Norfolk District
US Army
Corps of Engineers

# FINAL

## SUPPLEMENT TO THE ENVIRONMENTAL ASSESSMENT FOR THE AERIAL DISPERSAL OF PESTICIDE FOR MOSQUITO CONTROL

U.S. ARMY CORPS OF ENGINEERS CRANEY ISLAND DREDGED MATERIAL MANAGEMENT AREA, PORTSMOUTH, VA

In Compliance with the National Environmental Policy Act of 1969

U.S. Army Corps of Engineers
Norfolk District
Technical Services Division
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Point of Contact:
Keith B. Lockwood
U.S. Army Corps of Engineers
Norfolk District, Operations Branch
803 Front Street, Norfolk, VA 23510
(757) 201-7127

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## Executive Summary

The purpose of this Supplemental Environmental Assessment (EA) is to supplement the June 1996 Environmental Assessment for aerial dispersal of pesticide and herbicide for mosquito control at the Craney Island Dredged Material Management Area (CIDMMA). Currently, mosquito control at CIDMMA focuses on spraying pesticides for adult mosquitoes. Advances in pesticides allow for the control of mosquitoes before they develop from the larval stage. This EA has been prepared to ensure compliance with the National Environmental Policy Act of 1969 (NEPA). This EA includes pesticides and herbicides that will aid in controlling mosquitoes that are a nuisance to the residential communities adjacent to CIDMMA, and that have the potential to create public health concerns through the transmission of disease.

On June 6, 1996, the Norfolk District Engineer, Colonel Robert H. Reardon, Jr., signed a Finding of No Significant Impact (FONSI) for using both biological and chemical controls for mosquitoes. The 1996 EA did not address the use of additional larvicides and herbicides as mosquito control measures. This EA has been prepared to address these chemical controls and augment the existing 1996 EA.

## 1.0 INTRODUCTION

This supplement provides additional information and acts as a modification to the "*Final Environmental Assessment for Aerial Dispersal of Pesticide for Mosquito Control at the U.S. Army Corps of Engineers Craney Island Dredged Material Management Area (CIDMMA), U.S. Naval Fuel Terminal, Craney Island U.S. Coast Guard Base, and the City of Portsmouth, Virginia*" for portions dealing with CIDMMA. Environmental Assessments are living documents that can be modified and supplemented, as additional information is collected.

CIDMMA is a known staging and feeding area for thousands of migratory birds. It is also an important wintering habitat for waterfowl and shorebirds. These birds rely on the prey base thriving at CIDMMA. Broad-scale pesticide application has the potential to remove much of this prey base, which mainly consists of aquatic invertebrates. The Corps is aware of these environmental impacts, and strives to operate in a manner that will result in minimal impacts. Examples of these efforts will include timing of pesticide and herbicide application, and coordination with environmental agencies regarding the numerous biological resources at CIDMMA. A main priority in any Corps' project is to minimize potential adverse impacts to environmental resources.

Please refer to Section 1 "Purpose and Need for Action" of the 1996 Environmental Assessment for additional introductory information.

## 2.0 PURPOSE AND NEED

There are over fifteen mosquito species active in the vicinity of Craney Island. The Norfolk District, Army Corps of Engineers needs to have several options to be effective controlling these mosquitoes. The existing EA allows the Corps to only attack mosquitoes with *Bacillus thuringiensis israelensis* (B.t.i.), naled, and, to a limited extent, methoprene. In a letter dated August 17, 2004, the U.S. Fish and Wildlife Service (USFWS) recommends that mosquito spraying with methoprene should not occur during the shore bird breeding season of March 1 through mid-August. Further coordination with the USFWS may allow the use of targeted application of methoprene prior to mid-August if migratory bird species are not present in significant numbers. Additional larvicides will help control juvenile mosquitoes. Also, herbicides are needed to effectively combat extensive *Phragmites*, or common reed, stands at Craney Island, which will help reduce potential mosquito breeding areas.

As discussed in the Virginia Arbovirus Plan (VA Dept of Health, 2004), the safest, most effective mosquito control programs are based on the practice of Integrated Pest Management (IPM). The basic theory behind IPM is to base control decisions such as target area, time of application, and control method on

surveillance findings and knowledge of the pest, and to apply the most appropriate and least intrusive control method(s) for each situation. Maintaining a range of different control methods is necessary in dealing with various species of mosquitoes during all stages of their life cycle. IPM methodologies also decrease the possible development of pesticide resistance by minimizing reliance on any one type of pesticide or mode of action, and by minimizing the frequency and volume of application through appropriate targeting.

## 3.0 PROPOSED ACTION

This Supplemental Environmental Assessment proposes to include additional mosquito control measures to the existing Environmental Assessment (1996). These measures include the larvicides Altosid® and *Bacillus sphaericus* (B.s.), and the herbicides Rodeo® and Habitat®.

## 4.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This Supplemental EA covers the same environmental and socioeconomic setting of the Craney Island area presented in Section 4. "Affected Environment" of the current EA (1996). The physical characteristics, habitat and vegetation, public use, and cultural resources associated with this modification are the same as those already described in the 1996 EA.

Section 5. 'Environmental Consequences' of the existing EA describes the environmental consequences of no action. This would result in a probable increase of mosquito populations with an associated increase in nuisance issues in neighboring communities and continued public health concerns regarding the potential for disease transmission to humans. The early spring larval blooms would not be reduced, resulting in a large emergence of mosquitoes early in the spring. The alternatives outlined in the 1996 EA remain unchanged.

One listed species and one candidate species have been found in the vicinity of CIDMMA. They are the federally threatened piping plover (*Charadrius melodus*) and the Northern diamondback terrapin (*Malaclemys terrapin terrapin*). Upon completing a literary technical review of the proposed pesticides, no adverse impacts to these species are expected. Review of the proposed pesticides indicated there were no adverse impacts to listed species when labels were strictly followed.

## 5.0 ADDITIONS TO THE EA

The following larvicides and herbicides will be included in the chemical control methods discussed in Section 5 of the 1996 EA.

## 5.1 Larvicides

Mosquitoes are absolutely dependent on water during their juvenile period (Rindfleisch, 1994). Positive control of mosquito populations can be accomplished by applying larvicides in water occupied by juvenile mosquitoes. Larvicides are designed to inhibit growth of juvenile mosquitoes while they are confined to the water, thus preventing mosquitoes from emerging as adults. Application methods include land-based equipment or aircraft, and can be very effective if timed correctly.

### 5.1.1 Bacillus sphaericus (B.s.)

According to the U.S. Environmental Protection Agency fact sheet #128128, the active ingredient, *Bacillus sphaericus* (B.s.) Serotype H5a5b, strain 2362, is a naturally occurring bacterium found in the United States and throughout the world. The active ingredient was approved for sale in 1991. B.s. contains a protein that damages and paralyzes the gut of mosquito larvae that ingest the spores of this bacterium, inhibiting development of the larvae. The spores only become toxic when activated by the larva's specific gut pH and enzymes. Larvae stop feeding and die before they can pupate and reach adulthood.

B.s. based larvicides are sold under the trade name VectoLex™. There can be advantages in using B.s. over *Bacillus thuringiensis* var. *israelensis* (B.t.i.). B.s. has been found to be more effective against species in the *Culex* genus, which inhabit areas outside the containment cells on Craney Island (Virginia Interagency Arbovirus Task Force, 2004). Areas to use B.s. are similar to those sites for B.t.i.: storm water and drainage systems, marine and coastal areas, lakes and streams, and water that collects in depressions and containers. B.t.i. will continue to be an important component of the overall CIDMMA IPM because of its effectiveness against salt marsh mosquito species. The most common mosquitoes from dredged material placement areas are *Aedes sollicitans* and *Aedes taeniorhynchus* (Ezell, 1978).

Based upon the EPA's scientific findings, no harmful effects are expected to occur to human health when pesticide products using B.s. as the active ingredient are applied according to label directions (EPA, 1999). Vectolex™ will be applied at label recommended rates for control of mosquito larvae. There are no substantial environmental safety concerns. To assure no adverse impacts to non-target aquatic microorganisms occur, B.s. will be applied only to areas where mosquito larvae of the *Culex* spp. are found. B.s. is a viable alternative to B.t.i. and is considered as a valuable component of the IPM for CIDMMA. Please refer to Appendix A for an example Label and Material Data Safety Sheet for Vectolex™.

### 5.1.2 Methoprene

The EPA first registered Methoprene in 1975 as a chemical pesticide, and more specifically as an insect growth regulator. It is a compound that interferes with the normal maturation process of mosquitoes, preventing them from reproducing. Methoprene will affect mosquito larvae at all stages, except the late fourth instar stage and the pupal stage of development (Virginia Interagency Arbovirus Task Force, 2004). Treated larvae will pupate, but will not hatch into adults. It is considered a slightly to practically nontoxic General Use Pesticide (GUP) in the EPA toxicity class IV (EPA, 1982). Methoprene is used in the production of various foods, including meat, milk, eggs, mushrooms, peanuts, rice, and cereals (EXTOXNET, 1996). It is practically nontoxic when ingested or inhaled and slightly toxic by dermal absorption.

Altosid, methoprene product used for mosquito larvae, is applied as briquets, pellets, sand granules, and liquids. Recommended application rates on Specimen Labels will be strictly followed. Based upon EPA's scientific findings (EPA 1991), methoprene does not pose unreasonable risks to human health. Methoprene is used in cattle feed to deter insect larvae from growing in cattle feces. It has been found to remain unchanged in cattle feces in amounts that are sufficient to kill some larvae that breed in feces (McEwen, 1979). It is only slightly toxic to birds, and slightly to moderately toxic to fish. No effects were observed in reproduction of mallard ducks at 30 ppm constant feeding of Altosid. Altosid will have very little effect, if any, on non-target aquatic organisms including damselflies, snails, tadpoles, and mosquito fish (Zoecon Corporation, 1974). To prevent adverse impacts to non-target aquatic organisms, only targeted areas will be applied. It is nontoxic to bees. Please refer to Appendix A for an example Label and Material Data Safety Sheet for Altosid.

## 5.2 Proposed Action for *Phragmites* Control

An important component for mosquito control is source reduction, which includes draining or filling stagnant, wet areas, ditching, and vegetation removal. Areas not in use for construction purposes at CIDMMA are quickly populated by *Phragmites*. Stands of *Phragmites* in North America proliferate and decrease native biodiversity and quality of wetland habitat, especially for migrating wading birds and waterfowl species. On the Coastal Plain of Virginia, *Phragmites australis* (common reed or phragmites) is considered a serious management problem and has rapidly expanded into tidal wetlands along the Chesapeake Bay region (Pyke & Havens 1999).

Phragmites provides habitat for mosquitoes by trapping freshwater from rain events, and creating structure for mosquitoes to lay their eggs. Mechanical removal, such as cutting, mowing, and disking, encourages the spread of

phragmites. The rhizomes remain, and new plants rapidly emerge. In disturbed sites, phragmites dominates the area, choking out most native plant species. Herbicides can effectively reduce the amount of phragmites-choked areas, decreasing the potential breeding areas available to mosquitoes.

The disturbed portions of CIDMMA have become overgrown with phragmites. This common reed grows throughout the area in dense stands that are up to ten feet high and difficult to penetrate. Mosquitoes exploit this habitat for harborage, providing larvae with considerable protection from natural predators and a quiet environment for development. Due to the density of these reeds, access for mosquito control work is difficult. Phragmites can be detrimental to wildlife. The uncontrolled proliferation of this reed is a problem in many wildlife habitat areas due to reduction of food and habitat for waterfowl. Consequently, several jurisdictions have devised control methodologies for phragmites control.

The proposed action is to apply herbicides to stands of phragmites and follow with mechanical removal or burning of dead stalks. The following subsections list other alternatives considered.

### 5.2.1 Alternative Analysis

The following information on alternatives for phragmites control comes from the *Environmental Assessment on the Aerial Application of Herbicide and Post Treatment to Control Invasive Species, Langley AFB, VA (June 2001)*.

#### 5.2.1.1 Alternative 1: Aerial Spray Only

Alternative 1 consists of aerial application of herbicidal spray only. Aerial application has proven very effective (90 percent or more) initially, however treated areas require follow up herbicidal treatment (annually or bi-annually) or the phragmites reinvades and propagates at the same or slightly lower rate prior to treatment. Additionally, in areas thickly inhabited by the phragmites, the dead stalks remain making it difficult for other native species to propagate and thus, negatively impact the coastal watershed.

#### 5.2.1.2 Alternative 2: Burn Only

Prescribed burns do not reduce the growing ability of the phragmites unless the roots are burned. It is difficult to successfully burn the roots because a layer of mud, soil and/or water usually covers the rhizomes. Burning does destroy dead stalks providing other vegetation an opportunity to grow but also encourages more rapid new growth from the unaffected rhizomes. Fires in phragmites stands can be dangerous because this species can cause spot fires more than

100 feet away from the primary burn area. Controlled burning has been attempted at CIDMMA without success.

#### 5.2.1.3 Alternative 3: No Action Alternative

Under the No Action alternative, there would be no treatment (herbicide, prescribed burn or mowing) applied to the three sites. The phragmites would continue to propagate and spread, negatively impacting the ability of indigenous species to exist and flourish. Mosquitoes would continue to thrive in these areas and inhibit effective mosquito control.

#### 5.2.1.4 Alternatives Considered and Eliminated from Further Consideration

Alternatives considered but eliminated from further consideration include repeat harvesting (mowing), smothering the vegetation with the overlay of black plastic on the three sites, removal of the vegetation through excavation (mechanical), flooding or capping the sites and biological controls.

#### 5.2.1.5 Repeat Harvesting (Mowing)

Mowing alone is not a feasible choice because it does not kill the plant; it only removes the vegetative portion without impacting its roots. The roots will sprout in the following season. In addition, it is not feasible to mow in dredged material. This option does not meet the needs of the installation of controlling the spread of phragmites, which harbors mosquitoes.

#### 5.2.1.6 Smothering Using Black Plastic

Use of this option would be very costly, unsightly and would require coverage of relatively large areas. The plastic must cover the entire area infested with phragmites for a minimum of three growing seasons for it to be effective at killing the roots (Ailstock et al. 1999). Even after the plastic is in place, new growth may punch through letting light back into the covered area. In hot summer months, the plastic will increase the soil temperature thus killing other desirable plant roots and soil organisms. Also, it is not feasible to place on dredged material. In short, this method does not meet the needs of the installation by eliminating any benefit to the environment and may do more harm than an herbicide application.

#### 5.2.1.7 Removal by Excavation

Phragmites deeply penetrates many soils and for proper control all phragmites must be removed. This is very expensive and will only be effective if all

underground portions are removed during excavation. Also, it is not a feasible option in dredged material.

#### 5.2.1.8 Flooding the Infestation

Phragmites has not been controlled even when flooded for one year. It would be too difficult and costly to set up cofferdams to hold the floodwater in the areas that are infested with phragmites. This doesn't meet the needs of the installation to control the spread of phragmites since it would be too costly, not environmentally sound, and contrary to the purpose of CIDMMA (i.e., the dewatering and consolidation of dredged material).

#### 5.2.1.9 Biological Controls

There are no known biological controls for phragmites at this time. The need of the installation is to control the growth and spread of phragmites.

### 5.2.2 Herbicides

#### 5.2.2.1 Glyphosate

At this time the most effective method of phragmites control appears to be the use of the herbicide Glyphosate. This herbicide is found under several trade names as Roundup, Rodeo, Accord, and others. It is a general use, non-selective herbicide that acts by absorption through the leaves and kills systemically by blocking the production of amino acids within the plant.

Glyphosate has been used for many years as a herbicide. Experience has shown that when used according to label directions glyphosate will not cause adverse effects to mammals, birds, aquatic organisms such as fish and shellfish, amphibians, insects, earthworms, soil microorganisms and other terrestrial arthropods. This herbicide has been used extensively for wildlife management without adverse impacts.

Application of glyphosate late in the growing season, followed by prescribed burning or mechanical removal of dead *Phragmites'* stalks is a widespread and successful approach of controlling *Phragmites*. Application of glyphosate is economical and will require follow-up removal of the dead stalks. Retreatments are usually necessary every 3-5 years (EXTOXNET, 1996).

Rodeo® herbicide (EPA Reg. No. 524-343, 53.8% glyphosate) will be applied aerially at the current recommended rate of 0.5% of active ingredient per acre, diluted with water. Approved adjuvants will be mixed with Rodeo® to enhance control and reduce drift. Application methods include aerial, truck, backpack or

hand-held spraying; wiper application; frill treatment, and by cartridge injecting lance (E-Z-Ject®). The current recommended rate is approximately 0.3 to 4.0 pounds of the active ingredient applied per acre. Rodeo® is preferred over Roundup and Accord because of its approved use around aquatic areas.

Glyphosate does not have herbicidal properties once in contact with soil, and plant roots do not absorb it from the soil (USDOE-BPA, 2000). Glyphosate dissolves easily in water, and half-life in water ranges from 35 to 63 days (Weed Science Society, 1994). Glyphosate and the non-ionic surfactant recommended for use with Rodeo® do not readily evaporate. Thus having a minor impact to air quality during or after the application (Langley, 2001). It has no significant potential to accumulate in animal tissues, or tissues of aquatic organisms (Malik, 1989). Because Rodeo® is a herbicide and its mode of action (preventing plants from producing an essential amino acid) does not occur in animals, it has little to no effect to fish, birds or mammals, and is practically non-toxic to aquatic invertebrates. It does not bioaccumulate in fish, birds, mammals, or invertebrates and thus does not become part of the food chain. There are minor effects of glyphosate formulations on humans and only those with direct contact with the herbicide (mixing, loading, or application). There are no reported cases of long-term health effects in humans (Langley, 2001). Please refer to Appendix B for Label and Material Data Safety Sheet information for Rodeo®.

#### 5.2.2.2 Imazapyr

Imazapyr, the active ingredient in Habitat®, is part of the imidazolinone family, which is manufactured by the BASF corporation. Habitat® inhibits a plant-specific enzyme (not found in animals or humans) that causes vascular plants to stop growing and slowly die as their food and energy reserves are exhausted. Habitat® is effective at very low rates, which means there would be less chemical load on the environment when used at label rates. Habitat® helps replace older, higher-use rate products. The current recommended rate for *Phragmites* control is 4 to 6 pints per acre applied to actively growing, green foliage after full leaf elongation. Stands with substantial amounts of old stem tissue should be mowed or burned first, then treated when new growth reaches approximately 5 feet in height.

The EPA does not classify the inert ingredients of the imazapyr formulations as toxicological concerns to humans or the environment (USDOE-BPA, 2000). Required testing by the EPA determined Habitat® is practically nontoxic, with the exception of green plants. Habitat® is ideal in aquatic areas because it breaks down quickly in water. Due to potential soil uptake, application in upland areas can result in impacts to vegetation not directly sprayed. Please refer to Appendix B for Label and Material Data Safety Sheet information for Habitat®.

## 6.0 ADDITIONAL MODIFICATIONS TO THE EA

The first paragraph of Section 2.4 'Treatment Method' will be replaced because there should be an expanded capability due to uncertainty of Air Force availability for spraying. It states, "The treatment aircraft will be a C-130H fitted with a Modular Aerial Spray System (MASS). The aircraft is staffed by fully trained and certified aircrew. Due to logistical considerations, the local base of operations for this aircraft will normally be Langley Air Force Base, in Hampton, Virginia."

The paragraph will now read, "Treatment aircraft will be properly equipped, licensed, and certified for the application of the appropriate pesticide or herbicide. The applicator shall be in possession of a current certificate of insurance and a valid Virginia pesticide applicators' certificate certified in Categories 8 (Public Health Pest Control) and 11 (Aerial Pesticide Application)." An expanded capability will allow the necessary flexibility for effective aerial spraying of pesticide and herbicide.

References to the Peninsula Airspray Advisory Board in Section 2.3 will be removed. Control measures will be based upon larval and adult monitoring at CIDMMA. In Section 2.3.1.3 'Adult Mosquito Surveillance', "a count of 25 *Aedes sollicitans* over the period of one minute observed in systematic transects is used as a minimum threshold that must be achieved for aerial treatment". This statement will be deleted. Larval monitoring will ensure the correct timing of larvae and adult control measures. Adult monitoring will be conducted as well, but adult mosquitoes do not need to increase to 25 per minute before treatment can be carried out.

## 7.0 AGENCY COORDINATION

The following interested parties and agencies were coordinated with during the NEPA process:

Churchland Civic League
City of Portsmouth
Commander, Naval Fuel Depot
Commander, U.S. Coast Guard Support Center
College of William and Mary
National Marine Fisheries Service
U.S. Environmental Protection Agency
U.S. Fish and Wildlife Agency
Virginia Department of Conservation and Recreation
Virginia Department of Historic Resources
Virginia Department of Game and Inland Fisheries

Virginia Institute of Marine Science
Virginia Marine Resources Commission
Virginia Department of Environmental Quality
Virginia Department of Health

## 8.0 CONCLUSIONS AND RECOMMENDATIONS

The proposed action includes using methoprene and *Bacillus sphaericus* to kill mosquito larvae developing in stagnant, wet areas. B.s. will be targeted in areas where *Culex spp*. is found. Also, it is necessary to control *Phragmites australis,* or common reed, invasively growing on CIDMMA. The recommended approach is to combine spraying phragmites stands with either Rodeo® or Habitat®, and mechanical removal or controlled burning of dead stalks.

Mosquito control measures at CIDMMA will be accomplished in the most environmentally acceptable and cost-effective manner. Any effects on the environment will be minimized to the greatest extent practicable and be offset by the project benefits of reducing mosquito populations and their potential to transmit disease.

## 9.0 COMMENT/RESPONSE SECTION

The following comments and responses are furnished from the draft supplement:

### US Environmental Protection Agency

Comment – Due to resistance from the continued use of Rodeo there may be more effective alternatives with equal or possibly lower human and environmental toxicity (Habitat (BASF), Active Ingredient: imazapyr) was this or other alternatives looked at?

Response – Habitat (BASF) was included as an alternative to Rodeo in the Draft Supplement.

Comment – The list of Federal and State Cooperating Agencies does not list the Virginia Department of Agriculture and Consumer Services (VDACS) who is the primary regulatory authority for the State of Virginia. The inclusion of VDACS could assist in ensuring that the applications were performed by or under the supervision of certified applicators and all mixing loading, application and disposal would be consistent with label specifications.

Response – The Draft Supplement was sent to the Virginia Department of Agriculture and Consumer Services (VDACS) for comments. VDACS' remarks

stated, “No additional comments are necessary in reference to endangered plant and insect species regarding this project”.

### Virginia Department of Environmental Quality

Comment – Due to the legal status of the piping plover, the Department of Conservation recommends that the Corps coordinate with the U.S. Fish and Wildlife Service (Karen Mayne, telephone (804) 693-6694) and the Virginia Department of Game and Inland Fisheries (Ray Fernald, telephone (804) 367-6913).

Response – The Norfolk District has coordinated with both aforementioned agencies regarding the contents of the Draft Supplement. We will continue to coordinate with the agencies about the piping plover, and other species of concern that may utilize the Craney Island Dredged Material Management Area (CIDMMA). Also, we will continue to work with Ruth Beck from the College of William and Mary to monitor piping plovers and other migratory bird species using CIDMMA.

Comment – The Department of Game and Inland Fisheries (VDGIF) recommends that the Integrated Pest Management program for CIDMMA be designed to reduce reliance on pesticides. One alternative may be to encourage the presence of natural predators of mosquitoes by installing bat boxes and birdhouses. Only as a last resort should aerial spraying be utilized. Specifically, the Corps of Engineers should take into consideration the potential impacts that aerial spraying for mosquitoes may have upon night-flying insectivores, such as swifts, swallows, and bats.

Response – One of the main objectives of our Integrated Pest Management (IPM) program is to reduce reliance on pesticides. In prior years, we have followed a more reactionary approach to mosquito control with aerial sprayings of pesticides. We are currently implementing a proactive approach that focuses on source reduction activities, natural predators such as mosquito fish, and larval surveillance to minimize the use of pesticides.

We would like to encourage the presence of more natural predators of mosquitoes at CIDMMA. There are currently 15 birdhouses located on site, including 11 distributed around the containment areas and 4 located near the administration office. These birdhouses are primarily to encourage the presence of purple martins. We will continue to stock mosquito fish in appropriate areas, and will consider other ways to encourage natural predators of mosquitoes.

Comment – VDGIF supports the recommendation of the U.S. Fish and Wildlife Service (USFWS) that spraying with methoprene should not take place during the

shorebird-breeding season, March 1 to the middle of August. VDGIF recommends that the ground application of methoprene should also not take place during that period. However, if migratory bird species are not present in significant numbers prior to mid-August, the targeted application of methoprene may be allowed, provided that the Corps consults with the USFWS in this regard as a pre-requisite.

Response – The Norfolk District works with Ruth Beck from the College of William and Mary to monitor migratory bird species using CIDMMA. We will coordinate with USFWS and utilize the experience and knowledge of Ruth Beck regarding acceptable times for application of methoprene for mosquito control.

Comment – VDGIF supports the proposal that B.s. will be applied only to areas where mosquito larvae of the *Culex* genus are found (DSEA, page 5, section 5.1.1).

VDGIF states that using the pesticides Rodeo® and Habitat® for controlling phragmites may help reduce potential mosquito breeding areas (DSEA, pages 6-7, section 5.2), and indicates that use of these herbicides as the label directs will not result in significant adverse impacts to species under VDGIF's jurisdiction.

Response – Noted.

Comment – The DEQ's Waste Division's Federal Facilities Program staff indicates that the proposed aerial application would not affect any on-going investigation or remediation actions.

Response – Noted.

Comment – With regard to the use of additional larvicides as part of the Craney Island mosquito control program, DEQ's Tidewater Regional Office (TRO) questions the validity of using herbicides to eliminate phragmites as part of the mosquito control plan, especially in combination with the other means proposed.

If phragmites control is designed simply to eliminate a degraded wetland and thereby reduce mosquito breeding and "hiding" areas, as it appears to be in the DSEA (see pages 6-7, section 5.2), then a Virginia Water Protection Permit will be required, because this activity will clearly "cause significant alteration or degradation of existing wetland acreage or functions" as contemplated in the State Water Control Law (*Virginia Code* section 62.1-44.15:5D).

DEQ-TRO indicates that the project boundary is outside of the area specifically designated as the disposal area, and includes surrounding residential areas as well. The Final Supplemental EA should indicate specifically the areas, and

associated ownership, subject to the proposed phragmites control, since this information was not present in the DSEA. The DSEA indicates that the Corps contemplates allowing the use of large Air Force fixed-wing aircraft (C-130, etc.) for overhead application of herbicides. This is not only contrary to the manufacturer's application recommendations, but it is unacceptable so far as DEQ-TRO is concerned. While spraying from helicopters may be acceptable in some situations, depending on site-specific details, ground-based spraying is preferred. Other application limitations on such things as the season (after dormancy of desirable vegetation), humidity, temperature, wind-speed (3 to 10 mph), and altitude (10 feet) must be specified in the document.

If glyphosate is to be used for phragmites control, it should be applied from late August through October, before the first frost, according to DEQ's Division of Water Quality. Glyphosate must be mixed with clean water (or, if possible, distilled water) because it binds tightly to sediments and is thus rendered non-toxic to plants (Lefor, personal communication, 1992). This limits the effectiveness of glyphosate, but also may help prevent it from acting on non-target plants. The Division also recommends that any prescribed burning of phragmites stalks, which is mentioned as an alternative to mechanical removal following herbicide application (see DSEA, page 7, section 5.2), take place in July rather than in winter or spring. Winter or spring burning may actually increase the density of spring crops of the plant.

The herbicide Rodeo should not be applied in windy conditions, because the spray will drift.

Response – The additional larvicides and herbicides proposed in the DSEA will be applied to areas actively utilized for construction purposes within CIDMMA property boundaries. Figure 1 of the DSEA illustrates the current mosquito spray area in the 1996 EA for aerial application of adulticides only. This effort is part of the ongoing partnership with the City of Portsmouth. The Norfolk District will not apply larvicides or herbicides on the surrounding areas, including the residential areas.

Herbicides will be used to maintain existing ditches and disturbed areas on CIDMMA that have become overgrown with phragmites. Construction activities and maintenance operations occur frequently in these areas, but phragmites stands are still able to coexist. Mechanical removal alone has been ineffective and not economical.

The validity of using herbicides in an IPM is that, "mosquitoes exploit this habitat for harborage, providing larvae with considerable protection from natural predators and quiet environment for development. Due to the density of these

reeds, access for mosquito control work is difficult" (DSEA, page 7, section 5.2). Also, existing ditches choked with phragmites do not function effectively.

The Norfolk District does not contemplate the use of large Air Force fixed-wing aircraft, such as the C-130, for application of herbicides. It would not be a targeted and effective means of controlling phragmites. We will follow the manufacturer's application recommendations, and only when environmental conditions permit. We agree that glyphosate should be applied near the end of the growing season, or late August through October, and before the first frost. The additional comments relating to herbicide application mechanism and time have been noted.

Comment – According to the Department of Historic Resources (DHR project 1996-0457), this undertaking will not affect any known architectural or archaeological resources listed in or eligible for the National Register of Historic Places or the Virginia Landmarks Register.

Response – Noted.

Comment – Pursuant to the Coastal Zone Management Act of 1972, as amended, the Corps is required to determine the consistency of its activities affecting the Virginia's coastal resources or coastal uses with the Virginia Coastal Resources Management Program (VCP) (see section 307(c)(1) of the Act and 15 CFR Part 930, sub-part C, section 930.34). This involves an analysis of the activities in light of the Enforceable Programs of the VCP, and submission of a consistency determination reflecting that analysis and committing the Corps to comply with the Enforceable Programs to the maximum extent practicable. The federal consistency determination may be provided as part of the documentation concluding the NEPA process, or independently, depending on your agency's preference.

Response – A federal consistency determination will be provided as part of the documentation concluding the NEPA process.

Comment – A permit may be required from DEQ for the prescribed burning that may follow the aerial application of herbicides or larvicides. The Corps should contact DEQ-TRO (Jane Workman, Air Permits Manager, telephone (757) 518-2112) in this regard.

Response – Noted.

**City of Portsmouth**

Comment – Portsmouth applauds your initiative to refocus your efforts from a reactive plan that focuses on spraying adult mosquitoes to a proactive plan that focuses on treating mosquitoes in the larval stage.

Response – We appreciate your support on our integrated pest management approach towards mosquito control at the Craney Island Dredged Material Management Area (CIDMMA).

Comment – Our major concern has always been that large mosquito populations have impacted Portsmouth residents. As stated in the original 1996 Environmental Assessment Executive Summary, Portsmouth residents have faced the risk of serious disease transmissions from mosquitoes and decreased quality of life from not being able to work and recreate outside.

Response – We agree that the risk of mosquito-borne diseases and the potential for a decreased quality of life for residents is a serious concern. The Norfolk District will continue to strive to reduce these risks through the Integrated Pest Management (IPM) program.

Comment – Our experience shows that properly timed applications of larvicide can significantly diminish the adult mosquito populations. The very dynamic mosquito breeding conditions found at Craney Island are a direct result of harbor maintenance operations, and to be effective controlling mosquitoes your plan must be flexible and properly supervised.

Response – Although we do not concur that mosquito breeding at CIDMMA is a direct result of our operations, we understand that our facility, as well as the surrounding areas in Portsmouth, can provide ideal habitat and conditions for mosquitoes. The Norfolk District will maintain a high level of supervision and flexibility on mosquito control initiatives at CIDMMA to obtain the greatest results.

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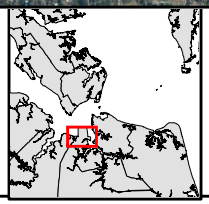
# Figures


US Army Corps of Engineers
Norfolk District

# Figure 1

**Mosquito Spray Area For Final Environmental Assessment June 1996**



0 775 1,550 3,100 Feet

1" = 3100'

N W E S

Legend

Air Spray Boundary

Projection:
Virginia State Plane
South Zone - NAD 83
U.S. Survey Feet

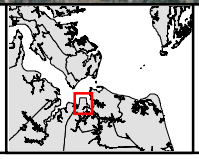
Imagery: AirPhoto USA
December 2000

Prepared by: Amanda Glazebrook
Geospatial Services Section

Map File: mosquito_spray_area
Map Date: 1 August 2004


US Army Corps of Engineers
Norfolk District

Figure 2
Craney Island and
Surrounding Communities



0 750 1,500 3,000 Feet

1" = 3,000'

Imagery:
Craney Island:
Earth Data
September, 2003

Background:
AirPhoto USA
December, 2000

Projection:
Virginia State Plane
South Zone - NAD 83
U.S. Survey Feet

Prepared by: Amanda Glazebrook
Geospatial Services Section

Map Date: 9 November 2004

Appendix A

# LARVICIDE SPECIMEN LABELS & MATERIAL SAFETY DATA SHEETS

# VectoLex® WDG

**Biological Larvicide**

ACTIVE INGREDIENT:

| | |
|---|---|
| *Bacillus sphaericus* Serotype H5a5b, Strain 2362 dried concentrate | 51.2% w/w |
| INERT INGREDIENTS | 48.8% w/w |
| TOTAL | 100.0% w/w |

Potency: This product contains 650 BsITU/mg or 0.299 Billion BsITU/lb.

EPA Reg. No. 73049-57
EPA Est. No. 33762-IA-001 List No. 60201

**INDEX:**



**KEEP OUT OF REACH OF CHILDREN**

**CAUTION**

**For MEDICAL and TRANSPORT Emergencies ONLY Call 24 Hours A Day 1-877-315-9819. For All Other Information Call 1-800-323-9597.**

## 1.0 STATEMENT OF PRACTICAL TREATMENT

**IF IN EYES:** Flush with plenty of water. Call a physician if irritation persists.

## 2.0 PRECAUTIONARY STATEMENTS

### 2.1 HAZARD TO HUMANS (AND DOMESTIC ANIMALS) CAUTION

Causes moderate eye irritation. Avoid contact with eyes or clothing. Wash thoroughly with soap and water after handling. As a general precaution when exposed to potentially high concentrations of living microbial products such as this, all mixer/loaders and applicators not in enclosed cabs or aircraft must wear a dust/mist filtering respirator meeting NIOSH standards of at least N-95, R-95, or P-95.

