse el llenado con agua y mezcle bien. Tenga cuidado de que el líquido no regrese al recipiente original. Use dispositivos aprobados para evitar que el líquido regrese al recipiente original cuando así lo exijan las reglamentaciones estatales o locales. Es posible que durante la mezcla y rociado, la solución produzca espuma. Para evitar o minimizar la formación de espuma, evite el uso de agitadores mecánicos, cierre las tuberías de derivación y de retorno en el fondo del tanque, y si es necesario, use compuestos aprobados para evitar la formación de espuma o para eliminar la espuma ya formada.

6.2 Procedimiento para mezclas de tanque

Cuando haga mezclas de tanque, lea y siga cuidadosamente las instrucciones de la etiqueta, las precauciones y toda la información contenida en las etiquetas de todos los productos utilizados. Agregue el producto al

tanque según las instrucciones de la etiqueta. Agite continuamente y agregue la cantidad recomendada de este producto.

Agite continuamente hasta usar totalmente el contenido del tanque. Si se deja que la mezcla para rociar se asiente, agite bien para que la mezcla vuelva a estar en suspensión antes de continuar con el rociado.

A fin de minimizar la formación de espuma, mantenga las tuberías de retorno lo más cerca del fondo del tanque. El tamaño del cernidor en la boquilla o de los cernidores en las tuberías no debe ser menor al número 50.

Siempre determine previamente la compatibilidad de la mezcla de este producto, que viene en tanque rotulado, con agua como vehículo mezclando cantidades pequeñas proporcionales con anticipación.

Vea la sección "**Mezclas de Tanque**" de "INFORMACION GENERAL" para las precauciones adicionales.

6.3 Mezcla para rociadores de mano o mochila de espalda.

Prepare la cantidad deseada de la solución para rociar, mezclando las proporciones de este producto con agua, según se muestra en la siguiente tabla:

Solución para rociar

Volumen deseado	Cantidad de Roundup Pro Concentrate herbicida 0.4%	0.8%	1.2%	1.6%	4%	8%
1 Gallon	0.5 oz	1 oz	1.6 oz	2.1 oz	5.2 oz	10.5 oz
25 Gallon	13 oz	0.8 qt	1.2 qt	1.6 qt	4 qt	8 qt
100 Gallon	1.6 qt	0.8 gal	1.2 gal	1.6 gal	4 gal	8 gal
2 cucharadas = 1 onza fluida						

Cuando se usen rociadores tipo mochila, o para bombeo, se recomienda que este producto se mezcle con agua en un recipiente grande. Llene el rociador con la solución ya lista.

6.4 Colorantes o tinturas

A este producto se le pueden agregar colorantes o tinturas para marcar, que sean aprobados para uso agrícola. Los colorantes o tinturas utilizados en las soluciones en aerosol de este producto pueden reducir su rendimiento, especialmente a bajas concentraciones del producto o a bajas diluciones. Para usar los colorantes y tinturas siga las instrucciones del fabricante.

7.0 EQUIPOS Y TECNICAS PARA LA APLICACION

MANEJO DE LA DERIVA POR ROCIADO

EVITE LA DERIVA. DEBE USARSE EXTREMO CUIDADO EN LA APLICACIÓN DE ESTE PRODUCTO PARA EVITAR DAÑOS A PLANTAS Y CULTIVOS DESEADOS.

Es la responsabilidad del aplicador evitar la deriva por rociado en el lugar de aplicación. La interacción de varios factores relacionados con el clima y el equipo determina la posibilidad de deriva por rociado. El aplicador y el cultivador son responsables de considerar todos estos factores al tomar decisiones.

No use ningún sistema de irrigación para aplicar este producto.

Aplique estas soluciones para rociar utilizando equipos debidamente mantenidos y calibrados que sean capaces de rociar el volumen deseado.

No permita que la solución del herbicida empañe, gotee, se derive o salpique sobre la vegetación deseada, ya que minúsculas cantidades de este producto pueden causar daños graves o destrucción del cultivo, plantas u otras áreas que no se pretendía tratar.

7.1 Equipo aéreo

NO APLIQUE ESTE PRODUCTO CON EQUIPOS AEREOS EXCEPTO BAJO LAS CONDICIONES QUE SE ESPECIFICAN EN ESTE LIBRETO.

Para aplicaciones aéreas por difusión, a menos que se indique de otra manera, utilice este producto en una dosis de 0,8 a 1,6 cuartos de galón por acre para malezas anuales, 1,6 a 4 cuartos de galón por acre para malezas perennes y 4 a 8 cuartos de galón por acre para árboles y arbustos leñosos. Use las dosis recomendadas de este herbicida en 3 a 25 galones de agua por acre. Cuando se usa de acuerdo a las instrucciones de la etiqueta, este producto proporciona el control o el control parcial de malezas herbáceas, matorrales leñosos y árboles que se indican en la sección "MALEZAS CONTROLADAS" de esta etiqueta.

PARA LA APLICACION AEREA EN CALIFORNIA, CONSULTE LA ETIQUETA DE EL SUPLEMENTO FEDERAL PARA APLICACIONES AEREAS EN DICHO ESTADO, PARA CONOCER LAS INSTRUCCIONES, LIMITACIONES Y REQUISITOS ESPECIFICOS. En California, no puede aplicarse este producto desde el aire cuando está en mezclas de tanque con Banvel®.

MANEJO DE LA DERIVA POR ROCIADO AÉREO

Deben seguirse los siguientes requerimientos de manejo de la deriva para evitar el movimiento de ésta fuera de objetivo en aplicaciones aéreas a campos de cultivo agrícola. Estos requerimientos no se emplean en aplicaciones forestales o para usos de salud pública.

1. La distancia del pulverizador más externo en la barra distribuidora no debe exceder 3/4 del largo de la envergadura o rotor.
2. Los pulverizadores deben siempre apuntar hacia atrás, paralelos a la corriente de aire, nunca hacia abajo más de 45 grados. En los estados con reglamentos más estrictos, éstos deben observarse.

Importancia del tamaño de la gotita

La forma más eficaz de reducir la posibilidad de deriva es la aplicación de gotitas grandes. La mejor estrategia de manejo de la deriva es la aplicación de las gotitas más grandes que provean suficiente cobertura y control. La aplicación de gotitas más grandes reduce la posibilidad de deriva, pero no la evitará si las aplicaciones se realizan inadecuadamente o bajo condiciones ambientales desfavorables (vea las secciones de "Viento", "Temperatura y Humedad", e "Inversión de la Temperatura" en esta etiqueta).

Control del tamaño de la gotita

- **Volumen:** Use pulverizadores de velocidad de flujo alta para aplicar el mayor volumen de rociado práctico. Los pulverizadores con mayores velocidades de flujo producen gotitas más grandes.
- **Presión:** Use las presiones de rociado más bajas recomendadas para el pulverizador. La presión más alta reduce el tamaño de la gotita y no mejora la penetración del todo. Cuando sean necesarias velocidades de flujo mayores, use pulverizadores con velocidad de flujo mayor en lugar de aumentar la presión.
- **Número de pulverizadores:** Use el número mínimo de pulverizadores que provean cobertura uniforme.
- **Orientación del pulverizador:** Oriente los pulverizadores de modo que el rocío sea liberado hacia atrás, paralelo a la corriente de aire, produzca gotitas más grandes que en otras orientaciones. Una deflexión significativa de la horizontal reducirá el tamaño de la gotita y aumentará la posibilidad de deriva.
- **Tipo de pulverizador:** Use un tipo de pulverizador que esté diseñado para la aplicación prevista. Con la mayoría de los tipos de pulverizadores, los ángulos de rociado más angostos producen gotitas más grandes. Considere el uso de pulverizadores de deriva baja. Los pulverizadores de flujo sólido orientados hacia atrás producen gotitas más grandes que otros tipos de pulverizador.
- **Largo de la barra distribuidora:** Para algunos tipos de uso, la reducción del largo efectivo de la barra distribuidora a menos de 3/4 de la envergadura o el largo del rotor puede reducir más la deriva sin reducir el ancho de la hilera (pasada).
- **Altura de la aplicación: Las aplicaciones no deben realizarse a una altura mayor que 10 pies por encima de la copa de las plantas más grandes, a menos que se requiera mayor altura por razones de seguridad del aeroplano. La realización de las aplicaciones a la menor altura que sea segura reduce la exposición de las gotitas a la evaporación y el viento.**

Ajuste de la hilera (pasada)

Cuando se realizan aplicaciones con viento cruzado, la pasada se desplazará hacia abajo. Por ello, en los extremos con o contra el viento del campo, el aplicador debe compensar por este desplazamiento ajustando la vía del aeroplano con el viento hacia arriba. La distancia de ajuste de la hilera debe aumentar, con aumento de la posibilidad de deriva (mayor viento, gotitas más pequeñas, etc.).

Viento

La posibilidad de deriva es menor con velocidades del viento entre 2 y 10 millas por hora. Sin embargo, muchos factores, incluyendo el tamaño de las gotitas y el tipo de equipo determinan la posibilidad de deriva a una velocidad determinada. Debe evitarse la aplicación menos de 2 millas por hora debido a la dirección variable del viento y la posibilidad alta de inversión. **NOTA:** El terreno local puede influir en los patrones de viento. Cada aplicador debe conocer los patrones (vientos) locales y cómo éstos afectan la deriva.

Temperatura y humedad

Cuando se realizan aplicaciones con humedad relativa baja, fije el equipo para que produzca gotitas más grandes para compensar por la evaporación. La evaporación de gotitas es más grave cuando las condiciones son calurosas y secas.

Inversiones de temperatura

No deben realizarse aplicaciones durante una inversión de temperatura debido a que es alta la posibilidad de deriva. Las inversiones de temperatura restringen la mezcla de aire vertical, lo que causa que pequeñas gotitas suspendidas permanezcan en una nube concentrada. Esta nube puede moverse en direcciones no predecibles debido a los vientos variables leves que son comunes durante las inversiones. Las inversiones de temperatura están caracterizadas por temperaturas en aumento con altitud y son comunes en las noches con cobertura de nubes limitada y poco o ningún viento. Comienzan a formarse cuando se mete el sol y a menudo continúan en la mañana. Su presencia puede indicarse por neblina en el suelo; sin embargo, si la neblina no está presente, las inversiones también pueden identificarse por el movimiento del humo desde una fuente del suelo o por el generador de humo de un aeroplano. El humo en capas

que se mueve lateralmente en una nube concentrada (bajo condiciones de poco viento) indica una inversión, mientras que el humo que se mueve hacia arriba y se disipa rápidamente indica buena mezcla de aire vertical.

