

Attachment E – Notice of Intent

RECEIVED

FEB 26 2014

WATER QUALITY ORDER NO. 2013-0002-DWQ  
GENERAL PERMIT NO. CAG990005

DIVISION OF WATER QUALITY

STATEWIDE GENERAL NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM  
(NPDES) PERMIT FOR RESIDUAL AQUATIC PESTICIDE DISCHARGES TO WATERS OF  
THE UNITED STATES FROM ALGAE AND AQUATIC WEED CONTROL APPLICATIONS

I. NOTICE OF INTENT STATUS (see Instructions)

Mark only one item	A. New Applicator	B. <input checked="" type="checkbox"/> Change of Information: WDID#	4A567900011
	C. <input type="checkbox"/> Change of ownership or responsibility: WDID#		

II. DISCHARGER INFORMATION

A. Name Naval Base Ventura County (NBVC)			
B. Mailing Address 311 Main Road, Suite 1, NASV Building 632			
C. City Point Mugu	D. County Ventura	E. State CA	F. Zip 93042
G. Contact Person Valerie Vartanian	H. E-mail address valerie.vartanian@navy.mil	I. Title Wetlands Manager	J. Phone 805-989-4740

III. BILLING ADDRESS (Enter Information only if different from Section II above)

A. Name			
B. Mailing Address			
C. City	D. County	E. State	F. Zip
G. E-mail address	H. Title	I. Phone	

**IV. RECEIVING WATER INFORMATION**

A. Algaecide and aquatic herbicides are used to treat (check all that apply):

1.  Canals, ditches, or other constructed conveyance facilities owned and controlled by Discharger.  
Name of the conveyance system: NBVC Point Mugu and Port Hueneme flood control channels

2.  Canals, ditches, or other constructed conveyance facilities owned and controlled by an entity other than the Discharger.  
Owner's name: \_\_\_\_\_  
Name of the conveyance system: \_\_\_\_\_

3. Directly to river, lake, creek, stream, bay, ocean, etc.  
Name of water body: \_\_\_\_\_

B. Regional Water Quality Control Board(s) where treatment areas are located  
(REGION 1, 2, 3, 4, 5, 6, 7, 8, or 9): Region 4  
(List all regions where algaecide and aquatic herbicide application is proposed.)

**V. ALGAECIDE AND AQUATIC HERBICIDE APPLICATION INFORMATION**

A. Target Organisms: Aquatic Weeds (surface)  
Species include, but are not limited to: Cattail (Typha sp.); and Bulrush (Scirpus sp.).

B. Algaecide and Aquatic Herbicide Used: List Name and Active ingredients  
Aquamaster Herbicide - Isopropylamine salt of glyphosate

C. Period of Application: Start Date April 1, 2014 End Date Applied annually

D. Types of Adjuvants Used: ~~n/a~~ No Foam A

**VI. AQUATIC PESTICIDE APPLICATION PLAN**

Has an Aquatic Pesticide Application Plan been prepared and is the applicator familiar with its contents?  
 Yes  No

If not, when will it be prepared? \_\_\_\_\_

**VII. NOTIFICATION**

Have potentially affected public and governmental agencies been notified?  Yes  No

**VIII. FEE**

Have you included payment of the filing fee (for first-time enrollees only) with this submittal?  
 YES  NO  NA

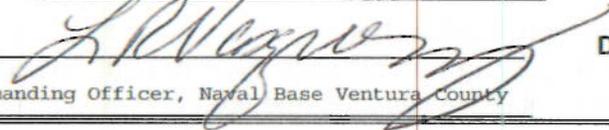
GENERAL NPDES PERMIT FOR RESIDUAL  
 AQUATIC PESTICIDE DISCHARGES FROM  
 ALGAE AND AQUATIC WEED CONTROL APPLICATIONS

ORDER NO. 2013-0002-DWQ  
 NPDES NO. CAG990005

**IX. CERTIFICATION**

"I certify under penalty of law that this document and all attachments were prepared under my direction and supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment. Additionally, I certify that the provisions of the General Permit, including developing and implementing a monitoring program, will be complied with."