### 2.2 ENVIRONMENTAL HAZARDS

Do not contaminate water when cleaning equipment or disposing of equipment washwaters.

## 3.0 DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling. Do not apply directly to treated finished drinking water reservoirs or drinking water receptacles.

### 3.1 Chemigation

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

## 4.0 STORAGE AND DISPOSAL

Do not contaminate water, food, or feed by storage or disposal.

**Storage:** Store in cool [59-86°F (15-30°C)], dry place.

**Pesticide Disposal:** Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.

**Container Disposal:** Triple rinse (or equivalent). 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 APPLICATION DIRECTIONS

Do not apply when wind speed favors drift beyond the area of treatment.

**I. For control of mosquito larvae species* in the following non-crop sites.**

| Habitats | Rate Range |
|---|---|
| **Wastewater:** Sewage effluent, sewage lagoons, oxidation ponds, septic ditches, animal waste lagoons, impounded wastewater associated with fruit and vegetable processing | 0.5-1.5 lbs/acre (8oz-24oz/acre) |
| **Stormwater/Drainage Systems:** Storm sewers, catch basins, drainage ditches, retention, detention and seepage ponds | 0.5-1.5 lbs/acre (8oz-24oz/acre) |
| **Marine/Coastal Areas:** Salt marshes, mangroves, estuaries | 0.5-1.5 lbs/acre (8oz-24oz/acre) |
| **Water Bodies:** Natural and manmade aquatic sites such as lakes, ponds, rivers, canals and streams | 0.5-1.5 lbs/acre (8oz-24oz/acre) |
| **Dormant Rice Fields:** Impounded water in dormant rice fields (For application only during the interval between harvest and preparation of the field for the next cropping cycle) | 0.5-1.5 lbs/acre (8oz-24oz/acre) |

**II. For control of mosquito larvae species* in agricultural/crop sites where mosquito breeding occurs.**

| Habitats | Rate Range |
|---|---|
| Rice, pastures/hay fields, orchards, citrus groves, irrigated crops | 0.5-1.5 lbs/acre (8oz-24oz/acre) |

Use higher rates (1 to 1.5 lbs/acre) in areas where extended residual control is necessary, or in habitats having deep water or dense surface cover.

Apply uniformly by aerial or conventional ground equipment. Reapply as needed after 1-4 weeks.

*Mosquito species effectively controlled by VectoLex WDG:

| | |
|---|---|
| *Culex* spp. | *Psorophora columbiae* |
| *Aedes vexans* | *Psorophora ferox* |
| *Aedes melanimon* | *Aedes triseriatus* |
| *Aedes stimulans* | *Aedes sollicitans* |
| *Aedes nigromaculis* | *Anopheles quadrimaculatus* |
| | *Coquillettidia perturbans* |

## 6.0 GROUND AND AERIAL APPLICATION

VectoLex WDG may be applied using conventional ground or aerial application equipment with quantities of water sufficient to provide uniform coverage of the target area. For application, first add the VectoLex WDG to water to produce a final spray mixture. The amount of water will depend on weather, spray equipment, and mosquito habitat characteristics. For application, fill the mix tank or plane hopper with the desired quantity of water. **Start the mechanical or manual agitation to provide moderate circulation of water before adding the VectoLex WDG.** Backpack and compressed air sprayers may be agitated by shaking after adding VectoLex WDG to the water in the sprayer. VectoLex WDG suspends readily in water and will stay suspended over normal application periods. Brief recirculation may be necessary if the spray mixture has sat for several hours or longer. Do not mix more VectoLex WDG than can be used in a 48 hour period. AVOID CONTINUOUS AGITATION OF THE SPRAY MIXTURE DURING SPRAYING. For ground spraying, apply 8-24 oz./acre (227-680 g/acre) of VectoLex WDG in 5-100 gallons of water per acre using hand-pump, airblast, mist blower, or other spray equipment. For aerial application, apply 8-24 oz./acre (227-680 g/acre) of VectoLex WDG through fixed wing or helicopter aircraft equipped with either conventional boom and nozzle systems or rotary atomizers at a convenient dilution rate. For aerial application, apply 0.5-10 gallons/acre of the final spray mixture to provide uniform coverage of the target area. Rinse and flush spray equipment thoroughly following each use.

Amount of VectoLex WDG needed to treat small areas:

| | Rate of VectoLex WDG/Acre | | |
|---|---|---|---|
| **Area To Treat** | **8 oz.** | **16 oz.** | **24 oz.** |
| 1/4 Acre | 2 oz | 4 oz | 6 oz |
| 1/2 Acre | 4 oz | 8 oz | 12 oz |
| 10 Acres | 5 lb | 10 lb | 15 lb |
| 20 Acres | 10 lb | 20 lb | 30 lb |

## 7.0 NOTICE TO USER

SELLER MAKES NO WARRANTY, EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS OR OTHERWISE CONCERNING USE OF THIS PRODUCT OTHER THAN AS INDICATED ON THE LABEL. USER ASSUMES ALL RISKS OF USE, STORAGE OR HANDLING NOT IN STRICT ACCORDANCE WITH ACCOMPANYING DIRECTIONS.

VALENT BIOSCIENCES CORPORATION
870 TECHNOLOGY WAY
LIBERTYVILLE, IL 60048 - 800-323-9597

**VectoLexâ WDG**
**MSDS# BIO-0035 Rev. 1** **ISSUED 12/23/03**

---

## 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MATERIAL NAME: VectoLex® WDG
EPA Registration No.: 73049-57
Code Number: 82835
List Number: 60201

SYNONYMS: VectoLex® WG

MANUFACTURER: Valent BioSciences Corporation
870 Technology Way, Suite 100
Libertyville, Illinois 60048

EMERGENCY TELEPHONE NUMBERS
Emergency Health or Spill:
Outside the United States: 651-632-6184
Within the United States: 877-315-9819

## 2. COMPOSITION/INFORMATION ON INGREDIENTS

INGREDIENT NAME: Bacillus sphaericus
CONCENTRATION: 51.20%
CAS NUMBER: N/A
OSHA-PEL 8HR TWA: N/L
STEL: N/L
CEILING: N/L
ACGIH-TLV 8HR TWA: N/L
STEL: N/L
CEILING: N/L
OTHER 8HR TWA: N/A
LIMITS STEL: N/A
CEILING: N/A

INGREDIENT NAME: Other/Inert Ingredients - identity withheld as a Trade Secret
CONCENTRATION: 48.80%
CAS NUMBER: N/A
OSHA-PEL 8HR TWA: N/L
STEL: N/L
CEILING: N/L
ACGIH-TLV 8HR TWA: N/L
STEL: N/L
CEILING: N/L
OTHER 8HR TWA: N/A
LIMITS STEL: N/A
CEILING: N/A

## 3. HAZARDS INFORMATION

EMERGENCY OVERVIEW: Product is non-toxic by ingestion, skin contact, or inhalation. Direct contact with eyes may cause mild irritation.

ROUTE(S) OF ENTRY: Skin: No
Inhalation: No
Ingestion: No

SKIN CONTACT: Non-irritant

SKIN SENSITIZATION: Non-sensitizer

EYE CONTACT: Non-irritant

TARGET ORGANS: N/D

CARCINOGENICITY RATING: NTP: N/L IARC: N/L OSHA: N/L ACGIH: N/L
None

SIGNS AND SYMPTOMS: Direct contact with eyes may cause mild irritation.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: N/D

## 4. FIRST AID MEASURES

EYES: Remove from source of exposure. Flush with copious amounts of water. If irritation persists or signs of toxicity occur, seek medical attention. Provide symptomatic/supportive care as necessary.

SKIN: Remove from source of exposure. Flush with copious amounts of water. If irritation persists or signs of toxicity occur, seek medical attention. Provide symptomatic/supportive care as necessary.

INGESTION: Remove from source of exposure. If signs of toxicity occur, seek medical attention. Provide symptomatic/supportive care as necessary.

INHALATION: Remove from source of exposure. If signs of toxicity occur, seek medical attention. Provide symptomatic/supportive care as necessary.

---

## 5. FIRE FIGHTING PROCEDURES

FLASH POINT: N/A
FLASH POINT METHOD: N/A
LOWER EXPLOSIVE LIMIT(%): N/A
UPPER EXPLOSIVE LIMIT(%): N/A
AUTOIGNITION TEMPERATURE: N/A

FIRE & EXPLOSION HAZARDS: Non-flammable and no explosive properties.

EXTINGUISHING MEDIA: Use appropriate medium for the underlying cause of the fire.

FIRE FIGHTING INSTRUCTIONS: Wear protective clothing and self-contained breathing apparatus.

## 6. ACCIDENTAL RELEASE MEASURES

SPILL OR RELEASE PROCEDURES: Recover product and place in an appropriate container for disposal. Avoid breathing dust. Ventilate and wash the spill area.

## 7. HANDLING AND STORAGE

HANDLING: N/D

STORAGE: Store product in closed container in a cool and dry place.

SPECIAL PRECAUTIONS: N/D

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS: Use local exhaust.

RESPIRATORY PROTECTION: Not usually required. If necessary, use a MSHA/NIOSH approved (or equivalent) respirator with a dust/mist filter. Mixer/loaders and applicators not in enclosed cabs or aircraft must wear a dust/mist filtering respirator meeting NIOSH standards of at least N-95, R-95, or P-95.

SKIN PROTECTION: Impervious gloves, clothing to minimize skin contact.

EYE PROTECTION: Not usually required. If necessary, use safety glasses or goggles.

OTHER PROTECTION: Wash thoroughly with soap and water after handling.

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## 9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE/PHYSICAL STATE: Fine brown granules
ODOR: Faint organic/malt/musty odor
BOILING POINT: N/A
MELTING/FREEZING POINT: N/A
VAPOR PRESSURE (mm Hg): N/A
VAPOR DENSITY (Air=1): N/A
EVAPORATION RATE: N/A
BULK DENSITY: 0.4 ± 0.1 g/mL
SPECIFIC GRAVITY: N/D
SOLUBILITY: Suspends readily in water.
pH: 4.5-6.5 as an aqueous solution.
VISCOSITY: N/A

## 10. STABILITY AND REACTIVITY

CHEMICAL STABILITY: Stable. No oxidizing or reducing properties.

INCOMPATIBILITIES: Alkalinity inactivates product.

HAZARDOUS DECOMPOSITION PRODUCTS: None that are known.

HAZARDOUS POLYMERIZATION: Will not occur.

## 11. TOXICOLOGICAL INFORMATION

Acute Toxicity

ORAL LD50: LD50 (rat) > 5,050 mg/kg

DERMAL LD50: LD50 (rabbit) > 5,050 mg/kg

INHALATION LC50: No lethality was observed in rats after a 4 hour exposure at the highest obtainable inhalation exposure chamber concentration.

CORROSIVENESS: N/D. Not expected to have any corrosive properties.

DERMAL IRRITATION: Transient, slight or mild irritation noted in a dermal toxicity study with this product.

OCULAR IRRITATION: Transient, redness and conjunctival irritation observed in test animals in a study with this product. No positive ocular effects were observed. Classified as a mild irritant.

## 11. TOXICOLOGICAL INFORMATION, continued

DERMAL SENSITIZATION: In a study with this product, no skin sensitization was observed.

SPECIAL TARGET ORGAN EFFECTS: N/D

CARCINOGENICITY INFORMATION: N/D. None of the components are classified as carcinogens.

## 12. ECOLOGICAL INFORMATION

ECOLOGICAL INFORMATION: N/D

## 13. DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHODS: Dispose of product in accordance with federal, state and local regulations.

## 14. TRANSPORTATION INFORMATION

DOT STATUS: Not Regulated
PROPER SHIPPING NAME: N/A
HAZARD CLASS: N/A
UN NUMBER: N/A
PACKING GROUP: N/A
REPORTABLE QUANTITY: N/A

IATA/ICA0 STATUS: Not Regulated
PROPER SHIPPING NAME: N/A
HAZARD CLASS: N/A
UN NUMBER: N/A
PACKING GROUP: N/A
REPORTABLE QUANTITY: N/A

IMO STATUS: Not Regulated
PROPER SHIPPING NAME: N/A
HAZARD CLASS: N/A
UN NUMBER: N/A
PACKING GROUP: N/A
REPORTABLE QUANTITY: N/A
FLASH POINT: N/D

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## 15. REGULATORY INFORMATION

TSCA STATUS: Exempt RCRA STATUS: N/D

CERCLA STATUS: N/D PROP 65 (CA): N/D

SARA STATUS: N/D

## 16. OTHER INFORMATION

REASON FOR ISSUE: Updated Hazard Information (Section 3) and Toxicological Information (Section 11).
APPROVAL DATE: 12/23/03
SUPERSEDES DATE: 06/12/01

LEGEND: N/A = Not Applicable
N/D = Not Determined
N/L = Not Listed
L = Listed
C = Ceiling
S = Short-term
® = Registered Trademark of Valent BioSciences
(TM) = Registered Trademark of Valent BioSciences

The information and recommendations contained herein are based upon tests believed to be reliable. However, Valent BioSciences does not guarantee their accuracy or completeness nor shall any of this information constitute a warranty, whether expressed or implied, as to the safety of the goods, the merchantability of the goods, or the fitness of the goods for a particular purpose. Adjustment to conform with actual conditions of usage may be required. Valent BioSciences assumes no responsibility for results obtained or for incidental or consequential damages arising from the use of these data. No freedom from infringement of any patent, copyright or trademark is to be inferred.

# Altosid®
## BRIQUETS

**A SUSTAINED RELEASE MOSQUITO GROWTH REGULATOR TO PREVENT ADULT MOSQUITO EMERGENCE**

# SPECIMEN LABEL

**ACTIVE INGREDIENT:**

| | |
|---|---|
| S-Methoprene (CAS #65733-16-6) (Dry Weight Basis) | 8.62% |
| **OTHER INGREDIENTS:** | 91.38% |
| Total | 100.00% |

This product contains water, therefore the weight of the briquet and percent by weight of active ingredient will vary with hydration. The Ingredient Statement is expressed on a dry weight basis.

EPA Reg No. 2724-375
EPA Est. No. 39578-TX-1

KEEP OUT OF REACH OF CHILDREN

## CAUTION

### PRECAUTIONARY STATEMENTS
### HAZARDS TO HUMANS AND DOMESTIC ANIMALS
### CAUTION
### ENVIRONMENTAL HAZARDS

This product is toxic to aquatic dipteran. Using it in a manner other than that described by the label could result in harm to aquatic dipteran. Do not contaminate water when disposing of rinsate or equipment washwaters.

### DIRECTIONS FOR USE

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

**NOTE TO USER**

Do not remove **ALTOSID® Briquets** from container except for immediate use.

Because of the unique mode of action of **ALTOSID Briquets**, users must be familiar with special techniques for accurate evaluation of treatments. See **APPLICATION RATES AND INTERVALS** section of this label or consult local Mosquito Abatement Agency. Effective use of **ALTOSID Briquets** in sites subjected to periodic heavy flow of water requires careful attention to briquet placement and to the possible need for retreatment. Use of the product in storm drains, waste treatment and settling ponds, and similar systems should therefore be limited to experienced pesticide applicators such as personnel of Mosquito Abatement Districts and Public Health Agencies.

### INTRODUCTION

The **ALTOSID Briquet** is a formulation designed to release effective levels of **ALTOSID®** Insect Growth Regulator over a 30 day period under typical environmental conditions. Release of **ALTOSID** Insect Growth Regulator is effected by dissolution of the **ALTOSID Briquet**. Obstructions, such as debris, vegetation, and loose sediment can cover the briquets and inhibit normal dispersion of the active ingredient. Such obstructions may occur after high rainfall or flow. The product may not be effective in those situations where the briquet can be removed from the site by flushing action. **ALTOSID Briquets** prevent the emergence of adult mosquitoes including *Anopheles, Culex, Culiseta, Coquillettidia, and Mansonia* spp., as well as those of the floodwater mosquito complex (*Aedes* and *Psorophora* spp.) from treated water. Treated larvae continue to develop normally to the pupal stage where they die.

**APPLICATION TIME**
Placement of **ALTOSID Briquets** should be made at the beginning of the mosquito season. Under normal conditions repeat treatment every 30 days. Renew at the recommended interval and rate (see table). Continue treatment through the last brood of the season. Placement may be made at any stage of larval development.

**NOTE:** This insect growth regulator has no effect on mosquitoes which have reached the pupal or adult stage prior to treatment.

**APPLICATION SITES**
**ALTOSID Briquets** are designed to control mosquitoes in small bodies of water. Examples of application sites are: storm drains, catch basins, roadside ditches, fish ponds, ornamental ponds and fountains, other artificial water-holding containers, cesspools and septic tanks, waste treatment and settling ponds, flooded crypts, transformer vaults, abandoned swimming pools, tires, construction and other manmade depressions, cattail marshes, water-hyacinth beds, vegetation-choked phosphate pits, pastures, meadows, rice fields, freshwater swamps and marshes, salt and tidal marshes, treeholes, woodland pools, floodplains, and dredging spoil sites. For application sites connected by a water system, i.e., storm drains or catch basins, all of the water holding sites in the system should be treated to maximize the efficiency of the treatment program.

**APPLICATION RATES AND INTERVALS**
For mosquito control in non-(or low-) flow, shallow depressions (up to 2 ft in depth), treat on the basis of surface area placing 1 **ALTOSID Briquet** per 100 sq ft. For mosquito control in water subject to flow or deeper than 2 ft, treat on the basis of volume. Apply at the rate of 1**ALTOSID Briquet** per 10 cu ft (75 gal of water). **ALTOSID Briquets** will maintain an effective concentration throughout 4 complete volume changes per 30 day treatment interval according to the following table.

**ALTOSID BRIQUETS** FOR FLOWING WATER
Volume/Treatment Rate/Flow

| Maximum Water VOLUME in Application Site | Basic Application Rate (**ALTOSID Briquets**) | Allowable FLOW for 30 Day Mosquito Control |
|---|---|---|
| 0-10 cu ft (75 gal) | 1 | up to 300 gal |
| 10-20 cu ft | 2 | up to 600 gal |
| 20-30 cu ft | 3 | up to 900 gal |
| 30-40 cu ft | 4 | up to 1200 gal |

In the event of higher flow, reduce the treatment interval proportionately using the following flow formula. Do not increase the application rate.

FLOW ADJUSTMENT FORMULA

$$\frac{\text{Allowable Flow}^*}{\text{Actual Flow}} \times 30 = \text{Adjusted Treatment Interval (Days)}$$

* 4 volume changes or see above table.

Example: For a 36 cu ft catch basin of low flow (up to 1200 gal per 30 days), treat with four **ALTOSID Briquets**. For higher flow, such as 2400 gal per 30 days, the treatment interval should be reduced to 15 days (1200/2400 x 30 = 15).

## STORAGE AND DISPOSAL

Do not contaminate water, food, or feed by storage or disposal.

**STORAGE**
Store in cool, dry place.

**PESTICIDE DISPOSAL**
Wastes resulting from use of this product may be disposed of on site or at an approved waste disposal facility.

**CONTAINER DISPOSAL**
Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill or incineration, or if allowed by state and local authorities, by burning. If burned, stay out of smoke.



Always read the label before using this product.

For information call **1-800-248-7763** or visit our web site: **www.altosid.com**

Wellmark

ZOËCON Professional Products

Wellmark International
Schaumburg, Illlinois U.S.A.





January 2002
Schaumburg, IL

Date Issued: November, 2003
Supersedes: May, 2001

# MATERIAL SAFETY DATA SHEET
# ZOECON ALTOSID® BRIQUETS

**Manufacturer:** Wellmark International

**Address:** 1100 East Woodfield Road, Suite 500 Schaumburg, IL 60173

**Emergency Phone:** 1-800-248-7763

**Transportation Emergency Phone:** CHEMTREC: 1-800-424-9300

## 1. CHEMICAL PRODUCT INFORMATION

**Product Name:** Zoecon Altosid® Briquets

**Chemical Name/Synonym:** S)-Methoprene: Isopropyl (2E,4E,7S)-11-methoxy-3,7,11-trimethyl-2,4-dodecadienoate

**Chemical Family:** Terpenoid

**Formula:** C19 H34 O3

**EPA Registration No.:** 2724-375-

**RF Number:** 433A

## 2. COMPOSITION / INFORMATION ON INGREDIENTS

| Component (chemical, common name) | CAS Number | Weight | Tolerance |
|---|---|---|---|
| **(S)-Methoprene**: Isopropyl (2E,4E,7S)-11-methoxy-3,7,11-trimethyl-2,4-dodecadienoate | 65733-16-6 | 8.62% | Not established |
| Inert ingredients (non-hazardous and/or trade secret): | | 91.38% | |

## 3. HAZARD INFORMATION

**PRECAUTIONARY STATEMENT**

Caution: Keep out of the reach of children..

### SIGNS AND SYMPTOMS OF OVEREXPOSURE

No adverse reactions have resulted from normal human exposure during research and testing. Adverse animal reactions to this product have not been shown.

**PRIMARY ROUTE OF ENTRY** **Dermal/Eye:** Yes **Oral:** Yes **Inhalation:** Yes

**ACUTE TOXICITY**

**Oral:** LD50 (rat): > 34,600 mg/kg bw (highest dose level tested) (Based on S-Methoprene)

**Dermal:** LD50 (rabbit) >5,000 mg/kg bw) (Based on S-Methoprene)

**Inhalation:** LC50 (rat): >5.19 mg/L air (Based on S-Methoprene)

### OTHER TOXICOLOGICAL INFORMATION

**Skin Irritation:** Non-irritating (rabbit) (Based on S-Methoprene)

**Eye Irritation:** Practically non-irritating (rabbit) (Based on S-Methoprene)

**Sensitizer:** Not a sensitizer(guinea pig) (Based on RS-Methoprene)

## 4. FIRST AID MEASURES

**Eye:** Hold eyes 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 eyes.

**Skin:** Wash material off with soap and water. Remove contaminated clothing and footwear. See a physician if symptoms persist.

**Ingestion:** Drink 1-2 glasses of water and try to induce vomiting. Seek medical attention. Never give anything by mouth to an unconscious person.

**Inhalation:** Remove victim to fresh air. See a physician if cough or other respiratory symptoms develop

**Note to Physician:** Treat symptomatically

## 5. FIRE FIGHTING MEASURES

**NFPA Rating:** **Health: 0** **Fire: 0** **Reactivity: 0**

**Flammability Class:** N/A

**Flash Point:** Does not flash

**Explosive Limits (% of Volume):** N/A

**Extinguishing Media:** Water, foam, dry chemical

**Special Protective Equipment:** Firefighters should wear protective clothing, eye protection, and self contained breathing apparatus.

**Fire Fighting Procedures:** Normal procedures. Do not allow run-off to enter waterways inhabited by aquatic organisms

**Combustion Products:** Carbon dioxide, carbon monoxide

**Unusual Fire/Explosion Hazards:** None

## 6. ACCIDENTAL RELEASE MEASURES

**Steps to be taken:** Sweep up material and place in a container for disposal. Do not allow spill to enter waterways inhabited by aquatic organisms

**Absorbents:** None necessary due to product form

**Incompatibles:** None

## 7. HANDLING AND STORAGE

**Handling:** Avoid contact with eyes or clothing. Avoid breathing dust. Wash thoroughly with soap and water after handling.

**Storage:** Store in a cool, dry place. Do not contaminate food or feed by storage or disposal. Keep away from children.

## 8. EXPOSURE CONTROL / PERSONAL MEASURES

**Exposure Limits:** Not applicable

**Ventilation:** Use with adequate ventilation.

**Personal Protective Equipment:** Under ordinary use conditions, no special protection is required. If prolonged exposure is expected, it is recommended to wear a MSHA/NIOSH approved organic vapor/pesticide respirator, impervious gloves, chemical goggles or safety glasses with side shields.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

| | |
|---|---|
| **Appearance and Odor:** | Grey to black solid with slight hydrocarbon odor. |
| **Boiling Point:** | N/A |
| **Melting Point:** | N/A |
| **Vapor Pressure (mm Hg):** | N/A |
| **Vapor Density (Air = 1):** | N/A |
| **Specific Gravity:** | 1.4 g/cc |
| **Bulk Density:** | N/A |
| **Solubility:** | 1 ppm |
| **Evaporation Rate:** | N/A |
| **pH:** | N/A |

## 10. STABILITY AND REACTIVITY

| | |
|---|---|
| **Stability:** | Stable |
| **Reactivity:** | Non-reactive |
| **Incompatibility w/ Other Materials:** | None |
| **Decomposition Products:** | None |
| **Hazardous Polymerization:** | Will not occur |

## 11. TOXICOLOGICAL INFORMATION

**CHRONIC TOXICITY [Based on (RS)-Methoprene Technical]**
Methoprene is not considered as a carcinogen. The NOEL for non-carcinogen effects in an 18-month mouse study was 250ppm..

**DEVELOPMENTAL/REPRODUCTIVE TOXICITY [Based on (RS)-Methoprene Technical]**
Methoprene is not a teratogen. The NOEL for maternal and embryo toxicity in rabbits was 200/mg/kg/day. The NOEL for reproductive effects in rats was 500 ppm..

**MUTAGENICITY [Based on (RS)-Methoprene Technical]**
Methoprene is not a mutagen.

## 12. ECOLOGICAL INFORMATION

**ENVIRONMENTAL FATE [Based on (RS)-Methoprene Technical]**

| | |
|---|---|
| **Hydrolysis:** | T1/2 > 4 weeks |
| **Photolysis:** | T1/2 < 10 hours |
| **Soil half life:** | ~ 10 days |
| | < 2 ppm |
| **Water solubility:** | |

**ECOTOXICITY [Based on (S)-Methoprene Technical]**

**Acute Toxicity:** fish:LC50 (trout): 760 ppb, (bluegill): > 370 ppb ((S)-Methoprene); **aquatic invertebrates**:LC50 (Daphnia): 360 ppb ((S)-Methoprene. )

Wastes resulting from the use of this product may be disposed of on site or at an approved waste management facility. Triple rinse (or equivalent). Do not contaminate water when disposing of rinsate or equipment wash waters. Then offer for recycling or reconditioning or puncture and dispose of in a sanitary landfill or incineration, or if allowed by state and local authorities, by burning. If burned, stay out of smoke.

## 14. TRANSPORT INFORMATION

**DOT49CFR Description:** Not regulated as hazardous by D.O.T.

**Freight Classification:** Insecticides, NOI other than poison in boxes or drums. NMFC 102120

## 15. REGULATORY INFORMATION

**CERCLA (Superfund):** Not regulated

**RCRA:** Not regulated as hazardous

**SARA 311/312 HAZARD CATEGORIES**

**Immediate Health:** Yes (irritation)

**Delayed Health:** No

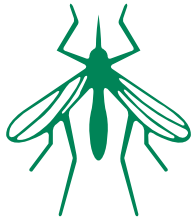
**Fire:** No

**Sudden Pressure:** No

**Reactivity:** No

*The information presented herein, while not guaranteed, was prepared by technically knowledgeable personnel and to the best of our knowledge is true and accurate. It is not intended to be all inclusive and the manner and conditions of use and handling may involve other or additional considerations.*

# Altosid® Liquid Larvicide CONCENTRATE



**PREVENTS ADULT MOSQUITO EMERGENCE**
**(INCLUDING THOSE WHICH MAY TRANSMIT WEST NILE VIRUS)**

# SPECIMEN LABEL

| | |
|---|---|
| **ACTIVE INGREDIENT:** | |
| (S)-Methoprene (CAS # 65733-16-6) . . . . | 20% |
| **OTHER INGREDIENTS:** . . . . . | 80% |
| Total . . . . . | 100% |

Formulation contains 1.72 lb/gal (205.2 g/l) active ingredient

EPA Reg No. 2724-446

KEEP OUT OF REACH OF CHILDREN

**CAUTION**

SEE ADDITIONAL PRECAUTIONARY STATEMENTS

BECAUSE OF THE UNIQUE MODE OF ACTION OF A.L.L.™, SUCCESSFUL USE REQUIRES FAMILIARITY WITH SPECIAL TECHNIQUES FOR APPLICATION TIMING AND TREATMENT EVALUATION. SEE **GUIDE TO PRODUCT APPLICATION** OR CONSULT LOCAL MOSQUITO ABATEMENT AGENCY.

## PRECAUTIONARY STATEMENTS
## HAZARDS TO HUMANS AND DOMESTIC ANIMALS
## CAUTION

Causes moderate eye irritation. Harmful if absorbed through skin. Avoid contact with skin, eyes, or clothing. Wash thoroughly with soap and water after handling. Prolonged or frequently repeated skin contact may cause allergic reactions in some individuals.

## FIRST AID

Call a poison control center or doctor immediately for treatment advice.

**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.

**If on skin or clothing** • Take off contaminated clothing. • Rinse skin immediately with plenty of water for 15-20 minutes.

Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact 1-800-248-7763 for emergency medical treatment information.

## ENVIRONMENTAL HAZARDS

Do not contaminate water when disposing of rinsate or equipment washwaters.

## DIRECTIONS FOR USE

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

### CHEMIGATION

Refer to supplemental labeling entitled **"Guide to Product Application"** for use directions for chemigation. Do not apply this product through any irrigation system unless the supplemental labeling on chemigation is followed.

## MIXING AND HANDLING INSTRUCTIONS

1. **SHAKE WELL BEFORE USING**. **A.L.L.** may separate on standing and must be thoroughly agitated prior to dilution.

2. Do not mix with oil; use clean equipment.
3. Partially fill spray tank with water; then add the labeled amount of A.L.L., agitate, and complete filling. Mild agitation during application is desirable.
4. Use spray solution within 48 hours; always agitate before spraying.

## APPLICATIONS

**A.L.L.** must be applied to 2nd, 3rd, or 4th larval instars of floodwater mosquitoes to prevent adult emergence. Treated larvae continue normal development to the pupal stage where they die. This insect growth regulator **has no effect when applied to pupae or adult mosquitoes. A.L.L.** has sufficient field life to be effective at label rates when applied to larval stages under varying field conditions. For further information, see **Guide to Product Application**.

## METHODS OF APPLICATION

### AERIAL

Use the amount of **A.L.L.** listed below in sufficient water to give complete coverage. One-half to 5 gallons of spray solution per acre is usually satisfactory. Do not apply when weather conditions favor drift from areas treated.

### GROUND

Determine the average spray volume used per acre by individual operators and/or specific equipment. Mix A.L.L. in the appropriate volume of water to give the rate per acre shown below.

### APPLICATION RATE

Apply 3/4 to 1 fl oz of **A.L.L.** per acre (55 to 73 ml/hectare) in water as directed.

## APPLICATION SITES

### PASTURES

**A.L.L.** may be applied after each flooding without removal of grazing livestock.

### RICE

**A.L.L.** must be applied to 2nd, 3rd, and/or 4th instar larvae of mosquitoes found in rice, usually within 4 days after flooding. A.L.L. treatment may be repeated with each flooding.

### INTERMITTENTLY FLOODED NONCROP AREAS

Apply **A.L.L.** as directed above when flooding may result in floodwater mosquito hatch. Typical sites include: freshwater swamps and marshes, salt marshes, woodland pools and meadows, dredging spoil sites, drainage areas, waste treatment and settling ponds, ditches and other natural and manmade depressions.

### CROP AREAS

Apply **A.L.L.** to irrigated croplands after flooding to control mosquito emergence. Examples of such sites are: vineyards, rice fields (including wild rice), date palm orchards, fruit and nut orchards, and berry fields and bogs. Irrigated pastures may be treated after each flooding **without** removal of livestock.

### DENSE VEGETATION OR CANOPY AREAS

Apply an **A.L.L.** sand mixture using standard granular dispersal equipment. For detailed preparation instructions, refer to **Guide to Product Application**.

## STORAGE AND DISPOSAL

Do not contaminate water, food, or feed by storage or disposal.

### STORAGE

Store in a cool place away from other pesticides, food, and feed. In case of leakage or spill, soak up with sand or another absorbent material.

### PESTICIDE DISPOSAL

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

### CONTAINER DISPOSAL

Triple rinse or equivalent. Then offer for recycling or reconditioning or puncture and dispose of in a sanitary landfill, or incineration, or if allowed by state and local authorities, by burning. If burned, stay out of smoke.



Always read the label before using the product.

For information, call 1-800-248-7763 or visit our Web site: **www.altosid.com**

Wellmark

ZOËCON Professional Products

Wellmark International
Schaumburg, Illinois U.S.A.



23-24-034 Made in the U.S.A.