Áreas sensibles

El pesticida sólo debe aplicarse cuando la posibilidad de deriva a áreas sensibles adyacentes (por ej., áreas residenciales, extensiones de agua, hábitat conocido para especies amenazadas o en peligro de extinción, cultivos que no son el objetivo) es mínima (por ej., cuando el viento sopla alejándose de las áreas sensibles).

Evite la aplicación directa sobre agua.

Se pueden usar aditivos para controlar el acarreo. Cuando se use este tipo de aditivos, lea y siga cuidadosamente las precauciones, así como toda la información adicional que aparezca en la etiqueta del aditivo.

Asegúrese de que la aplicación sea uniforme—A fin de evitar que queden áreas sin tratar, que la aplicación no sea uniforme o que las aplicaciones se traslapen, se deben usar marcadores adecuados.

EL CONTACTO PROLONGADO DE ESTE PRODUCTOS A PARTES DE ACERO QUE NO ESTA RECUBIERTO CON ALGUN TIPO DE PROTECCION, PUEDE DAR COMO RESULTADO LA CORROSION Y POSIBLEMENTE QUE LAS PARTES FALLEN. Es posible prevenir la corrosión recubriendo las partes con pintura orgánica, que cumpla con las especificaciones aero-espaciales MIL-C-38413. Al final de cada día de trabajo, para evitar la corrosión de las partes expuestas, lave muy bien el avión a fin de remover los residuos de este producto que se acumulan durante el rociado o por derramamientos. Las partes del tren de aterrizaje son extremadamente susceptibles.

7.2 Equipo de aplicación terrestre

Para aplicaciones de suelo por difusión, a menos que se indique de otra manera, utilice este producto en una dosis de 0.8 a 1.6 cuartos de galón por acre para malezas anuales, de 1.6 a 4 cuartos de galón por acre para malezas perennes y de 4 a 8 cuartos de galón por acre para matorrales leñosos y árboles. Cuando se usa de acuerdo a las instrucciones de la etiqueta, este producto proporciona el control o el control parcial de malezas herbáceas, matorrales leñosos y árboles que se indican en la sección "MALEZAS CONTROLADAS" de esta etiqueta.

Use las proporciones recomendadas de este producto con 3 a 40 galones de agua por acre para rociar de manera diseminada, a menos que se indique de otra manera en este libreto. A medida que la densidad de las malezas aumenta, el volumen de rociado se debe aumentar también para conseguir una cobertura completa, pero siempre dentro de los límites recomendados. A fin de evitar un rociado muy fino, seleccione la boquilla cuidadosamente. Para obtener mejores resultados con equipo a nivel del terreno, use boquillas tipo abanico plano. Asegúrese de que las gotas del rociado se distribuyan uniformemente.

7.3 Equipo de mano y de alto volumen

Aplique el producto al follaje de la vegetación que se desea controlar. En aplicaciones de rociado para mojar, la cobertura del follaje debe ser completa y uniforme. No rocíe hasta el punto en que el producto gotee de la vegetación. Use rociadores gruesos solamente.

Para el control de las malezas indicadas en la sección de "Malezas Anuales" de "MALEZAS CONTROLADAS", aplique una solución del 0.4 por ciento de este producto a las malezas de menos de 6 pulgadas de altura o longitud de extensión. Para las malezas anuales de más de 6 pulgadas de altura, o salvo que se especifique lo contrario, emplee una solución del 0.8 por ciento. Aplique antes de la formación de semillas en la hierba o la formación de brotes en las malezas de hoja ancha.

Para obtener el mejor resultado, emplee una solución del 1.6 por ciento en las plantas perennes que son más difíciles de controlar, tales como Bermudagrass, dock, field bindweed, hemo dogbane, milkweed y Canada thistle.

Para las aplicaciones de rociado dirigido de bajo volumen, emplee una solución de este producto del 4 al 8 por ciento para el control total o parcial de las malezas anuales y perennes o matorrales leñosos y árboles. La cobertura de rociado debe ser uniforme cubriendo como mínimo el 50 por ciento del follaje. Para obtener el mejor resultado, es importante cubrir la mitad superior de la planta. Para asegurar una cobertura adecuada de rociado, rocíe ambos lados grandes o altos de matorrales leñosos y árboles, cuando el follaje sea tupido y denso o cuando haya múltiples brotes.

7.4 Equipo especializado

Este producto puede aplicarse usando rociadores de recirculación, aplicadores con pantalla, rociadores con capucha, aplicadores por frotación o barras de esponja, diluyendo y mezclando bien con agua, sobre las malezas mencionadas que crecen en lugares no cultivables especificados en este libreto.

Los rociadores de recirculación dirigen la solución hacia los tipos de malezas que crecen sobre vegetación deseable, mientras que la solución que no ha sido interceptada por las malezas se recoge y se retorna al tanque para volverla a usar.

Los rociadores con pantalla o con capucha aplican la solución del herbicida directamente sobre las malezas, al mismo tiempo que protegen la vegetación deseable, para que no sea tocada por el herbicida.

Los aplicadores por frotación o de esponja aplican la solución del herbicida frotando las malezas con un material absorbente que contenga la solución del herbicida.

EVITE EL CONTACTO DEL HERBICIDA CON LA VEGETACION DESEABLE.

Los aplicadores utilizados por encima de la vegetación deseable deben ser calibrados de tal manera que el rociado o el punto de contacto más bajo esté por lo menos a 2 pulgadas arriba de la vegetación deseable. Gotas, niebla, espuma o salpicaduras del herbicida en contacto con la vegetación deseable pueden causar con mucha probabilidad descoloración, atrofia o destrucción.

Se obtienen mejores resultados cuando una mayor cantidad de la maleza entra en contacto con el herbicida. Las malezas que no entran en contacto con la solución herbicida no serán afectadas. Esto puede ocurrir en lugares donde las malezas están muy concentradas, cuando la infestación es grave o donde la altura de las malezas es variada, lo que no permite que todas sean tocadas por el herbicida. En estos casos puede hacerse necesario repetir el tratamiento.

Aplicadores con pantalla y con capucha

Use boquillas que aseguren un recubrimiento uniforme en toda el área tratada. En los rociadores con pantalla, mantenga las pantallas debidamente colocadas a fin de proteger la vegetación que no se desee destruir. SE DEBE TENER MUCHO CUIDADO PARA EVITAR EL CONTACTO DEL HERBICIDA CON LA VEGETACION DESEABLE.

Aplicadores por frotación y barras de esponja

El equipo debe ser diseñado, mantenido y operado de manera que la solución del herbicida no haga contacto con la vegetación deseable. Opere este equipo a velocidades inferiores a las 5 millas por hora. En áreas donde la infestación es grave, se puede mejorar la eficacia reduciendo la velocidad, así se asegura que el frotador esté siempre adecuadamente saturado con la solución del herbicida. Se obtienen mejores resultados si se aplica dos veces en direcciones opuestas.

Evite fugas o goteos sobre la vegetación deseable. Ajuste la altura de los aplicadores a fin de asegurar un contacto adecuado con las malezas. Mantenga limpias las superficies de frotación. Tenga presente que en terrenos inclinados, el herbicida puede migrar causando goteos en la parte baja y el secado de las mechas en la parte superior del aplicador por frotación.

No use aplicadores por frotación cuando las malezas estén mojadas.

Mezcle solamente la cantidad de solución que se usará durante el período de un día, debido a que el uso de sobras de días anteriores puede dar como resultado un efecto menos eficiente. Inmediatamente después de usar este producto, lave bien el aplicador usando bastante agua.

Para aplicadores de cordón o de mecha de esponja—Puede emplearse soluciones que oscilan entre 33 y 75 por ciento de este producto en agua.

Para aplicadores tipo plástico poroso y sistemas a presión—Se pueden usar soluciones que vayan del 33 por ciento al 100 por ciento de este producto con agua.

Cuando se aplica de acuerdo con las condiciones descritas, este producto CONTROLA las malezas siguientes:

Corn, volunteer	Sicklepod
Panicum, Texas	Spanishneedles
Rye, common	Starbur, bristly
Shattercane	

Cuando se aplica de acuerdo con las condiciones descritas, este producto SUPRIME las malezas siguientes:

Beggarweed, Florida	Ragweed, common
Bermudagrass	Ragweed, giant
Dogbane, hemp	Smutgrass
Dogfennel	Sunflower
Guineagrass	Thistle, Canada
Johnsongrass	Thistle, musk
Milkweed	Vaseygrass
Nightshade, silverleaf	Velvetleaf
Pigweed, redroot	

7.5 Sistemas por inyección

Este producto puede usarse con sistemas de rociado por inyección, ya sean aéreos o a nivel del terreno. Puede usarse como concentrado líquido no diluido antes de la inyección en el chorro de rociado. No mezcle este producto con concentraciones de otros productos cuando use los sistemas por inyección salvo que se recomiende específicamente.

7.6 Equipo de aplicación por goteo controlado

La proporción del producto aplicado por acre usando el equipo de aplicación por goteo controlado no debe ser menor que la recomendada en este libreto cuando se usa equipo convencional para aplicación diseminada. Cuando se usa el equipo aplicador por goteo controlado montado en un vehículo, use de 3 a 15 galones de agua por acre.

Los equipos de goteo controlado producen un rociado que es difícil de ver. Se debe tener especial cuidado para evitar que el rociado o el acarreo entre en contacto con el follaje o cualquier otra parte verde de la vegetación que no se quiere tratar, ya que en caso contrario, es probable que ésta sea dañada o destruida.

8.0 RECOMENDACIONES SEGUN AREAS Y USO

A continuación aparecen las instrucciones detalladas para cada área.

A menos que se especifique lo contrario, pueden hacerse aplicaciones para controlar las malezas listadas en las tablas de malezas anuales, perennes y matorrales leñosos. Vea también la sección "Equipo Selectivo".