February 2003
Schaumburg, IL

Date Issued: October, 1997
Supersedes: April, 1996

# MATERIAL SAFETY DATA SHEET - **Zoëcon® ALTOSID® LIQUID LARVICIDE CONCENTRATE**

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**Manufacturer**: Wellmark International
**Address:** 1000 Tower Lane, Suite 245, Schaumburg, Illinois 60106
**Emergency Phone:** 1-800-248-7763
**Transportation Emergency Phone:** CHEMTREC: 1-800-424-9300

## 1. CHEMICAL PRODUCT INFORMATION

**Product Name:** Zoëcon® Altosid® Liquid Larvicide Concentrate
**Chemical Name/Synonym:** (S)-Methoprene; isopropyl (2E,4E,7S)-11-methoxy-3,7,11-trimethyl-2,4-dodecadienoate
**Chemical Family:** Terpenoid
**Formula:** $C_{19}\,H_{34}\,O_3$
**EPA Registration No.:** 2724-446
**RF Number:** 437

## 2. COMPOSITION / INFORMATION ON INGREDIENTS

| **Component (chemical, common name)** | **CAS Number** | **Weight** | **Tolerance** |
|---|---|---|---|
| (S)-Methoprene: isopropyl (2E,4E,7S)-11-Methoxy- 3,7,11-trimethyl-2,4-dodecadienoate | 65733-16-6 | 20.0% | Not established |
| Inert ingredients (non-hazardous and/or trade secret) | | 80.0% | N/A |

## 3. HAZARD INFORMATION

**PRECAUTIONARY STATEMENT**

**CAUTION**: CAUSES MODERATE EYE IRRITATION. AVOID CONTACT WITH EYES OR CLOTHING. WASH THOROUGHLY WITH SOAP AND WATER AFTER HANDLING. PROLONGED OR FREQUENTLY REPEATED SKIN CONTACT MAY CAUSE ALLERGIC REACTIONS IN SOME INDIVIDUALS.

**SIGNS AND SYMPTOMS OF OVEREXPOSURE:** No adverse reactions have resulted from normal human exposure during research and testing.

**PRIMARY ROUTE OF ENTRY Dermal/Eye:** Yes **Oral:** No **Inhalation:** No

**ACUTE TOXICITY**
**Oral:** $LD_{50}$ (rat): >5,000 mg/kg (highest dose tested) (HDT) (Based on (S)-Methoprene)
**Dermal:** $LD_{50}$ (rabbit): >2,000 mg/kg (highest dose tested) (HDT) (Based on (S)-Methoprene)
**Inhalation:** $LC_{50}$ (rat): >5.2 mg/L air (4 hour study)

**OTHER TOXICOLOGICAL INFORMATION**
**Skin Irritation:** Non-irritating (rabbit) (Based on (S)-Methoprene)
**Eye Irritation:** Practically non-irritating (rabbit) (Based on (S)-Methoprene)
**Sensitizer:** Not a sensitizer (guinea pig) (Based on (RS)-Methoprene)

## 4. FIRST AID MEASURES

**Eye:** Immediately flush with copious amounts of water for at least 15 minutes. See a physician if irritation persists.
**Skin:** Wash material off with copious amounts of water and soap. Remove contaminated clothing and footwear. See a physician if symptoms persist.
**Ingestion:** Drink 1-2 glasses of water and try to induce vomiting. Seek medical attention. Never give anything by mouth to an unconscious person.
**Inhalation:** Remove victim to fresh air. See a physician if cough or other respiratory symptoms develop.
**Note to Physician:** Treat symptomatically

## 5. FIRE FIGHTING MEASURES

**NFPA Rating: Health:** 0 **Fire:** 0 **Reactivity:** 0
**Flammability Class:** Combustible liquid
**Flash Point:** Does not flash
**Explosive Limits (% of Volume):** None
**Extinguishing Media:** Water, Foam, $CO_2$
**Special Protective Equipment:** Firefighters should wear full protective clothing and self-contained breathing apparatus.
**Fire Fighting Procedures:** Normal procedures. Do not allow fire fighting water to escape into waterways or sewers.
**Combustion Products:** Carbon monoxide, carbon dioxide
**Unusual Fire/Explosion Hazards:** None

## 6. ACCIDENTAL RELEASE MEASURES

**Steps to be Taken:** In case of leakage or spill, soak up with absorbent material. Place in a container for disposal.
**Absorbents:** Clay granules, sawdust, dirt or equivalent.
**Incompatibles:** None

## 7. HANDLING AND STORAGE

**Handling:** Avoid contact with eyes or clothing. Wash thoroughly with soap and water after handling.
**Storage:** Store in a cool, dry place, away from other pesticides, food and feed.

## 8. EXPOSURE CONTROL / PERSONAL MEASURES

**Exposure Limits:** Not established
**Ventilation:** Use with adequate ventilation.
**Personal Protective Equipment:** Under ordinary use conditions, no special protection is required. If prolonged exposure is expected, it is recommended to wear a MSHA/NIOSH approved organic vapor/pesticide respirator, impervious gloves, chemical goggles or safety glasses with side shields.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

**Appearance and Odor:** Creamy, yellow liquid with slight odor.
**Boiling Point:** 100 degrees Celsius
**Melting Point:** Not applicable
**Vapor Pressure (mm Hg):** 17.5 mm Hg
**Vapor Density (Air = 1):** 0.6 (water phase)
**Specific Gravity:** 1.04 - 1.06
**Bulk Density:** 8.3 lbs/gal
**Solubility:** Disperses in water
**Evaporation Rate:** Approximately 0.8
**pH:** 7.5

## 10. STABILITY AND REACTIVITY

**Stability:** Stable
**Reactivity:** Non-reactive
**Incompatibility with Other Materials:** Bleach, oxidizing/alkaline materials
**Decomposition Products:** None
**Hazardous Polymerization:** Will not occur

## 11. TOXICOLOGICAL INFORMATION

**CHRONIC TOXICITY [Based on (RS)-Methoprene]**
Methoprene is not considered as an oncogenic compound. The NOEL for non-carcinogenic effects in an 18 month mouse study was 250 ppm.

**DEVELOPMENTAL/REPRODUCTIVE TOXICITY [Based on (RS)-Methoprene]**
Methoprene is not a teratogenic compound. The NOEL for maternal and embryotoxicity in rabbits was 200 mg/kg/day. The NOEL for reproductive effects in rats was 500 ppm.

**MUTAGENICITY [Based on (RS)-Methoprene]**
Methoprene is not a mutagenic compound.

## 12. ECOLOGICAL INFORMATION

**ENVIRONMENTAL FATE [Based on (RS)-Methoprene]**
**Hydrolysis:** $T^1/_2$ > 4 weeks
**Photolysis:** $T^1/_2$ <10 hours
**Soil half life:** ~ 10 days
**Water solubility:** < 2 ppm

**ECOTOXICITY [Based on (S)-Methoprene]**
**Acute Toxicity: fish:** $LC_{50}$ (trout): 760 ppb, (bluegill): >370 ppb
**aquatic invertebrates:** $LC_{50}$ (Daphnia): 360 ppb

## 13. DISPOSAL CONSIDERATIONS

Wastes resulting from this product may be disposed of on site or at an approved waste management facility. Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or incineration, or if allowed by state and local authorities, by burning. If burned, stay out of smoke.

## 14. TRANSPORTATION INFORMATION

**DOT49CFR Description:** Not regulated as hazardous by D.O.T.
**Freight Classification:** Insecticides, NOI other than poison in boxes or drums. NMFC 102120

## 15. REGULATORY INFORMATION

**CERCLA (Superfund):** Not regulated
**RCRA:** Not regulated as hazardous

**SARA 311/312 HAZARD CATEGORIES**
**Immediate Health:** Yes (irritation)
**Delayed Health:** No
**Fire:** No
**Sudden Pressure:** No
**Reactivity:** No

*The information presented herein, while not guaranteed, was prepared by technically knowledgeable personnel and to the best of our knowledge is true and accurate. It is not intended to be all inclusive and the manner and conditions of use and handling may involve other or additional considerations.*

98-14-363

Appendix B

# HERBICIDE SPECIMEN LABELS & MATERIAL SAFETY DATA SHEETS

# Specimen Label

Dow AgroSciences™

# Rodeo®

## Herbicide

**For aquatic weed and brush control. For control of annual and perennial weeds and woody plants in and around aquatic and other noncrop sites; also for use in wildlife habitat areas, for perennial grass release, and grass growth suppression.**

**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.**

| | |
|---|---|
| Active Ingredient(s): | |
| glyphosate†: N-(phosphonomethyl)glycine, isopropylamine salt | 53.8% |
| Inert Ingredients | 46.2% |
| Total Ingredients | 100.0% |

†Contains 5.4 pounds per gallon glyphosate, isopropylamine salt (4 pounds per gallon glyphosate acid).

EPA Reg. No. 62719-324

**Keep Out of Reach of Children**

## CAUTION PRECAUCION

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

### Precautionary Statements

### Hazards to Humans and Domestic Animals

**Harmful If Inhaled**

**Avoid breathing spray mist. Remove contaminated clothing and wash before reuse. Wash thoroughly with soap and water after handling.**

### 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 PPE (Personal Protective Equipment). If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

### Engineering Controls

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.

### First Aid

**If inhaled:** Remove individual to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. Get medical attention.

### Environmental Hazards

Do not contaminate water when disposing of equipment washwaters. Treatment of aquatic weeds can result in oxygen depletion or loss due to decomposition of dead plants. This oxygen loss can cause fish suffocation.

In case of leak or spill, soak up and remove to a landfill.

### 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.

**Notice:** Read the entire label. Use only according to label directions. **Before buying or using this product, read "Warranty Disclaimer" and "Limitation of Remedies" elsewhere on this label.**

In case of emergency endangering health or the environment involving this product, call 1-800-992-5994. If you wish to obtain additional product information, visit our web site at www.dowagro.com.

Agricultural Chemical: Do not ship or store with food, feeds, drugs or clothing.

## Directions for Use

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.
Read all Directions for Use carefully before applying.

**This is an end-use product. Dow AgroSciences does not intend and has not registered it for reformulation. See individual container label for repackaging limitations.**

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 regulation.

## 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
- Chemical resistant gloves made of any waterproof material
- Shoes plus socks

## Storage and Disposal

Do not contaminate water, food, feed or seed by storage or disposal.
**Storage: Store above 10°F (-12°C) to keep product from crystallizing.** Crystals will settle to the bottom. If allowed to crystallize, place in a warm room 68°F (20°C) for several days to redissolve and roll or shake container or recirculate in mini-bulk containers to mix well before using.
**Pesticide Disposal:** Wastes resulting from 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.
**Container Disposal:** Emptied container retains vapor and product residue. Observe all labeled safeguards until container is cleaned, reconditioned or destroyed. Do not reuse this container. Triple rinse (or equivalent). 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.

## General Information
**(How this product works)**

This product herbicide is a water-soluble liquid which mixes readily with water and nonionic surfactant to be applied as a foliar spray for the control or destruction of many herbaceous and woody plants. Rodeo is intended for control of annual and perennial weeds and woody plants in and around aquatic and other noncrop sites; also for use in wildlife habitat areas, for perennial grass release, and grass growth suppression.

The active ingredient in Rodeo 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, 7 days or more on most perennial weeds, and 30 days or more on most woody plants. Extremely cool or cloudy weather following treatment may slow the activity of this product and delay visual effects of control. Visible effects include gradual wilting and yellowing of the plant which advances to complete browning of above-ground growth and deterioration of underground plant parts.

Unless otherwise directed on this label, delay application until vegetation has emerged and reached the stages described for control of such vegetation under the “Weeds Controlled” section of this label.

Unemerged plants arising from unattached underground rhizomes or root stocks of perennials or brush will not be affected by the spray and will continue to grow. For this reason best control of most perennial weeds or brush is obtained when treatment is made at late growth stages approaching maturity.

Always use the higher rate of Rodeo and surfactant within the recommended range when vegetation is heavy or dense.

Do not treat weeds, brush or trees under poor growing conditions such as drought stress, disease or insect damage, as reduced control may result. Reduced control of target vegetation may also occur if foliage is heavily covered with dust at the time of treatment.

Reduced control may result when applications are made to woody plants or weeds following site disturbance or plant top growth removal from grazing, mowing, logging or mechanical brush control. For best results, delay treatment of such areas until resprouting and foliar growth has restored the target vegetation to the recommended stage of growth for optimum herbicidal exposure and control.

Rainfall or irrigation occurring within 6 hours after application may reduce effectiveness. Heavy rainfall or irrigation within 2 hours after application may wash the product off the foliage and a repeat treatment may be required.

Rodeo 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.

**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. When not in use, keep container closed to prevent spills and contamination.

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

**ATTENTION: 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 plant or crop injury occurring from the use of this product is greatest when winds are gusty or in excess of 5 miles per hour or when other conditions, including lesser wind velocities, will allow spray drift to occur. 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.**

## Mixing and Application Instructions

**Clean sprayer and parts immediately after using this product by thoroughly flushing with water and dispose of rinsate according to labeled use or disposal instructions.**

**Apply these spray solutions in properly maintained and calibrated equipment capable of delivering desired volumes. Hand-gun applications should be properly directed to avoid spraying desirable plants. Note: reduced results may occur if water containing soil is used, such as water from ponds and unlined ditches.**

### Mixing

Rodeo mixes readily with water. Mix spray solutions of this product as follows:

1. Fill the mixing or spray tank with the required amount of water while adding the required amount of this product (see "Directions for Use" and "Weeds Controlled" sections of this label).
2. Near the end of the filling process, add the required surfactant and mix well. Remove hose from tank immediately after filling to avoid siphoning back into the water source.

**Note:** If tank mixing with Garlon* 3A herbicide, ensure that Garlon 3A is well mixed with at least 75 percent of the total spray volume before adding Rodeo to the spray tank to avoid incompatibility.

During mixing and application, foaming of the spray solution may occur. To prevent or minimize foam, avoid the use of mechanical agitators, place the filling hose below the surface of the spray solution (only during filling), terminate by-pass and return lines at the bottom of the tank, and, if needed, use an approved anti-foam or defoaming agent.

Keep by-pass line on or near bottom of tank to minimize foaming. Screen size in nozzle or line strainers should be no finer than 50 mesh. Carefully select correct nozzle to avoid spraying a fine mist. For best results with conventional ground application equipment, use flat fan nozzles. Check for even distribution of spray droplets.

**IMPORTANT:** When using this product, unless otherwise specified, mix 2 or more quarts of a nonionic surfactant per 100 gallons of spray solution. Use a nonionic surfactant labeled for use with herbicides.
The surfactant must contain 50 percent or more active ingredient.

Always read and follow the manufacturer's surfactant label recommendations for best results.

These surfactants should not be used in excess of 1 quart per acre when making **broadcast** applications.

Carefully observe all cautionary statements and other information appearing in the surfactant label.

**Colorants or marking dyes** approved for use with herbicides may be added to spray mixtures of this product. Colorants or dyes used in spray solutions of this product may reduce performance, especially at lower rates or dilutions. Use colorants or dyes according to the manufacturer's label recommendations.

## Application Equipment and Techniques

**ATTENTION:** AVOID DRIFT. EXTREME CARE MUST BE EXERCISED 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 crops, plants, or other areas on which the treatment was not intended. The likelihood of plant or crop injury occurring from the use of this product is greatest when winds are gusty or in excess of 5 miles per hour or when other conditions, including lesser wind velocities, will allow spray drift to occur. 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 a manner not consistent with this label may result in injury to persons, animals, or crops, or other unintended consequences. When not in use, keep container closed to prevent spills and contamination.

### Spray Drift Management

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. 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, public health uses or to applications using dry formulations.

1. The distance of the outer most 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 air stream and never be pointed downwards more than 45 degrees. Where states have more stringent regulations, they should be observed.

The applicator should be familiar with and take into account the information covered in the following **Aerial Drift Reduction Advisory Information**:

**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 Wind, Temperature and Humidity, and Temperature Inversion section of this label).

**Controlling Droplet Size:** Volume-Use high flow rate nozzles to apply the highest practical spray volume. Nozzles with higher rated flows product 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 ¾ of the wingspan or rotor length may further reduce drift without reducing swath width.

Application-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 exposure of droplets to evaporation and wind.

**Swath Adjustment:** When applications are made with a cross-wind, the swath will be displaced downwind. 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 drops, etc.).

**Wind:** Drift potential is lowest between wind speeds of 2-10 mph. However, many factors, including droplet size and equipment type determine drift potential at any given speed. Application should be avoided below 2 mph 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 connected cloud (under low wind conditions) indicates an inversion, while smoke that moves upwards 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).

## Aerial Equipment

**For aerial application of this product in California, refer to Federal supplemental label for Rodeo herbicide entitled "For Aerial Application in California Only".** In California, aerial application may be made in aquatic sites and noncrop areas, including aquatic sites present in noncrop areas that are part of the intended treatment.

**For control of weed or brush species listed in this label using aerial application equipment**: For aerial broadcast application, unless otherwise specified, apply the rates of Rodeo and surfactant recommended for broadcast application in a spray volume of 3 to 20 gallons of water per acre. See the "Weeds Controlled" section of this label for labeled annual and herbaceous weeds and woody plants and broadcast rate recommendations. Aerial applications of this product may only be made as specifically recommended in this label.

**AVOID DRIFT. Do not apply during inversion conditions, when winds are gusty or under any other condition which will allow drift. Drift may cause damage to any vegetation contacted to which treatment is not intended. To prevent injury to adjacent desirable vegetation, appropriate buffer zones must be maintained.**

Coarse sprays are less likely to drift; therefore, do not use nozzles or nozzle configurations which dispense spray as fine spray droplets. Do not angle nozzles forward into the airstream and do not increase spray volume by increasing nozzle pressure.

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 in the additive label. The use of a drift control agent for conifer and herbaceous release applications may result in conifer injury and is not recommended.

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

Thoroughly wash aircraft, especially landing gear, after each day of spraying to remove residues of this product accumulated during spraying or from spills. **Prolonged exposure of this product to uncoated steel surfaces may result in corrosion and possible failure of the part. Landing gear are most susceptible.** The maintenance of an organic coating (paint) which meets aerospace specification MIL-C-38413 may prevent corrosion.

### Ground Broadcast Equipment

**For control of weed or brush species listed in this label using conventional boom equipment:** For ground broadcast application, unless otherwise specified, apply the rates of Rodeo and surfactant recommended for broadcast application in a spray volume of 3 to 30 gallons of water per acre. See the "Weeds Controlled" section of this label for labeled annual and herbaceous weeds and woody plants and broadcast rate recommendations. As density of vegetation increases, spray volume should be increased within the recommended range to ensure complete coverage. Carefully select correct nozzle to avoid spraying a fine mist. For best results with ground application equipment, use flat fan nozzles. Check for even distribution of spray droplets.

### Hand-Held and High-Volume Equipment
**(Use Coarse Sprays Only)**

**For control of weeds listed in this label using knapsack sprayers or high-volume spraying equipment utilizing handguns or other suitable nozzle arrangements:**

**High volume sprays:** Prepare a **3/4 to 2 percent solution** of this product in water, add a nonionic surfactant and apply to foliage of vegetation to be controlled. For specific rates of application and instructions for control of various annual and perennial weeds, see the "Weeds Controlled" section in this label.

Applications should be made on a spray-to-wet basis. Spray coverage should be uniform and complete. Do not spray to point of runoff.

**Low volume directed sprays**: Rodeo may be used as a **5 to 8 percent solution** in low-volume directed sprays for spot treatment of trees and brush. This treatment method is most effective in areas where there is a low density of undesirable trees or brush. If a straight stream nozzle is used, start the application at the top of the targeted vegetation and spray from top to bottom in a lateral zig-zag motion. Ensure that at least 50 percent of the leaves are contacted by the spray solution. For flat fan and cone nozzles and with hand-directed mist blowers, mist the application over the foliage of the targeted vegetation. Small, open-branched trees need only be treated from one side. If the foliage is thick or there are multiple root sprouts, applications must be made from several sides to ensure adequate spray coverage.

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

**Spray Solution**

| Desired Volume | Amount of Rodeo | | | | | | |
|---|---|---|---|---|---|---|---|
| | **3/4%** | **1%** | **1 1/4%** | **1 1/2%** | **2%** | **5%** | **8%** |
| **1 gal** | 1 fl oz | 1 1/3 fl oz | 1 2/3 fl oz | 2 fl oz | 2 2/3 fl oz | 6 1/2 fl oz | 10 1/4 fl oz |
| **25 gal** | 1 1/2 pt | 1 qt | 1 1/4 qt | 1 1/2 qt | 2 qt | 5 qt | 2 gal |
| **100 gal** | 3 qt | 1 gal | 1 1/4 gal | 1 1/2 gal | 2 gal | 5 gal | 8 gal |

2 tablespoons = 1 fluid ounce

For use in knapsack sprayers, it is suggested that the recommended amount of this product be mixed with water in a larger container. Fill the knapsack sprayer with the mixed solution and add the correct amount of surfactant.

### Wiper Applications

For wick or wiper applications, mix 1 gallon of this product with 2 gallons of clean water to make a 33 percent solution. Addition of a nonionic surfactant at a rate of 10 percent by volume of total herbicide solution is recommended.

Wiper applications can be used to control or suppress annual and perennial weeds listed on this label. In heavy weed stands, a double application in opposite directions may improve results. See the "Weed Controlled" section in this label for recommended timing, growth stage and other instructions for achieving optimum results

## Aquatic and Other Noncrop Sites

Apply Rodeo as directed and under conditions described to control or partially control weeds and woody plants listed in the "Weeds Controlled" section in industrial, recreational and public areas or other similar aquatic or terrestrial sites on this label.

### Aquatic Sites

**Rodeo may be applied to emerged weeds in all bodies of fresh and brackish water which may be flowing, nonflowing or transient. This includes lakes, rivers, streams, ponds, estuaries, rice levees, seeps, irrigation and drainage ditches, canals, reservoirs, wastewater treatment facilities, wildlife habitat restoration and management areas, and similar sites.**

**If aquatic sites are present in the noncrop area and are part of the intended treatment, read and observe the following directions:**

- **Rodeo does not control plants which are completely submerged or have a majority of their foliage under water.**
- There is no restriction on the use of treated water for irrigation, recreation or domestic purposes.
- Consult local state fish and game agency and water control authorities before applying this product to public water. Permits may be required to treat such water.

- **NOTE:** Do not apply this product directly to water within 1/2 mile upstream of an active potable water intake in flowing water (i.e., river, stream, etc.) or within 1/2 mile of an active potable water intake in a standing body of water such as lake, pond or reservoir. To make aquatic applications around and within 1/2 mile of active potable water intakes, the water intake must be turned off for a minimum period of 48 hours after the application. The water intake may be turned on prior to 48 hours if the glyphosate level in the intake water is below 0.7 parts per million as determined by laboratory analysis. These aquatic applications may be made **only** in those cases where there are alternative water sources or holding ponds which would permit the turning off of an active potable water intake for a minimum period of 48 hours after the applications. This restriction does not apply to intermittent inadvertent overspray of water in terrestrial use sites.
- For treatments after drawdown of water or in dry ditches, allow 7 or more days after treatment before reintroduction of water to achieve maximum weed control. Apply this product within 1 day after drawdown to ensure application to actively growing weeds.
- Floating mats of vegetation may require retreatment. Avoid wash-off of sprayed foliage by spray boat or recreational boat backwash or by rainfall within 6 hours of application. Do not re-treat within 24 hours following the initial treatment.
- Applications made to moving bodies of water must be made while traveling upstream to prevent concentration of this herbicide in water. When making any bankside applications, do not overlap more than 1 foot into open water. Do not spray in bodies of water where weeds do not exist. The maximum application rate of 7 1/2 pints per acre must not be exceeded in any single broadcast application that is being made over water.
- When emerged infestations require treatment of the total surface area of impounded water, treating the area in strips may avoid oxygen depletion due to decaying vegetation. Oxygen depletion may result in fish kill.

### Other Noncrop Sites

**Rodeo may be used to control the listed weeds in the following terrestrial noncrop sites and/or in aquatic sites within these areas:**

Habitat Restoration & Management Areas
Highways & Roadsides
Industrial Plant Sites
Petroleum Tank Farms
Pipeline, Power, Telephone & Utility Rights-of-Way
Pumping Installations
Railroads
Similar Sites

### Cut Stump Application

Woody vegetation may be controlled by treating freshly cut stumps of trees and resprouts with this product. Apply this product using suitable equipment to ensure coverage of the entire cambium. Cut vegetation close to the soil surface. **Apply a 50 to 100 percent solution of this product to freshly cut surface immediately after cutting.** Delay in applying this product may result in reduced performance. For best results, trees should be cut during periods of active growth and full leaf expansion.

When used according to directions for cut stump application, this product will **control**, **partially control or suppress** most woody brush and tree species, some of which are listed below:

| **Common Name** | **Scientific Name** |
|---|---|
| Alder | *Alnus spp.* |
| Coyote brush † | *Baccharis consanguinea* |
| Dogwood † | *Cornus spp.* |
| Eucalyptus | *Eucalyptus spp.* |
| Hickory † | *Carya spp.* |
| Madrone | *Arbutus menziesii* |
| Maple † | *Acer spp.* |
| Oak | *Quercus spp.* |
| Poplar † | *Populus spp.* |
| Reed, giant | *Arundo donax* |
| Salt cedar | *Tamarix spp.* |
| Sweet gum † | *Liquidambar styraciflua* |
| Sycamore † | *Platanus occidentalis* |
| Tan oak | *Lithocarpus densiflorus* |
| Willow | *Salix spp.* |

† Rodeo is not approved for this use on these species in the state of California.

## Wildlife Habitat Restoration and Management Areas

Rodeo is recommended for the restoration and/or maintenance of native habitat and in wildlife management areas.

**Habitat Restoration and Maintenance:** When applied as directed, exotic and other undesirable vegetation may be controlled in habitat management areas. Applications may be made to allow recovery of native plant species, to open up water to attract waterfowl, and for similar broad-spectrum vegetation control requirements in habitat management areas. Spot treatments may be made to selectively remove unwanted plants for habitat enhancement. For spot treatments, care should be exercised to keep spray off of desirable plants.

**Wildlife Food Plots:** Rodeo may be used as a site preparation treatment prior to planting wildlife food plots. Apply as directed to control vegetation in the plot area. Any wildlife food species may be planted after applying this product, or native species may be allowed to reinfest the area. If tillage is needed to prepare a seedbed, wait 7 days after applying this product before tilling to allow for maximum effectiveness.

### Injection and Frill Applications

Woody vegetation may be controlled by injection or frill application of this product. Apply this product using suitable equipment which must penetrate into living tissue. Apply the equivalent of 1 ml of this product per 2 to 3 inches of trunk diameter. This is best achieved by applying 25 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 dilute material to a continuous frill or more closely spaced cuttings. Avoid application techniques that allow runoff to occur from frill or cut areas in species that exude sap freely after frills or cutting. In species such as these, make frill or cut at an oblique angle so as to produce a cupping effect and use undiluted material. For best results, applications should be made during periods of active growth and full leaf expansion.

**This treatment will control the following woody species:**

| Common Name | Scientific Name |
|---|---|
| Oak | *Quercus spp.* |
| Poplar | *Populus spp.* |
| Sweet gum | *Liquidambar styraciflua* |
| Sycamore | *Platanus occidentalis* |

**This treatment will suppress the following woody species:**

| Common Name | Scientific Name |
|---|---|
| Black gum † | *Nyssa sylvatica* |
| Dogwood | *Cornus spp.* |
| Hickory | *Carya spp.* |
| Maple, red | *Acer rubrum* |

† Rodeo is not approved for this use on this species in the state of California.

## Release of Bermudagrass or Bahiagrass on Noncrop Sites

### Release Of Dormant Bermudagrass and Bahiagrass

When applied as directed, this product will provide control or suppression of many winter annual weeds and tall fescue for effective release of dormant bermudagrass or bahiagrass. Make applications to dormant bermudagrass or bahiagrass.

For best results on winter annuals, treat when weeds 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 in or beyond the 4 to 6-leaf stage.

### Weeds Controlled

Rate recommendations for control or suppression of winter annuals and tall fescue are listed below.

Apply the recommended rates of this product in 10 to 25 gallons of water per acre plus 2 quarts nonionic surfactant per 100 gallons of total spray volume.

**Weeds Controlled or Suppressed †**

**Note:** C = Controlled; S = Suppressed

| | Rate of Rodeo (Fluid Ounces Per Acre) | | | | | |
|---|---|---|---|---|---|---|
| **Weed Species** | **6** | **9** | **12** | **18** | **24** | **48** |
| **Barley, little** *Hordeum pusillum* | S | C | C | C | C | C |
| **Bedstraw, catchweed** *Galium aparine* | S | C | C | C | C | C |
| **Bluegrass, annual** *Poa annua* | S | C | C | C | C | C |
| **Chervil** *Chaerophyllum tainturieri* | S | C | C | C | C | C |
| **Chickweed, common** *Stellaria media* | S | C | C | C | C | |
| **Clover, crimson** *Trifolium incarnatum* | • | S | S | C | C | C |
| **Clover, large hop** *Trifolium campestre* | • | S | S | C | C | C |
| **Speedwell, corn** *Veronica arvensis* | S | C | C | C | C | C |
| **Fescue, tall** *Festuca arundinacea* | • | • | • | • | S | S |
| **Geranium, Carolina** *Geranium carolinianum* | • | • | S | S | C | C |
| **Henbit** *Lamium amplexicaule* | • | S | C | C | C | C |
| **Ryegrass, Italian** *Lolium multiflorum* | • | • | S | C | C | C |
| **Vetch, common** *Vicia sativa* | • | • | S | C | C | C |

† These rates apply only to sites where an established competitive turf is present.

### Release of Actively Growing Bermudagrass

**NOTE: Use only on sites where bahiagrass or bermudagrass are desired for ground cover and some temporary injury or yellowing of the grasses can be tolerated.**

When applied as directed, this product will aid in the release of bermudagrass by providing control of annual species listed in the "Weeds Controlled" section in this label, and suppression or partial control of certain perennial weeds.

For control or suppression of those annual species listed in this label, use 3/4 to 2 1/4 pints of this product as a broadcast spray in 10 to 25 gallons of spray solution per acre, plus 2 quarts of a nonionic surfactant per 100 gallons of total spray volume. Use the lower rate when treating annual weeds below 6 inches in height (or length of runner in annual vines). Use the higher rate as size of plants increases or as they approach flower or seedhead formation.

Use the higher rate for partial control or longer-term suppression of the following perennial species. Use lower rates for shorter-term suppression of growth.

| | |
|---|---|
| Bahiagrass | Johnsongrass † |
| Dallisgrass | Trumpetcreeper †† |
| Fescue (tall) | Vaseygrass |

† Johnsongrass is controlled at the higher rate.
†† Suppression at the higher rate only.

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 result.

### Bahiagrass Seedhead and Vegetative Suppression

When applied as directed in the "Noncrop Sites" section in this label, this product will provide significant inhibition of seedhead emergence and will suppress vegetative growth for a period of approximately 45 days with single applications and approximately 120 days with sequential applications.

Apply this product 1 to 2 weeks after full green-up of bahiagrass or after the bahiagrass has been mowed to a uniform height of 3 to 4 inches. Applications must be made prior to seedhead emergence. Apply 5 fluid ounces per acre of this product, plus 2 quarts of an approved nonionic surfactant per 100 gallons of total spray volume in 10 to 25 gallons of water per acre.

Sequential applications of this product plus nonionic surfactant may be made at approximately 45-day intervals to extend the period of seedhead and vegetative growth suppression. For continued vegetative growth suppression, sequential applications must be made prior to seedhead emergence.

Apply no more than 2 sequential applications per year. As a first sequential application, apply 3 fluid ounces of this product per acre plus nonionic surfactant. A second sequential application of 2 to 3 fluid ounces per acre plus nonionic surfactant may be made approximately 45 days after the last application.

### Annual Grass Growth Suppression

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 ounces of this product in 10 to 40 gallons of spray solution per acre. Mix 2 quarts of a nonionic surfactant per 100 gallons of spray solution. Applications should be made when annual grasses are actively growing and before the seedheads are in the boot stage of development. Treatments made after seedhead emergence may cause injury to the desired grasses.

## Weeds Controlled

### Annual Weeds

Apply to actively growing annual grasses and broadleaf weeds.

Allow at least 3 days after application before disturbing treated vegetation. After this period the weeds may be mowed, tilled or burned. See "Directions for Use," "General Information" and "Mixing and Application Instructions" for labeled uses and specific application instructions.

**Broadcast Application Rates:** Use 1 1/2 pints of this product per acre plus 2 or more quarts of a nonionic surfactant per 100 gallons of spray solution if weeds are less than 6 inches tall. If weeds are greater than 6 inches tall, use 2 1/2 pints of this product per acre plus 2 or more quarts of an approved nonionic surfactant per 100 gallons of spray solution.

**Hand-Held, High-Volume Application Rates:** Use a 3/4 percent solution of this product in water plus 2 or more quarts of a nonionic surfactant per 100 gallons of spray solution and apply to foliage of vegetation to be controlled.

**When applied as directed, Rodeo plus nonionic surfactant will control the following annual weeds:**

| Common Name | Scientific Name |
|---|---|
| Balsamapple † | *Momordica charantia* |
| Barley | *Hordeum vulgare* |
| Barnyardgrass | *Echinochloa crus-galli* |
| Bassia, fivehook | *Bassia hyssopifolia* |
| Bluegrass, annual | *Poa annua* |
| Bluegrass, bulbous | *Poa bulbosa* |
| Brome | *Bromus spp.* |
| Buttercup | *Ranunculus spp.* |
| Cheat | *Bromus secalinus* |
| Chickweed, mouseear | *Cerastium vulgatum* |
| Cocklebur | *Xanthium strumarium* |
| Corn, volunteer | *Zea mays* |
| Crabgrass | *Digitaria spp.* |
| Dwarfdandelion | *Krigia cespitosa* |
| Falseflax, smallseed | *Camelina microcarpa* |
| Fiddleneck | *Amsinckia spp.* |
| Flaxleaf fleabane | *Conyza bonariensis* |
| Fleabane | *Erigeron spp.* |
| Foxtail | *Setaria spp.* |
| Foxtail, Carolina | *Alopecurus carolinianus* |
| Groundsel, common | *Senecio vulgaris* |
| Horseweed/Marestail | *Conyza canadensis* |
| Kochia | *Kochia scoparia* |
| Lambsquarters, common | *Chenopodium album* |
| Lettuce, prickly | *Lactuca serriola* |
| Morningglory | *Ipomoea spp.* |
| Mustard, blue | *Chorispora tenella* |
| Mustard, tansy | *Descurainia pinnata* |
| Mustard, tumble | *Sisymbrium altissimum* |
| Mustard, wild | *Sinapis arvensis* |
| Oats, wild | *Avena fatua* |
| Panicum | *Panicum spp.* |
| Pennycress, field | *Thlaspi arvense* |
| Pigweed, redroot | *Amaranthus retroflexus* |
| Pigweed, smooth | *Amaranthus hybridus* |
| Ragweed, common | *Ambrosia artemisiifolia* |
| Ragweed, giant | *Ambrosia trifida* |
| Rocket, London | *Sisymbrium irio* |
| Rye | *Secale cereale* |
| Ryegrass, Italian †† | *Lolium multiflorum* |
| Sandbur, field | *Cenchrus spp.* |
| Shattercane | *Sorghum bicolor* |
| Shepherd's-purse | *Capsella bursa-pastoris* |
| Signalgrass, broadleaf | *Brachiaria platyphylla* |
| Smartweed, Pennsylvania | *Polygonum pensylvanicum* |
| Sowthistle, annual | *Sonchus oleraceus* |

| | |
|---|---|
| Spanishneedles [††] | *Bidens bipinnata* |
| Stinkgrass | *Eragrostis cilianensis* |
| Sunflower | *Helianthus annuus* |
| Thistle, Russian | *Salsola kali* |
| Spurry, umbrella | *Holosteum umbellatum* |
| Velvetleaf | *Abutilon theophrasti* |
| Wheat | *Triticum aestivum* |
| Witchgrass | *Panicum capillare* |

[†]Apply with hand-held equipment only.
[††]Apply 3 pints of this product per acre.