8.1 Troncos cortados

El tratamiento de troncos cortados puede hacerse en cualquier área indicada en esta etiqueta. Este producto controla muchas especies de matorrales leñosos y árboles, algunos de los cuales se mencionan a continuación. Aplique este producto usando equipo adecuado para garantizar la cobertura completa del cámbium. Corte los árboles o sus brotes cerca de la superficie del suelo. Aplique una solución de este producto del 50 al 100 por ciento a la superficie recién cortada, **inmediatamente** después del corte. Demorar la aplicación puede reducir la eficacia del producto. Para obtener mejores resultados, la aplicación deberá hacerse durante los períodos de crecimiento activo y expansión completa de las hojas.

Alder	Saltcedar
Eucalyptus	Sweetgum
Madrone	Tan oak
Oak	Willow
Reed, giant	

NO HAGA LAS APLICACIONES SOBRE TRONCOS CORTADOS CUANDO LAS RAICES DE LOS MATORRALES LEÑOSOS O ARBOLES DESEABLES PUEDEN ESTAR INJERTADAS A LAS RAICES DE LOS TRONCOS CORTADOS. ES PROBABLE QUE LOS MATORRALES LEÑOSOS O ARBOLES ADYACENTES SE VEAN DAÑADOS DEBIDO AL INJERTO DE RAICES.

8.2 Areas generales no cultivables y áreas industriales

Uselo en áreas como aeropuertos, orillas de acequias, acequias secas, canales secos, filas de vallas, áreas industriales, depósitos de madera, viveros ornamentales, áreas de estacionamiento, terrenos de tanques de petróleo e instalaciones de bombeo, vías de ferrocarril, carreteras, granjas de semillas de céspedes o tepes, áreas de almacenamiento, almacenes, y lugares similares industriales y no cultivables.

Control general de malezas, recortado de bordes y suelo limpio de malezas

Este producto puede usarse en áreas generales no cultivables. Puede aplicarse con cualquiera de los equipos descritos en este libreto. Puede usarse para el recortado de bordes alrededor de objetos en áreas no cultivables. Este producto puede usarse antes de colocar asfalto o de comenzar un proyecto de construcción.

Pueden hacerse aplicaciones repetidas de este producto, a medida que emergen las malezas, para mantener el suelo limpio de malezas.

Este producto puede mezclarse en tanque con los productos siguientes. Vea las etiquetas de estos productos para ver cuáles son los lugares no cultivables aprobados y las proporciones para su aplicación.

ARSENAL®	PRINCEP LIQUID
BANVEL	RONSTAR® 50 WP
BARRICADE® 65WG	SAHARA®
DIURON	SIMAZINE
ENDURANCE®	OUST®
ESCORT®	PENDULUM® 3.3 EC
GARLON® 3A	PENDULUM WDG
GARLON 4	PLATEAU®
KARMEX® DF	SURFLAN®
KROVAR® I DF	TELAR®
MANAGE®	VANQUISH®
PRINCEP® DF	2,4-D

Las mezclas con Banvel no se pueden aplicar en forma aerea en California.

Cuando se aplica como mezcla de tanque para mantener el suelo limpio de malezas, este producto proporciona control sobre las malezas anuales emergidas y control o control parcial sobre las malezas perennes emergidas, matorrales leñosos y árboles.

Para controlar o controlar parcialmente las malezas perennes siguientes, aplique 0.8 a 1.6 cuartos de galón de este producto más 2 a 4 onzas de Oust por acre.

Bahiagrass	Fescue, tall
Bermudagrass	Johnsongrass
Broomsedge	Poorjoe
Dallisgrass	Quackgrass
Dock, curly	Vaseygrass
Dogfennel	Vervain, blue

Segeo químico - Plantas perennes

Este producto suprime las hierbas perennes mencionadas en esta sección para servir como substituto del segeo. Use 6.4 onzas fluidas de este producto por acre cuando trate tall fescue, fine fescue, orchardgrass o quackgrass. Use 5 onzas fluidas de este producto por acre cuando trate Kentucky bluegrass. Aplique el tratamiento en 10 a 40 galones de solución para rociar por acre.

Uselo solamente en áreas en las que puede tolerarse un daño o decoloración temporal de las hierbas perennes.

Segeo químico - Plantas anuales

Para suprimir el crecimiento de algunas hierbas anuales, tales como el ballico, la cebada silvestre y la avena loca anuales que crecen en céspedes agrestes al borde de las carreteras u otras áreas industriales, aplique de 3 a 4 onzas fluidas de este producto en 10 a 40 galones de solución de rociado por acre. Las aplicaciones se deben realizar cuando las hierbas anuales crezcan activamente y antes de que las semillas se encuentren en la etapa de "boot" del desarrollo. Los tratamientos pueden perjudicar a las hierbas deseadas.

8.3 Manejo de hábitats

Restauración y mantenimiento de hábitats

Este producto puede ser usado para controlar la vegetación exótica y otras plantas indeseables en áreas de manejo de hábitats y en áreas naturales, incluyendo hábitats nativos y refugios para la fauna silvestre. Pueden hacerse aplicaciones para permitir la recuperación de las especies de plantas nativas, antes de plantar dichas especies nativas deseables, y para otros requisitos similares de control de la vegetación de amplia efectividad. A fin de eliminar selectivamente ciertas plantas indeseables, se pueden hacer aplicaciones en puntos específicos para controlar y mejorar el hábitat.

Sitios donde se siembran alimentos para la fauna silvestre

Este producto puede ser usado para preparar el terreno donde se desea sembrar alimentos para la fauna silvestre. Cualquier especie de alimento para la fauna silvestre puede ser sembrada después de aplicar este producto, o también se puede permitir que las especies nativas vuelvan a poblar el área. Si hace falta labrar para preparar el terreno antes de sembrar las semillas, espere 7 días después de aplicar este producto antes de arar a fin de permitir la absorción adecuada en las partes de la planta que estén bajo tierra.

8.4 Inyección y chorro (matorrales leñosos y árboles)

Los matorrales leñosos y árboles pueden ser controlados aplicando este producto por inyección o chorro. Aplique este producto usando equipo adecuado, que debe ser capaz de penetrar en el tejido viviente. Aplique 1 ml de este producto por cada 2 ó 3 pulgadas de diámetro del tronco a la altura del pecho (DBH en inglés). La mejor forma de hacerlo es aplicando una solución del 50 al 100 por ciento de este producto, con un chorro continuo alrededor del árbol o en cortes espaciados uniformemente alrededor del árbol y por debajo del nivel de las ramas. A medida que el diámetro del árbol aumenta, se obtienen mejores resultados aplicando el producto diluido con el chorro continuo alrededor del árbol o más cerca en cortes espaciados. Evite las aplicaciones que permiten el desagüe de material cuando se chorrea alrededor del árbol o sobre los cortes en árboles que tienen la facilidad de exudar savia de los cortes. En especies de este tipo, haga los cortes de manera oblicua a fin de producir el efecto de copa y use el producto sin disolver. Para obtener mejores resultados, la aplicación debe tener lugar durante periodos de crecimiento activo y expansión completa de las hojas. Este tratamiento controlará muchas especies, algunas de las cuales incluyen:

Control	Control parcial
Oak	Black gum
Poplar	Dogwood
Sweetgum	Hickory
Sycamore	Maple, red

8.5 Plantas ornamentales y viveros, árboles de Navidad

Post-dirigido, recortado de bordes

Este producto puede ser usado como un rocío post-dirigido alrededor de especies ornamentales leñosas establecidas, como arborvitae, azalea, boxwood, crabapple, euonymus, fir, douglas fir, jojoba, hollies, lilac, magnolia, maple, oak, privet, pine, spruce y yew. Este producto también puede ser usado para recortado de bordes alrededor de árboles, edificios, aceras y carreteras, plantas en macetas y otros objetos de viveros.

Las plantas deseables pueden ser protegidas de la solución usando pantallas o cubriéndolas con cartón o con algún otro material impermeable. ESTE PRODUCTO NO SE RECOMIENDA PARA ROCIARSE DESDE ARRIBA POR DISEMINACIÓN SOBRE PLANTAS ORNAMENTALES Y ARBOLES DE NAVIDAD. Se debe tener mucho cuidado para que el rocío, acarreo o neblina de este producto no hagan contacto con el follaje o la corteza verde de las especies ornamentales establecidas.

Preparación del terreno

Este producto puede ser usado antes de plantar cualquier tipo de planta ornamental, de vivero o árboles de Navidad.

Invernaderos/cobertizos

Este producto puede ser usado para controlar las malezas que estén creciendo en o alrededor de los invernaderos y cobertizos. No debe haber vegetación que no se quiera destruir y los equipos de ventilación deben estar apagados.

8.6 Vías de ferrocarril

Todas las instrucciones de la sección "Areas Generales No Cultivables y Areas Industriales" son válidas para las vías de ferrocarril.

Suelo vacío, balastos y bordes, cruces y tratamiento loca-lizado

Este producto puede ser usado para mantener el suelo limpio de malezas en balastos y bordes de las vías de ferrocarril. Pueden hacerse aplicaciones repetidas de este producto, a medida que emergen las malezas, para mantener el suelo limpio de malezas. Este producto puede usarse para controlar las malezas altas y mejorar la línea visual en los cruces de ferrocarril y reducir la necesidad de segar a lo largo de las servidumbres de vía. Para aplicaciones en los cruces, pueden usarse hasta 80 galones de solución para rociar por acre. Este producto puede mezclarse en tanque con los siguientes productos para tratamiento de balastos, bordes, tratamientos localizados, suelo limpio y cruces:

ARSENAL	KROVAR I DF
BANVEL	OUST
DIURON	SAHARA
ESCORT	SPIKE®
GARLON 3A	TELAR
GARLON 4	VANQUISH
HYVAR® X	2,4-D

Control de matorrales

Este producto puede ser usado para controlar matorrales leñosos y árboles en las servidumbres de las vías. Aplique de 3 a 8 cuartos de galón de este producto por acre para aplicaciones diseminadas, usando boquillas tipo aguilón o sin aguilón. Pueden usarse hasta 80 galones de solución para rociar por acre. Aplique una solución de 2/3 a 1.6% de este producto cuando haga aplicaciones de rociado para mojar a gran escala. Aplique una solución de 4% a 8% de este producto cuando haga aplicaciones de rociado dirigido a pequeña escala para tratamientos localizados. Este producto puede ser mezclado con los siguientes productos para un mejor control de los matorrales leñosos y árboles:

ARSENAL	GARLON 4
ESCORT	TORDON® K
GARLON 3A	

Mantenimiento del Bermudagrass

Este producto puede ser usado para controlar o controlar parcialmente muchas malezas anuales y perennes para el mantenimiento eficaz de Bermudagrass que esté creciendo activamente. Aplique de 13 a 38 onzas fluidas de este producto en un máximo de 80 galones de solución para rociar por acre. Para tratar malezas anuales que tengan menos de 6 pulgadas de altura (o el largo de los tallos), use las proporciones más bajas. Use la proporción más alta a medida que las malezas aumenten de tamaño o cuando estén cerca de la floración o de la formación de semillas. Estas proporciones también controlan parcialmente las siguientes especies perennes:

Bahiagrass	Johnsongrass
Bluestem, silver	Trumpetcreeper
Fescue, tall	Vaseygrass

Este producto puede ser mezclado con Oust. Si se mezcla en tanques, no use más de 13 a 38 onzas fluidas de este producto con 1 a 2 onzas de Oust por acre. Para tratar malezas anuales indicadas en este libreto y en el libreto de Oust, que tengan menos de 6 pulgadas de altura (o el largo de los tallos), use las proporciones más bajas de cada producto. Use la proporción más alta a medida que las malezas aumenten de tamaño o cuando estén cerca de la floración o de la formación de semillas. Estas proporciones también controlan parcialmente las siguientes especies perennes:

Bahiagrass	Fescue, tall
Blackberry	Johnsongrass
Bluestem, silver	Poorjoe
Broomsedge	Raspberry
Dallisgrass	Trumpetcreeper
Dewberry	Vaseygrass
Dock, curly	Vervain, blue
Donfennel	

Uselo solamente en Bermudagrass que esté bien establecido. Como resultado del tratamiento, el Bermudagrass puede sufrir deterioro, pero volverá a crecer si se riega. No se recomienda repetir el tratamiento en la misma estación, ya que esto puede ocasionar daños graves al Bermudagrass.

8.7 Carreteras

Todas las instrucciones de la sección "Areas Generales No Cultivables y Areas Industriales" son válidas para las carreteras.

Tratamiento de bordes

Este producto puede ser usado en los bordes de las carreteras. Puede aplicarse con rociadores de aguilón, rociadores de aguilón con pantalla, boquillas descentradas de gran volumen, equipo de mano y equipos similares.

Barandas y otros obstáculos para la siega

Este producto puede ser usado para controlar las malezas que crecen debajo de las barandas y alrededor de los postes de la señalización y otros objetos en los bordes de las carreteras.

Tratamiento localizado

Este producto puede ser usado como tratamiento localizado para controlar la vegetación indeseable que crece a lo largo de los bordes de las carreteras.

Mezclas de tanque

Este producto puede mezclarse en tanque con los productos siguientes para tratamientos de bordes, barandas, localizados y de suelo vacío:

BANVEL	PRINCEP DF
DIURON	PRINCEP LIQUID
ENDURANCE	RONSTAR 50WP
ESCORT	SAHARA
KROVAR I DF	SIMAZINE
OUTRIDER®	SURFLAN
OUST	TELAR
PENDULUM 3.3 EC	VANQUISH
PENDULUM WDG	2,4-D

Vea las instrucciones generales para mezclas de tanque en la sección "Areas Generales No Cultivables y Areas Industriales" de este libreto.

Mantenimiento del Bermudagrass y Bahiagrass

Aplicaciones cuando estén latentes (durmientes)

Este producto puede usarse para controlar o controlar parcialmente muchas malezas anuales de invierno y tall fescue para el alivio eficaz de Bermudagrass y bahiagrass latentes. Trate solamente cuando el césped esté latente y antes de su reverdecer primaveral. Este producto puede mezclarse con herbicida Outrider o Oust en tanque para el control residual. Las mezclas de tanque de este producto con Oust pueden retrasar el reverdecer.

Para obtener mejores resultados con malezas anuales de invierno, haga el tratamiento cuando las plantas estén en una etapa temprana de su crecimiento (menos de 6 pulgadas de altura) después de que la mayoría haya germinado. Para obtener mejores resultados con tall fescue, haga el tratamiento cuando el fescue esté en o después de su etapa de 4 a 6 hojas.

Aplique entre 6.4 y 51 onzas fluidas de este producto en una mezcla de tanque con .75 a 1.33 onzas del herbicida Outrider por acre. Lea y siga todas las instrucciones de la etiqueta del herbicida Outrider.

Aplique de 6.4 a 51 onzas fluidas de este producto por acre, solo o en mezcla de tanque con .25 a 1 onza de Oust por acre. Aplique las proporciones recomendadas en 10 a 40 galones de agua por acre. Uselo solamente en áreas donde el Bermudagrass o bahiagrass son deseables y en las que puede tolerarse un poco de daño o decoloración. Para evitar que el reverdecer se retarde y para minimizar el daño, no agregue más de 1 onza de Oust por acre sobre Bermudagrass y no más de 0.5 onzas de Oust por acre sobre bahiagrass, y evite el tratamiento cuando estas hierbas se encuentren en estado semi-latente.

Bermudagrass que esté creciendo activamente

Este producto puede ser usado para controlar total o parcialmente muchas malezas anuales y perennes para el mante-nimiento eficaz de Bermudagrass que esté creciendo activamente. Aplique de 13 a 38 onzas

fluidas de este producto en 10 a 40 galones de solución para rociar por acre. Para tratar malezas anuales que tengan menos de 6 pulgadas de altura (o el largo de los tallos), use las proporciones más bajas. Use la proporción más alta a medida que las malezas aumenten de tamaño o cuando estén cerca de la floración o de la formación de semillas. Estas proporciones también controlan parcialmente las siguientes especies perennes:

Bahiagrass	Johnsongrass
Bluestem, silver	Trumpetcreeper
Fescue, tall	Vaseygrass

Este producto se puede mezclar en tanque con el herbicida Outrider para el control o el control parcial de Johnsongrass y otras malezas que se indican en la etiqueta del herbicida Outrider. Use entre 6.4 y 26 onzas fluidas de este producto con .75 a 1.33 onzas del herbicida Outrider. Use las dosis más elevadas de ambos productos para el control de malezas perennes o anuales que tengan una altura superior a 6 pulgadas.

Este producto puede ser mezclado en tanque con Oust. Si se mezcla en tanques, no use más de 13 a 26 onzas fluidas de este producto con 1 a 2 onzas de Oust por acre. Para tratar malezas anuales indicadas en este libreto y en el libreto de Oust, que tengan menos de 6 pulgadas de altura (o el largo de los tallos), use las proporciones más bajas de cada producto. Use la proporción más alta a medida que las malezas aumenten de tamaño o cuando estén cerca de la floración o de la formación de semillas. Estas proporciones también controlan parcialmente las siguientes especies perennes:

Bahiagrass	Fescue, tall
Bluestem, silver	Johnsongrass
Broomsedge	Poorjoe
Dallisgrass	Trumpetcreeper
Dock, curly	Vaseygrass
Dogfennel	Vervain, blue

Uselo solamente en Bermudagrass que esté bien establecido. Como resultado del tratamiento, el Bermudagrass puede sufrir deterioro, pero volverá a crecer si se riega. No se recomienda repetir el tratamiento con la mezcla de tanque en la misma estación, ya que esto puede ocasionar daños graves al Bermudagrass.

Bahiagrass que esté creciendo activamente

Para suprimir el crecimiento vegetativo y la inhibición de la formación de semillas de bahiagrass durante aproximadamente 45 días, aplique 5 onzas fluidas de este producto en 10 a 40 galones de agua por acre. Aplique de 1 a 2 semanas después de reverdecer completo o después de cortar a una altura uniforme de 3 a 4 pulgadas. Esta aplicación debe ser hecha antes de la emergencia de las semillas.

Para la supresión durante un máximo de 120 días, aplique 3 onzas fluidas de este producto por acre, y a continuación una aplicación de 1.5 a 3 onzas fluidas por acre unos 45 días más tarde. No haga más de 2 aplicaciones al año.

Este producto se puede usar para el control o el control parcial de Johnsongrass y otras malezas que se indican en la etiqueta del herbicida Outrider en bahiagrass que esté creciendo activamente. Aplique de 1.25 a 4 onzas de este producto con .75 a 1.33 onzas de Outrider por acre. Use las dosis más elevadas para el control de malezas perennes o anuales que tengan una altura superior a 6 pulgadas. Utilice sólo en bahiagrass bien establecido.

Puede usarse una mezcla de tanque de este producto con Oust. Aplique 5 onzas fluidas de este producto con 0.25 onzas de Oust por acre, 1 a 2 semanas después de la primera siega de la primavera. Haga solamente 1 aplicación al año.

9.0 TIPOS DE MALEZAS CONTROLADAS

Use siempre la proporción más alta de este producto por acre, dentro de las proporciones recomendadas, cuando las malezas son densas o cuando crecen en un área no tocada (no cultivada).

Puede haber una disminución de los resultados cuando se traten malezas cubiertas con mucho polvo. Para las malezas que han sido segadas, pastadas o cortadas, permita que vuelvan a crecer antes del tratamiento.

Vea las secciones siguientes para las proporciones recomendadas para el control de malezas anuales y perennes, matorrales leñosos y árboles. Para las malezas perennes, matorrales leñosos y árboles difíciles de controlar, donde las plantas crecen en condiciones de estrés, o donde la infestación es densa, pueden usarse 4 a 8 cuartos de galón por acre de este producto para obtener mejores resultados.

9.1 Malezas anuales

Use 26 onzas fluidas por acre si las malezas tienen menos de 6 pulgadas de altura o largo de los tallos y 1.2 cuartos a 3.2 cuartos de galón por acre si las malezas tienen más de 6 pulgadas de altura o largo de los tallos o cuando las malezas crecen en condiciones de estrés.