Annual weeds will generally continue to germinate from seed throughout the growing season. Repeat treatments will be necessary to control later germinating weeds.

## Perennial Weeds

Apply Rodeo to control most vigorously growing perennial weeds. Unless otherwise directed, apply when target plants are actively growing and most have reached early head or early bud stage of growth. Unless otherwise directed, allow at least 7 days after application before disturbing vegetation.

**NOTE**: If weeds have been mowed or tilled, do not treat until regrowth has reached the recommended stages. Fall treatments must be applied before a killing frost.

Repeat treatments may be necessary to control weeds regenerating from underground parts or seed.

**Specific Weed Control Recommendations:** For perennial weeds, apply the recommended rate plus 2 or more quarts of a nonionic surfactant per 100 gallons of spray solution. See the "General Information", "Directions for Use" and "Mixing and Application" sections in this label for specific uses and application instructions.

**When applied as directed, Rodeo plus nonionic surfactant will control the following perennial weeds:** (Numbers in parentheses "(-)" following common name of a listed weed species refer to "Specific Perennial Weed Control Recommendations" for that weed which follow the species listing.)

| **Common Name** | **Scientific Name** |
|---|---|
| Alfalfa (31) | *Medicago sativa* |
| Alligatorweed [†] (1) | *Alternanthera philoxeroides* |
| Anise/Fennel (31) | *Foeniculum vulgare* |
| Artichoke, Jerusalem (31) | *Helianthus tuberosus* |
| Bahiagrass (31) | *Paspalum notatum* |
| Bermudagrass (2) | *Cynodon dactylon* |
| Bindweed, field (3) | *Convolvulus arvensis* |
| Bluegrass, Kentucky (12) | *Poa pratensis* |
| Blueweed, Texas (3) | *Helianthus ciliaris* |
| Brackenfern (4) | *Pteridium spp.* |
| Bromegrass, smooth (12) | *Bromus inermis* |
| Canarygrass, reed (12) | *Phalaris arundinacea* |
| Cattail (5) | *Typha spp.* |
| Clover, red (31) | *Trifolium pratense* |
| Clover, white (31) | *Trifolium repens* |
| Cogongrass (6) | *Imperata clylindrica* |
| Cordgrass (7) | *Spartina spp.* |
| Cutgrass, giant [†] (8) | *Zizaniopsis miliacea* |
| Dallisgrass (31) | *Paspalum dilatatum* |
| Dandelion (31) | *Taraxacum officinale* |
| Dock, curly (31) | *Rumex crispus* |
| Dogbane, hemp (9) | *Apocynum cannabinum* |
| Fescue (31) | *Festuca spp.* |
| Fescue, tall (10) | *Festuca arundinacea* |
| Guineagrass (11) | *Panicum maximum* |
| Hemlock, poison (31) | *Conium maculatum* |
| Horsenettle (31) | *Solanum carolinense* |
| Horseradish (9) | *Armoracia rusticana* |
| Ice Plant (22) | *Mesembryanthemum crystallinum* |
| Johnsongrass (12) | *Sorghum halepense* |
| Kikuyugrass (21) | *Pennisetum clandestinum* |
| Knapweed (9) | *Centaurea repens* |
| Lantana (13) | *Lantana camara* |
| Lespedeza, common (31) | *Lespedeza striata* |
| Lespedeza, sericea (31) | *Lespedeza cuneata* |
| Loosestrife, purple (14) | *Lythrum salicaria* |
| Lotus, American (15) | *Nelumbo lutea* |
| Maidencane (16) | *Panicum hematomon* |
| Milkweed (17) | *Asclepias spp.* |
| Muhly, wirestem (21) | *Muhlenbergia frondosa* |
| Mullein, common (31) | *Verbascum thapsus* |
| Napiergrass (31) | *Pennisetum purpureum* |
| Nightshade, silverleaf (3) | *Solanum elaeagnifolium* |
| Nutsedge, purple (18) | *Cyperus rotundus* |
| Nutsedge, yellow (18) | *Cyperus esculentus* |
| Orchardgrass (12) | *Dactylis glomerata* |
| Pampasgrass (19) | *Cortaderia jubata* |
| Paragrass (16) | *Brachiaria mutica* |
| Phragmites[††] (20) | *Phragmites spp.* |
| Quackgrass (21) | *Agropyron repens* |
| Reed, giant (22) | *Arundo donax* |
| Ryegrass, perennial (12) | *Lolium perenne* |
| Smartweed, swamp (31) | *Polygonum coccineum* |
| Spatterdock (23) | *Nuphar luteum* |
| Starthistle, yellow (31) | *Centaurea solstitialis* |
| Sweet potato, wild [†] (24) | *Ipomoea pandurata* |
| Thistle, artichoke (25) | *Cynara cardunculus* |
| Thistle, Canada (25) | *Cirsium arvense* |
| Timothy (12) | *Phleum pratense* |
| Torpedograss [†] (26) | *Panicum repens* |
| Tules, common (27) | *Scirpus acutus* |
| Vaseygrass (31) | *Paspalum urvillei* |
| Velvetgrass (31) | *Holcus spp.* |
| Waterhyacinth (28) | *Eichornia crassipes* |
| Waterlettuce (29) | *Pistia stratiotes* |
| Waterprimrose (30) | *Ludwigia spp.* |
| Wheatgrass, western (12) | *Agropyron smithii* |

[†]Partial control.
[††]Partial control in southeastern states. See "Specific Weed Control Recommendations" below.

**Specific Perennial Weed Control Recommendations:**

1. **Alligatorweed:** Apply 6 pints of this product per acre as a broadcast spray or as a 1 1/4 percent solution with hand-held equipment to provide partial control of alligatorweed. Apply when most of the target plants are in bloom. Repeat applications will be required to maintain such control.
2. **Bermudagrass:** Apply 7 1/2 pints of this product per acre as a broadcast spray or as a 1 1/2 percent solution with hand-held equipment. Apply when target plants are actively growing and when seedheads appear.
3. **Bindweed, field / Silverleaf Nightshade / Texas Blueweed:** Apply 6 to 7 1/2 pints of this product per acre as a broadcast spray west of the Mississippi River and 4 1/2 to 6 pints of this product per acre east of the Mississippi River. With hand-held equipment, use a 1 1/2 percent solution. Apply when target plants are actively growing and are at or beyond full bloom. For silverleaf nightshade, best results can be obtained when application is made after berries are formed. Do not treat when weeds are under drought stress. New leaf development indicates active growth. For best results apply in late summer or fall.
4. **Brackenfern:** Apply 4 1/2 to 6 pints of this product per acre as a broadcast spray or as a 3/4 to 1 percent solution with hand-held equipment. Apply to fully expanded fronds which are at least 18 inches long.
5. **Cattail:** Apply 4 1/2 to 6 pints of this product per acre as a broadcast spray or as a 3/4 percent solution with hand-held equipment. Apply when target plants are actively growing and are at or beyond the early-to-full bloom stage of growth. Best results are achieved when application is made during the summer or fall months.
6. **Cogongrass:** Apply 4 1/2 to 7 1/2 pints of this product per acre as a broadcast spray. Apply when cogongrass is at least 18 inches tall and actively growing in late summer or fall. Allow 7 or more days after application before tillage or mowing. Due to uneven stages of growth and the dense nature of vegetation preventing good spray coverage, repeat treatments may be necessary to maintain control.
7. **Cordgrass:** Apply 4 1/2 to 7 1/2 pints of this product per acre as a broadcast spray or as a 1 to 2 percent solution with hand-held equipment. Schedule applications in order to allow 6 hours before treated plants are covered by tidewater. The presence of debris and silt on the cordgrass plants will reduce performance. It may be necessary to wash targeted plants prior to application to improve uptake of this product into the plant.
8. **Cutgrass, giant:** Apply 6 pints of this product per acre as a broadcast spray or as a 1 percent solution with hand-held equipment to provide partial control of giant cutgrass. Repeat applications will be required to maintain such control, especially where vegetation is partially submerged in water. Allow for substantial regrowth to the 7 to 10-leaf stage prior to retreatment.
9. **Dogbane, hemp / Knapweed / Horseradish:** Apply 6 pints of this product per acre as a broadcast spray or as a 1 1/2 percent solution with hand-held equipment. Apply when target plants are actively growing and most have reached the late bud-to-flower stage of growth. For best results, apply in late summer or fall.
10. **Fescue, tall:** Apply 4 1/2 pints of this product per acre as a broadcast spray or as a 1 percent solution with hand-held equipment. Apply when target plants are actively growing and most have reached the boot-to-head stage of growth. When applied prior to the boot stage, less desirable control may be obtained.
11. **Guineagrass:** Apply 4 1/2 pints of this product per acre as a broadcast spray or as a 3/4 percent solution with hand-held equipment. Apply when target plants are actively growing and when most have reached at least the 7-leaf stage of growth.
12. **Johnsongrass / Bluegrass, Kentucky / Bromegrass, smooth / Canarygrass, reed / Orchardgrass / Ryegrass, perennial / Timothy / Wheatgrass, western:** Apply 3 to 4 1/2 pints of this product per acre as a broadcast spray or as a 3/4 percent solution with hand-held equipment. Apply when target plants are actively growing and most have reached the boot-to-head stage of growth. When applied prior to the boot stage, less desirable control may be obtained. In the fall, apply before plants have turned brown.
13. **Lantana:** Apply this product as a 3/4 to 1 percent solution with hand-held equipment. Apply to actively growing lantana at or beyond the bloom stage of growth. Use the higher application rate for plants that have reached the woody stage of growth.
14. **Loosestrife, purple:** Apply 4 pints of this product per acre as a broadcast spray or as a 1 to 1 1/2 percent solution using hand-held equipment. Treat when plants are actively growing at or beyond the bloom stage of growth. Best results are achieved when application is made during summer or fall months. Fall treatments must be applied before a killing frost.
15. **Lotus, American:** Apply 4 pints of this product per acre as a broadcast spray or as a 3/4 percent solution with hand-held equipment. Treat when plants are actively growing at or beyond the bloom stage of growth. Best results are achieved when application is made during summer or fall months. Fall treatments must be applied before a killing frost. Repeat treatment may be necessary to control regrowth from underground parts and seeds.
16. **Maidencane / Paragrass:** Apply 6 pints of this product per acre as a broadcast spray or as a 3/4 percent solution with hand-held equipment. Repeat treatments will be required, especially to vegetation partially submerged in water. Under these conditions, allow for regrowth to the 7 to 10-leaf stage prior to retreatment.
17. **Milkweed, common:** Apply 4 1/2 pints of this product per acre as a broadcast spray or as a 1 1/2 percent solution with hand-held equipment. Apply when target plants are actively growing and most have reached the late bud-to-flower stage of growth.
18. **Nutsedge: purple, yellow:** Apply 4 1/2 pints of this product per acre as a broadcast spray, or as a 3/4 percent solution with hand-held equipment to control existing nutsedge plants and immature nutlets attached to treated plants. Apply when target plants are in flower or when new nutlets can be found at rhizome tips. Nutlets which have not germinated will not be controlled and may germinate following treatment. Repeat treatments will be required for long-term control.
19. **Pampasgrass:** Apply a 1 1/2 percent solution of this product with hand-held equipment when plants are actively growing.
20. **Phragmites:** For partial control of phragmites in Florida and the counties of other states bordering the Gulf of Mexico, apply 7 1/2 pints per acre as a broadcast spray or apply a 1 1/2 percent solution with hand-held equipment. In other areas of the U.S., apply 4 to 6 pints per acre as a broadcast spray or apply a 3/4 percent solution with hand-held equipment for partial control. For best results, treat during late summer of fall months when plants are actively growing and in full bloom. Due to the dense nature of the vegetation, which may prevent good spray coverage and uneven stages of growth, repeat treatments may be necessary to maintain control. Visual control symptoms will be slow to develop.
21. **Quackgrass / Kikuyugrass / Muhly, wirestern:** Apply 3 to 4 1/2 pints of this product per acre as a broadcast spray or as a 3/4 percent solution with hand-held equipment when most quackgrass or wirestem muhly is at least 8 inches in height (3 to 4-leaf stage of growth) and actively growing. Allow 3 or more days after application before tillage.
22. **Reed, giant / ice plant:** For control of giant reed and ice plant, apply a 1 1/2 percent solution of this product with hand-held equipment when plants are actively growing. For giant reed, best results are obtained when applications are made in late summer to fall.

23. **Spatterdock:** Apply 6 pints of this product per acre as a broadcast spray or as a 3/4 percent solution with hand-held equipment. Apply when most plants are in full bloom. For best results, apply during the summer or fall months.
24. **Sweet potato, wild:** Apply this product as a 1 1/2 percent solution using hand-held equipment. Apply to actively growing weeds that are at or beyond the bloom stage of growth. Repeat applications will be required. Allow the plant to reach the recommended stage of growth before retreatment.
25. **Thistle, Canada / artichoke:** Apply 3 to 4 1/2 pints of this product per acre as a broadcast spray or as a 1 1/2 percent solution with hand-held equipment for Canada thistle. To control artichoke thistle, apply a 2 percent solution as a spray-to-wet application. Apply when target plants are actively growing and are at or beyond the bud stage of growth.
26. **Torpedograss:** Apply 6 to 7 1/2 pints of this product per acre as a broadcast spray or as a 3/4 to 1 1/2 percent solution with hand-held equipment to provide partial control of torpedograss. Use the lower rates under terrestrial conditions, and the higher rates under partially submerged or a floating mat condition. Repeat treatments will be required to maintain such control.
27. **Tules, common:** Apply this product as a 1 1/2 percent solution with hand-held equipment. Apply to actively growing plants at or beyond the seedhead stage of growth. After application, visual symptoms will be slow to appear and may not occur for 3 or more weeks.
28. **Waterhyacinth:** Apply 5 to 6 pints of this product per acre as a broadcast spray or apply a 3/4 to 1 percent solution with hand-held equipment. Apply when target plants are actively growing and at or beyond the early bloom stage of growth. After application, visual symptoms may require 3 or more weeks to appear with complete necrosis and decomposition usually occurring within 60 to 90 days. Use the higher rates when more rapid visual effects are desired.
29. **Waterlettuce:** For control, apply a 3/4 to 1 percent solution of this product with hand-held equipment to actively growing plants. Use higher rates where infestations are heavy. Best results are obtained from mid-summer through winter applications. Spring applications may require retreatment.
30. **Waterprimrose:** Apply this product as a 3/4 percent solution using hand-held equipment. Apply to plants that are actively growing at or beyond the bloom stage of growth, but before fall color changes occur. Thorough coverage is necessary for best control.
31. **Other perennial weeds listed above:** Apply 4 1/2 to 7 1/2 pints of Rodeo per acre as a broadcast spray or apply as a 3/4 to 1 1/2 percent solution with hand-held equipment.

## Woody Brush and Trees

**NOTE:** If brush has been mowed or tilled or trees have been cut, do not treat until regrowth has reached the recommended stage of growth.

**Application Rates and Timing**
When applied as a 5 to 8 percent solution as a directed application as described in the "Hand-Held and High-Volume Equipment" section, this product will control or partially control all wood brush and tree species listed in this section of this label. Use the higher rate of application for dense stands and larger woody brush and trees.

**Specific Brush or Tree Control Recommendations:** Numbers in parentheses "(-)" following the common name of a listed brush or tree species refer to "Specific Brush or Tree Control Recommendations" which follow the species listing. See this section for specific application rates and timing for listed species.

For woody brush and trees, apply the recommended rate plus 2 or more quarts of a nonionic surfactant per 100 gallons of spray solution when plants are actively growing and, unless otherwise directed, after full-leaf expansion. 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 application is made in the spring or early summer when brush species are at high moisture content and are flowering. Ensure thorough coverage when using hand-held equipment. 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.

See the "Directions for Use" and "Mixing and Application Instructions" sections in this label for labeled use and specific application instructions. **When applied as directed, Rodeo plus nonionic surfactant will control the following woody brush plants and trees:** (Numbers in parentheses "(-)" following common name of a listed brush or tree species refer to "Specific Brush or Tree Control Recommendations" for that species which follow the species listing.)

| **Common Name** | **Scientific Name** |
|---|---|
| Alder (1) | *Alnus spp.* |
| Ash † (20) | *Fraxinus spp.* |
| Aspen, quaking (2) | *Populus tremuloides* |
| Bearclover, Bearmat (20) | *Chamaebatia foliolosa* |
| Birch (3) | *Betula spp.* |
| Blackberry (1) | *Rubus spp.* |
| Broom, French (4) | *Cytisus monspessulanus* |
| Broom, Scotch (4) | *Cytisus scoparius* |
| Buckwheat, California † (5) | *Eriogonum fasciculatum* |
| Cascara † (20) | *Rhamnus purshiana* |
| Catsclaw † (6) | *Acacia greggi* |
| Ceanothus (20) | *Ceanothus spp.* |
| Chamise (17) | *Adenostoma fasciculatum* |
| Cherry, bitter (7) | *Prunus emarginata* |
| Cherry, black (7) | *Prunus serotina* |
| Cherry, pin (7) | *Prunus pensylvanica* |
| Coyote brush (8) | *Baccharis consanguinea* |
| Creeper, Virginia † (20) | *Parthenocissus quinquefolia* |
| Dewberry (1) | *Rubus trivialis* |
| Dogwood (9) | *Cornus spp.* |
| Elderberry (3) | *Sambucus spp.* |
| Elm † (20) | *Ulmus spp.* |
| Eucalyptus, bluegum (10) | *Eucalyptus globulus* |
| Hasardia † (5) | *Haplopappus squamosus* |
| Hawthorn (2) | *Crataegus spp.* |
| Hazel (3) | *Corylus spp.* |
| Hickory (9) | *Carya spp.* |
| Holly, Florida (11) (Brazilian peppertree) | *Schinus terebinthifolius* |
| Honeysuckle (1) | *Lonicera spp.* |
| Hornbeam, American (20) | *Carpinus caroliniana* |
| Kudzu (12) | *Pueraria lobata* |
| Locust, black † (20) | *Robinia pseudoacacia* |
| Manzanita (20) | *Arctostaphylos spp.* |

| | |
|---|---|
| Maple, red † (13) | *Acer rubrum* |
| Maple, sugar (14) | *Acer saccharum* |
| Maple, vine † (20) | *Acer circinatum* |
| Monkey flower † (5) | *Mimulus guttatus* |
| Oak, black † (20) | *Quercus velutina* |
| Oak, northern pin (14) | *Quercus palustris* |
| Oak, post (1) | *Quercus stellata* |
| Oak, red (14) | *Quercus rubra* |
| Oak, southern red (7) | *Quercus falcata* |
| Oak, white † (20) | *Quercus alba* |
| Persimmon † (20) | *Diospyros spp.* |
| Poison-ivy (15) | *Rhus radicans* |
| Poison-oak (15) | *Rhus toxicodendron* |
| Poplar, yellow † (20) | *Liriodendron tulipifera* |
| Prunus (7) | *Prunus spp.* |
| Raspberry (1) | *Rubus spp.* |
| Redbud, eastern (20) | *Cercis canadensis* |
| Rose, multiflora (16) | *Rosa multiflora* |
| Russian-olive (20) | *Elaeagnus angustifolia* |
| Sage: black (17), white | *Salvia spp.* |
| Sagebrush, California (17) | *Artemisia californica* |
| Salmonberry (3) | *Rubus spectabilis* |
| Salt cedar † (9) | *Tamarix spp.* |
| Saltbush, sea myrtle (18) | *Baccharis halimifolia* |
| Sassafras (20) | *Sassafras aibidum* |
| Sourwood † (20) | *Oxydendrum arboreum* |
| Sumac, poison † (20) | *Rhus vernix* |
| Sumac, smooth † (20) | *Rhus glabra* |
| Sumac, winged † (20) | *Rhus copallina* |
| Sweetgum (7) | *Liquidambar styraciflua* |
| Swordfern † (20) | *Polystichum munitum* |
| Tallowtree, Chinese (17) | *Sapium sebiferum* |
| Thimbleberry (3) | *Rubus parviflorus* |
| Tobacco, tree † (5) | *Nicotiana glauca* |
| Trumpetcreeper (2) | *Campsis radicans* |
| Waxmyrtle, southern † (11) | *Myrica cerifera* |
| Willow (19) | *Salix spp.* |

† Partial control (See below for control or partial control instructions.)

**Specific Brush or Tree Control Recommendations:**

1. **Alder / Blackberry / Dewberry / Honeysuckle / Oak, Post / Raspberry:** For control, apply 4 1/2 to 6 pints per acre as a broadcast spray or as a 3/4 to 1 1/4 percent solution with hand-held equipment.
2. **Aspen, Quaking / Hawthorn / Trumpetcreeper:** For control, apply 3 to 4 1/4 pints of this product per acre as a broadcast spray or as a 3/4 to 1 1/4 percent solution with hand-held equipment.
3. **Birch / Elderberry / Hazel / Salmonberry / Thimbleberry:** For control, apply 3 pints per acre of this product as a broadcast spray or as a 3/4 percent solution with hand-held equipment.
4. **Broom, French / Broom, Scotch:** For control, apply a 1 1/4 to 1 1/2 percent solution with hand-held equipment.
5. **Buckwheat, California / Hasardia / Monkey flower / Tobacco, tree:** For partial control of these species, apply a 3/4 to 1 1/2 percent solution of this product as a foliar spray with hand-held equipment. Thorough coverage of foliage is necessary for best results.
6. **Catsclaw:** For partial control, apply a 1 1/4 to 1 1/2 percent solution with hand-held equipment when at least 50 percent of the new leaves are fully developed.
7. **Cherry, bitter / Cherry, black / Cherry, pin / Oak, southern red / Sweetgum / Prunus:** For control, apply 3 to 7 1/2 pints of this product per acre as a broadcast spray or as a 1 to 1 1/2 percent solution with hand-held equipment.
8. **Coyote brush:** For control, apply a 1 1/4 to 1 1/2 percent solution with hand-held equipment when at least 50 percent of the new leaves are fully developed.
9. **Dogwood / Hickory / Salt cedar:** For partial control, apply a 1 to 2 percent solution of this product with hand-held equipment or 6 to 7 1/2 pints per acre as a broadcast spray.
10. **Eucalyptus, bluegum:** For control of eucalyptus resprouts, apply a 1 1/2 percent solution of this product with hand-held equipment when resprouts are 6 to 12-feet tall. Ensure complete coverage. Apply when plants are actively growing. Avoid application to drought-stressed plants.
11. **Holly, Florida / Waxmyrtle, southern:** For partial control, apply this product as a 1 1/2 percent solution with hand-held equipment.
12. **Kudzu:** For control, apply 6 pints of this product per acre as a broadcast spray or as a 1 1/2 percent solution with hand-held equipment. Repeat applications will be required to maintain control.
13. **Maple, red:** For control, apply as a 3/4 to 1 1/4 percent solution with hand-held equipment when leaves are fully developed. For partial control, apply 2 to 7 1/2 pints of this product per acre as a broadcast spray.
14. **Maple, sugar / Oak: northern pin / Oak, red:** For control, apply as a 3/4 to 1 1/4 percent solution with hand-held equipment when at least 50 percent of the new leaves are fully developed.
15. **Poison-ivy / Poison-oak:** For control, apply 6 to 7 1/2 pints of this product per acre as a broadcast spray or as a 1 1/2 percent solution with hand-held equipment. Repeat applications may be required to maintain control. Fall treatments must be applied before leaves lose green color.
16. **Rose, multiflora:** For control, apply 3 pints of this product per acre as a broadcast spray or as a 3/4 percent solution with hand-held equipment. Treatments should be made prior to leaf deterioration by leaf-feeding insects.
17. **Sage, black / Sagebrush, California / Chamise / Tallowtree, Chinese:** For control of these species, apply a 3/4 percent solution of this product as a foliar spray with hand-held equipment. Thorough coverage of foliage is necessary for best results.
18. **Saltbush, sea myrtle:** For control, apply this product as a 1 percent solution with hand-held equipment.
19. **Willow:** For control, apply 4 1/2 pints of this product per acre as a broadcast spray or as a 3/4 percent solution with hand-held equipment.
20. **Other woody brush and trees listed above:** For partial control, apply 3 to 7 1/2 pints of this product per acre as a broadcast spray or as a 3/4 to 1 1/2 percent solution with hand-held equipment.

## Warranty Disclaimer

Dow AgroSciences warrants that this product conforms to the chemical description on the label and is reasonably fit for the purposes stated on the label when used in strict accordance with the directions, subject to the inherent risks set forth below. Dow AgroSciences MAKES NO OTHER EXPRESS OR IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY OTHER EXPRESS OR IMPLIED WARRANTY.

## Inherent Risks of Use

It is impossible to eliminate all risks associated with use of this product. Crop injury, lack of performance, or other unintended consequences may result because of such factors as use of the product contrary to label instructions (including conditions noted on the label, such as unfavorable temperatures, soil conditions, etc.), abnormal conditions (such as excessive rainfall, drought, tornadoes, hurricanes), presence of other materials, the manner of application, or other factors, all of which are beyond the control of Dow AgroSciences or the seller. All such risks shall be assumed by buyer.

## Limitation of Remedies

The exclusive remedy for losses or damages resulting from this product (including claims based on contract, negligence, strict liability, or other legal theories), shall be limited to, at Dow AgroSciences' election, one of the following:

(1) Refund of purchase price paid by buyer or user for product bought, or
(2) Replacement of amount of product used.

Dow AgroSciences shall not be liable for losses or damages resulting from handling or use of this product unless Dow AgroSciences is promptly notified of such loss or damage in writing. In no case shall Dow AgroSciences be liable for consequential or incidental damages or losses.

The terms of the Warranty Disclaimer above and this Limitation of Remedies cannot be varied by any written or verbal statements or agreements. No employee or sales agent of Dow AgroSciences or the seller is authorized to vary or exceed the terms of the Warranty Disclaimer or this Limitation of Remedies in any manner.

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**Dow AgroSciences LLC • Indianapolis, IN 46268 U.S.A.**

Label Code: D02-148-002
Replaces Label: D02-148-001

EPA-accepted 05/15/2002

**Revisions:**

1. Update of specific uses allowed in the state of California.

# MATERIAL SAFETY DATA SHEET

**Emergency Phone: 800-992-5994**
**Dow AgroSciences LLC**
**Indianapolis, IN 46268**

## RODEO* HERBICIDE

Effective Date: 1/12/00
Product Code: 84825
MSDS: 006694

### 1. PRODUCT AND COMPANY IDENTIFICATION:

**PRODUCT:** Rodeo* Herbicide

**COMPANY IDENTIFICATION:**
Dow AgroSciences
9330 Zionsville Road
Indianapolis, IN 46268-1189

### 2. COMPOSITION/INFORMATION ON INGREDIENTS:

| | | |
|---|---|---|
| Glyphosate: N-(phosphono-methyl)glycine, Isopropylamine Salt | CAS # 038641-94-0 | 53.8% |
| Inert Ingredients, Total | | 46.2% |

This document is prepared pursuant to the OSHA Hazard Communication Standard (29 CFR 1910.1200). In addition, other substances not 'Hazardous' per this OSHA Standard may be listed. Where proprietary ingredient shows, the identity may be made available as provided in this standard.

### 3. HAZARDOUS IDENTIFICATIONS:

**EMERGENCY OVERVIEW**

Hazardous Chemical. Clear, pale yellow liquid. May cause eye irritation. $LD_{50}$ for skin absorption in rabbits is >5000 mg/kg. Oral $LD_{50}$ for rats is >5000 mg/kg. Aerosol $LC_{50}$ for rats is >6.37 mg/L for 4 hrs. Slightly toxic to aquatic organisms.
**EMERGENCY PHONE NUMBER:** 800-992-5994

**POTENTIAL HEALTH EFFECTS:** This section includes possible adverse effects, which could occur if this material is not handled in the recommended manner.

**EYE:** May cause slight eye irritation. Corneal injury is unlikely.

**SKIN:** Essentially non-irritating to skin. A single prolonged exposure is not likely to result in the material being absorbed through the skin in harmful amounts. The $LD_{50}$ for skin absorption in rabbits is >5000 mg/kg. Did not cause allergic skin reactions when tested in guinea pigs.

**INGESTION:** Single dose oral toxicity is extremely low. No hazards anticipated from swallowing small amounts incidental to normal handling operations. The oral $LD_{50}$ for rats is >5000 mg/kg.

**INHALATION:** A single brief (minutes) inhalation exposure is not likely to cause adverse effects. The aerosol $LC_{50}$ for rats is >6.37 mg/L for 4 hours.

**SYSTEMIC (OTHER TARGET ORGAN) EFFECTS**: No relevant information found.

**CANCER INFORMATION**: Did not cause cancer in laboratory animals.

**TERATOLOGY (BIRTH DEFECTS):** Birth defects are unlikely. Exposures having no adverse effects on the mother should have no effect on the fetus.

**REPRODUCTIVE EFFECTS**: No relevant information found.

### 4. FIRST AID:

**EYE**: Flush eyes with plenty of water.

**SKIN**: Wash off in flowing water or shower.

**INGESTION:** No adverse effects anticipated by this route of exposure incidental to proper industrial handling.

**INHALATION**: Remove to fresh air if effects occur. Consult a physician.

**NOTE TO PHYSICIAN**: No specific antidote. Supportive care. Treatment based on judgment of the physician in response to reactions of the patient.

### 5. FIRE FIGHTING MEASURES:

**FLASH POINT:** >214°F (>101°C)
**METHOD USED:** Setaflash

**FLAMMABLE LIMITS:**
LFL: Not applicable
UFL: Not applicable

**EXTINGUISHING MEDIA:** Foam, $CO_2$, Dry Chemical

**FIRE AND EXPLOSION HAZARDS**: Foam fire extinguishing system is preferred because uncontrolled water can spread possible contamination. Toxic irritating gases may be formed under fire conditions.

**FIRE-FIGHTING EQUIPMENT:** Use positive-pressure, self-contained breathing apparatus and full protective equipment.

# MATERIAL SAFETY DATA SHEET

Dow AgroSciences™

**Emergency Phone: 800-992-5994**
**Dow AgroSciences LLC**
**Indianapolis, IN 46268**

## RODEO* HERBICIDE

Effective Date: 1/12/00
Product Code: 84825
MSDS: 006694

### 6. ACCIDENTAL RELEASE MEASURES:

**ACTION TO TAKE FOR SPILLS:** Absorb small spills with an inert absorbent material such as Hazorb, Zorball, sand, or dirt. Report large spills to Dow AgroSciences on 800-992-5994.

### 7. HANDLING AND STORAGE:

**PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE:** Keep out of reach of children. Do not swallow. Avoid contact with eyes, skin, and clothing. Avoid breathing vapors and spray mist. Handle concentrate in ventilated area. Wash thoroughly with soap and water after handling and before eating, chewing gum, using tobacco, using the toilet or smoking. Keep away from food, feedstuffs, and water supplies. Store in original container with the lid tightly closed. Store above 10°F (-12°C) to keep from crystallizing.

### 8. EXPOSURE CONTROLS/PERSONAL PROTECTION:

These precautions are suggested for conditions where the potential for exposure exists. Emergency conditions may require additional precautions.

**EXPOSURE GUIDELINES**: None established

**ENGINEERING CONTROLS**: Good general ventilation should be sufficient for most conditions. Local exhaust ventilation may be necessary for some operations.

**RECOMMENDATIONS FOR MANUFACTURING, COMMERCIAL BLENDING, AND PACKAGING WORKERS:**

**EYE/FACE PROTECTION**: Use safety glasses.

**SKIN PROTECTION:** No precautions other than clean body-covering clothing should be needed.

**RESPIRATORY PROTECTION**: For most conditions, no respiratory protection should be needed; however, if discomfort is experienced, use a NIOSH approved air-purifying respirator.

**APPLICATIONS AND ALL OTHER HANDLERS**: Please refer to the product label for personal protective clothing and equipment.

### 9. PHYSICAL AND CHEMICAL PROPERTIES:

**APPEARANCE:** Clear, pale yellow liquid
**DENSITY:** 10.0 - 10.5 lbs/gal
**pH:** 4.8 – 5.0
**ODOR**: None
**SOLUBILITY IN WATER:** Miscible
**SPECIFIC GRAVITY:** 1.21 gm/L
**FREEZING POINT**: -7°F - -10°F (-21°C - -25°C)

### 10. STABILITY AND REACTIVITY:

**STABILITY:** (CONDITIONS TO AVOID) Stable under normal storage conditions.

**INCOMPATIBILITY:** (SPECIFIC MATERIALS TO AVOID) Galvanized or unlined steel (except stainless steel) containers or spray tanks may produce hydrogen gas which may form a highly combustible gas mixture.