Para aplicaciones de rociado para mojar, aplique una solución de 0.4% de este producto a las malezas que tengan menos de 6 pulgadas de altura o largo de los tallos. Haga la aplicación antes de la formación de semillas para la hierba, o la formación de yemas para las malezas de hoja ancha. Para las malezas anuales que tienen más de 6 pulgadas de altura o las malezas más pequeñas que crecen en condiciones de estrés, use una solución del 0.8 al 1.6 por ciento. Use la dosis más alta para las especies difíciles de controlar o las malezas de más de 24 pulgadas de altura.

ESPECIES DE MALEZAS

Annoda, spurred	Kochia
Barley*	Lamb's-quarters*
Barnyardgrass*	Little barley*
Bittercress*	London rocket*
Black nightshade*	Mayweed
Bluegrass, annual*	Medusahead*
Bluegrass, bulbous*	Morningglory
Bassia, fivehook	*(Ipomoea spp.)*
Brome, downy*	Mustard, blue*
Brome, Japanese*	Mustard, tansy*
Browntop panicum*	Mustard, tumble*
Buttercup*	Mustard, wild*
Carolina foxtail*	Oats
Carolina geranium	Pigweed*
Castor Bean	Plains/Tickseed coreopsis*
Cheatgrass*	Prickly lettuce*
Cheeseweed	Puncturevine
(malva Parviflora)	Purslane, common
Chervil*	Ragweed, common*
Chickweed*	Ragweed, giant
Cocklebur*	Red rice
Copperleaf, hophornbeam	Russian thistle
Corn*	Rye*
Corn speedwell*	Ryegrass*
Crabgrass*	Sandbur, field*
Dwarfdandelion*	Shattercane*
Eastern mannagrass*	Shepherd's-purse*
Eclipta*	Sicklepod
Fall panicum*	Signalgrass, broadleaf*
Falsedandelion*	Smartweed, ladysthumb*
Falseflax, smallseed*	Smartweed, Pennsylvania*
Fiddleneck	Sowthistle, annual
Field pennycress*	Spanishneedles
Filaree	Speedwell, purslane*
Fleabane, annual*	Sprangletop*
Fleabane, hairy	Spurge, annual
*(Conyza bonariensis)**	Spurge, prostrate*
Fleabane, rough*	Spurge, spotted*
Florida pusley	Spurry, umbrella*
Foxtail*	Starthistle, yellow
Goatgrass, jointed*	Stinkgrass*
Goosegrass	Sunflower*
Grain sorghum (milo)*	Teaweed/Prickly sida
Groundsel, common*	Texas panicum*
Hemp sesbania	Velvetleaf
Henbit	Virginia copperleaf
Horseweed/Marestail	Virginia pepperweed*
(Conyza canadensis)	Wheat*
Itchgrass*	Wild oats*
Johnsongrass, seedling	Witchgrass*
Junglerice	Woolly cupgrass*
Knotweed	Yellow rocket

*Cuando use equipos de aplicación diseminada a nivel del terreno (aplicaciones aéreas o rociadores de aguilón con boquillas tipo abanico plano), estas especies serán controladas o controladas parcialmente con 13 onzas fluidas de este producto por acre. Las aplicaciones deben hacerse usando de 3 a 10 galones de volumen por acre. Use boquillas que garanticen una cobertura completa del follaje y haga el tratamiento cuando las malezas estén en su etapa temprana de crecimiento.

9.2 Malezas perennes

Los mejores resultados se obtienen cuando las malezas perennes son tratadas una vez que han alcanzado la etapa reproductiva de su crecimiento (inicio de las semillas para hierbas y formación de yemas para malezas de hoja ancha). Para las plantas sin flores, los mejores resultados se obtienen cuando las plantas alcanzan el estado de madurez. En muchos casos, se requiere el tratamiento antes de estas etapas del crecimiento.

En estos casos, use la proporción más alta dentro de las proporciones recomendadas.

Asegúrese de que la cobertura sea a fondo cuando emplee tratamientos de rociado para mojar con equipo de mano. Cuando se utilice equipo manual para tratamientos puntuales localizados de bajo volumen, aplique una solución de 4 a 8 por ciento de este producto.

Espere 7 días o más después de la aplicación antes de labrar.

ESPECIES DE MALEZAS	PROPORCIÓN (CUARTOS POR ACRE)	% DE SOLUCIÓN DE MANO
Alfalfa*	0.8	1.6
Alligatorweed*	3.2	1.2
Anise (fennel)	1.6-3.2	0.8-1.6
Bahiagrass	2.4-4	1.6
Beachgrass, European (*Ammophila arenaria*)	—	4
Bentgrass*	1.2	1.6
Bermudagrass	4	1.6
Bermudagrass, water (knotgrass)	1.2	1.6
Bindweed, field	3.2-4	1.6
Bluegrass, Kentucky	1.6	1.6
Blueweed, Texas	3.2-4	1.6
Brackenfern	2.4-3.2	0.8-1.2
Bromegrass, smooth	1.6	1.6
Bursage, woolly-leaf	—	1.6
Canarygrass, reed	1.6-2.4	1.6
Cattail	2.4-4	1.6
Clover; red, white	2.4-4	1.6
Cogongrass	2.4-4	1.6
Dallisgrass	2.4-4	1.6
Dandelion	2.4-4	1.6
Dock, curly	2.4-4	1.6
Dogbane, hemp	3.2	1.6
Fescue (except tall)	2.4-4	1.6
Fescue, tall	0.8-2.4	1.6
German ivy	1.6-3.2	0.8-1.6
Guineagrass	2.4	0.8
Horsenettle	2.4-4	1.6
Horseradish	3.2	1.6
Iceplant	1.6	1.2-1.6
Jerusalem artichoke	2.4-4	1.6
Johnsongrass	1.6-2.4	0.8
Kikuyugrass	1.6-2.4	1.6
Knapweed	3.2	1.6
Lantana	—	0.8-1
Lespedeza	2.4-4	1.6
Milkweed, common	2.4	1.6
Muhly, wirestem	1.6	1.6
Mullein, common	2.4-4	1.6
Napiergrass	2.4-4	1.6
Nightshade, silverleaf	1.6	1.6
Nutsedge; purple, yellow	2.4	0.8-1.6
Orchardgrass	1.6	1.6
Pampasgrass	2.4-4	1.2-1.6
Paragrass	2.4-4	1.6
Pepperweed, perennial	3.2	1.6
Phragmites*	2.4-4	0.8-1.6
Poison hemlock	1.6-3.2	0.8-1.6
Quackgrass	1.6-2.4	1.6
Redvine*	1.6	1.6
Reed, giant	3.2-4	1.6
Ryegrass, perennial	1.6-2.4	0.8
Smartweed, swamp	2.4-4	1.6
Spurge, leafy*	—	1.6
Sweet potato, wild*	—	1.6
Thistle, artichoke	1.6-2.4	0.8-1.6
Thistle, Canada	1.6-2.4	1.6
Timothy	1.6-2.4	1.6
Torpedograss*	3.2-4	1.6
Trumpetcreeper*	1.6-2.4	1.6
Vaseygrass	2.4-4	1.6
Velvetgrass	2.4-4	1.6
Wheatgrass, western	1.6-2.4	1.6

*Control parcial

9.3 Matorrales leñosos y árboles

Aplique este producto después de la formación completa de hojas, a menos que se indique de otra manera. Para las plantas más grandes y/o donde la densidad de la vegetación sea alta, use la proporción más alta. En las plantas enredaderas que han alcanzado el estado leñoso de crecimiento, use las proporciones más altas. Los mejores resultados se obtienen cuando se aplica a finales del verano o en el otoño, después de la formación de frutos.

En zonas áridas, se obtienen mejores resultados cuando se aplica en la primavera o a principios del verano cuando las especies que crecen como matorrales tienen alto contenido de humedad y florecen.

Cuando haga tratamientos de rociado para mojar con equipos de mano, asegúrese de que la cobertura sea total.

Cuando use equipos de mano para tratamientos localizados con rociado dirigido de poco volumen, aplique una solución del 4 por ciento al 8 por ciento de este producto.

Es posible que los síntomas no aparezcan antes de las heladas o del envejecimiento con tratamientos de otoño.

Permita que pasen 7 o más días después de la aplicación antes de labrar, segar o remover. Es posible que se necesite repetir el tratamiento para tratar plantas que emergen de partes enterradas o de semillas. Un poco de colorido otoñal es aceptable en plantas indeseables que pierden las hojas en el otoño, siempre y cuando no hayan sufrido mayor pérdida de hojas. Si la aplicación de otoño se realiza después de que hayan ocurrido heladas, es posible que se obtengan resultados deficientes.