**HAZARDOUS DECOMPOSITION PRODUCTS**: None known.

**HAZARDOUS POLYMERIZATION:** Not known to occur.

### 11. TOXICOLOGICAL INFORMATION:

**MUTAGENICITY:** Animal mutagenicity studies were negative.

### 12. ECOLOGICAL INFORMATION:

**ENVIRONMENTAL DATA:**

**ECOTOXICOLOGY**:
Material is slightly toxic to aquatic organisms on an acute basis ($LC_{50}$/$EC_{50}$ is between 10 and 100 mg/L in most sensitive species).
Acute $LC_{50}$ for rainbow trout (Oncorhynchus mykiss) is 60 mg/L.
Material is practically non-toxic to birds on an acute basis ($LD_{50}$ is >2000 mg/kg).
Acute oral $LD_{50}$ in bobwhite (Colinus virginianus) is >2000 mg/kg.
The $LC_{50}$ in earthworm Eisenia foetida is >1000 mg/kg.

# MATERIAL SAFETY DATA SHEET

**Emergency Phone: 800-992-5994**
**Dow AgroSciences LLC**
**Indianapolis, IN 46268**

## RODEO* HERBICIDE

Effective Date: 1/12/00
Product Code: 84825
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### 13. DISPOSAL CONSIDERATIONS:

**DISPOSAL METHOD:** Do not contaminate water, food, or feed by storage or disposal. Excess wastes resulting from the use of this product may be disposed of on site according to label directions or at an approved waste disposal facility. Follow all local, state, and federal requirements for disposal.

### 14. TRANSPORT INFORMATION:

For DOT regulatory information, if required, consult transportation regulations, product shipping papers, or contact your Dow AgroSciences representative.

### 15. REGULATORY INFORMATION:

**NOTICE:** The information herein is presented in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ from one location to another; it is the buyer's responsibility to ensure that its activities comply with federal, state or provincial, and local laws. The following specific information is made for the purpose of complying with numerous federal, state or provincial, and local laws and regulations.

**U.S. REGULATIONS**

**SARA 313 INFORMATION**: To the best of our knowledge, this product contains no chemical subject to SARA Title III Section 313 supplier notification requirements.

**SARA HAZARD CATEGORY:** This product has been reviewed according to the EPA "Hazard Categories" promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

Not to have met any hazard category

**TOXIC SUBSTANCES CONTROL ACT (TSCA):** All ingredients are on the TSCA inventory or are not required to be listed on the TSCA inventory.

**STATE RIGHT-TO-KNOW:** This product is not known to contain any substances subject to the disclosure requirements of

New Jersey
Pennsylvania

**OSHA HAZARD COMMUNICATION STANDARD:** This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

**COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT (CERCLA, or SUPERFUND):** To the best of our knowledge, this product contains no chemical subject to reporting under CERCLA.

### 16. OTHER INFORMATION:

**MSDS STATUS**: New
Reference: DR-0361-8028
Document Code: D03-148-001

The Information Herein Is Given In Good Faith, But No Warranty, Express Or Implied, Is Made. Consult Dow AgroSciences For Further Information.

# Habitat®

## herbicide

**Applications may only be made for the control of undesirable emergent and floating aquatic vegetation in and around standing and flowing water, including estuarine and marine sites. Applications may be made to control undesirable wetland, riparian and terrestrial vegetation growing in or around surface water when applications may result in inadvertent applications to surface water.**

| | |
|---|---|
| **Active ingredient:** | |
| Isopropylamine salt of Imazapyr (2-[4,5-dihydro-4-methyl-4-(1-methylethyl)-5-oxo-1H-imidazol-2-yl]-3-pyridinecarboxylic acid)* | 28.7% |
| **Inert ingredients** | 71.3% |
| **Total** | 100.0% |

* Equivalent to 22.6% 2-[4,5-dihydro-4-methyl-4-(1-methylethyl)-5-oxo-1H-imidazol-2-yl]-3-pyridinecarboxylic acid or 2 pounds acid per gallon.

**EPA Reg. No. 241-426** **U.S. Patent No. 4,798,619** **EPA Est. No.**

## KEEP OUT OF REACH OF CHILDREN.
## CAUTION/PRECAUCIÓN

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

**In case of an emergency endangering life or property involving this product, call day or night, 800-832-HELP.**

**See Next Page for Additional Precautionary Statements**

**For more information, please visit our web site:**

**www.vmanswers.com**

PROFESSIONAL VEGETATION MANAGEMENT

**Net contents: _____**

BASF Corporation
26 Davis Drive
Research Triangle Park, NC 27709

BASF

| FIRST AID | |
|---|---|
| **If on skin or clothing** | • Take off contaminated clothing.<br>• Rinse skin immediately with plenty of water for 15-20 minutes.<br>• Call a poison control center or doctor for treatment advice. |
| **If in eyes** | • Hold eye open and rinse slowly and gently with water for 15-20 minutes.<br>• Remove contact lenses, if present, after first 5 minutes, then continue rinsing eye.<br>• Call a poison control center or doctor for treatment advice. |
| **If inhaled** | • Move person to fresh air.<br>• If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth, if possible.<br>• Call a poison control center or doctor for further 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. You may also contact BASF Corporation for emergency medical treatment information: 1-800-832-HELP (4357). | |

## PRECAUTIONARY STATEMENTS

### HAZARDS TO HUMANS

### CAUTION!

Avoid contact with skin, eyes or clothing. Avoid breathing spray mist. Wash thoroughly with soap and water after handling. Remove contaminated clothing and wash before reuse.

### PERSONAL PROTECTIVE EQUIPMENT(PPE):

Some materials that are chemical-resistant to this product are listed below. If you want more options, follow the instructions for category A on an EPA chemical-resistant category selection chart.

Applicators and other handlers must wear:

- Long-sleeve shirt and long pants
- Chemical-resistant gloves, Category A
- shoes plus socks

Follow manufacturer's instructions for cleaning and maintaining PPE. If no such instructions are given for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

### PHYSICAL AND CHEMICAL HAZARDS

Spray solutions of **HABITAT® herbicide** should be mixed, stored and applied only in stainless steel, fiberglass, plastic and plastic-lined steel containers.

DO NOT mix, store or apply **HABITAT herbicide** or spray solutions of **HABITAT herbicide** in unlined steel (except stainless steel) containers or spray tanks.

### ENVIRONMENTAL HAZARDS

DO NOT apply to water except as specified in this label. Treatment of aquatic weeds may result in oxygen depletion or loss due to decomposition of dead plants. This oxygen loss may cause the suffocation of some aquatic organisms. Do not treat more than one half of the surface area of the water in a single operation and wait at least 10 to 14 days between treatments. Begin treatment along the shore and proceed outward in bands to allow aquatic organisms to move into untreated areas. Do not contaminate water when disposing of equipment washwaters or rinsate.

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

## DIRECTIONS FOR USE

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

**HABITAT herbicide** should be used only in accordance with recommendations on the leaflet label attached to the container. Keep containers closed to avoid spills and contamination.

### STORAGE AND DISPOSAL

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

**PESTICIDE STORAGE:** DO NOT store below 10° F.

**PESTICIDE DISPOSAL:** Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.

**CONTAINER DISPOSAL:** Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in an approved sanitary landfill, or by incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

### IMPORTANT

**DO NOT** use on food crops. **DO NOT** apply this product within one-half mile upstream of an active potable water intake in flowing water (i.e., river, stream, etc.) or within one-half mile of an active potable water intake in a standing body of water, such as a lake, pond or reservoir. **DO NOT** apply to water used for irrigation except as described in APPLICATION TO WATERS USED FOR IRRIGATION section of this label. Keep from contact with fertilizers, insecticides, fungicides and seeds. **DO NOT** drain or flush equipment on or near desirable trees or other plants, or on areas where their roots may extend, or in locations where the treated soil may be washed or moved into contact with their roots.

**DO NOT** use on lawns, walks, driveways, tennis courts, or similar areas. **DO NOT** side trim desirable vegetation with this product unless severe injury and plant death can be tolerated. Prevent drift of spray to desirable plants.

Clean application equipment after using this product by thoroughly flushing with water.

## GENERAL USE PRECAUTIONS AND RESTRICTIONS

Applications may only be made for the control of undesirable emergent and floating aquatic vegetation in and around standing and flowing water, including estuarine and marine sites. Applications may be made to control undesirable wetland, riparian and terrestrial vegetation growing in or around surface water when applications may result in inadvertent applications to surface water.

Do not apply more than 6 pints of product (1.5 lbs. acid equivalent) per acre per year.

Aerial application is restricted to helicopter only.

Application of **HABITAT® herbicide** can only be made by federal or state government entities or applicators who are licensed or certified applicators making applications under a program sponsored by federal or state government entities.

Treatment to other than non-native invasive species is limited to only those plants that have been determined to be a nuisance by a federal or state government entity.

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

**Application to public waters:** Applications may be made to public waters such as ponds, lakes, reservoirs, marshes, bayous, drainage ditches, canals, streams, rivers, and other slow-moving or quiescent bodies of water for control of aquatic weeds or for control of riparian and wetland weed species. Applications of **HABITAT herbicide** to public waters can only be made by Federal or State agencies such as Water Management District personnel, municipal officials and the U.S. Army Corps of Engineers or those applicators who are licensed or certified as aquatic pest control applicators and are authorized by the State or local government.

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

**Recreational Use of Water in Treatment Area:** There are no restrictions on the use of water in the treatment area for recreational purposes, including swimming and fishing.

**Livestock Use of Water in/from Treatment Area:** There are no restrictions on livestock consumption of water from the treatment area.

**Precautions for Potable Water Intakes:** Do not apply **HABITAT herbicide** directly to water within one-half mile upstream of an active potable water intake in flowing water (i.e., river, stream, etc.) or within one-half mile of an active potable water intake in a standing body of water such as lake, pond or reservoir. To make aquatic applications around and within one-half mile of active potable water intakes, the water intake must be turned off during application and for a minimum of 48 hours after the application. These aquatic applications may be made only in the cases where there are alternative water sources or holding ponds, which would permit the turning off of an active potable water intake for a minimum period of 48 hours after the applications. Note: Existing potable water intakes which are no longer in use, such as those replaced by connections to wells or a municipal water system, are not considered to be active potable water intakes. This restriction does not apply to intermittent, inadvertent overspray of water in terrestrial use sites.

### APPLICATION TO WATERS USED FOR IRRIGATION

Water treated with **HABITAT herbicide** may not be used for irrigation purposes for 120 days after application or until **HABITAT herbicide** residue levels are determined by laboratory analysis, or other appropriate means of analysis, to be 1.0 ppb or less.

**Seasonal Irrigation Waters: HABITAT herbicide** may be applied during the off-season to surface waters that are used for irrigation on a seasonable basis, provided that there is a minimum of 120 days between **HABITAT herbicide** application and the first use of treated water for irrigation purposes or until **HABITAT herbicide** residue levels are determined by laboratory analysis, or other appropriate means of analysis, to be 1.0 ppb or less.

**Irrigation Canals/Ditches:** DO NOT apply **HABITAT herbicide** to irrigation canals/ditches unless the 120-day restriction on irrigation water usage can be observed or **HABITAT herbicide** residue levels are determined by laboratory analysis, or other appropriate means of analysis, to be 1.0 ppb or less. DO NOT apply **HABITAT herbicide** to dry irrigation canals/ditches.

**Quiescent or Slow Moving Waters:** In lakes and reservoirs DO NOT apply **HABITAT herbicide** within one (1) mile of an active irrigation water intake during the irrigation season. Applications less than one (1) mile from an inactive irrigation water intake may be made during the off-season, provided that the irrigation intake will remain inactive for a minimum 120 days after application or until **HABITAT herbicide** residue levels

are determined by laboratory analysis, or other appropriate means of analysis, to be 1.0 ppb or less.

**Moving water:** DO NOT apply within one-half mile downstream of an active irrigation water intake. When making applications upstream from an active irrigation water intake, the intake must be turned off for a period of time sufficient to allow the upstream portion of treated water to completely flow past the irrigation intake before use can resume. Shut off time will be determined by the speed of water flow and the distance and length of water treated upstream from the intake. Consult local, state and/or federal authorities before making any applications upstream from an active irrigation water intake.

## GENERAL INFORMATION

**Use Sites: HABITAT® herbicide** is an aqueous solution to be mixed with water and a surfactant and applied as a spray solution to control floating and emergent undesirable vegetation (see **AQUATIC WEEDS CONTROLLED** section and the **ADDITIONAL WEEDS CONTROLLED BY HABITAT HERBICIDE** section) in or near bodies of water which may be flowing, non-flowing, or transient. **HABITAT herbicide** may be applied to aquatic sites that include lakes, rivers, streams, ponds, seeps, drainage ditches, canals, reservoirs, swamps, bogs, marshes, estuaries, bays, brackish water, transitional areas between terrestrial and aquatic sites and seasonal wet areas. See **AQUATIC USE** section of this label for precautions, restrictions, and instructions on aquatic uses.

Read and observe the following directions if aquatic sites are present in terrestrial noncrop areas and are part of the intended treatment area:

**Herbicidal Activity: HABITAT herbicide** will control most annual and perennial grasses and broadleaf weeds in addition to many brush and vine species with some residual control of undesirable species that germinate above the waterline. **HABITAT herbicide** is readily absorbed through emergent leaves and stems and is translocated rapidly throughout the plant, with accumulation in the meristematic regions. Treated plants stop growing soon after spray application. Chlorosis appears first in the newest leaves, and necrosis spreads from this point. In perennials, the herbicide is translocated into, and kills, underground or submerged storage organs which prevents regrowth. Chlorosis and tissue necrosis may not be apparent in some plant species until two or more weeks after application. Complete kill of plants may not occur for several weeks. Applications of **HABITAT herbicide** are rainfast one hour after treatment.

**HABITAT herbicide does not control plants which are completely submerged or have a majority of their foliage under water.**

**Application Methods: HABITAT herbicide** must be applied to the emergent foliage of the target vegetation and has little to no activity on submerged aquatic vegetation. **HABITAT herbicide** concentrations resulting from direct application to water are not expected to be of sufficient concentration nor duration to provide control of target vegetation. Application should be made in such a way as to maximize spray interception by the target vegetation while minimizing the amount of overspray that enters the water. For maximum activity, weeds should be growing vigorously at the time of application and the spray solution should include a surfactant (See ADJUVANTS section for specific recommendations). **HABITAT herbicide** may be selectively applied by using low-volume directed application techniques or may be broadcast applied by using ground equipment, watercraft or by helicopter. In addition, **HABITAT herbicide** may also be used for cut stump, cut stem and frill and girdle treatments within aquatic sites (see **AERIAL APPLICATIONS** and **GROUND APPLICATIONS** sections for additional details).

**HABITAT herbicide** should be applied with surface or helicopter application equipment in a minimum of 5 gallons of water per acre. When applying by helicopter, follow directions under the **AERIAL APPLICATIONS** section of this label, otherwise refer to section on **GROUND APPLICATIONS** when using surface equipment.

Applications made to moving bodies of water should be made while traveling upstream to prevent concentration of this herbicide in water. DO NOT apply to bodies of water or portions of bodies of water where emergent and/or floating weeds do not exist.

When application is to be made to target vegetation that covers a large percentage of the surface area of impounded water, treating the area in strips may avoid oxygen depletion due to decaying vegetation. Oxygen depletion may result in the suffication of some sensitive aquatic organisms. Do not treat more than one half of the surface area of the water in a single operation and wait at least 10 to 14 days between treatments. Begin treatment along the shore and proceed outward in bands to allow aquatic organisms to move into untreated areas.

Avoid wash-off of sprayed foliage by spray boat or recreational boat backwash for one hour after application.

Apply **HABITAT herbicide** at 2 to 6 pints per acre depending on species present and weed density. DO NOT exceed the maximum label rate of 6 pints per acre (1.5 lb ai/A) per year. Use the higher labeled rates for heavy weed pressure. Consult the **AQUATIC WEEDS CONTROLLED** section and the **ADDITIONAL WEEDS CONTROLLED BY HABITAT HERBICIDE** section of this label for specific rates.

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

## PRECAUTIONS FOR AVOIDING INJURY TO NON-TARGET PLANTS

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

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

### MANAGING OFF-TARGET MOVEMENT

**Spray Drift**: Avoiding spray drift at the application site is the responsibility of the applicator. The interaction of many equipment-and-weather-related factors determines the potential for spray drift. The applicator and the entity authorizing spraying are responsible for considering all these factors when making decisions.

Spray drift from applying this product may result in damage to sensitive plants adjacent to the treatment area. Only apply this product when the potential for drift to these and other adjacent sensitive areas (e.g. residential areas, bodies of water, known habitat for threatened or endangered species, or non-target crops) is minimal. Do not apply when the following conditions exist that increase the likelihood of spray drift from intended targets: high or gusty winds, high temperatures, low humidity, temperature inversions.

To minimize spray drift, the applicator should be familiar with and take into account the following drift reduction advisory information. Additional information may be available from state enforcement agencies or the Cooperative Extension on the application of this product.

The best drift management strategy and most effective way to reduce drift potential are to apply large 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 WIND, TEMPERATURE AND HUMIDITY, and TEMPERATURE INVERSIONS).

#### CONTROLLING DROPLET SIZE

- Volume - Use high flow rate nozzles to apply the highest practical spray volume. Nozzles with higher rated flows produce larger droplets.
- Pressure - Do not exceed the nozzle manufacturer's recommended pressures. For many nozzle types, lower pressure produces larger droplets. 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 parallel to the airstream produces larger droplets than other orientations and is recommended practice. 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 the largest droplets and the lowest drift. Do not use nozzles producing a mist droplet spray.

#### APPLICATION HEIGHT

Making applications at the lowest possible height (helicopter, ground driven spray boom) that is safe and practical reduces exposure of droplets to evaporation and wind.

#### SWATH ADJUSTMENT

When applications are made with a crosswind, the swath will be displaced downwind. Therefore, on the up and downwind edges of the treatment area, the applicator must compensate for this displacement by adjusting the path of the application equipment (e.g. aircraft, ground) upwind. Swath adjustment distance should increase with increasing drift potential (higher wind, smaller droplets, etc.).

#### WIND

Drift potential is lowest between wind speeds of 3-10 mph. However, many factors, including droplet size and equipment type, determine drift potential at any given speed. Application should be avoided below 3 mph 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 spray 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

Drift potential is high during a temperature inversion. Temperature inversions restrict vertical air mixing, which causes small suspended droplets to remain in a concentrated cloud, which 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.

### WIND EROSION

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

### AERIAL APPLICATION METHODS AND EQUIPMENT HELICOPTERS ONLY

**Water Volume:** Use 2 or more gallons of water per acre. The actual minimum spray volume per acre is determined by the spray equipment used. Use adequate spray volume to provide accurate and uniform distribution of spray particles over the treated area and to avoid spray drift.

**Managing spray drift from aerial applications:** Applicators must follow these requirements to avoid off-target drift movement: 1) boom length - the distance of the outermost nozzles on the boom must not exceed ¾ the length of the rotor, 2) nozzle orientation - nozzles must always point backward parallel with the air stream and never be pointed downwards more than 45 degrees, and 3) application height - without compromising helicopter safety, applications should made at a height of 10 feet or less above the crop canopy or tallest plants. Applicators must follow the most restrictive use cautions to avoid drift hazards, including those found in this labeling as well as applicable state and local regulations and ordinances.

## GROUND APPLICATION (BROADCAST)

**Water Volume:** Use 5 or more gallons of water per acre. The actual minimum spray volume per acre is determined by the spray equipment used. Use adequate spray volume to provide accurate and uniform distribution of spray particles over the treated area and to avoid spray drift.

## ADJUVANTS

Postemergence applications of **HABITAT® herbicide** require the addition of a spray adjuvant. Only spray adjuvants that are approved or appropriate for aquatic use should be utilized.

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

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

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

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

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

## TANK MIXES

**HABITAT herbicide** may be tank-mixed with other aquatic use herbicides for the control of emergent and floating aquatic vegetation.

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

## AERIAL APPLICATIONS

All precautions should be taken to minimize or eliminate spray drift. Helicopters can be used to apply **HABITAT® herbicide**; however, DO NOT make applications by helicopter unless appropriate buffer zones can be maintained to prevent spray drift out of the target area, or when spray drift as a result of helicopter application can be tolerated. Aerial equipment designed to minimize spray drift, such as a helicopter equipped with a Microfoil™ boom, Thru-Valve™ boom or raindrop nozzles, must be used and calibrated. Except when applying with a Microfoil boom, a drift control agent may be added at the recommended label rate. To avoid drift, applications should not be made during inversion conditions, when winds are gusty, or any other conditions which allow drift. Side trimming is not recommended with **HABITAT herbicide** unless death of treated tree can be tolerated.

Uniformly apply the recommended amount of **HABITAT herbicide** in 5 to 30 gallons of water per acre; include in the spray solution a nonionic surfactant or methylated seed oil or manufacturer's label rate of a silicone-based surfactant (See the Adjuvant section of this label for specific recommendations). A foam reducing agent may be added at the recommended label rate, if needed.

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

## GROUND APPLICATIONS

### FOLIAR APPLICATIONS

**Low Volume Foliar:**

Use equipment calibrated to deliver 5 to 20 gallons of spray solution per acre. To prepare the spray solution, thoroughly mix in water 0.5 to 5% **HABITAT herbicide** plus surfactant (see the ADJUVANTS section of this label for specific recommendations). A foam reducing agent may be applied at the recommended label rate, if needed. For control of difficult species (see AQUATIC WEEDS CONTROLLED section and the ADDITIONAL WEEDS CONTROLLED BY **HABITAT HERBICIDE** section for relative susceptibility of weed species), use the higher concentrations of herbicide and/or spray volumes but do not apply more than 6 pints of **HABITAT herbicide** per acre. Excessive wetting of foliage is not recommended. See the Mixing Guide below for some suggested volumes of **HABITAT herbicide** and water.

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

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

Moisten, but do not drench target vegetation causing spray solution to run off.

**Low Volume Foliar with Backpacks:**

For low growing species, spray down on the crown, covering crown and penetrating approximately 70% of the plant.

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

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

**Low Volume Foliar with Hydraulic Handgun Application Equipment:**

Use same technique as described above for Low Volume with Backpacks.

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

### SPRAY SOLUTION MIXING GUIDE FOR LOW-VOLUME FOLIAR APPLICATIONS

| AMOUNT OF SPRAY SOLUTION BEING PREPARED | DESIRED CONCENTRATION (fluid volume) | | | | |
|---|---|---|---|---|---|
| | 0.5% | 0.75% | 1% | 1.5% | 5% |
| | (amount of **HABITAT** to use) | | | | |
| 1 gallon | 0.6 oz. | 0.9 oz. | 1.3 oz. | 1.9 oz. | 6.5 oz. |
| 3 gallons | 1.9 oz. | 2.8 oz. | 3.8 oz. | 5.8 oz. | 1.2 pint |
| 4 gallons | 2.5 oz. | 3.8 oz. | 5.1 oz. | 7.7 oz. | 1.6 pint |
| 5 gallons | 3.2 oz. | 4.8 oz. | 6.5 oz. | 9.6 oz. | 2 pints |
| 50 gallons | 2 pints | 3 pints | 4 pints | 6 pints | 10 quarts |
| 100 gallons | 4 pints | 6 pints | 8 pints | 6 quarts | 5 gallons |
| 2 tablespoons = 1 fluid ounce | | | | | |

**High Volume Foliar:**

For optimum performance when spraying medium to high-density vegetation, use equipment calibrated to deliver up to 100 gallons of spray solution per acre (GPA). Spray solutions exceeding 100 GPA may result in excessive spray run-off, causing increased ground cover injury, and injury to desirable species. To prepare the spray solution, thoroughly mix **HABITAT® herbicide** in water and add a surfactant (see Adjuvant section for specific recommendations and rates of surfactants). A foam reducing agent may be added at the recommended label rate, if needed. For control of difficult species (see **AQUATIC WEEDS CONTROLLED** section and the **ADDITIONAL WEEDS CONTROLLED BY HABITAT HERBICIDE** section for relative susceptibility of weed species), use the higher concentrations of herbicide and/or spray volumes but do not apply more than 6 pints of **HABITAT herbicide** per acre. Uniformly cover the foliage of the vegetation to be controlled but do not apply to run-off. Excessive wetting of foliage is not recommended.

**Side Trimming:**

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

## CUT SURFACE TREATMENTS

**HABITAT herbicide** may be used to control undesirable woody vegetation by applying the **HABITAT herbicide** solution to the cambium area of freshly cut stump surfaces or to fresh cuts on the stem of the target woody vegetation. Applications can be made at any time of the year except during periods of heavy sap flow in the spring. Do not overapply solution causing run-off from the cut surface.

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

**Cut Surface Applications with Dilute and Concentrate Solutions:**

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

- To prepare a dilute solution, mix 8 to 12 fluid ounces of **HABITAT herbicide** with one gallon of water. The use of a surfactant or penetrating agent may improve uptake through partially callused cambiums.
- To prepare a concentrated solution, mix 2 quarts of **HABITAT herbicide** with no more than 1 quart of water.

**Cut stump treatments:**

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

**Cut stem (injection, hack & squirt) treatments:**

- Dilute Solutions- Using standard injection equipment, apply 1 milliliter of solution at each injection site around the tree with no more than one-inch intervals between cut edges. Insure that the injector completely penetrates the bark at each injection site.
- Concentrate Solutions- Using standard injection equipment, apply 1 milliliter of solution at each injection site. Make at least one injection cut for every 3 inches of Diameter at Breast Height (DBH) on the target tree. For example, a 3-inch DBH tree will receive 1 injection cut and a 6-inch DBH tree will receive 2 injection cuts. On trees requiring more than one injection site place the injection cuts at approximately equal intervals around the tree.

**Frill or girdle treatments:**

- Using a hatchet, machete, or chainsaw, make cuts through the bark and completely around the tree to expose the cambium. The cut should angle downward extending into the cambium enough to expose at least two growth rings. Using a spray applicator or brush, apply a 25% to 100% solution of **HABITAT herbicide** into each cut until thoroughly wet. Avoid applying so much herbicide that runoff to the ground or water occurs.

## AQUATIC SPECIES CONTROLLED

**HABITAT® herbicide** will control the following target species as specified in the BASF RECOMMENDATION section of the table. Rate recommendations are expressed in terms of product volume for broadcast applications and as a %solution for directed applications including spot treatments. **For % solution applications, DO NOT apply more than the equivalent of 3 quarts of HABITAT herbicide per acre.**

| COMMON NAME | SCIENTIFIC NAME | BASF RECOMMENDATION |
|---|---|---|
| **Floating Species** | | |
| Duckweed | *Lemna minor* | 2-3 pints/acre (1% solution) applied in 100 GPA water mix. Ensure 100% coverage of actively growing, emergent foliage. |
| Duckweed, Giant | *Spirodela polyriza* | 2-3 pints/acre (1% solution) applied in 100 GPA water mix. Ensure 100% coverage of actively growing, emergent foliage. |
| Frogbit | *Limnobium spongia* | 1-2 pints/acre (0.5% solution) applied in 100 GPA water mix. Ensure 100% coverage of actively growing, emergent foliage. |
| Spatterdock | *Nuphar luteum* | Apply a tank-mix of 2-4 pints/acre **HABITAT herbicide** + 4 to 6 pints/acre glyphosate (0.5% **HABITAT herbicide** + 1.5% glyphosate) in 100 GPA water for best control. Ensure 100% coverage of actively growing, emergent foliage. |
| Water Hyacinth | *Eichhornia crassipes* | 1-2 pints/acre (0.5% solution) applied in 100 GPA water to actively growing foliage. |
| Water Lettuce | *Pistia stratiotes* | 1-2 pints/acre (0.5% solution) applied in 100 GPA water mix. Ensure 100% coverage of actively growing, emergent foliage. |
| **Emerged Species** | | |
| Alligatorweed | *Alternanthera philoxeroides* | 1 to 4 pints/acre (0.5% solution) applied in 100 GPA water mix. Ensure 100% coverage of actively growing emergent foliage. Tank-mix with glyphosate is NOT recommended, and may reduce alligatorweed control, requiring higher **HABITAT herbicide** rates. |
| Arrowhead, Duck-potato | *Sagittaria* spp. | 1-2 pints/acre (0.5% solution) applied in 100 GPA water mix. Ensure 100% coverage of actively growing, emergent foliage. |
| Bacopa, lemon | *Bacopa* spp. | 1-2 pints/acre (0.5% solution) applied in 100 GPA water mix. Ensure 100% coverage of actively growing, emergent foliage. |
| Parrot feather | *Myriophyllum aquaticum* | Must be foliage above water for sufficient HABITAT uptake. Apply 2 - 4 pints to actively growing emergent foliage. |
| Pennywort | *Hydrocotyle* spp. | 1-2 pints/acre (0.5% solution) applied in 100 GPA water mix. Ensure 100% coverage of actively growing, emergent foliage. |
| Pickerelweed | *Pontederia cordata* | 2-3 pints/acre (1% solution) applied in 100 GPA water mix. Ensure 100% coverage of actively growing, emergent foliage. |
| Taro, wild; Dasheen; Elephant's Ear; Coco Yam | *Colocasia esculentum* | 4-6 pints/acre (1.5% solution) applied in 100 GPA with a high quality 'sticker' adjuvant. Ensure good coverage of actively growing, emergent foliage. |
| Water lily | *Nymphaea odorata* | 2-3 pints/acre (1% solution) applied in 100 GPA water mix. Ensure 100% coverage of actively growing, emergent foliage. |
| Water primrose | *Ludwigia uruguayensis* | 4-6 pints/acre (1.5% solution), ensure 100% coverage of actively growing, emergent foliage. Tank-mix with glyphosate is NOT recommended and may reduce water primrose control. |

## AQUATIC SPECIES CONTROLLED (CONT.)

| COMMON NAME | SCIENTIFIC NAME | BASF RECOMMENDATION |
|---|---|---|
| **Terrestrial/Marginal** | | |
| Soda Apple, aquatic; Nightshade | *Solanum tampicense* | 2 pts./acre applied to foliage |
| Bamboo, Japanese | *Phyllostachys* spp. | 3 to 4 pints/acre applied to the foliage when plant is actively growing. Before setting seed head. More foliage will result in greater herbicide uptake, resulting in greater root kill. |
| Brazilian Pepper; Christmasberry | *Schinus terebinthifolius* | 2 - 4 pints/acre applied to foliage |
| Cattail | *Typha* spp. | 2-4 pints (1% solution) applied to actively growing, green foliage after full leaf elongation. Lower rates will control cattail in the north; higher rates are needed in the south. |
| Chinese Tallow Tree | *Sapium sebiferum* | 16 to 24 oz applied to foliage |
| Cogon Grass | *Imperata cylindrica* | Burn foliage, till area, that fall spray 2 qt./acre **HABITAT herbicide** + MSO applied to new growth. |
| Cordgrass, prairie | *Spartina* spp. | 4-6 pints applied to actively growing foliage |
| Cutgrass | *Zizaniopsis miliacea* | 4-6 pints applied to actively growing foliage |
| Elephant Grass; Napier Grass- | *Pennisetum purpureum* | 3 pts../acre applied to actively growing foliage |
| Flowering rush | *Butumu typla* | 2-3 pints applied to actively growing foliage |
| Giant Reed, Wild Cane | *Arundo donax* | 4 to 6 pints/acre applied in spring to actively growing foliage |
| Golden Bamboo | *Phyllostachys aurea* | 3 to 4 pints/acre applied to the foliage when plant is actively growing. Before setting seed head. More foliage will result in greater herbicide uptake, resulting in greater root kill. |
| Junglerice | *Echinochloa colonum* | 3-4 pints applied to actively growing foliage |
| Knapweeds | *Centaurea species* | Russian Knapweed - 2 to 3 pints + 1 qt./acre MSO fall applied after senescence begins |
| Knotweed, Japanese (see Fallopia japonica) | *Polygonum cuspidatum* | 3 to 4 pts../acre applied postemergence to actively growing foliage |
| Melaleuca; Paperbark Tree | *Melaleuca quinquenervia* | For established stands, apply 6 pints/acre **HABITAT® herbicide** + 6 pints/acre glyphosate + spray adjuvant. For best results use 4 qt./A methylated seed oil as an adjuvant. For ground foliar application, uniformly apply to ensure 100% coverage. For broadcast foliar control, apply aerially in a minimum of two passes at 10 gallons/acre applied cross treatment. For spot treatment use a 25% **HABITAT herbicide** + 25% solution of + glyphosate + 1.25% MSO in water applied as a frill or stump treatment. |
| Nutgrass; Kili'p'opu | *Cyperus rotundus* | 2 pints **HABITAT** + 1 qt./acre MSO applied early postemergence |
| Nutsedge | *Cyperus* spp. | 2 to 3 pints postemergence to foliage or pre-emergence incorporated, non-incorporated preemergence applications will not control. |

## AQUATIC SPECIES CONTROLLED (CONT.)

| COMMON NAME | SCIENTIFIC NAME | BASF RECOMMENDATION |
|---|---|---|
| **Terrestrial/Marginal (Cont.)** | | |
| Phragmites; Common Reed | *Phragmites australis* | 4 to 6 pints/acre applied to actively growing, green foliage after full leaf elongation, ensure 100% coverage. If stand has a substantial amount of old stem tissue, mow or burn, allow to regrow to approximately 5' tall before treatment. Lower rates will control phragmites in the north; higher rates are needed in the south. |
| Poison Hemlock | *Conium maculatum* | 2 pints **HABITAT herbicide** + 1 qt./acre MSO applied pre-emergence to early postemergence to rosette, prior to flowering |
| Purple Loosestrife | *Lythrum salicaria* | 1 pint/acre applied to actively growing foliage |
| Reed canarygrass | *Phalaris arundinacea* | 3 to 4 pints/acre applied to actively growing foliage |
| Rose, swamp | *Rosa palustris* | 2 to 3 pts./acre applied to actively growing foliage |
| Russian-Olive | *Elaeagnus angustifolia* | 2 to 4 pints/acre or a 1% solution, applied to foliage |
| Saltcedar; Tamarisk | *Tamarix* species | Aerial apply 2 qts. **HABITAT herbicide** + 0.25%v/v NIS applied to actively growing foliage during flowering. For spot spraying use 1% solution of **HABITAT herbicide** + 0.25%v/v NIS and spray to wet foliage. After application wait at least two years before disturbing treated saltcedar. Earlier disturbance can reduce overall control. |
| Smartweed | *Polygonum spp.* | 2 pints/acre applied early postemergence |
| Sumac | *Rhus* spp. | 2 to 3 pts./acre applied to foliage |
| Swamp Morning Glory; Water Spinach; Kangkong | *Ipomoea aquatica* | 1 to 2 pints/acre **HABITAT herbicide** + 1 qt./acre MSO applied early postemergence |
| Torpedo Grass | *Panicum repens* | 4 pints/acre (1 - 1.5% solution), ensure good coverage to actively growing foliage. |
| White Top; Hoary Cress | *Cardaria draba* | 1 to 2 pints/acre applied in spring, to foliage, during flowering. |
| Willow | *Salix* spp. | 2 to 3 pts./acre **HABITAT herbicide** applied to actively growing foliage, ensure good coverage. |

## ADDITIONAL WEEDS CONTROLLED BY HABITAT HERBICIDE

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

The rates shown below pertain to broadcast applications and indicate the relative sensitivity of these weeds. The relative sensitivity should be referenced when preparing low volume spray solutions (see "Low Volume" section of "Ground Applications"); low volume applications may provide control of the target species with less **HABITAT herbicide** per acre than is shown for the broadcast treatments. **HABITAT herbicide** should be used only in accordance with the recommendations on this label and the leaflet label.