ESPECIES DE MALEZAS	PROPORCIÓN DISEMINACIÓN (CUARTOS POR ACRE)	% DE SOLUCIÓN DE MANO DE ROCIADO PARA MOJAR
Alder	2.4-3.2	0.8-1.2
Ash*	1.6-4	0.8-1.6
Aspen, quaking	1.6-2.4	0.8-1.2
Bearclover (Bearmat)*	1.6-4	0.8-1.6
Beech*	1.6-4	0.8-1.6
Birch	1.6	0.8
Blackberry	2.4-3.2	0.8-1.2
Blackgum	1.6-4	0.8-1.6
Bracken	1.6-4	0.8-1.6
Broom; French, Scotch	1.6-4	1.2-1.6
Buckwheat, California*	1.6-3.2	0.8-1.6
Cascara*	1.6-4	0.8-1.6
Catsclaw*	—	0.8-1.2
Ceanothus*	1.6-4	0.8-1.6
Chamise*	1.6-4	0.8
Cherry; bitter, black, pin	1.6-2.4	0.8-1.2
Coyote brush	2.4-3.2	1.2-1.6
Deerweed	1.6-4	0.8
Dogwood*	1.6-4	0.8-1.6
Elderberry	1.6	0.8
Elm*	1.6-4	0.8-1.6
Eucalyptus	—	1.6
Gorse*	1.6-4	0.8-1.6
Hasardia*	1.6-3.2	0.8-1.6
Hawthorn	1.6-2.4	0.8-1.2
Hazel	1.6	0.8
Hickory*	1.6-4	0.8-1.6
Honeysuckle	2.4-3.2	0.8-1.2
Hornbeam, American*	1.6-4	0.8-1.6
Kudzu	3.2	1.6
Locust, black*	1.6-3.2	0.8-1.6
Madrone resprouts*	—	1.6
Manzanita*	1.6-4	0.8-1.6
Maple, red	1.6-3.2	0.8-1.2
Maple, sugar	—	0.8-1.2
Monkey flower*	1.6-3.2	0.8-1.6
Oak; black, white*	1.6-3.2	0.8-1.6
Oak, post	2.4-3.2	0.8-1.2
Oak; northern, pin	1.6-3.2	0.8-1.2
Oak, Scrub*	1.6-3.2	0.8-1.2
Oak; southern red	1.6-2.4	0.8-1.2
Peppertree, Brazilian (Florida holly)*	1.6-4	0.8-1.6
Persimmon*	1.6-4	0.8-1.6
Pine 1.6-4	0.8-1.6	
Poison ivy	3.2-4	1.6
Poison oak	3.2-4	1.6
Poplar, yellow*	1.6-4	0.8-1.6
Redbud, eastern	1.6-4	0.8-1.6
Rose, multiflora	1.6	0.8
Russian olive*	1.6-4	0.8-1.6
Sage, black	1.6-3.2	0.8
Sage, white*	1.6-3.2	0.8-1.6
Sage brush, California	1.6-3.2	0.8
Salmonberry	1.6	0.8
Saltcedar*	1.6-4	0.8-1.6
Sassafras*	1.6-4	0.8-1.6
Sourwood*	1.6-4	0.8-1.6
Sumac; laurel, poison, smooth, sugarbush, winged*	1.6-3.2	0.8-1.6
Sweetgum	1.6-2.4	0.8-1.2
Swordfern*	1.6-4	0.8-1.6
Tallowtree, Chinese	—	0.8
Tan oak resprouts*	—	1.6

Thimbleberry	1.6	0.8
Tobacco, tree*	1.6-3.2	0.8-1.6
Toyon*	—	1.6
Trumpetcreeper	1.6-2.4	0.8-1.2
Vine maple*	1.6-4	0.8-1.6
Virginia creeper	1.6-4	0.8-1.6
Waxmyrtle, southern*	1.6-4	0.8-1.6
Willow	2.4	0.8
Yerbasenta*	—	1.6

*Control parcial

10.0 LIMITES EN LA GARANTIA Y EN LA RESPONSABILIDAD

Monsanto Company garantiza que este producto concuerda con la descripción química de la etiqueta y es razonablemente adecuado para los propósitos descritos en el libreto titulado Instrucciones Completas para el Uso ("Instrucciones") cuando se usa de acuerdo con dichas Instrucciones y las condiciones que allí se detallan. NO SE HACE NINGUNA OTRA GARANTIA EXPRESA O IMPLICITA ACERCA DE LA IDONEIDAD PARA UN USO PARTICULAR O COMERCIABILIDAD. Esta garantía está sujeta también a las condiciones y limitaciones que aquí se indican.

El comprador y todos los usuarios deberán reportar con prontitud a esta Compañía acerca de cualquier reclamo que se base en un contrato, negligencia, estricta responsabilidad, y otros actos ilícitos.

El comprador y todos los usuarios son responsables por todas las pérdidas o daños que resultasen por el uso o manipulación en condiciones que estén más allá del control de esta Compañía, incluyendo pero no limitándose a: incompatibilidad con productos que no sean los señalados en las Instrucciones, aplicación o contacto con vegetación que no se quiera destruir, condiciones climáticas inusuales, condiciones de clima que estén fuera de los límites que se consi-deran normales en el lugar de la aplicación y para el período de tiempo en el cual se aplica, así como condiciones de clima que estén fuera de los límites indicados en las Instrucciones, aplicaciones que no estén explícitamente aconsejadas en las Instrucciones, condiciones de humedad que estén fuera de los límites establecidos en las Instrucciones, o la presencia de productos en la tierra o sobre ella, en las plantas o en la vegetación que se está tratando, diferentes a los indicados en las Instrucciones.

Esta Compañía no garantiza ninguno de los productos reformulados o reempacados de este producto, excepto de acuerdo a los requisitos de la administración de esta Compañía y con el permiso escrito expreso de esta Compañía.

LA UNICA Y EXCLUSIVA COMPENSACION AL USUARIO O COMPRADOR Y EL LIMITE DE RESPONSABILIDAD DE ESTA COMPAÑIA O DE CUALQUIER OTRO VENDEDOR POR CUALQUIER PERDIDA O POR TODAS LAS PERDIDAS, PERJUICIOS O DAÑOS QUE RESULTASEN DEL USO O MANEJO DE ESTE PRODUCTO (INCLUYENDO RECLAMOS QUE SE BASEN EN UN CONTRATO, NEGLIGENCIA, ESTRICTA RESPONSABILIDAD Y OTROS ACTOS ILICITOS) SERA EL PRECIO PAGADO POR EL USUARIO O EL COMPRADOR POR LA CANTIDAD INVOLUCRADA DE ESTE PRODUCTO, O A ELECCION DE ESTA COMPAÑIA O DE OTRO VENDEDOR, EL REEMPLAZO DE DICHA CANTIDAD, O SI NO SE OBTUVO MEDIANTE COMPRA SE REEMPLAZARA DICHA CANTIDAD DEL PRODUCTO. EN NINGUN CASO ESTA COMPAÑIA U OTRO VENDEDOR SERAN RESPONSABLES POR DAÑOS INCIDENTALES, CONSECUENTES O ESPECIALES.

En el momento de abrir y usar el producto, se asume que el comprador y todos los usuarios han aceptado las condiciones de los LIMITES EN LA GARANTIA Y EN LA RESPONSABILIDAD que no pueden variar por medio de ningún acuerdo verbal o escrito. Si las condiciones son inaceptables, devuelva el producto inmediatamente sin abrir el recipiente.

Manage, Monsanto y el su logo, Outrider, Proformance, y Roundup Pro son marcas commerciales de Monsanto Technology LLC.

Escort, Hyvar, Karmex, Krovar, Oust, y Telar son marcas comerciales de E.I. duPont de Nemours and Company.

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Registro en la EPA Nº 524-529

En caso de que se presente una emergencia relacionada con este producto, llame por cobrar a cualquier hora del día o de la noche, al teléfono (314)-694-4000.

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ST. LOUIS, MISSOURI, 63167 U.S.A.

MONSANTO

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Material Safety Data Sheet
Commercial Product

1. PRODUCT AND COMPANY IDENTIFICATION

Product name
ROUNDUP® Pro Concentrate Herbicide

EPA Reg. No.
524-529
Chemical name
Not applicable
Synonyms
None
Company
MONSANTO COMPANY, 800 N. Lindbergh Blvd., St. Louis, MO, 63167
Telephone: 800-332-3111, **Fax:** 314-694-5557
Emergency numbers
FOR CHEMICAL EMERGENCY, SPILL LEAK, FIRE, EXPOSURE, OR ACCIDENT Call CHEMTREC - Day or Night: 1-800-424-9300 toll free in the continental U.S., Puerto Rico, Canada, or Virgin Islands. For calls originating elsewhere: 703-527-3887 (collect calls accepted).
FOR MEDICAL EMERGENCY - Day or Night: 314-694-4000 (collect calls accepted).

2. COMPOSITION/INFORMATION ON INGREDIENTS

Active ingredient
Isopropylamine salt of N-(phosphonomethyl)glycine; {Isopropylamine salt of glyphosate}

Composition

COMPONENT	CAS No.	% by weight (approximate)
Isopropylamine salt of glyphosate	38641-94-0	50.2
Other ingredients		49.8

The specific chemical identity is being withheld because it is trade secret information of Monsanto Company.

OSHA Status
This product is hazardous according to the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

3. HAZARDS IDENTIFICATION

Emergency overview
Appearance and odour (colour/form/odour): Amber - Brown / Liquid, (viscous) / Slight

CAUTION!
CAUSES MODERATE EYE IRRITATION

Potential health effects
Likely routes of exposure
Skin contact, eye contact, inhalation
Eye contact, short term

Irritating to eyes.

Skin contact, short term

Not expected to produce significant adverse effects when recommended use instructions are followed.

Inhalation, short term

Not expected to produce significant adverse effects when recommended use instructions are followed.

Refer to section 11 for toxicological and section 12 for environmental information.

4. FIRST AID MEASURES

Eye contact

Immediately flush with plenty of water.
Continue for at least 15 minutes.
If easy to do, remove contact lenses.
If there are persistent symptoms, obtain medical advice.

Skin contact

Immediately wash affected skin with plenty of water.
Take off contaminated clothing, wristwatch, jewellery.
Wash clothes before re-use.

Inhalation

Remove to fresh air.

Ingestion

Immediately offer water to drink.
Never give anything by mouth to an unconscious person.
Do NOT induce vomiting unless directed by medical personnel.
If symptoms occur, get medical attention.

Advice to doctors

This product is not an inhibitor of cholinesterase.

Antidote

Treatment with atropine and oximes is not indicated.

5. FIRE FIGHTING MEASURES

Flash point

None.

Extinguishing media

Recommended: Water, foam, dry chemical, carbon dioxide (CO2)

Unusual fire and explosion hazards

Minimise use of water to prevent environmental contamination.
Environmental precautions: see section 6.

Hazardous products of combustion

Carbon monoxide (CO), nitrogen oxides (NOx), phosphorus oxides (PxOy)

Fire fighting equipment

Self-contained breathing apparatus.
Equipment should be thoroughly decontaminated after use.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protection recommended in section 8.

Environmental precautions
SMALL QUANTITIES:
Low environmental hazard.
LARGE QUANTITIES:
Minimise spread.
Contain spillage with sand bags or other means.
Keep out of drains, sewers, ditches and water ways.
Notify authorities.

Methods for cleaning up
Absorb in earth, sand or absorbent material.
Dig up heavily contaminated soil.
Collect in containers for disposal.
Refer to section 7 for types of containers.
Flush residues with small quantities of water.
Minimise use of water to prevent environmental contamination.