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

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

## GRASSES

| COMMON NAME | SPECIES | GROWTH HABIT[2] |
|---|---|---|
| **Apply 2-3 pints per acre[1]** | | |
| Annual bluegrass | *(Poa annua)* | A |
| Broadleaf signalgrass | *(Brachiaria platyphylla)* | A |
| Canada bluegrass | *(Poa compressa)* | P |
| Downy brome | *(Bromus tectorum)* | A |
| Fescue | *(Festuca* spp.*)* | A/P |
| Foxtail | *(Setaria* spp.*)* | A |
| Italian ryegrass | *(Lolium multiflorum)* | A |
| Johnsongrass | *(Sorghum halepense)* | P |
| Kentucky bluegrass | *(Poa pratensis)* | P |
| Lovegrass | *(Eragrostis* spp.*)* | A/P |
| Napier grass | *(Pennisetum purpureum)* | P |
| Orchardgrass | *(Dactylis glomerata)* | P |
| Paragrass | *(Brachiaria mutica)* | P |
| Quackgrass | *(Agropyron repens)* | P |
| Sandbur | *(Cenchrus* spp.*)* | A |
| Sand dropseed | *(Sporobulus cryptandrus)* | P |
| Smooth brome | *(Bromus inermis)* | P |
| Vaseygrass | *(Paspalum urvillei)* | P |
| Wild oats | *(Avena fatua)* | A |
| Witchgrass | *(Panicum capillare)* | A |
| **Apply 3-4 pints per acre[1]** | | |
| Barnyardgrass | *(Echinochloa crus-gali)* | A |
| Beardgrass | *(Andropogon* spp.*)* | P |
| Bluegrass, Annual | *(Poa annua)* | A |
| Bulrush | *(Scirpus validus)* | P |
| Cheat | *(Bromus secalinus)* | A |
| Crabgrass | *(Digitaria* spp.*)* | A |
| Crowfootgrass | *(Dactyloctenium aegyptium)* | A |
| Fall panicum | *(Panicum dichotomiflorum)* | A |
| Goosegrass | *(Eleusine indica)* | A |
| Itchgrass | *(Rottboellia exaltata)* | A |
| Lovegrass | *(Eragrostis* spp.*)* | A |
| Maidencane | *(Panicum hemitomon)* | A |
| Panicum, Browntop | *(Panicum fasciculatum)* | A |
| Panicum, Texas | *(Panicum texanum)* | A |
| Prairie threeawn | *(Aristida oligantha)* | P |
| Sandbur, Field | *(Cenchrus incertus)* | A |
| Signalgrass | *(Brachiaria platyphylla)* | A |
| Wild barley | *(Hordeum* spp.*)* | A |
| Wooly Cupgrass | *(Eriochloa villosa)* | A |

## GRASSES (CONT)

| COMMON NAME | SPECIES | GROWTH HABIT[2] |
|---|---|---|
| **Apply 4-6 pints per acre[1]** | | |
| Bahiagrass | *(Paspalum notatum)* | P |
| Bermudagrass[3] | *(Cynodon dactylon)* | P |
| Big bluestem | *(Andropogon gerardii)* | P |
| Dallisgrass | *(Paspalum dilatatum)* | P |
| Feathertop | *(Pennisetum villosum)* | P |
| Guineagrass | *(Panicum maximum)* | P |
| Saltgrass[3] | *(Distichlis stricta)* | P |
| Sand dropseed | *(Sporobolus cryptandrus)* | P |
| Sprangletop | *(Leptochloa* spp.*)* | A |
| Timothy | *(Phleum pratense)* | P |
| Wirestem muhly | *(Muhlenbergia frondosa)* | P |

## BROADLEAF WEEDS

| COMMON NAME | SPECIES | GROWTH HABIT[2] |
|---|---|---|
| **Apply 2-3 pints per acre[1]** | | |
| Burdock | *(Arctium* spp.*)* | B |
| Carpetweed | *(Mollugo verticillata)* | A |
| Carolina geranium | (Geranium carolinianum) | A |
| Clover | *(Trifolium* spp.*)* | A/P |
| Common chickweed | *(Stellaria media)* | A |
| Common ragweed | *(Ambrosia artemisiifolia)* | A |
| Dandelion | *(Taraxacum officinale)* | P |
| Dog fennel | *(Eupatorium capillifolium)* | A |
| Filaree | (*Erodium* spp.*)* | A |
| Fleabane | *(Erigeron* spp.*)* | A |
| Hoary vervain | *(Verbena stricta)* | P |
| Indian mustard | (*Brassica juncea)* | A |
| Kochia | *(Kochia scoparia)* | A |
| Lambsquarters | *(Chenopodium album)* | A |
| Lespedeza | (*Lespedeza* spp.*)* | P |
| Miners lettuce | *(Montia perfoliata)* | A |
| Mullein | *(Verbascum* spp.*)* | B |
| Nettleleaf goosefoot | *(Chenopodium murale)* | A |
| Oxeye daisy | *(Chrysanthemum leucanthemum)* | P |
| Pepperweed | *(Lepidium* spp.*)* | A |
| Pigweed | *(Amaranthus* spp.*)* | A |
| Puncturevine | *(Tribulus terrestris)* | A |
| Russian thistle | *(Salsola kali)* | A |
| Smartweed | *(Polygonum* spp.*)* | A/P |
| Sorrell | *(Rumex* spp.*)* | P |
| Sunflower | *(Helianthus* spp.*)* | A |

## BROADLEAF WEEDS (CONT)

| COMMON NAME | SPECIES | GROWTH HABIT[2] |
|---|---|---|
| Sweet clover | *(Melilotus* spp.*)* | A/B |
| Tansymustard | (*Descurainia pinnata)* | A |
| Western ragweed | *(Ambrosia psilostachya)* | P |
| Wild carrot | (*Daucus carota)* | B |
| Wild lettuce | *(Lactuca* spp.*)* | A/B |
| Wild parsnip | *(Pastinaca sativa)* | B |
| Wild turnip | *(Brassica campestris)* | B |
| Woollyleaf bursage | *(Franseria tomentosa)* | P |
| Yellow woodsorrel | *(Oxalis stricta)* | P |
| **Apply 3-4 pints per acre[1]** | | |
| Broom snakeweed[4] | *(Gutierrezia sarothrae)* | P |
| Bull thistle | *(Cirsium vulgare)* | B |
| Burclover | *(Medicago* spp.) | A |
| Chickweed, Mouseear | *(Cerastium vulgatum)* | A |
| Clover, Hop | *(Trifolium procumbens)* | A |
| Cocklebur | *(Xanthium strumarium)* | A |
| Cudweed | *(Gnaphalium* spp.*)* | A |
| Desert Camelthorn | *(Alhagi pseudalhagi)* | P |
| Dock | *(Rumex* spp.*)* | P |
| Fiddleneck | *(Amsinckia intermedia)* | A |
| Goldenrod | *(Solidago* spp.*)* | P |
| Henbit | *(Lamium aplexicaule)* | A |
| Knotweed, prostrate | *(Polygonum aviculare)* | A/P |
| Pokeweed | *(Phytolacca americana)* | P |
| Purslane | *(Portulaca* spp.*)* | A |
| Pusley, Florida | *(Richardia scabra)* | A |
| Rocket, London | *(Sisymbrium irio)* | A |
| Rush skeletonweed[4] | *(Chondrilla juncea)* | B |
| Saltbush | *(Atriplex* spp.) | A |
| Shepherd's-purse | *(Capsella bursa-pastoris)* | A |
| Spurge, Annual | *(Euphorbia* spp.*)* | A |
| Stinging nettle[4] | *(Urtica dioica)* | P |
| Velvetleaf | *(Abutilon theophrasti)* | A |
| Yellow starthistle | *(Centaurea solstitialis)* | A |
| **Apply 4-6 pints per acre[1]** | | |
| Arrowwood | *(Pluchea sericea)* | A |
| Canada thistle | *(Cirsium arvense)* | P |
| Giant ragweed | *(Ambrosia trifida)* | A |
| Grey rabbitbrush | *(Chrysothamnus nauseosus)* | P |
| Little mallow | *(Malva parviflora)* | B |
| Milkweed | *(Asclepias* spp.*)* | P |
| Primrose | *(Oenothera kunthiana)* | P |

## BROADLEAF WEEDS (CONT)

| COMMON NAME | SPECIES | GROWTH HABIT[2] |
|---|---|---|
| Silverleaf nightshade | *(Solanum eleagnifolium)* | P |
| Sowthistle | *(Sonchus* spp.*)* | A |
| Texas thistle | *(Cirsium texanum)* | P |

## VINES AND BRAMBLES

| COMMON NAME | SPECIES | GROWTH HABIT[2] |
|---|---|---|
| **Apply 1 pint per acre** | | |
| Field bindweed | *(Convolvulus arvensis)* | P |
| Hedge bindweed | *(Calystegia sequium)* | A |
| **Apply 2-3 pints per acre[1]** | | |
| Wild buckwheat | *(Polygonum convolvulus)* | P |
| **Apply 3-4 pints per acre[1]** | | |
| Greenbriar | *(Smilax* spp.*)* | P |
| Honeysuckle | *(Lonicera* spp.*)* | P |
| Morningglory | *(Ipomoea* spp.*)* | A/P |
| Poison ivy | *(Rhus radicans)* | P |
| Redvine | *(Brunnichia cirrhosa)* | P |
| Wild rose | *(Rosa* spp.*)* | P |
| Including: | | |
| Multiflora rose | *(Rosa multiflora)* | P |
| McCartney rose | *(Rosa bracteata)* | P |
| **Apply 4-6 pints per acre[1]** | | |
| Kudzu[3] | *(Pueraria lobata)* | P |
| Trumpetcreeper | *(Campsis radicans)* | P |
| Virginia creeper | *(Parthenocissus quinquefolia)* | P |
| Wild grape | *(Vitis* spp.*)* | P |

## BRUSH SPECIES

| COMMON NAME | SPECIES | GROWTH HABIT[2] |
|---|---|---|
| **Apply 4-6 pints per acre[1]** | | |
| American beech | *(Fagus grandifolia)* | P |
| Ash | *(Fraxinus* spp.*)* | P |
| Bald cypress | *(Taxodium distichum)* | P |
| Bigleaf Maple | *(Acer macrophylum)* | P |
| Black Locust[5] | *(Robinia pseudoacacia)* | P |
| Black gum | *(Nyssa sylvatica)* | P |
| Box elder | *(Acer negundo)* | P |
| Cherry | *(Prunus* spp.*)* | P |
| Chinaberry | *(Melia azadarach)* | P |
| Dogwood | *(Cornus* spp.*)* | P |
| Elm[6] | *(Ulmus* spp.*)* | P |

## BRUSH SPECIES (CONT)

| COMMON NAME | SPECIES | GROWTH HABIT[2] |
|---|---|---|
| Hawthorn | *(Crataegus* spp.*)* | P |
| Hickory | *(Carya* spp.*)* | P |
| Honeylocust[5] | *(Gleditsia triacanthos)* | P |
| Maple | *(Acer* spp.*)* | P |
| Mulberry | *(Morus* spp.*)* | P |
| Oak | (Quercus spp.) | P |
| Persimmon | *(Diospyros virginiana)* | P |
| Pine[5] | *(Pinus* spp.*)* | P |
| Poplar | *(Populus* spp.*)* | P |
| Privet | *(Ligustrum vulgare)* | P |
| Red Alder | *(Alnus rubra)* | P |
| Red Maple | *(Acer rubrum)* | P |
| Russian Olive | *(Eleagnus angustifolia)* | P |
| Sassafras | *(Sassafras albidum)* | P |
| Sourwood | *(Oxydendrum arboreum*) | P |
| Sweetgum | *(Liquidambar styraciflua)* | P |
| Water willow | *(Justica americana)* | P |
| Willow | *(Salix* spp.*)* | P |
| Yellow poplar | *(Liriodendron tulipifera*) | P |

[1] The higher rates should be used where heavy or well-established infestations occur.

[2] Growth Habit - A = Annual, B = Biennial, P = Perennial

## DISCLAIMER

The label instructions for the use of this product reflect the opinion of experts based on research and field use. The directions are believed to be reliable and should be followed carefully. However, it is impossible to eliminate all risks inherently associated with use of this product. Turf injury, ineffectiveness or other unintended consequences may result because of such factors as weather conditions, presence of other materials, or the use of, or application of the product contrary to label instructions, all of which are beyond the control of BASF Corporation (BASF). All such risks shall be assumed by the user.

BASF shall not be responsible for losses or damages resulting from use of this product in any manner not set forth on this label. User assumes all risks associated with the use of this product in any manner not specifically set forth on this label.

BASF warrants only that the material contained herein conforms to the chemical description on the label and is reasonably fit for the use therein described when used in accordance with the directions for use, subject to the risks referred to above. BASF DOES NOT MAKE OR AUTHORIZE ANY AGENT OR REPRESENTATIVE TO MAKE ANY OTHER WARRANTIES, EXPRESS OR IMPLIED AND EXPRESSLY EXCLUDES AND DISCLAIMS ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

BUYER'S EXCLUSIVE REMEDY AND BASF'S EXCLUSIVE LIABILITY, WHETHER IN CONTRACT, TORT, NEGLIGENCE, STRICT LIABILITY OR OTHERWISE, SHALL BE LIMITED TO REPAYMENT OF THE PURCHASE PRICE OF **HABITAT® herbicide**. In no case shall BASF or the seller be liable for consequential, special or indirect damages resulting from the use or handling of this product.

BASF makes no other express or implied warranty, including other express or implied warranty of FITNESS or of MERCHANTABILITY. User assumes the risk of any use contrary to label instructions, or under abnormal conditions, or under conditions not reasonably foreseeable by BASF.

*Habitat is a registered trademark of BASF Corporation.*

*Microfoil is a trademark of Rhone Poulenc Ag Company.*

*Thru-Valve is a trademark of Waldrum Specialties.*


000241-00426.20031202.NVA 2003-04-104-0164.pdf

BASF Corporation
26 Davis Drive
Research Triangle Park, NC 27709

**Agricultural Products**

BASF

**MATERIAL SAFETY DATA SHEET**

Agricultural Products Group
P.O.Box 13528,
Research Triangle Park, NC 27709
(919) 547-2000

**EMERGENCY TELEPHONE NUMBERS:**

**BASF Corporation: 1 (800) 832-HELP**

**CHEMTREC: 1 (800) 424-9300**

**Product No.: 58A119** **Habitat ® Herbicide**

**Date Prepared: 9/22/2003** **Date Revised:**

## SECTION I

**Trade Name: Habitat ® Herbicide**

**Chemical Name: 2-[4,5-dihydro-4-methyl-4-(1-methylethyl)-5-oxo-1H-imidazol-2-yl]-3-pyridinecarboxylic acid, salt with 2-propanamine (1:1)**

**Synonyms: Isopropylamine of imazapyr; AC252, 925;** **Formula: C(13)H(15)N(3)O(3).C(3)H(9)N**

**Chemical Family: Imidazolinone** **Mol Wt: 320.4**

## SECTION II - INGREDIENTS

| COMPONENT | CAS NO. | % | PEL/TLV - SOURCE |
|---|---|---|---|
| Isopropylamine salt of Imazapyr | 81510-83-0 | 28.7 | 0.5 mg/m3 TWA BASF recommended |
| Inerts | N/A | 71.3 | None established |

**SARA Title III Section 313: Not listed**

## SECTION III - PHYSICAL DATA

**BOILING/MELTING POINT@760mm Hg: N/D** **pH: 6.6 - 7.2**

**VAPOR PRESSURE mmHg @ 20ºC: N/D**

**SPECIFIC GRAVITY OR BULK DENSITY: 1.04 - 1.07 g/mL**

**SOLUBILITY IN WATER: Soluble**

**APPEARANCE: Clear blue liquid** **ODOR: Ammonia** **INTENSITY: Slight**

## SECTION IV - FIRE AND EXPLOSION DATA

**FLASH POINT (TEST METHOD): >210ºF SFCC** **AUTOIGNITION TEMP: > 200º F**

**FLAMMABILITY LIMITS IN AIR (% BY VOL):** **LOWER: N/D** **UPPER: N/D**

**NFPA 704 HAZARD CODES**

**HEALTH: 1** **FLAMMABLE: 1** **INSTABILITY: 0** **OTHER: N/R**

**NFPA 30 STORAGE CLASSIFICATION: Class IIIB**

| | |
|---|---|
| **EXTINGUISHING MEDIUM** | **Use water fog, foam, CO(2), or dry chemical extinguishing media.** |
| **SPECIAL FIREFIGHTING PROCEDURES** | **Firefighters should be equipped with self-contained breathing apparatus and turnout gear.** |
| **UNUSUAL FIRE _EXPLOSION HAZARDS** | **None known.** |

## SELECT ACRONYM KEY

**N/A - Not available; N/D - Not determined; N/R - Not rated; N/E - Not established**

## SECTION V - HEALTH DATA

**TOXICOLOGICAL TEST DATA:**

Data for formulated product:

Rat, Oral LD50 (combined sexes) > 5000 mg/kg

Rabbit, Dermal LD50 (combined sexes) > 2000 mg/kg

Rat, Inhalation LC50 (4 hr) - Not available

Rat, Inhalation LC50 (1 hr calculated) - Not available

Rabbit, Eye Irritation - Not Irritating

Rabbit, Skin Irritation - Mildly irritating

Guinea pig, Dermal Sensitizer - Not available

**OSHA, NTP, or IARC Carcinogen:** Not listed.

**EFFECTS OF OVEREXPOSURE:**

**See Product Label and Directions For Use for additional precautionary statements.**

CAUTION

Avoid contact with skin, eyes, and clothing. Avoid breathing spray mist.

Existing medical conditions aggravated by this product:

None known.

**FIRST AID PROCEDURES**

| | |
|---|---|
| **If on skin:** | Wash with plenty of soap and water. Get medical attention if irritation persists. |
| **If in eyes:** | Flush eyes with plenty of water. Call a physician if irritation persists. |
| **If inhaled:** | Remove victim to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. Get medical attention. |
| **If swallowed:** | Call a physician or Poison Control Center. Drink 1 or 2 glasses of water and induce vomiting by touching back of throat with finger. If person is unconscious, do not give anything by mouth and do not induce vomiting. |
| **Note to physician:** | Treat symptomatically. No specific antidote. |
| **Note:** | Have the product container or label with you when calling a poison control center or doctor or going for treatment. |

## SECTION VI - REACTIVITY DATA

**STABILITY:** Stable. Do not store below 32º F or above 100º F.

**CONDITIONS TO AVOID:** Store in original container in cool,dry, well ventilated place away from ignition sources, heat or flame.

**CHEMICAL INCOMPATIBILITY:** Oxidizing agents and reducing agents.

**HAZARDOUS DECOMPOSITION PRODUCTS:** Including but not limited to oxides of carbon and nitrogen.

**HAZARDOUS POLYMERIZATION:** Does not occur.

**CONDITIONS TO AVOID:** Does not polymerize.

**CORROSIVE TO METAL:** Mild steel, brass **OXIDIZER:** No

## SECTION VII - PERSONAL PROTECTION

**Users of a pesticidal end use product should refer to the product label for personal protective equipment requirements.**

**RECOMMENDATIONS FOR MANUFACTURING, COMMERCIAL BLENDING, AND PACKAGING WORKERS:**

**Respiratory Protection:**
Supplied air respirators should be worn if large quantities of mist/dust are generated or prolonged exposure possible.

**Eye Protection:**
Chemical goggles when respirator does not provide eye protection.

**Protective Clothing:**
Gloves and protective clothing as necessary to prevent skin contact.

**Ventilation:**
Whenever possible, engineering controls should be used to minimize the need for personal protective equipment.

## SECTION VIII - ENVIRONMENTAL DATA

**ENVIRONMENTAL TOXICITY DATA**

See the product label for information regarding environmental toxicity.

**SARA 311/312 REPORTING**

**FIRE: N PRESSURE: N REACTIVITY: N ACUTE: Y CHRONIC: N TPQ(lbs): N/R**

**SPILL AND LEAK PROCEDURES:**

In case of large scale spillage of this product, avoid contact, isolate area and keep out animals and unprotected persons. Call CHEMTREC (800 424-9300) or BASF Corporation (800 832-HELP). For a small spill, wear personal protective equipment as specified on the label.
FOR A LIQUID SPILL: Dike and contain the spill with inert material (sand, earth, etc.) and transfer the liquid and solid diking materials to separate containers for disposal.
FOR A SOLID SPILL: Sweep solid into a drum for re-use or disposal. Remove personal protective equipment and decontaminate it prior to re-use.

**HAZARDOUS SUBSTANCE SUPERFUND: No RQ(lbs): None**

**WASTE DISPOSAL METHOD:**

Pesticide wastes are acutely hazardous. Wastes resulting from this product may be disposed of on site or at an approved waste disposal facility. Improper disposal of excess pesticide, spray mix or rinsate is a violation of federa law. If these wastes cannot be disposed of according to label instructions, contact the state agency responsible for pesticide regulation or the Hazardous Waste representative at the nearest EPA Regional Office for guidance.

**HAZARDOUS WASTE 40CFR261: No HAZARDOUS WASTE NUMBER: None**

**CONTAINER DISPOSAL:**

FOR PLASTIC CONTAINERS: Triple rinse (or equivalent) and add rinsate to the spray tank. Then offer for recycling or reconditioning, or 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 BULK CONTAINERS: Reusable containers should be returned to the point of purchase for cleaning and re-filling.
FOR MINIBULK CONTAINERS: Clean all tanks on an approved loading pad so rinsate can be collected and mixed into the spray solution or into a dedicated tank. Using a high pressure sprayer, rinse several times with small volumes of water to minimize rinsate.

## SECTION IX - SHIPPING DATA - PACKAGE AND BULK

**D.O.T. PROPER SHIPPING NAME (49CFR172.101-102):**
None

**HAZARDOUS SUBSTANCE (49CFR CERCLA LIST):**
None

**RQ(lbs):** None

**D.O.T. HAZARD CLASSIFICATION (CFR 172.101-102):**

**PRIMARY**
None

**SECONDARY**
None

| D.O.T. LABELS REQUIRED (49CFR172.101-102): | D.O.T. PLACARDS REQUIRED (CFR172.504): | POISON CONSTITUENT (49CFR172.203(K)): |
|---|---|---|
| None | None | None |

**BILL OF LADING DESCRIPTION**

Compounds, tree or weed killing, NOIBN
This product is not regulated by the Department of Transportation (DOT). It does not meet the definition of DOT corrosive (49 CFR 173.136).

**CC NO.:** Not applicable **UN/NA CODE:**

## SECTION X - ADDITIONAL INFORMATION

**Habitat ® Herbicide**

**KEEP OUT OF REACH OF CHILDREN**

**CAUTION**

**BASF Corporation**

Agricultural Products Group
P.O.Box 13528,
Research Triangle Park, NC 27709
(919) 547-2000

## DISCLAIMER

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Appendix C

# CORRESPONDENCE

# United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
6669 Short Lane
Gloucester, VA 23061

January 21, 2005

Colonel Yvonne J. Prettyman-Beck
District Engineer
Norfolk District, Corps of Engineers
Fort Norfolk, 803 Front Street
Norfolk, Virginia 23510-1096

Attn: Matthew T. Byrne
Operations Branch

Re: Craney Island Mosquito Control,
Suffolk, Virginia

Dear Colonel Prettyman-Beck:

The U.S. Fish and Wildlife Service (Service) has received the draft Supplement Environmental Assessment for Craney Island mosquito control, dated December 10, 2004.

Due to staffing reductions, we are no longer able to review and comment on environmental assessments unless they involve Endangered Species Act consultation. Please keep us on your mailing list so we may comment on such documents when/if staffing improves.

The Service appreciates your coordination of this project with us. If you have questions, please contact Mr. William Hester of this office at (804) 693-6694, extension 134.

Sincerely,

for Karen L. Mayne
Supervisor
Virginia Field Office

DEPARTMENT OF THE ARMY
NORFOLK DISTRICT CORPS OF ENGINEERS
FORT NORFOLK 803 FRONT STREET
NORFOLK VIRGINIA 23510-1096

REPLY TO
ATTENTION OF

February 7, 2005

Operations Branch

Ms. Karen L. Mayne
Supervisor, Virginia Field Office
U.S. Fish and Wildlife Service
Ecological Services
6669 Shore Lane
Gloucester, VA 23061

RE: Draft Supplement to the 1996 Environmental Assessment for the Aerial Dispersal of Pesticide for Mosquito Control at the Craney Island Dredged Material Management Area

Dear Ms. Mayne:

It has been noted that the U.S. Fish and Wildlife Service is no longer able to review and comment on environmental assessments not involved in Endangered Species Act consultations, unless staffing levels permit. We will keep you on our mailing list for future projects.

Should you have any additional questions or concerns, please contact Mr. Keith Lockwood of my staff at (757) 201-7127. Thank you for your assistance.

Sincerely,

Matthew T. Byrne, P.E.
Chief, Operations Branch

## Lockwood, Keith B NAO

**From:** Petrow.Carol@epamail.epa.gov
**Sent:** Monday, January 10, 2005 1:20 PM
**To:** Lockwood, Keith B NAO
**Subject:** Public Notice concerning mosquito control at Craney Island Dredged Material Mangement Area

Keith

Our comments on the proposed changes are attached:

1. Due to resistance from the continued use of Rodeo there may be more effective alternatives with equal or possibly lower human and environmental toxicity (Habitat (BASF), Active Ingredient: imazapyr) was this or other alternatives looked at?

2. The list of Federal and State Cooperating Agencies does not list the Virginia Department of Agriculture and Consumer Services (VDACS) who is the primary regulatory authority for the State of Virginia. The inclusion of VDACS could assist in ensuring that the applications were performed by or under the supervision of certified applicators and all mixing loading, application and disposal would be consistent with label specifications.

Thank you for the opportunity to review and comment on this proposal. My contact information is below.

Carol Petrow

U.S. Environmental Protection Agency
1650 Arch Street, 3EA30
Philadelphia, PA 19301
phone: (215) 814-2789
email: petrow.carol@epa.gov

DEPARTMENT OF THE ARMY
NORFOLK DISTRICT CORPS OF ENGINEERS
FORT NORFOLK 803 FRONT STREET
NORFOLK VIRGINIA 23510-1096

REPLY TO
ATTENTION OF

February 7, 2005

Operations Branch

Carol Petrow
U.S. Environmental Protection Agency
1650 Arch Street, 3EA30
Philadelphia, PA 19301

RE: Draft Supplement to the 1996 Environmental Assessment for the Aerial Dispersal of Pesticide for Mosquito Control at the Craney Island Dredged Material Management Area

Dear Ms. Petrow:

We have reviewed your comments on the Draft Supplement and provide the following responses:

Comments – Due to resistance from the continued use of Rodeo there may be more effective alternatives with equal or possibly lower human and environmental toxicity (Habitat (BASF), Active Ingredient: imazapyr) was this or other alternatives looked at?

**Response – Habitat (BASF) was included as an alternative to Rodeo in the Draft Supplement.**

Comments – The list of Federal and State Cooperating Agencies does not list the Virginia Department of Agriculture and Consumer Services (VDACS) who is the primary regulatory authority for the State of Virginia. The inclusion of VDACS could assist in ensuring that the applications were performed by or under the supervision of certified applicators and all mixing loading, application and disposal would be consistent with label specifications.

**Response – The Draft Supplement was sent to the Virginia Department of Agriculture and Consumer Services (VDACS) for comments. VDACS' remarks stated, "No additional comments are necessary in reference to endangered plant and insect species regarding this project".**

Should you have any additional questions or concerns, please contact Mr. Keith Lockwood of my staff at (757) 201-7127. Thank you for your assistance.

Sincerely,

Matthew T. Byrne, P.E.
Chief, Operations Branch

# COMMONWEALTH of VIRGINIA

*DEPARTMENT OF ENVIRONMENTAL QUALITY*

W. Tayloe Murphy, Jr.
Secretary of Natural Resources

*Street address:* 629 East Main Street, Richmond, Virginia 23219
*Mailing address:* P.O. Box 10009, Richmond, Virginia 23240
Fax (804) 698-4500 TDD (804) 698-4021
www.deq.state.va.us

Robert G. Burnley
Director

(804) 698-4000
1-800-592-5482


January 20, 2005

Mr. Matthew T. Byrne, P.E.
Chief, Operations Branch
U.S. Army Corps of Engineers, Norfolk District
803 Front Street (Fort Norfolk)
Norfolk, Virginia 23510

RE: Draft Supplemental Environmental Assessment, Aerial Dispersal of Pesticide for Mosquito Control
DEQ-04-217F

Dear Mr. Byrne:

The Commonwealth of Virginia has completed its review of the above Draft Supplemental Environmental Assessment (DSEA). The Department of Environmental Quality (DEQ) is responsible for coordinating Virginia's review of federal environmental documents and responding to appropriate federal officials on behalf of the Commonwealth. DEQ, as the lead agency for Virginia's Coastal Resources Management Program, is responsible for coordinating Virginia's review of federal consistency determinations submitted pursuant to the Coastal Zone Management Act (see "Regulatory and Coordination Needs," item 1, below). The following agencies joined in this review:

Department of Environmental Quality
Department of Game and Inland Fisheries
Department of Agriculture and Consumer Services
Department of Conservation and Recreation
Marine Resources Commission
Department of Historic Resources
Virginia Institute of Marine Science

In addition, the Department of Health, the Hampton Roads Planning District Commission, and the City of Portsmouth were invited to comment.

Project Description

The Corps of Engineers has issued a Supplement to the Environmental Assessment (hereinafter "Draft Supplemental EA" or "DSEA") to address advances in pesticides for mosquito control since the 1996 Environmental Assessment on this activity was prepared. The Corps proposes to control mosquitoes in residential areas near the Craney Island Dredged Material Management Area (hereinafter "Craney Island") with larvicides aimed at larval stages of mosquitoes. The earlier review addressed only pesticides aimed at adult mosquitoes (DSEA, page 2). New pesticides proposed in the Supplemental EA include the larvicides Altosid® and *Bacillus sphaericus*, and the herbicides Rodeo® and Habitat®; these will allow the Corps to address larval as well as adult stages of mosquitoes as part of an Integrated Pest Management approach, (DSEA, pages 3-4, sections 2.0 and 3.0). The Corps proposes to apply these herbicides to *phragmites* stands and follow up with mechanical removal or burning of dead stalks (DSEA, page 7, section 5.2).

Environmental Impacts and Mitigation

*1. Natural Heritage Resources.*

*(a) Data base search.* The Department of Conservation and Recreation has searched its Biotics Data Base for occurrences of natural heritage resources at Fort Monroe and the Big Bethel area. "Natural heritage resources" are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, significant geologic formations, and similar features of scientific interest. According to the Department of Conservation and Recreation, the project area is located within the Craney Island Conservation Site.

*(b) Conservation Site and its Resources.* Conservation sites are tools for representing key areas of the landscape warranting further review for possible conservation action because of the natural heritage resources and habitat they support. Conservation sites are polygons built around one or more rare plant, animal, or natural community. They are designed to include the element and, where possible, its associated habitat, and a buffer or other adjacent land necessary for the element's conservation. Conservation sites are given a biodiversity significance ranking based on the rarity, quality, and number of element occurrences they contain. The ranking is from 1 to 5, with 1 being most significant. The Craney Island Conservation Site has been given a biodiversity significance ranking of B4, which means a site of moderate significance. Natural heritage resources of concern at this site are the piping plover, least tern, and black-necked stilt.

*(i) Piping Plover.* The piping plover (*Charadrius melodus*) inhabits coastal areas, utilizing the flat, sandy beaches of barrier islands for breeding. Threats to the species include predation of eggs and young, and the development and disturbance of barrier island breeding sites (Cross, 1991). The species is listed as threatened by both the U.S. Fish and Wildlife Service (USFWS) and the Virginia Department of Game and Inland Fisheries (VDGIF).

*(ii) Least Tern.* The least tern (*Sterna antillarum*) nests on broad, flat beaches with minimal vegetation, and forages in salt water near the shore. Threats to this species include loss of nesting habitat due to development and disturbance of breeding colonies by human activities, as well as high numbers of predators. The least tern is listed as a special concern species by VDGIF.

*(iii) Black-necked Stilt.* Black-necked stilts (*Himantopus mexicanus*) occur primarily near shallow salt or fresh water bodies with soft muddy bottoms, including grassy marshes, wet savannas, mudflats, shallow ponds, flooded fields, and the borders of salt ponds. They nest along the shallow water of ponds, lakes, swamps, or lagoons and may nest on the ground or in the shallow water on a plant tussock. Black-necked stilts feed on insects, crustaceans, and small fish as well as the seeds of aquatic plants.

*(c) Threatened species coordination.* Due to the legal status of the piping plover, the Department of Conservation recommends that the Corps coordinate with the U.S. Fish and Wildlife Service (Karen Mayne, telephone (804) 693-6694) and the Virginia Department of Game and Inland Fisheries (Ray Fernald, telephone (804) 367-6913).

*2. Wildlife Resources.* The Department of Game and Inland Fisheries recommends that the integrated pest management program for Craney Island be designed to reduce reliance on pesticides. Specifically, the Corps should take into consideration the potential impacts of aerial spraying for mosquitoes on night-flying insectivores, such as swifts, swallows, and bats. See also "Alternatives," below. Aerial spraying should be a last resort, if allowed at all (see item 4(b), below), because of its potential impacts on night-flying insectivores such as bats, swifts, and swallows.

*(a) Altosid Application.* According to the Department of Game and Inland Fisheries, the larvicide Altosid contains methoprene, which is known to be slightly toxic to birds and slightly-to-moderately toxic to fish. VDGIF supports the recommendation of the U.S. Fish and Wildlife Service that spraying with methoprene should not take place during the shorebird breeding season, March 1 to the middle of August. VDGIF recommends further that the ground application of methoprene should also not take place during this period. However, if migratory bird species are not present in significant numbers prior to mid-August, the targeted application of methoprene may be allowed,

provided that the Corps consults with the U.S. Fish and Wildlife Service in this regard as a pre-requisite.

*(b) Bacillus Spaericus Application.* VDGIF understands that the larvicide *Bacillus sphaericus* (B.s.) is virtually harmless to non-target aquatic organisms, and supports the proposal that B.s. will be applied only to areas where mosquito larvae of the *Culex* genus are found (DSEA, page 5, section 5.1.1).

*(c) Rodeo and Habitat Application.* VDGIF states that using the pesticides Rodeo and Habitat for controlling *phragmites* may help reduce potential mosquito breeding areas (DSEA, pages 6-7, section 5.2), and indicates that use of this pesticide as the label directs will not result in significant adverse impacts to species under VDGIF's jurisdiction.

*3. Solid and Hazardous Waste Management.* According to DEQ's Waste Division, solid waste issues and sites were addressed to some extent in the DSEA, but hazardous waste issues and sites were not addressed. The DSEA did not include a search of waste-related data bases.

DEQ's Waste Division did a cursory review of its data files and found that Craney Island is a site listed on DEQ's Federal Facilities Installation Restoration Program (identification number VA170022472). It is also a small-quantity generator of hazardous waste, as listed pursuant to the Resource Conservation Recovery Act (identification number VA0170090005). The Waste Division's Federal Facilities Program staff indicates that the proposed aerial application would not affect any on-going investigation or remediation actions. The following web sites may be helpful in locating further information for the two identification numbers given above:

- http://www.epa.gov/echo/search_by_permit.html and
- http://www.epa.gov/enviro/html/rcris/rcris_query_java.html.

*4. Water Quality and Wetlands.* DEQ's Division of Water Quality emphasizes that non-chemical control options should be exhausted before chemical control options are employed. If chemical controls become necessary, preference should be given to chemicals that are least toxic to humans and the environment. Use of the chemical options should be in accordance with label instructions and with regulations of the Virginia Department of Agriculture and Consumer Services; these include a requirement for a licensed applicator. The chemical use should take place during the times and environmental conditions that make the treatment most effective and least damaging to the environment.

With regard to the use of additional larvicides as part of the Craney Island mosquito control program, DEQ's Tidewater Regional Office questions the validity of using herbicides to eliminate *phragmites* as part of the mosquito control plan, especially in combination with the other means proposed.

*(a) Phragmites Control.* It is recognized that *phragmites* is an invasive wetland plant species that may displace more desirable vegetation where they co-exist. Where the control of *phragmites* will improve the functional value of a wetland area, DEQ frequently reviews and approves requests to control it. When mitigation plans involve the creation, restoration, or enhancement of wetlands, invasive species control is a requirement. No permit is required for it where *phragmites* control is clearly designed to make room for more desirable species such as *Spartina* and no other adverse impacts are anticipated. However, if *phragmites* control is designed simply to eliminate a degraded wetland and thereby reduce mosquito breeding and "hiding" areas, as it appears to be in the DSEA (see pages 6-7, section 5.2), then a Virginia Water Protection Permit will be required, because this activity will clearly "cause significant alteration or degradation of existing wetland acreage or functions" as contemplated in the State Water Control Law (*Virginia Code* section 62.1-44.15:5.D.).

*(b) Herbicide Application Mechanism.* DEQ's Tidewater Regional Office indicates that the project boundary is outside of the area specifically designated as the disposal area, and includes surrounding residential areas as well. The Final Supplemental EA should indicate specifically the areas, and associated ownership, subject to the proposed *phragmites* control, since this information was not present in the DSEA. The DSEA indicates that the Corps contemplates allowing the use of large Air Force fixed-wing aircraft (C-130, etc.) for overhead application of herbicides. This is not only contrary to the manufacturer's application recommendations, but it is unacceptable so far as DEQ's Tidewater Regional Office is concerned. While spraying from helicopters may be acceptable in some situations, depending on site-specific details, ground-based spraying is preferred. Other application limitations on such things as the season (after dormancy of desirable vegetation), humidity, temperature, wind-speed (3 to 10 mph), and altitude (10 feet) must be specified in the document. See next paragraph.

*(c) Timing of Herbicide Application.* If glyphosate is to be used for *phragmites* control, it should be applied from late August through October, before the first frost, according to DEQ's Division of Water Quality. Glyphosate must be mixed with clean water (or, if possible, distilled water) because it binds tightly to sediments and is thus rendered non-toxic to plants (Lefor, personal communication, 1992). This limits the effectiveness of glyphosate, but also may help prevent it from acting on non-target plants. The Division also recommends that any prescribed burning of *phragmites* stalks, which is mentioned as an alternative to mechanical removal following herbicide application (see

DSEA, page 7, section 5.2), take place in July rather than in winter or spring. Winter or spring burning may actually increase the density of spring crops of the plant.

The herbicide Rodeo should not be applied in windy conditions, because the spray will drift.

*(d) Reporting Fish Kills.* Precautions recommended in the DSEA and in these comments are aimed at avoiding fish kills, which would be violations of the State Water Control Law if they are attributable to chemical applications. However, in the event of a fish kill, certain reporting requirements apply. See "Regulatory and Coordination Needs," item 5, below.

*5. Historic Structures and Archaeological Resources.* According to the Department of Historic Resources (DHR project 1996-0457), this undertaking will not affect any known architectural or archaeological resources listed in or eligible for the National Register of Historic Places or the Virginia Landmarks Register.

*6. Air Quality.* DEQ's Division of Air Program Coordination indicates that the proposed activities would take place in an area of ozone non-attainment, which means that all necessary precautions should be taken to restrict emissions of oxides of nitrogen ($NO_x$) and volatile organic compounds (VOCs), which are the precursors of atmospheric ozone. The prescribed burning contemplated as a possible follow-up action to the aerial spraying of herbicides (DSEA, page 7, section 5.2) may require an open burning permit; see "Regulatory and Coordination Needs," item 4, below.

*7. Local and Regional Comments.* The Hampton Roads Planning District Commission and the City of Portsmouth were invited to comment.

Alternatives

The Department of Game and Inland Fisheries recommends consideration of an alternative not contemplated in the DSEA. This would be to encourage natural predators of mosquitoes by installing bat boxes and bird houses in the area.

Regulatory and Coordination Needs

*1. Federal Consistency under the Coastal Zone Management Act.* Pursuant to the Coastal Zone Management Act of 1972, as amended, the Corps is required to determine the consistency of its activities affecting Virginia's coastal resources or coastal uses with the Virginia Coastal Resources Management Program (VCP) (see section 307(c)(1) of the Act and 15 CFR Part 930, sub-part C, section 930.34). This involves an analysis of the activities in light of the Enforceable Programs of the VCP (first enclosure), and

submission of a consistency determination reflecting that analysis and committing the Corps to comply with the Enforceable Programs to the maximum extent practicable. In addition, we invite your attention to the Advisory Policies of the VCP (second enclosure). The federal consistency determination may be provided as part of the documentation concluding the NEPA process, or independently, depending on your agency's preference. Section 930.39 gives content requirements for the consistency determination. If you need clarification of these comments, please contact this Office (Charles Ellis, telephone (804) 698-4488).

*2. Solid and Hazardous Waste Management.* Any wastes that are generated during pesticide dispersal activities must be tested and disposed of in accordance with applicable federal, state, and local laws and regulations. These include, but are not limited to, the Virginia Waste Management Act (*Virginia Code* section 10.1-1400 et seq.), the Virginia Hazardous Waste Management Regulations (9 VAC 20-60), the Virginia Solid Waste Management Regulations (9 VAC 20-80), and the federal Resource Conservation and Recovery Act (42 U.S.C., sections 6901 et seq.) (see enclosed DEQ memorandum, Brockman to Ellis, dated January 11, 2005 for further citations).

*3. Wildlife Protection.* As a pre-requisite to undertaking aerial spraying, the Corps should consult the U.S. Fish and Wildlife Service (Karen Mayne, telephone (804) 693-6694) and the Virginia Department of Game and Inland Fisheries (Ray Fernald, telephone (804) 367-6913) in order to ensure protection of the piping plover (see "Environmental Impacts and Mitigation," item 1(c), above) and of nearby fish species that may inhabit affected waters.

*4. Air Quality Regulation.* A permit may be required from DEQ for the prescribed burning that may follow the aerial application of herbicides and larvicides. The Corps should contact DEQ's Tidewater Regional Office (Jane Workman, Air Permits Manager, telephone (757) 518-2112) in this regard.

*5. Fish Kills.* In the event of a fish kill, the Corps must report the incident immediately upon discovery by calling DEQ's Tidewater Regional Office (telephone (757) 518-2103) during business hours, or the Virginia Department of Emergency Management (telephone (800) 468-8892) during non-business hours.

Thank you for the opportunity to review the Draft Supplemental EA. We look forward to reviewing the Final Supplemental EA. If you have questions, please feel free to contact me (telephone (804) 698-4325) or Charles Ellis of this Office (telephone (804) 698-4488).

Sincerely,

Ellie L. Irons
Program Manager
Office of Environmental Impact Review

Enclosures

cc: Andrew K. Zadnik, DGIF
Keith R. Tignor, VDACS
Robert S. Munson, DCR
Alan L. Weber, VDH
Allen R. Brockman, DEQ-Waste
Ellen Gilinsky, DEQ-Water
Kotur S. Narasimhan, DEQ-Air
Harold J. Winer, DEQ-TRO
Tony Watkinson, MRC
Marc E. Holma, DHR
Thomas A. Barnard, Jr., VIMS
John Carlock, Hampton Roads PDC
Robert Baldwin, City of Portsmouth

# COMMONWEALTH of VIRGINIA

*DEPARTMENT OF ENVIRONMENTAL QUALITY*

W. Tayloe Murphy, Jr.
Secretary of Natural Resources

*Street address:* 629 East Main Street, Richmond, Virginia 23219
*Mailing address:* P.O. Box 10009, Richmond, Virginia 23240
Fax (804) 698-4500 TDD (804) 698-4021
www.deq.state.va.us

Robert G. Burnley
Director

(804) 698-4000
1-800-592-5482


**Attachment 1**

**Enforceable Regulatory Programs comprising Virginia's Coastal Resources Management Program (VCP)**

a. Fisheries Management - The program stresses the conservation and enhancement of finfish and shellfish resources and the promotion of commercial and recreational fisheries to maximize food production and recreational opportunities. This program is administered by the Marine Resources Commission (VMRC); Virginia Code ∋28.2-200 to ∋28.2-713 and the Department of Game and Inland Fisheries (DGIF); Virginia Code ∋29.1-100 to ∋29.1-570.

The State Tributyltin (TBT) Regulatory Program has been added to the Fisheries Management program. The General Assembly amended the Virginia Pesticide Use and Application Act as it related to the possession, sale, or use of marine antifoulant paints containing TBT. The use of TBT in boat paint constitutes a serious threat to important marine animal species. The TBT program monitors boating activities and boat painting activities to ensure compliance with TBT regulations promulgated pursuant to the amendment. The VMRC, DGIF, and Virginia Department of Agriculture Consumer Services (VDACS) share enforcement responsibilities; Virginia Code ∋3.1-249.59 to ∋3.1-249.62.

b. Subaqueous Lands Management - The management program for subaqueous lands establishes conditions for granting or denying permits to use state-owned bottomlands based on considerations of potential effects on marine and fisheries resources, tidal wetlands, adjacent or nearby properties, anticipated public and private benefits, and water quality standards established by the Department of Environmental Quality (DEQ). The program is administered by the Marine Resources Commission; Virginia Code ∋28.2-1200 to ∋28.2-1213.

c. Wetlands Management - The purpose of the wetlands management program is to preserve wetlands, prevent their despoliation, and accommodate economic development in a manner consistent with wetlands preservation.

(1) The tidal wetlands program is administered by the Marine Resources Commission; Virginia Code ∋28.2-1301 through ∋28.2-1320.

(2) The Virginia Water Protection Permit program administered by DEQ includes protection of wetlands --both tidal and non-tidal; Virginia Code §62.1-44.15:5 and Water Quality Certification pursuant to Section 401 of the Clean Water Act.

d. Dunes Management - Dune protection is carried out pursuant to The Coastal Primary Sand Dune Protection Act and is intended to prevent destruction or alteration of primary dunes. This program is administered by the Marine Resources Commission; Virginia Code ∋28.2-1400 through ∋28.2-1420.

e. Non-point Source Pollution Control – (1) Virginia's Erosion and Sediment Control Law requires soil-disturbing projects to be designed to reduce soil erosion and to decrease inputs of chemical nutrients and sediments to the Chesapeake Bay, its tributaries, and other rivers and waters of the Commonwealth. This program is administered by the Department of Conservation and Recreation; Virginia Code ∋10.1-560 et.seq.).

(2) Coastal Lands Management is a state-local cooperative program administered by the DCR's Division of Chesapeake Bay Local Assistance and 84 localities in Tidewater (see i) Virginia; Virginia Code §10.1-2100 –10.1-2114 and 9 VAC10-20 et seq.

f. Point Source Pollution Control - The point source program is administered by the State Water Control Board (DEQ) pursuant to Virginia Code ∋62.1-44.15. Point source pollution control is accomplished through the implementation of:

(1) the National Pollutant Discharge Elimination System (NPDES) permit program established pursuant to Section 402 of the federal Clean Water Act and administered in Virginia as the Virginia Pollutant Discharge Elimination System (VPDES) permit program.

(2) The Virginia Water Protection Permit (VWPP) program administered by DEQ; Virginia Code §62.1-44.15:5 and Water Quality Certification pursuant to Section 401 of the Clean Water Act.

g. Shoreline Sanitation - The purpose of this program is to regulate the installation of septic tanks, set standards concerning soil types suitable for septic tanks, and specify minimum distances that tanks must be placed away from streams, rivers, and other waters of the Commonwealth. This program is administered by the Department of Health (Virginia Code ∋32.1-164 through ∋32.1-165).

h. Air Pollution Control - The program implements the federal Clean Air Act to provide a legally enforceable State Implementation Plan for the attainment and maintenance of the National Ambient Air Quality Standards. This program is administered by the State Air Pollution Control Board (Virginia Code ∋10-1.1300 through §10.1-1320).

(i) Coastal Lands Management is a state-local cooperative program administered by the DCR's Division of Chesapeake Bay Local Assistance and 84 localities in Tidewater, Virginia established pursuant to the Chesapeake Bay Preservation Act; Virginia Code §10.1-2100 –10.1-2114 and Chesapeake Bay Preservation Area Designation and Management Regulations; Virginia Administrative Code 9 VAC10-20 et seq.

**Attachment 2**

## Advisory Policies for Geographic Areas of Particular Concern

a. Coastal Natural Resource Areas - These areas are vital to estuarine and marine ecosystems and/or are of great importance to areas immediately inland of the shoreline. Such areas receive special attention from the Commonwealth because of their conservation, recreational, ecological, and aesthetic values. These areas are worthy of special consideration in any planning or resources management process and include the following resources:

a) Wetlands
b) Aquatic Spawning, Nursery, and Feeding Grounds
c) Coastal Primary Sand Dunes
d) Barrier Islands
e) Significant Wildlife Habitat Areas
f) Public Recreation Areas
g) Sand and Gravel Resources
h) Underwater Historic Sites.

b. Coastal Natural Hazard Areas - This policy covers areas vulnerable to continuing and severe erosion and areas susceptible to potential damage from wind, tidal, and storm related events including flooding. New buildings and other structures should be designed and sited to minimize the potential for property damage due to storms or shoreline erosion. The areas of concern are as follows:

i) Highly Erodible Areas
ii) Coastal High Hazard Areas, including flood plains.

c. Waterfront Development Areas - These areas are vital to the Commonwealth because of the limited number of areas suitable for waterfront activities. The areas of concern are as follows:

i) Commercial Ports
ii) Commercial Fishing Piers
iii) Community Waterfronts

Although the management of such areas is the responsibility of local government and some regional authorities, designation of these areas as Waterfront Development Areas of Particular Concern (APC) under the VCRMP is encouraged. Designation will allow the use of federal CZMA funds to be used to assist planning for such areas and the implementation of such plans. The VCRMP recognizes two broad classes of priority uses for waterfront development APC:

i) water access-dependent activities;
ii) activities significantly enhanced by the waterfront location and complementary to other existing and/or planned activities in a given waterfront area.

**Advisory Policies for Shorefront Access Planning and Protection**

a. Virginia Public Beaches - Approximately 25 miles of public beaches are located in the cities, counties, and towns of Virginia exclusive of public beaches on state and federal land. These public shoreline areas will be maintained to allow public access to recreational resources.

b. Virginia Outdoors Plan - Planning for coastal access is provided by the Department of Conservation and Recreation in cooperation with other state and local government agencies. The Virginia Outdoors Plan (VOP), which is published by the Department, identifies recreational facilities in the Commonwealth that provide recreational access. The VOP also serves to identify future needs of the Commonwealth in relation to the provision of recreational opportunities and shoreline access. Prior to initiating any project, consideration should be given to the proximity of the project
site to recreational resources identified in the VOP.

c. Parks, Natural Areas, and Wildlife Management Areas - Parks, Wildlife Management Areas, and Natural Areas are provided for the recreational pleasure of the citizens of the Commonwealth and the nation by local, state, and federal agencies. The recreational values of these areas should be protected and maintained.

d. Waterfront Recreational Land Acquisition - It is the policy of the Commonwealth to protect areas, properties, lands, or any estate or interest therein, of scenic beauty, recreational utility, historical interest, or unusual features which may be acquired, preserved, and maintained for the citizens of the Commonwealth.

e. Waterfront Recreational Facilities - This policy applies to the provision of boat ramps, public landings, and bridges which provide water access to the citizens of the Commonwealth. These facilities shall be designed, constructed, and maintained to provide points of water access when and where practicable.

f. Waterfront Historic Properties - The Commonwealth has a long history of settlement and development, and much of that history has involved both shorelines and near-shore areas. The protection and preservation of historic shorefront properties is primarily the responsibility of the Department of Historic Resources. Buildings, structures, and sites of historical, architectural, and/or archaeological interest are significant resources for the citizens of the Commonwealth. It is the policy of the Commonwealth and the VCRMP to enhance the protection of buildings, structures, and sites of historical, architectural, and archaeological significance from damage or destruction when practicable.

## Ellis,Charles

**From:** ProjectReview ProjectReview [ProjectReview.ProjectReview@dgif.virginia.gov]
**Sent:** Wednesday, December 29, 2004 11:40 AM
**To:** Ellis,Charles
**Subject:** 04-217F_Aerial Dispersal of Pesticide for Mosquito Control

We have reviewed the subject project and offer the following comments and recommendations. The purpose of this Supplemental Environmental Assessment (EA) is to supplement the June 1996 Environmental Assessment for aerial dispersal of pesticides and herbicides for mosquito control at the Craney Island Dredged Material Management Area (CIDMMA). Currently, mosquito control at CIDMMA focuses on the use of the pesticides naled and methoprene and larvicide Bacillus thuringiensis israelensis (B.t.i.). This Supplemental EA proposes to include additional mosquito control measures, including the larvicides Altosid® and Bacillus sphaericus (B.s.), and the herbicides Rodeo® and Habitat®.

Altosid contains methoprene, which is known to be slightly toxic to birds and slightly to moderately toxic to fish. To prevent adverse impacts to non-target aquatic organisms, only targeted areas will be applied. We support the recommendations of the U. S. Fish and Wildlife Service (USFWS), that spraying with methoprene should not occur during the shorebird breeding season, March 1 * mid-August. We further recommend that the ground application of methoprene also should not occur during this period. However, pending coordination with the USFWS, the targeted application of methoprene prior to mid-August may be allowed if migratory bird species are not present in significant numbers.

We understand that there are no substantial environmental safety concerns associated with the use of the larvicide B.s. It appears that this larvicide is virtually harmless to non-target aquatic organisms. We support the proposal that B.s. will be applied only to areas where mosquito larvae of the Culex spp. are found.

The herbicides Rodeo® and Habitat® are proposed to be used for the control of phragmites, which may help reduce potential mosquito breeding areas. If used as directed, we do not anticipate a significant adverse impact upon wildlife resources under our jurisdiction to occur.

We recommend that the Integrated Pest Management program for CIDMMA be designed to reduce reliance on pesticides. One alternative may be to encourage the presence of natural predators of mosquitoes by installing bat boxes and bird houses. Only as a last resort should aerial spraying be utilized. We recommend that the Corps of Engineers take into consideration the potential impacts that aerial spraying for mosquitoes may have upon night-flying insectivores, such as swifts, swallows, and bats.

Thank you for the opportunity to comment on this draft Supplemental EA. Please contact me at the email below if I can be of further assistance.

Andrew Zadnik
Andrew.Zadnik@dgif.virginia.gov

Virginia Department of Game and Inland Fisheries
Environmental Services Section
804-367-6913

If you cannot meet the deadline, please notify CHARLIE ELLIS at 804/698-4488 prior to the date given. Arrangements will be made to extend the date for your review if possible. An agency will not be considered to have reviewed a document if no comments are received (or contact is made) within the period specified.

REVIEW INSTRUCTIONS:

A. Please review the document carefully. If the proposal has been reviewed earlier (i.e. if the document is a federal Final EIS or a state supplement), please consider whether your earlier comments have been adequately addressed.

B. Prepare your agency's comments in a form which would be acceptable for responding directly to a project proponent agency.

C. Use your agency stationery or the space below for your comments. **IF YOU USE THE SPACE BELOW, THE FORM MUST BE SIGNED AND DATED.**

Please return your comments to:

**MR.CHARLES H. ELLIS III**
**DEPARTMENT OF ENVIRONMENTAL QUALITY**
**OFFICE OF ENVIRONMENTAL IMPACT REVIEW**
**629 EAST MAIN STREET, SIXTH FLOOR**
**RICHMOND, VA 23219**
**FAX #804/698-4319**

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JAN 10 2005

DEQ-Office of Environmental Impact Review

Charles H. Ellis III

**CHARLES H. ELLIS III**
**ENVIRONMENTAL PROGRAM PLANNER**

COMMENTS

Statements in the project document concerning endangered species were reviewed and compared to available information. No additional comments are necessary in reference to endangered plant and insect species regarding this project.

(signed) _____ (Keith R. Tignor) (date) January 5, 2005

(title) Endangered Species Coordinator

(agency) VDACS, Office of Plant and Pest Service

**PROJECT # 04-217F**

8/98

W. Tayloe Murphy, Jr.
Secretary of Natural Resources

Joseph H. Maroon
Director

# COMMONWEALTH of VIRGINIA

## DEPARTMENT OF CONSERVATION AND RECREATION

203 Governor Street
Richmond, Virginia 23219-2010
(804) 786-6124



11 January 2005

Mr. Charles H. Ellis, III
Environmental Program Planner
Virginia Department of Environmental Quality
629 East Main Street, 6th Floor
Richmond, Virginia 23219

Re: DEQ#04-217F: Aerial Dispersal of Pesticide for Mosquito Control, U. S. Army Corps of Engineers

Dear Mr. Ellis:

The Department of Conservation and Recreation (DCR) functions to preserve and protect the environment of the Commonwealth of Virginia and advocate the wise use of its scenic, cultural, recreation and natural heritage resources. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, state unique or exemplary natural communities, significant geologic formations and similar features of scientific interest.

DCR has searched its Biotics Data System for occurrences of natural heritage resources in the project area. According to the information currently in our files, this site is located within the Craney Island Conservation Site. Conservation sites are tools for representing key areas of the landscape that warrant further review for possible conservation action because of the natural heritage resources and habitat they support. Conservation sites are polygons built around one or more rare plant, animal, or natural community designed to include the element and, where possible, its associated habitat, and buffer or other adjacent land thought necessary for the element's conservation. Conservation sites are given a biodiversity significance ranking based on the rarity, quality, and number of element occurrences they contain; on a scale of 1-5, 1 being most significant. Craney Island Conservation Site has been given a biodiversity significance ranking of B4, which represents a site of moderate significance. The natural heritage resources of concern at this site are the Piping Plover (*Charadrius melodus*, G3/S2B,S2BS1N/LT/LT),

Least Tern (*Sterna antillarum*, G4/S2B/NL/SC), and Black-necked Stilt (*Himantopus mexicanus*, G5/S1B/NL/NL).

The Piping Plover inhabits coastal areas, utilizing the flat, sandy beaches of barrier islands for breeding. Threats to this species include predation of eggs and young and the development and disturbance of barrier island breeding sites (Cross, 1991). Please note that this species is listed as threatened by the United States Fish and Wildlife Service (USFWS) and the Virginia Department of Game and Inland Fisheries (VDGIF).

The Least Tern nests on broad, flat beaches with minimal vegetation and forages in saltwater near the shore. Threats to this species include loss of nesting habitat due to development and disturbance of breeding colonies by human activities and high numbers of predators (Beck, 1991). Please note that the Least Tern is listed as a special concern species by VDGIF.

Black-necked Stilts primarily occur near shallow salt or fresh water bodies with soft muddy bottoms, including grassy marshes, wet savannas, mudflats, shallow ponds, flooded fields, and the borders of salt ponds. They nest along the shallow water of ponds, lakes, swamps, or lagoons and may nest on the ground or in the shallow water on a plant tussock. Black-necked Stilts feed on insects, crustaceans, and small fish, as well as the seeds of aquatic plants.

Due to the legal status of the piping plover, DCR recommends coordination with USFWS and VDGIF to ensure compliance with protected species legislation.

Our files do not indicate the presence of any State Natural Area Preserves under DCR's jurisdiction in the project vicinity.

Thank you for the opportunity to offer comments on this project.

Sincerely,

Robert S. Munson
Planning Bureau Manager

# COMMONWEALTH of VIRGINIA

*DEPARTMENT OF ENVIRONMENTAL QUALITY*

W. Tayloe Murphy, Jr.
Secretary of Natural Resources

*Street address:* 629 East Main Street, Richmond, Virginia 23219
*Mailing address:* P.O. Box 10009, Richmond, Virginia 23240
Fax (804) 698-4500 TDD (804) 698-4021
www.deq.state.va.us

Robert G. Burnley
Director

(804) 698-4000
1-800-592-5482

**MEMORANDUM**

**TO:** Charles H. Ellis, Environmental Program Planner

**FROM:** ARB Allen Brockman, Waste Division Environmental Review Coordinator

**DATE:** January 11, 2005

**COPIES:** Sanjay Thirunagari, Waste Division Environmental Review Manager; Steve Mihalko, file

**SUBJECT:** Consistency Determination—Aerial Dispersal of Pesticide for Mosquito Control Craney Island; Portsmouth, Virginia; DEQ Project Code 04-217F

The Waste Division has completed its review of the consistency determination and final environmental assessment for the aerial dispersal of pesticide for mosquito control at Craney Island in Portsmouth, Virginia. We have the following comments concerning the waste issues associated with this project:

Solid waste issues and sites were addressed to some extent in the report. However, hazardous wastes issues and sites were not addressed. In addition, the report did not include a search of waste-related data bases. The Waste Division staff performed a cursory review of its data files and determined that the facility is a site under DEQ's Federal Facilities Installation Restoration Program (VA170022472). Garwin Eng of DEQ's Federal Facilities Program was contacted for his review of this assessment. Garwin found that "it does not appear that any ongoing investigation/remediation actions would be significantly affected" by this project. Also, the facility is a RCRA small quantity generator of hazardous waste (VA0170090005). The following websites may prove helpful in locating additional information for these identification numbers: http://www.epa.gov/echo/search_by_permit.html or http://www.epa.gov/enviro/html/rcris/rcris_query_java.html .

Any wastes that are generated during the pesticide dispersal activities must be tested and disposed of in accordance with applicable Federal, State, and local laws and regulations. Some of the applicable state laws and regulations are: Virginia Waste Management Act, Code of Virginia Section 10.1-1400 *et seq.*; Virginia Hazardous Waste Management Regulations (VHWMR) (9VAC 20-60); Virginia Solid Waste Management Regulations (VSWMR) (9VAC 20-80); Virginia Regulations for the Transportation of Hazardous Materials (9VAC 20-110). Some of the applicable Federal laws and regulations are: the Resource Conservation and Recovery Act (RCRA), 42 U.S.C. Section 6901 *et seq.*, and the applicable regulations contained in Title 40 of

the Code of Federal Regulations; and the U.S. Department of Transportation Rules for Transportation of Hazardous materials, 49 CFR Part 107.

Please note that DEQ encourages all construction projects and facilities to implement pollution prevention principles, including the reduction, reuse, and recycling of all solid wastes generated. All generation of hazardous wastes should be minimized and handled appropriately.

If you have any questions or need further information, please contact Allen Brockman at (804) 698-4468.

# DEPARTMENT OF ENVIRONMENTAL QUALITY
## DIVISION OF AIR PROGRAM COORDINATION

## ENVIRONMENTAL REVIEW COMMENTS APPLICABLE TO AIR QUALITY

**TO: Charles H. Ellis III** **DEQ - OEIA PROJECT NUMBER: 04 – 217F**

**PROJECT TYPE:** ☐ STATE EA / EIR / FONSI **X FEDERAL EA** / EIS ☐ SCC

☐ CONSISTENCY DETERMINATION/CERTIFICATION

**PROJECT TITLE: AERIAL DISPERSAL OF PESTICIDE FOR MOSQUITO CONTROL**

**PROJECT SPONSOR: DOD / ARMY / ARMY OF CORPS OF ENGINEERS**

**PROJECT LOCATION:** **X OZONE NON ATTAINMENT AREA**

**REGULATORY REQUIREMENTSMAY BE APPLICABLE TO:** ☐ CONSTRUCTION
**X OPERATION**



**STATE AIR POLLUTION CONTROL BOARD REGULATIONS THAT MAY APPLY:**

1. ☐ 9 VAC 5-40-5200 C & 9 VAC 5-40-5220 E – STAGE I
2. ☐ 9 VAC 5-40-5200 C & 9 VAC 5-40-5220 F – STAGE II Vapor Recovery
3. ☐ 9 VAC 5-40-5490 et seq. – Asphalt Paving operations
4. **X 9 VAC 5-40-5600 et seq. – Open Burning**
5. **X 9 VAC 5-50-60 et seq. Fugitive Dust Emissions**
6. ☐ 9 VAC 5-50-130 et seq. - Odorous Emissions; Applicable to_____
7. ☐ 9 VAC 5-50-160 et seq. – Standards of Performance for Toxic Pollutants
8. ☐ 9 VAC 5-50-400 Subpart_____, Standards of Performance for New Stationary Sources, designates standards of performance for the_____
9. ☐ 9 VAC 5-80-10 et seq. of the regulations – Permits for Stationary Sources
10. ☐ 9 VAC 5-80-1700 et seq. Of the regulations – Major or Modified Sources located in PSD areas. This rule may be applicable to the _____
11. ☐ 9 VAC 5-80-2000 et seq. of the regulations – New and modified sources located in non-attainment areas
12. ☐ 9 VAC 5-80-800 et seq. Of the regulations – Operating Permits and exemptions. This rule may be applicable to _____

**COMMENTS SPECIFIC TO THE PROJECT:**

**Being in an area of ozone non-attainment all precautions are necessary to restrict the emission of volatile organic compounds (VOC) and oxides of nitrogen (NOx).**

K.S. Narasimhan

**(Kotur S. Narasimhan)**
**Office of Air Data Analysis**

**DATE: January 13, 2005**

RECEIVED

JAN 13 2005

DEQ-Office of Environmental Impact Review

# MEMORANDUM

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF WATER QUALITY
Ellen Gilinsky, Ph.D., Director

**TO:** Charles H. Ellis III
Office of Environmental Impact Review

**FROM:** Michelle Henicheck MH
Office of Wetlands, and Water Protection

**DATE:** January 13, 2005

**SUBJECT:** Environmental Assessment
Aerial Dispersal of Pesticide for Mosquito Control
04-217F

We have reviewed the information provided concerning the above-referenced project. The purpose of the project is to significantly reduce existing stands of *Phragmites* through aerial application of Rodeo® (glyphosate) or Habitat® herbicide and control mosquito populations through aerial application of *Bacillus sphaericus* (naturally occurring bacteria) in the vicinity of Craney Island. In addition, a prescribed burn or mechanical removal will be conducted for the post-treatment of the *Phragmites*. The report concludes that there will be no adverse effects on surface or groundwater quality as a result of implementation of the plan.