Refer to section 13 for disposal of spilled material.

7. HANDLING AND STORAGE

Good industrial practice in housekeeping and personal hygiene should be followed.

Storage
Compatible materials for storage: stainless steel, aluminium, fibreglass, plastic
Incompatible materials for storage: unlined mild steel, galvanised steel, see section 10.
Keep out of reach of children.
Keep away from food, drink and animal feed.
Keep only in the original container.
Shelf life currently under test.
Recommended maximum shelf life: 2 years.
Follow all local/regional/national/international regulations.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Airborne exposure limits

Components	Exposure Guidelines
Isopropylamine salt of glyphosate	No specific occupational exposure limit has been established.
Other ingredients	No specific occupational exposure limit has been established.

Engineering controls
No special requirement when used as recommended.

Eye protection
If there is significant potential for contact:

Wear chemical goggles.
Applicators and other handlers must wear eye protection.

Skin protection
If repeated or prolonged contact:
Wear chemical resistant gloves.

Respiratory protection
No special requirement when used as recommended.

When recommended, consult manufacturer of personal protective equipment for the appropriate type of equipment for a given application.

9. PHYSICAL AND CHEMICAL PROPERTIES

These physical data are typical values based on material tested but may vary from sample to sample. Typical values should not be construed as a guaranteed analysis of any specific lot or as specifications for the product.

Colour/colour range:	Amber - Brown
Form:	Liquid (viscous)
Odour:	Slight
Flash point:	None.
Specific gravity:	1.199
pH:	4.8

10. STABILITY AND REACTIVITY

Stability
Stable under normal conditions of handling and storage.

Hazardous decomposition
Thermal decomposition: Hazardous products of combustion: see section 5.

Materials to avoid/Reactivity
Reacts with galvanised steel or unlined mild steel to produce hydrogen, a highly flammable gas that could explode.

11. TOXICOLOGICAL INFORMATION

This section is intended for use by toxicologists and other health professionals.

Data obtained on similar products and on components are summarized below.

Acute oral toxicity
Rat, LD50: > 5,000 mg/kg body weight
Practically non-toxic.
FIFRA category IV.

Acute dermal toxicity
Rat, LD50: > 5,000 mg/kg body weight
Practically non-toxic.
FIFRA category IV.

Skin irritation

Rabbit, 6 animals, OECD 404 test:

Days to heal: 10
Primary Irritation Index (PII): 1.7/8.0
Slight irritation.
FIFRA category IV.

Eye irritation

Rabbit, 6 animals, OECD 405 test:

Days to heal: 7
Moderate irritation.
FIFRA category III.

Acute inhalation toxicity

Rat, LC50, 4 hours, aerosol: > 2.01 mg/L
Practically non-toxic.
FIFRA category IV.

Skin sensitization

Guinea pig, Buehler test:

Positive incidence: 0 %
Negative.
No skin sensitization

N-(phosphonomethyl)glycine; {glyphosate}

Mutagenicity

In vitro and in vivo mutagenicity test(s):

Not mutagenic.

Repeated dose toxicity

Rabbit, dermal, 21 days:

NOAEL toxicity: > 5,000 mg/kg body weight/day
Target organs/systems : none
Other effects: none

Rat, oral, 3 months:

NOAEL toxicity: > 20,000 mg/kg diet
Target organs/systems : none
Other effects: none

Carcinogenicity

Mouse, oral, 24 months:

NOEL tumour: > 30,000 mg/kg diet
NOAEL toxicity: ~ 5,000 mg/kg diet
Tumours: none
Target organs/systems : liver
Other effects: decrease of body weight gain, histopathologic effects

Rat, oral, 24 months:

NOEL tumour: > 20,000 mg/kg diet
NOAEL toxicity: ~ 8,000 mg/kg diet
Tumours: none
Target organs/systems : eyes
Other effects: decrease of body weight gain, histopathologic effects

Toxicity to reproduction/fertility

Rat, oral, 3 generations:

NOAEL toxicity: > 30 mg/kg body weight
NOAEL reproduction: > 30 mg/kg body weight
Target organs/systems in parents: none
Other effects in parents: none
Target organs/systems in pups: none

Other effects in pups: none

Developmental toxicity/teratogenicity

Rat, oral, 6 - 19 days of gestation:
NOAEL toxicity: 1,000 mg/kg body weight
NOAEL development: 1,000 mg/kg body weight
Other effects in mother animal: decrease of body weight gain, decrease of survival
Developmental effects: weight loss, post-implantation loss, delayed ossification
Effects on offspring only observed with maternal toxicity.

Rabbit, oral, 6 - 27 days of gestation:
NOAEL toxicity: 175 mg/kg body weight
NOAEL development: 175 mg/kg body weight
Target organs/systems in mother animal: none
Other effects in mother animal: decrease of survival
Developmental effects: none

12. ECOLOGICAL INFORMATION

This section is intended for use by ecotoxicologists and other environmental specialists.

Data obtained on similar products and on components are summarized below.

Similar formulation

Aquatic toxicity, fish

Rainbow trout (Oncorhynchus mykiss):
Acute toxicity, 96 hours, static, LC50: 5.4 mg/L
Moderately toxic.

Bluegill sunfish (Lepomis macrochirus):
Acute toxicity, 96 hours, static, LC50: 7.3 mg/L
Moderately toxic.

Aquatic toxicity, invertebrates

Water flea (Daphnia magna):
Acute toxicity, 48 hours, static, EC50: 11 mg/L
Slightly toxic.

Avian toxicity

Mallard duck (Anas platyrhynchos):
Dietary toxicity, 5 days, LC50: > 5,620 mg/kg diet
Practically non-toxic.

Bobwhite quail (Colinus virginianus):
Dietary toxicity, 5 days, LC50: > 5,620 mg/kg diet
Practically non-toxic.

Arthropod toxicity

Honey bee (Apis mellifera):
Oral/contact, 48 hours, LD50: > 100 µg/bee
Practically non-toxic.

Soil organism toxicity, invertebrates

Earthworm (Eisenia foetida):
Acute toxicity, 14 days, LC50: > 1,250 mg/kg soil
Practically non-toxic.

Isopropylamine salt of glyphosate (62%)

Aquatic toxicity, algae/aquatic plants

Green algae (Scenedesmus subspicatus):
Acute toxicity, 72 hours, static, EbC50 (biomass): 72.9 mg/L
Slightly toxic.

N-(phosphonomethyl)glycine; {glyphosate}

Bioaccumulation
Bluegill sunfish (Lepomis macrochirus):
Whole fish: BCF: < 1
No significant bioaccumulation is expected.
Dissipation
Soil, field:
Half life: 2 - 174 days
Koc: 884 - 60,000 L/kg
Adsorbs strongly to soil.
Water, aerobic:
Half life: < 7 days

13. DISPOSAL CONSIDERATIONS

Product
Recycle if appropriate facilities/equipment available.
Burn in special, controlled high temperature incinerator.
Keep out of drains, sewers, ditches and water ways.
Follow all local/regional/national/international regulations.

Container
See the individual container label for disposal information.
Triple or pressure rinse empty containers.
Pour rinse water into spray tank.
Store for collection by approved waste disposal service.
Recycle if appropriate facilities/equipment available.
Emptied containers retain vapour and product residue.
Observe all labelled safeguards until container is cleaned, reconditioned or destroyed.
Follow all local/regional/national/international regulations.

14. TRANSPORT INFORMATION

The data provided in this section is for information only. Please apply the appropriate regulations to properly classify your shipment for transportation.

Not hazardous under the applicable DOT, ICAO/IATA, IMO, TDG and Mexican regulations.

15. REGULATORY INFORMATION

TSCA Inventory
All components are on the US EPA's TSCA Inventory

OSHA Hazardous Components
Surfactant(s)

SARA Title III Rules
Section 311/312 Hazard Categories

Immediate
Section 302 Extremely Hazardous Substances
Not applicable.
Section 313 Toxic Chemical(s)
Not applicable.

CERCLA Reportable quantity
Not applicable.

16. OTHER INFORMATION

The information given here is not necessarily exhaustive but is representative of relevant, reliable data.
Follow all local/regional/national/international regulations.
Please consult supplier if further information is needed.
In this document the British spelling was applied.

Full denomination of most frequently used acronyms. BCF (Bioconcentration Factor), BOD (Biochemical Oxygen Demand), COD (Chemical Oxygen Demand), EC50 (50% effect concentration), ED50 (50% effect dose), I.M. (intramuscular), I.P. (intraperitoneal), I.V. (intravenous), Koc (Soil adsorption coefficient), LC50 (50% lethality concentration), LD50 (50% lethality dose), LDLo (Lower limit of lethal dosage), LEL (Lower Explosion Limit), LOAEC (Lowest Observed Adverse Effect Concentration), LOAEL (Lowest Observed Adverse Effect Level), LOEC (Lowest Observed Effect Concentration), LOEL (Lowest Observed Effect Level), MEL (Maximum Exposure limit), MTD (Maximum Tolerated Dose), NOAEC (No Observed Adverse Effect Concentration), NOAEL (No Observed Adverse Effect Level), NOEC (No Observed Effect Concentration), NOEL (No Observed Effect Level), OEL (Occupational Exposure Limit), PEL (Permissible Exposure Limit), PII (Primary Irritation Index), Pow (Partition coefficient n-octanol/water), S.C. (subcutaneous), STEL (Short-Term Exposure Limit), TLV-C (Threshold Limit Value-Ceiling), TLV-TWA (Threshold Limit Value - Time Weighted Average), UEL (Upper Explosion Limit)

This Material Safety Data Sheet (MSDS) serves different purposes than and DOES NOT REPLACE OR MODIFY THE EPA-APPROVED PRODUCT LABELING (attached to and accompanying the product container). This MSDS provides important health, safety, and environmental information for employers, employees, emergency responders and others handling large quantities of the product in activities generally other than product use, while the labeling provides that information specifically for product use in the ordinary course. Use, storage and disposal of pesticide products are regulated by the EPA under the authority of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) through the product labeling, and all necessary and appropriate precautionary, use, storage, and disposal information is set forth on that labeling. It is a violation of federal law to use a pesticide product in any manner not prescribed on the EPA-approved label.