We emphasize that non-chemical control options should be exhausted before chemical control options are employed. If and when chemical control options become necessary, preference should be given to chemicals that are least toxic to humans and the environment. Whenever any chemical is applied, the directions outlined on the label should be carefully followed. Chemical applications should also take place during the times and environmental conditions that would make the treatment the most effective and least environmentally damaging. Any fish kills must be reported immediately upon discovery. During business hours contact the Tidewater Virginia Regional Office of the Department of Environmental Quality at 757-518-2103; otherwise contact the Department of Emergency Management at 1-800-468-8892. We note that any fish kills or other water quality problems caused by any chemical applications, although unlikely, would be considered a violation of Water Control Law. DEQ recommends coordination with the U.S. Fish and Wildlife Service prior to conducting the chemical spraying for mosquito control.

DEQ recommends applying glyphosate to the *Phragmites* in late August through October, prior to the first frost. DEQ also recommends for any prescribed burnings, that they occur in late July, as winter and spring burning may in fact increase the densities of spring crops.

Glyphosate must be mixed with clean or, if possible, distilled water because it binds tightly to sediments and is thus rendered non-toxic to plants (Lefor, pers. Comm. 1992). This limits

its effectiveness but also may help prevent it from acting on plants that were not originally targeted. Rodeo should not by applied in windy conditions, as the spray will drift. DEQ recommends that the herbicide application should follow all appropriate Virginia Department of Agricultural Consumer Services (VDACS) regulations, including a licensed applicator.

## Ellis,Charles

**From:** Winer,Harold
**Sent:** Tuesday, January 11, 2005 1:35 PM
**To:** Ellis,Charles
**Cc:** Parolari,Bert
**Subject:** EIR #04-217F, Aerial Dispersal of Pesticide for Mosquito Control

As requested, TRO staff have reviewed the supplied information and have the following comments:

**Regarding VWP issues,** with respect to the use of additional larvicides as part of the CIDMMA mosquito control program, we simply suggest that all appropriate care be utilized to ensure that application of these chemical/biological agents is conducted in accordance with the recommendation of the manufacturers and other regulatory entities. However, we question the validity of utilizing herbicides to eliminate *Phragmites* as a part of this mosquito control plan, especially in combination with the other biological/chemical means proposed.

It is clearly recognized that *Phragmites* is an invasive wetland plant species that has the potential to displace more desirable vegetation where they co-exist. As such we frequently review and approve requests for control of this invasive species where this activity will improve the functional value of a wetland area. In fact, invasive species control is a requirement of an approval mitigation plan that involves creation, restoration or enhancement of wetland areas. However, *Phragmites* is frequently the dominant species in a degraded wetland area. In situations where *Phragmites* control is clearly designed to make room for more favorable species such as *Spartina* and where no other adverse impacts are anticipated, no permit would be required. However, if *Phragmites* control is designed simply to eliminate a degraded wetland and thereby reduce mosquito breeding/ "hiding" areas, as appears to be proposed in this document, a VWP permit will be required since it's an activity that will clearly "cause significant alteration or degradation of existing wetland acreage or functions" (Virginia Code 62.1-44.15:5.D).

We also note that the proposed mechanism of herbicide application is lacking in necessary detail. The project boundary is far outside of that area specifically designated as CIDMMA and includes surrounding residential areas as well. Specific areas, and associated ownership, of proposed *Phragmites* control should be specified in this document. As written, the Supplement also appears to allow the use of large Air Force fixed wing aircraft (C-130, etc.) for overhead application of herbicide. This is not only contrary to the manufacturer's application recommendations for these chemicals, it is unacceptable. While spraying from helicopters may be acceptable in some situations depending on site specific details, ground based spraying is preferred. Other application limitations on such things as seasonally (after dormancy of desirable vegetation), humidity, temperature, wind speed (3-10mph) and altitude (10ft) etc. must be specified in the document.

Thanks for the opportunity to comment.

Harold J. Winer
Deputy Regional Director
DEQ, Tidewater Regional Office
Phone - 757-518-2153 Fax - 757-518-2003
email - hjwiner@deq.virginia.gov

804/698-4488 prior to the date given. Arrangements will be made to extend the date for your review if possible. An agency will not be considered to have reviewed a document if no comments are received (or contact is made) within the period specified.

REVIEW INSTRUCTIONS:

A. Please review the document carefully. If the proposal has been reviewed earlier (i.e. if the document is a federal Final EIS or a state supplement), please consider whether your earlier comments have been adequately addressed.

B. Prepare your agency's comments in a form which would be acceptable for responding directly to a project proponent agency.

C. Use your agency stationery or the space below for your comments. **IF YOU USE THE SPACE BELOW, THE FORM MUST BE SIGNED AND DATED.**

Please return your comments to:

**MR. CHARLES H. ELLIS III**
**DEPARTMENT OF ENVIRONMENTAL QUALITY**
**OFFICE OF ENVIRONMENTAL IMPACT REVIEW**
**629 EAST MAIN STREET, SIXTH FLOOR**
**RICHMOND, VA 23219**
**FAX #804/698-4319**

RECEIVED
JAN 13 2005
DEQ-Office of Environmental Impact Review

RECEIVED
JAN 13 2005
DEQ-Office of Environmental Impact Review

Charles H. Ellis III
**CHARLES H. ELLIS III**
**ENVIRONMENTAL PROGRAM PLANNER**

COMMENTS

No Comments

(signed) Tyson West (date) 1/11/05

(title) Environmental Engineer

(agency) VMRC

**PROJECT # 04-217F**

8/98

**If you cannot meet the deadline, please notify CHARLIE ELLIS at 804/698-4488 prior to the date given. Arrangements will be made to extend the date for your review if possible. An agency will not be considered to have reviewed a document if no comments are received (or contact is made) within the period specified.**

REVIEW INSTRUCTIONS:

A. Please review the document carefully. If the proposal has been reviewed earlier (i.e. if the document is a federal Final EIS or a state supplement), please consider whether your earlier comments have been adequately addressed.

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Please return your comments to:

**MR.CHARLES H. ELLIS III**
**DEPARTMENT OF ENVIRONMENTAL QUALITY**
**OFFICE OF ENVIRONMENTAL IMPACT REVIEW**
**629 EAST MAIN STREET, SIXTH FLOOR**
**RICHMOND, VA 23219**
**FAX #804/698-4319**

**RECEIVED**

JAN 13 2005

DEQ-Office of Environmental Impact Review

Charles H. Ellis III

**CHARLES H. ELLIS III**
**ENVIRONMENTAL PROGRAM PLANNER**

COMMENTS

The undertaking will not affect any known architectural or archeological resources listed in or eligible for the National Register or the Virginia Landmarks Register.

(signed) R. Cary Holma (date) 11 Jan 05

(title) Architectural Historian

(agency) DHR

**PROJECT # 04-217F** 8/98

DHR project # 1996-0457

If you cannot meet the deadline, please notify CHARLIE ELLIS at 804/698-4488 prior to the date given. Arrangements will be made to extend the date for your review if possible. An agency will not be considered to have reviewed a document if no comments are received (or contact is made) within the period specified.

REVIEW INSTRUCTIONS:

A. Please review the document carefully. If the proposal has been reviewed earlier (i.e. if the document is a federal Final EIS or a state supplement), please consider whether your earlier comments have been adequately addressed.

B. Prepare your agency's comments in a form which would be acceptable for responding directly to a project proponent agency.

C. Use your agency stationery or the space below for your comments. **IF YOU USE THE SPACE BELOW, THE FORM MUST BE SIGNED AND DATED.**

Please return your comments to:

**MR.CHARLES H. ELLIS III**
**DEPARTMENT OF ENVIRONMENTAL QUALITY**
**OFFICE OF ENVIRONMENTAL IMPACT REVIEW**
**629 EAST MAIN STREET, SIXTH FLOOR**
**RICHMOND, VA 23219**
**FAX #804/698-4319**

Charles H. Ellis III
**CHARLES H. ELLIS III**
**ENVIRONMENTAL PROGRAM PLANNER**

COMMENTS

We have reviewed from a marine environmental perspective the Draft Supplemental Environmental Assessment for the Aerial Dispersal of Pesticide for Mosquito Control. We have no comments on the plans and recommendations of the report.

(signed) JA Barnard Jr. (date) 1/13/05

(title) Marine Scientist

(agency) VIMS - CCRM

**PROJECT # 04-217F**

8/98

REPLY TO
ATTENTION OF

**DEPARTMENT OF THE ARMY**
NORFOLK DISTRICT CORPS OF ENGINEERS
FORT NORFOLK 803 FRONT STREET
NORFOLK VIRGINIA 23510-1096

February 9, 2005

Operations Branch

Ms. Ellie L. Irons
Program Manager, Office of Environmental Impact Review
Virginia Department of Environmental Quality
P.O. Box 10009
Richmond, VA 23240

RE: Draft Supplement to the 1996 Environmental Assessment for the Aerial Dispersal of Pesticide for Mosquito Control at the Craney Island Dredged Material Management Area

Dear Ms. Irons:

We have reviewed your comments on the Draft Supplement and provide the following responses:

Comments – Due to the legal status of the piping plover, the Department of Conservation recommends that the Corps coordinate with the U.S. Fish and Wildlife Service (Karen Mayne, telephone (804) 693-6694) and the Virginia Department of Game and Inland Fisheries (Ray Fernald, telephone (804) 367-6913).

**Response – The Norfolk District has coordinated with both aforementioned agencies regarding the contents of the Draft Supplement. We will continue to coordinate with the agencies about the piping plover, and other species of concern that may utilize the Craney Island Dredged Material Management Area (CIDMMA). Also, we will continue to work with Ruth Beck from the College of William and Mary to monitor piping plovers and other migratory bird species using CIDMMA.**

Comments – The Department of Game and Inland Fisheries (VDGIF) recommends that the Integrated Pest Management program for CIDMMA be designed to reduce reliance on pesticides. One alternative may be to encourage the presence of natural predators of mosquitoes by installing bat boxes and birdhouses. Only as a last resort should aerial spraying be utilized. Specifically, the Corps of Engineers should take into consideration the potential impacts that aerial spraying for mosquitoes may have upon night-flying insectivores, such as swifts, swallows, and bats.

**Response – One of the main objectives of our Integrated Pest Management (IPM) program is to reduce reliance on pesticides. In prior years, we have followed a more reactionary approach to mosquito control with aerial sprayings of pesticides. We are currently implementing a proactive approach that focuses on source reduction activities, natural predators such as mosquito fish, and larval surveillance to minimize the use of pesticides.**

DEQ-TRO indicates that the project boundary is outside of the area specifically designated as the disposal area, and includes surrounding residential areas as well. The Final Supplemental EA should indicate specifically the areas, and associated ownership, subject to the proposed phragmites control, since this information was not present in the DSEA. The DSEA indicates that the Corps contemplates allowing the use of large Air Force fixed-wing aircraft (C-130, etc.) for overhead application of herbicides. This is not only contrary to the manufacturer's application recommendations, but it is unacceptable so far as DEQ-TRO is concerned. While spraying from helicopters may be acceptable in some situations, depending on site-specific details, ground-based spraying is preferred. Other application limitations on such things as the season (after dormancy of desirable vegetation), humidity, temperature, wind-speed (3 to 10 mph), and altitude (10 feet) must be specified in the document.

If glyphosate is to be used for phragmites control, it should be applied from late August through October, before the first frost, according to DEQ's Division of Water Quality. Glyphosate must be mixed with clean water (or, if possible, distilled water) because it binds tightly to sediments and is thus rendered non-toxic to plants (Lefor, personal communication, 1992). This limits the effectiveness of glyphosate, but also may help prevent it from acting on non-target plants. The Division also recommends that any prescribed burning of phragmites stalks, which is mentioned as an alternative to mechanical removal following herbicide application (see DSEA, page 7, section 5.2), take place in July rather than in winter or spring. Winter or spring burning may actually increase the density of spring crops of the plant.

The herbicide Rodeo should not be applied in windy conditions, because the spray will drift.

**<u>Response</u> – The additional larvicides and herbicides proposed in the DSEA will be applied to areas actively utilized for construction purposes within CIDMMA property boundaries. Figure 1 of the DSEA illustrates the current mosquito spray area in the 1996 EA for aerial application of adulticides only. This effort is part of the ongoing partnership with the City of Portsmouth. The Norfolk District will not apply larvicides or herbicides on the surrounding areas, including the residential areas.**

**Herbicides will be used to maintain existing ditches and disturbed areas on CIDMMA that have become overgrown with phragmites. Construction activities and maintenance operations occur frequently in these areas, but phragmites stands are still able to coexist. Mechanical removal alone has been ineffective and not economical.**

**The validity of using herbicides in an IPM is that, "mosquitoes exploit this habitat for harborage, providing larvae with considerable protection from natural predators and quiet environment for development. Due to the density of these reeds, access for mosquito control work is difficult" (DSEA, page 7, section 5.2). Also, existing ditches choked with phragmites do not function effectively.**

**The Norfolk District does not contemplate the use of large Air Force fixed-wing aircraft, such as the C-130, for application of herbicides. It would not be a targeted and effective means of controlling phragmites. We will follow the manufacturer's application recommendations, and only when environmental conditions permit. We agree that glyphosate should be applied near**

**We would like to encourage the presence of more natural predators of mosquitoes at CIDMMA. There are currently 15 birdhouses located on site, including 11 distributed around the containment areas and 4 located near the administration office. These birdhouses are primarily to encourage the presence of purple martins. We will continue to stock mosquito fish in appropriate areas, and will consider other ways to encourage natural predators of mosquitoes.**

Comments – VDGIF supports the recommendation of the U.S. Fish and Wildlife Service (USFWS) that spraying with methoprene should not take place during the shorebird-breeding season, March 1 to the middle of August. VDGIF recommends that the ground application of methoprene should also not take place during that period. However, if migratory bird species are not present in significant numbers prior to mid-August, the targeted application of methoprene may be allowed, provided that the Corps consults with the USFWS in this regard as a pre-requisite.

**Response – The Norfolk District works with Ruth Beck from the College of William and Mary to monitor migratory bird species using CIDMMA. We will coordinate with USFWS and utilize the experience and knowledge of Ruth Beck regarding acceptable times for application of methoprene for mosquito control.**

Comments – VDGIF supports the proposal that B.s. will be applied only to areas where mosquito larvae of the *Culex* genus are found (DSEA, page 5, section 5.1.1).

VDGIF states that using the pesticides Rodeo® and Habitat® for controlling phragmites may help reduce potential mosquito breeding areas (DSEA, pages 6-7, section 5.2), and indicates that use of these herbicides as the label directs will not result in significant adverse impacts to species under VDGIF's jurisdiction.

**Response – Noted.**

Comments – The DEQ's Waste Division's Federal Facilities Program staff indicates that the proposed aerial application would not affect any on-going investigation or remediation actions.

**Response – Noted.**

Comments – With regard to the use of additional larvicides as part of the Craney Island mosquito control program, DEQ's Tidewater Regional Office (TRO) questions the validity of using herbicides to eliminate phragmites as part of the mosquito control plan, especially in combination with the other means proposed.

If phragmites control is designed simply to eliminate a degraded wetland and thereby reduce mosquito breeding and "hiding" areas, as it appears to be in the DSEA (see pages 6-7, section 5.2), then a Virginia Water Protection Permit will be required, because this activity will clearly "cause significant alteration or degradation of existing wetland acreage or functions" as contemplated in the State Water Control Law (*Virginia Code* section 62.1-44.15:5D).

**the end of the growing season, or late August through October, and before the first frost. The additional comments relating to herbicide application mechanism and time have been noted.**

Comments – According to the Department of Historic Resources (DHR project 1996-0457), this undertaking will not affect any known architectural or archaeological resources listed in or eligible for the National Register of Historic Places or the Virginia Landmarks Register.

**Response – Noted.**

Comments – Pursuant to the Coastal Zone Management Act of 1972, as amended, the Corps is required to determine the consistency of its activities affecting the Virginia's coastal resources or coastal uses with the Virginia Coastal Resources Management Program (VCP) (see section 307(c)(1) of the Act and 15 CFR Part 930, sub-part C, section 930.34). This involves an analysis of the activities in light of the Enforceable Programs of the VCP, and submission of a consistency determination reflecting that analysis and committing the Corps to comply with the Enforceable Programs to the maximum extent practicable. The federal consistency determination may be provided as part of the documentation concluding the NEPA process, or independently, depending on your agency's preference.

**Response – A federal consistency determination will be provided as part of the documentation concluding the NEPA process.**

Comments – A permit may be required from DEQ for the prescribed burning that may follow the aerial application of herbicides or larvicides. The Corps should contact DEQ-TRO (Jane Workman, Air Permits Manager, telephone (757) 518-2112) in this regard.

**Response – Noted.**

A copy of the Final Supplement will be made available to you upon request. Should you have any additional questions or concerns, please contact Mr. Keith Lockwood of my staff at (757) 201-7127. Thank you for your assistance.

Sincerely,

Matthew T. Byrne, P.E.
Chief, Operations Branch

W. Tayloe Murphy, Jr.
Secretary of Natural Resources

Joseph H. Maroon
Director

# COMMONWEALTH of VIRGINIA

## DEPARTMENT OF CONSERVATION AND RECREATION

217 Governor Street
Richmond, Virginia 23219-2010
Telephone (804) 786-7951 FAX (804) 371-2674 TDD (804) 786-2121

MEMORANDUM

DATE: January 5, 2005

TO: Matthew T. Byrne, ACOE

FROM: René Hypes, DCR-DNH

SUBJECT: Due January 7, 2005
Mosquito Control at Craney Island Dredged Material Area

The Department of Conservation and Recreation (DCR) has searched its Biotics Data System for occurrences of natural heritage resources from the area outlined on the submitted map. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

According to the information currently in our files, this site is located within the Craney Island Conservation Site. Conservation sites are tools for representing key areas of the landscape that warrant further review for possible conservation action because of the natural heritage resources and habitat they support. Conservation sites are polygons built around one or more rare plant, animal, or natural community designed to include the element and, where possible, its associated habitat, and buffer or other adjacent land thought necessary for the element's conservation. Conservation sites are given a biodiversity significance ranking based on the rarity, quality, and number of element occurrences they contain; on a scale of 1-5, 1 being most significant. Craney Island Conservation Site has been given a biodiversity significance ranking of B4, which represents a site of moderate significance. The natural heritage resources of concern at this site are the Piping Plover (*Charadrius melodus*, G3/S2B,S2BS1N/LT/LT), Least Tern (*Sterna antillarum*, G4/S2B/NL/SC), and Black-necked Stilt (*Himantopus mexicanus*, G5/S1B/NL/NL).

The Piping Plover inhabits coastal areas, utilizing the flat, sandy beaches of barrier islands for breeding. Threats to this species include predation of eggs and young and the development and disturbance of barrier island breeding sites (Cross, 1991). Please note that this species is listed as threatened by the United States Fish and Wildlife Service (USFWS) and the Virginia Department of Game and Inland Fisheries (VDGIF).

The Least Tern nests on broad, flat beaches with minimal vegetation and forages in saltwater near the shore. Threats to this species include loss of nesting habitat due to development and disturbance of breeding colonies by human activities and high numbers of predators (Beck, 1991). Please note that the Least Tern is listed as a special concern species by VDGIF.

Black-necked Stilts primarily occur near shallow salt or fresh water bodies with soft muddy bottoms, including grassy marshes, wet savannas, mudflats, shallow ponds, flooded fields, and the borders of salt ponds. They nest along the shallow water of ponds, lakes, swamps, or lagoons and may nest on the ground or in the shallow water on a plant tussock. Black-necked Stilts feed on insects, crustaceans, and small fish, as well as the seeds of aquatic plants.

Due to the legal status of the piping plover, DCR recommends coordination with USFWS and VDGIF to ensure compliance with protected species legislation.

Our files do not indicate the presence of any State Natural Area Preserves under DCR's jurisdiction in the project vicinity.

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the Virginia Department of Conservation and Recreation (DCR), DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species. The current activity will not affect any documented state-listed plants or insects.

Any absence of data may indicate that the project area has not been surveyed, rather than confirm that the area lacks natural heritage resources. New and updated information is continually added to Biotics. Please contact DCR for an update on this natural heritage information if a significant amount of time passes before it is utilized.

The Virginia Department of Game and Inland Fisheries maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters, that may contain information not documented in this letter. Their database may be accessed from http://www.dgif.virginia.gov/wildlife/info_map/index.html , or contact Shirl Dressler at (804) 367-6913.

Thank you for the opportunity to comment on this project.

CC: Kim Marbain, USFWS
Andy Zadnik, VDGIF

REPLY TO
ATTENTION OF

**DEPARTMENT OF THE ARMY**
NORFOLK DISTRICT CORPS OF ENGINEERS
FORT NORFOLK 803 FRONT STREET
NORFOLK VIRGINIA 23510-1096

February 7, 2005

Operations Branch

René Hypes, DCR-DNH
Department of Conservation and Recreation
217 Governor Street
Richmond, VA 23219-2010

RE: Draft Supplement to the 1996 Environmental Assessment for the Aerial Dispersal of Pesticide for Mosquito Control at the Craney Island Dredged Material Management Area

Dear Ms. Hypes:

We have reviewed your comments on the Draft Supplement and provide the following responses:

Comments – Due to the legal status of the piping plover, DCR recommends coordination with USFWS and VDGIF to ensure compliance with protected species legislation.

**Response – The Norfolk District has coordinated with both aforementioned agencies regarding the contents of the Draft Supplement. We will continue to coordinate with the agencies about the piping plover, and other species of concern that may utilize the Craney Island Dredged Material Management Area (CIDMMA). Also, we will continue to work with Ruth Beck from the College of William and Mary to monitor piping plovers and other migratory bird species using CIDMMA.**

Comments – Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the Virginia Department of Conservation and Recreation (DCR), DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species. The current activity will not affect any documented state-listed plants or insects.

**Response – Noted.**

A copy of the Final Supplement will be made available to you upon request. Should you have any additional questions or concerns, please contact Mr. Keith Lockwood of my staff at (757) 201-7127. Thank you for your assistance.

Sincerely,

Matthew T. Byrne, P.E.
Chief, Operations Branch

COMMONWEALTH of VIRGINIA

W. Tayloe Murphy, Jr.
*Secretary of Natural Resources*

***Department of Game and Inland Fisheries***

William L. Woodfin, Jr.
*Director*

December 21, 2004

Matthew T. Byrne, P. E.
Dept. of the Army
Norfolk District, Corps of Engineers
Ft. Norfolk, 803 Front St.
Norfolk, VA 23510-1096

RE: Draft supplement to 1996 EA
"Aerial Dispersal of Pesticide for Mosquito Control", Craney Island disposal area

Dear Mr. Byrne:

We have reviewed the subject project and offer the following comments and recommendations. The Virginia Department of Game and Inland Fisheries (VDGIF), as the Commonwealth's wildlife and freshwater fish management agency, exercises enforcement and regulatory jurisdiction over those resources, inclusive of state or federally endangered or threatened species, but excluding listed insects. We are a consulting agency under the U. S. Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.), and we provide environmental analysis of projects or permit applications coordinated through the Virginia Department of Environmental Quality, the Virginia Marine Resources Commission, the Virginia Department of Transportation, the U. S. Army Corps of Engineers, the Federal Energy Regulatory Commission, and other state or federal agencies. Our role in these procedures is to determine likely impacts upon fish and wildlife resources and habitats, and to recommend appropriate measures to avoid, reduce, or compensate for those impacts.

The purpose of this Supplemental Environmental Assessment (EA) is to supplement the June 1996 Environmental Assessment for aerial dispersal of pesticides and herbicides for mosquito control at the Craney Island Dredged Material Management Area (CIDMMA). Currently, mosquito control at CIDMMA focuses on the use of the pesticides naled and methoprene and larvicide *Bacillus thuringiensis israelensis* (B.t.i.). This Supplemental EA proposes to include additional mosquito control measures, including the larvicides Altosid® and *Bacillus sphaericus* (B.s.), and the herbicides Rodeo® and Habitat®.

Altosid contains methoprene, which is known to be slightly toxic to birds and slightly to moderately toxic to fish. To prevent adverse impacts to non-target aquatic organisms, only targeted areas will be applied. We support the recommendations of the U. S. Fish and Wildlife Service (USFWS), that spraying with methoprene should not occur during the shorebird breeding season, March 1 – mid-August. We further recommend that the ground application of methoprene also should not occur during this period. However, pending coordination with the USFWS, the

targeted application of methoprene prior to mid-August may be allowed if migratory bird species are not present in significant numbers.

We understand that there are no substantial environmental safety concerns associated with the use of the larvicide B.s. It appears that this larvicide is virtually harmless to non-target aquatic organisms. We support the proposal that B.s. will be applied only to areas where mosquito larvae of the *Culex* spp. are found.

The herbicides Rodeo® and Habitat® are proposed to be used for the control of phragmites, which may help reduce potential mosquito breeding areas. If used as directed, we do not anticipate a significant adverse impact upon wildlife resources under our jurisdiction to occur.

We recommend that the Integrated Pest Management program for CIDMMA be designed to reduce reliance on pesticides. One alternative may be to encourage the presence of natural predators of mosquitoes by installing bat boxes and bird houses. Only as a last resort should aerial spraying be utilized. We recommend that the Corps of Engineers take into consideration the potential impacts that aerial spraying for mosquitoes may have upon night-flying insectivores, such as swifts, swallows, and bats.

Thank you for the opportunity to comment on this draft Supplemental EA. Please call Andrew Zadnik or me at (804) 367-6913 if we may be of further assistance.

Sincerely,

Andrew Zadnik

for Raymond T. Fernald, Manager
Nongame and Environmental Programs

CC. Rene Hypes, VA Dept. of Conservation and Recreation – Division of Natural Heritage

DEPARTMENT OF THE ARMY
NORFOLK DISTRICT CORPS OF ENGINEERS
FORT NORFOLK 803 FRONT STREET
NORFOLK VIRGINIA 23510-1096

REPLY TO
ATTENTION OF

February 7, 2005

Operations Branch

Mr. Raymond T. Fernald
Manager, Nongame and Environmental Programs
Virginia Department of Game and Inland Fisheries
4010 West Broad St
P.O. Box 11104
Richmond, VA 23230-1104

RE: Draft Supplement to the 1996 Environmental Assessment for the Aerial Dispersal of Pesticide for Mosquito Control at the Craney Island Dredged Material Management Area

Dear Mr. Fernald:

We have reviewed your comments on the Draft Supplement and provide the following responses:

Comments – We support the recommendations of the U.S. Fish and Wildlife Service (USFWS), that spraying with methoprene should not occur during the shorebird breeding season, March 1 – mid-August. We further recommend that the ground application of methoprene also should not occur during this period. However, pending coordination with the USFWS, the targeted application of methoprene prior to mid-August may be allowed if migratory bird species are not present in significant numbers.

**Response – The Norfolk District works with Ruth Beck from the College of William and Mary to monitor migratory bird species using the Craney Island Dredged Material Management Area (CIDMMA). We will coordinate with USFWS and utilize the experience and knowledge of Ruth Beck regarding application of methoprene for mosquito control.**

Comments – We support the proposal that B.s. will be applied only to areas where mosquito larvae of the *Culex* spp. are found.

**Response – Noted.**

Comments – The herbicides Rodeo® and Habitat® are proposed to be used for the control of phragmites, which may help reduce potential mosquito breeding areas. If used as directed, we do not anticipate a significant adverse impact upon wildlife resources under our jurisdiction to occur.

**Response – Noted.**

Comments – We recommend that the Integrated Pest Management program for CIDMMA be designed to reduce reliance on pesticides. One alternative may be to encourage the presence of

natural predators of mosquitoes by installing bat boxes and bird houses. Only as a last resort should aerial spraying be utilized. We recommend that the Corps of Engineers take into consideration the potential impacts that aerial spraying for mosquitoes may have upon night-flying insectivores, such as swifts, swallows, and bats.

**Response – One of the main objectives of our Integrated Pest Management (IPM) program is to reduce reliance on pesticides. In prior years, we have followed a more reactionary approach to mosquito control with aerial sprayings of pesticides. We are currently implementing a proactive approach that focuses on source reduction activities, natural predators such as mosquito fish, and larval surveillance to minimize the use of pesticides.**

**We would like to encourage the presence of more natural predators of mosquitoes at CIDMMA. There are currently 15 birdhouses located on site, including 11 distributed around the containment areas and 4 located near the administration office. These birdhouses are primarily to encourage the presence of purple martins. We will continue to stock mosquito fish in appropriate areas, and will consider other ways to encourage natural predators of mosquitoes.**

Should you have any additional questions or concerns, please contact Mr. Keith Lockwood of my staff at (757) 201-7127. Thank you for your assistance.

Sincerely,

Matthew T. Byrne, P.E.
Chief, Operations Branch

**CITY OF PORTSMOUTH, VIRGINIA**
Established 1752
**Office of the Mayor**
(757) 393-8746 • Fax: (757) 393-5378

**Dr. James W. Holley III**
Mayor

**January 11, 2005**

**Mr. Matthew T. Byrne, P.E.**
**Chief, Operations Branch**
**Department of the Army**
**Norfolk District, Corps of Engineers**
**Fort Norfolk, 803 Front Street**
**Norfolk, VA 23510-1096**

**Dear Mr. Byrne,**

**Thank you for the opportunity to comment on the Environmental Assessment draft supplement.**

- **Portsmouth applauds your initiative to refocus your efforts from a reactive plan that focuses on spraying adult mosquitoes to proactive plan that focuses on treating mosquitoes in the larval stage.**

- **Our major concern has always been that large mosquito populations have impacted Portsmouth residents. As stated in the original 1996 Environmental Assessment Executive Summary, Portsmouth residents have faced the risk of serious disease transmissions from mosquitoes and decreased quality of life from not being able to work and recreate outside.**

- **Our experience shows that properly timed applications of larvicide can significantly diminish the adult mosquito populations. The very dynamic mosquito breeding conditions found at Craney Island are a direct result of harbor maintenance operations, and to be effective controlling mosquitoes your plan must be flexible and properly supervised.**

For all the reasons outlined above, Portsmouth supports the Corps of Engineers in the revision of their 1996 Environmental Assessment allowing for a tailored, flexible and more effective mosquito control program. Portsmouth and our mosquito control staff are committed to sharing information and supporting the Corps in a proactive mosquito control program. We applaud your actions in recognizing that the Corps is indeed part of the mosquito problem in Churchland and taking steps to address this.

Sincerely,

Dr. James W. Holley III

Dr. James W. Holley III
Mayor

cc: Portsmouth City Council
Mr. James B. Oliver, Jr., City Manager
Mr. James R. Spacek, P.E., Director of Public Utilities/Works

DEPARTMENT OF THE ARMY
NORFOLK DISTRICT CORPS OF ENGINEERS
FORT NORFOLK 803 FRONT STREET
NORFOLK VIRGINIA 23510-1096

REPLY TO
ATTENTION OF

February 7, 2005

Operations Branch

Dr. James W. Holley III
Mayor, City of Portsmouth
Office of the Mayor
P.O. Box 820
Portsmouth, VA 23705-0820

RE: Draft Supplement to the 1996 Environmental Assessment for the Aerial Dispersal of Pesticide for Mosquito Control at the Craney Island Dredged Material Management Area

Dear Dr. Holley:

We have reviewed your comments on the Draft Supplement and provide the following responses:

Comments – Portsmouth applauds your initiative to refocus your efforts from a reactive plan that focuses on spraying adult mosquitoes to a proactive plan that focuses on treating mosquitoes in the larval stage.

**Response – We appreciate your support on our integrated pest management approach towards mosquito control at the Craney Island Dredged Material Management Area (CIDMMA).**

Comments – Our major concern has always been that large mosquito populations have impacted Portsmouth residents. As stated in the original 1996 Environmental Assessment Executive Summary, Portsmouth residents have faced the risk of serious disease transmissions from mosquitoes and decreased quality of life from not being able to work and recreate outside.

**Response – We agree that the risk of mosquito-borne diseases and the potential for a decreased quality of life for residents is a serious concern. The Norfolk District will continue to strive to reduce these risks through the Integrated Pest Management (IPM) program.**

Comments – Our experience shows that properly timed applications of larvicide can significantly diminish the adult mosquito populations. The very dynamic mosquito breeding conditions found at Craney Island are a direct result of harbor maintenance operations, and to be effective controlling mosquitoes your plan must be flexible and properly supervised.

**Response – Although we do not concur that mosquito breeding at CIDMMA is a direct result of our operations, we understand that our facility, as well as the surrounding areas in Portsmouth, can provide ideal habitat and conditions for mosquitoes. The Norfolk District**

**will maintain a high level of supervision and flexibility on mosquito control initiatives at CIDMMA to obtain the greatest results.**

We look forward to working with the City of Portsmouth and your mosquito control staff on this important project. Your support and commitment to share information is appreciated. Should you have any additional questions or concerns, please contact Mr. Keith Lockwood of my staff at (757) 201-7127. Thank you for your assistance.

Sincerely,

Matthew T. Byrne, P.E.
Chief, Operations Branch