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Appendix B

Intra-Service Section 7 Biological Evaluation

INTRA-SERVICE SECTION 7 BIOLOGICAL EVALUATION FORM

22410-2006-
~~0-21-06~~-I-0444

Originating Person: Marty Jakle
Telephone Number: 520-670-6150
Date: June 9, 2006

I. Region: 2

II. Service Activity (Program):
Arizona Ecological Services Field Office, Phoenix, Arizona
Partners for Fish and Wildlife
Buffelgrass Control Project—A-Mountain and Tumamoc Hill, Tucson, Arizona

III. Pertinent Species and Habitat:

A. Listed species and/or their critical habitat within the action area:
Pima pineapple cactus, *Coryphantha scheeri* var. *robustispina* - Endangered
Cactus ferruginous pygmy-owl, *Glaucidium brasilianum cactorum* - Endangered

B. Proposed species and/or proposed critical habitat within the action area:
None

C. Candidate species within the action area:
None

A. Include species/habitat occurrence on a map:
None

IV. Geographic area or station name and action:
The City of Tucson (City) and the University of Arizona (U of A) are working together to control buffelgrass, a highly invasive exotic grass, in the Tucson area. The Partners program will provide funding to purchase herbicide that will be applied on 273 acres on A Mountain (273 acres), and 870 acres on Tumamoc Hill.

V. Location (attach map):
See Figure 1 and 2.

A. Ecoregion Number and Name: Number 8, Gila/Salt/Verde
B. County and State: Pima County, Arizona
C. Section, township, and range (or latitude and longitude): Project is located in Sections 14 and 15, T. 14S, R. 13E. A-Mountain: 32° 12' 39.42" N 110° 59' 29.54" W owned by the City of Tucson and Tumamoc Hill: 32° 12' 46.31" N 111° 00' 21.60" W owned by the University of Arizona.
D. Distance (miles) and direction to nearest town: The project is located in Tucson, Arizona, approximately 1 mile west of the downtown area.
E. Species/habitat occurrence: A total of 21 federally listed species occur in Pima County. No federally listed species are known to occur in the project area.

VI. Description of proposed action (attach additional pages as needed):

The City of Tucson (City) and the University of Arizona (U of A) are working together to control buffelgrass in the Tucson area and the Partners program will provide funding to both cooperators to help control this highly invasive exotic grass.

The U of A is in the process of identifying the location of patches of buffelgrass in the Tucson area and to document its spread. The City is engaged in controlling buffelgrass and wants to expand its control efforts.

The focus of this project is to control buffelgrass on A-Mountain (also known as Sentinel Peak) and Tumamoc Hill in the City approximately 1 mile west of downtown Tucson. The buffelgrass will be treated with a herbicide, glyphosate (e.g. Roundup Pro) in the form of a liquid spray applied with backpack spraying units and mounted units along roads and where possible.

It is believed that buffelgrass was introduced in the Tucson area in the 1930s by the Natural Resource Conservation Service (formerly the U.S. Soil Conservation Service). Regardless of its origin, it has become a highly invasive weed in Southern Arizona. In 2005 it was added to Arizona's Noxious Weed List because of its invasive nature.

Buffelgrass is a problem environmentally, from a public safety perspective, and aesthetically. Environmentally it forms monocultures quickly crowding out native species. Its habitat value is less than that of native plants, reducing the species richness and numbers of individuals in the area.

When wildfires occur in buffelgrass stands it burns very hot, hotter than the present plant cover in desert areas. Buffelgrass is fire adapted and benefits from fire. Unlike many other habitats, the Sonoran Desert plant community is not adapted to fire and a hot fire will kill many of the desert native plants including saguaros, palo verde trees, and ocotillos.

Because of its high density in some areas and high temperatures when it burns, buffelgrass poses a serious fire hazard not only to plant communities, but also to homes and businesses. Because of its potential to transform the Sonoran Desert into a dense monoculture grass, buffelgrass could change the scenic desert with its majestic saguaros into a sea of grass.

VII. Determination of Effects:

Cactus ferruginous pygmy owl

The cactus ferruginous pygmy-owl (CFPO) was federally listed as endangered in Arizona on March 10, 1997 (62 FR 10730). Critical habitat was designated on July 12, 1999. The owl was removed from the federal endangered species list in May 2006; however, it is considered for this project because the delisting is currently being challenged in court.

The project site is not within the proposed critical habitat for the species. No sightings of CFPO have been reported from the project area either currently or historically although surveys of the area have been conducted here over the past 3-5 years. The closest known

location of the CFPO to the project area is estimated to be 12-15 miles (Scott Richardson, pers. comm.).

Pima pineapple cactus
The Pima pineapple cactus is found in Pima County growing in semidesert grasslands and Sonoran desert scrub communities on a wide range of soil types, preferring silty to gravely deep alluvial soils. There are no known records of this species or any other listed plants from the project area (Mima Falk, pers. comm.).

VIII. Effect determination and response requested: **[* = optional]**

A. Listed species/designated critical habitat:

Determination	Response Requested
X No effect on species/critical habitat (species: **Cactus Ferruginous pygmy owl and Pima pineapple cactus**	**X** *Concurrence
_____ May affect, is not likely to adversely affect species/critical habitat (species: _____)	___ Concurrence
___ May affect, is likely to adversely affect species/critical habitat (species: _____)	____ Formal Consultation

Signature for Marty Jakle — 6/13/2006
Signature — Date
Arizona Partners for Fish & Wildlife Biologist, AESO

IX. Reviewing ESFO Evaluations:

A. Concurrence: X Nonconcurrence: _____
B. Formal consultation required: _____
C. Conference required _____
D. Informal conference required _____
E. Remarks (attach additional pages as needed):

6-13-2006
Signature — Date
Field Supervisor, AESO

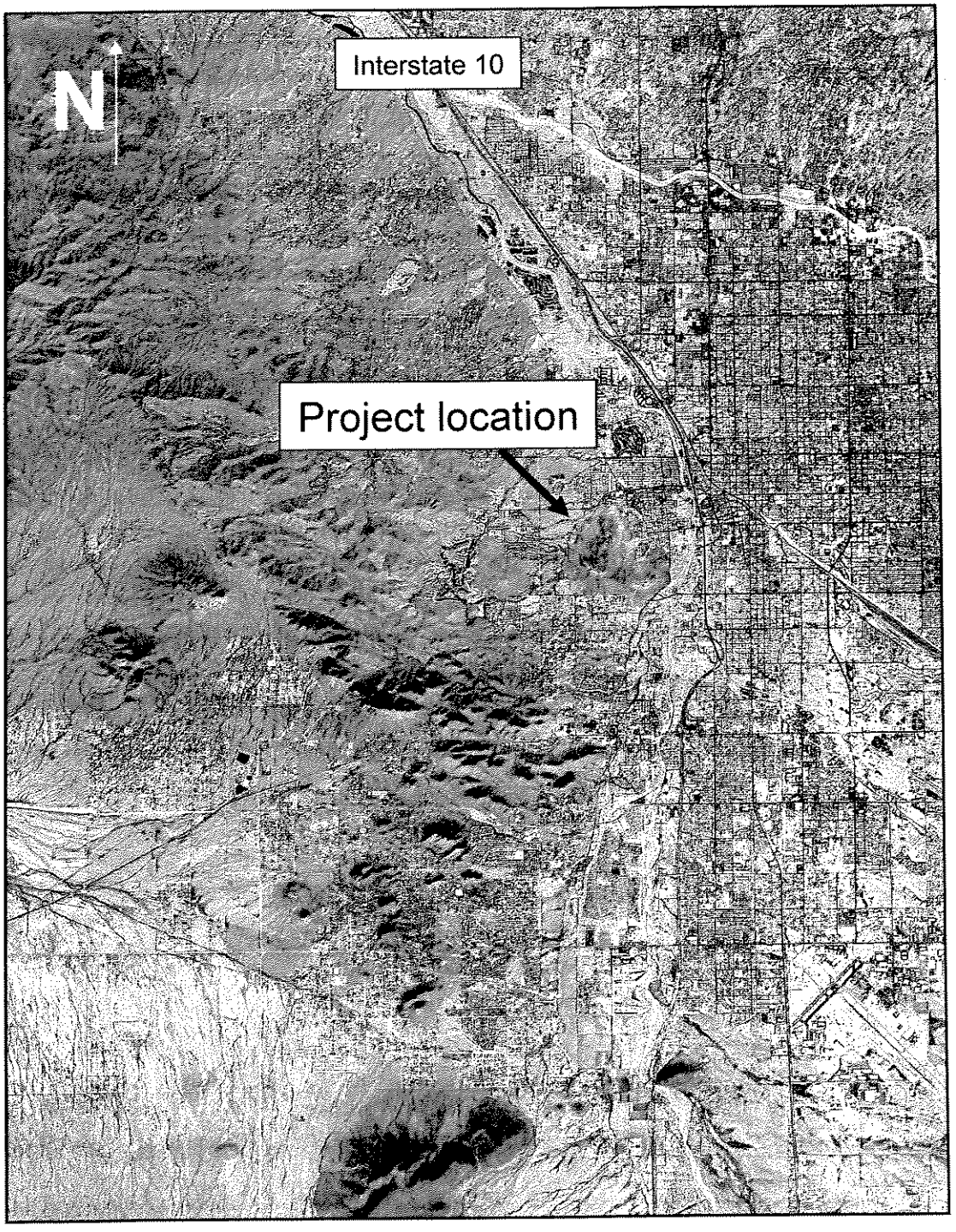

Figure 1. Location of project in the City of Tucson. "A" Mountain, also known as Sentinal Hill, is the mountain to the east and Tumamoc Hill is the mountain to the west.

Figure 2. Location of project area. "A" Mountain, also known as Sentinal Hill, shaded in red, is owned by the City of Tucson (32° 12' 39.42" N 110° 59' 29.54" W (UTM coordinates: zone 12, 500760m E, 3563640m N). Tumamoc Hill, shaded in yellow, is owned by the University of Arizona (32° 12' 46.31" N 111° 00' 21.60" W (UTM coordinates: zone 12, 499590m E, 3563960m N). The two project areas encompass approximately 1,143 acres of upland habitat.