A. Printed Name: L. R. Vasquez, Captain U.S. Navy

B. Signature:  Date: 26 NOV 13

C. Title: Commanding Officer, Naval Base Ventura County

**XI. FOR STATE WATER BOARD STAFF USE ONLY**

WDID:	Date NOI Received:	Date NOI Processed:
Case Handler's Initial:	Fee Amount Received: \$	Check #:
<input type="checkbox"/> Lyris List Notification of Posting of APAP	Date _____	Confirmation Sent _____

# **NAVAL BASE VENTURA COUNTY AQUATIC PESTICIDE APPLICATION PLAN**

**STATEWIDE GENERAL NATIONAL POLLUTANT DISCHARGE ELIMINATION  
SYSTEM PERMIT FOR RESIDUAL AQUATIC PESTICIDE DISCHARGES TO  
WATERS OF THE UNITED STATES FROM ALGAE AND AQUATIC WEED  
CONTROL APPLICATIONS  
GENERAL PERMIT NO. CAG990005  
WATER QUALITY ORDER NO. 2013-0002-DWQ**

November 2013

Prepared for:

State Water Resources Control Board  
Los Angeles Regional Water Quality Control Board (Region 4)

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## List of Exhibits and Appendices

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Exhibit 1 – Map of Naval Base Ventura County

Appendix 1 – *Integrated Pest Management Plan for Naval Base Ventura County*

## List of Acronyms and Abbreviations

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BASH	Bird Air Strike Hazard
BMP	Best Management Practice
CCR	California Code of Regulations
CDPH	California Department of Public Health
CFR	Code of Federal Regulations
DoD	Department of Defense
DPH	California Department of Public Health
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FIFRA	Federal Insecticide, Fungicide and Rodenticide Act
HAZWOPER	Hazardous Waste Operations and Emergency Response
IPM	Integrated Pest Management
IPMP	Integrated Pest Management Plan
MSDS	Material Safety Data Sheets
NAVFAC	Naval Facilities Engineering Command
NAWCWD	Naval Air Warfare Center
NBVC	Naval Base Ventura County
NPDES	National Pollutant Discharge Elimination System

OSHA	Occupational Safety and Health Administration
OPNAVINST	Operations Naval Instruction
PPE	Personal Protective Gear
RWQCB	Regional Water Quality Control Board
SERA	Syracuse Environmental Research Associates
SWRCB	State Water Resource Control Board
USEPA	U.S. Environmental Protection Agency

## Introduction

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Naval Base Ventura County (NBVC) Public Works Department is charged with maintaining waterways that emanate from and/or flow to off-base locations. Maintenance includes keeping waterways weed free in order to maximize stormwater runoff and prevent flooding on base. The use of chemicals to perform this duty is conducted under the U.S. Code of Federal Regulations (CFR) at 40 CFR Section E 152-180 Pesticide Programs, DoD, Navy and Marine Corps: DoD 4150.07, DoD Pest Management Program; OPNAVINST 6250.4B, Pest Management Programs; OPNAVINST 5090.1C, Environmental Readiness Program Manual California: California Code of Regulations (CCR) Title 3 Division 6. NBVC is within the jurisdiction of the Los Angeles Regional Water Quality Control Board, and is seeking coverage under the General Permit No. CAG 990005 as “a public entity” that applies biological and residual pesticides for aquatic weed control in or near waters of the United States.

There are 3 installations that comprise NBVC: Point Mugu, Port Hueneme, and San Nicolas Island. NBVC Point Mugu is located in Ventura County, California, about 50 miles northwest of Los Angeles. NBVC Point Mugu’s closest neighboring communities are Oxnard, Camarillo, Thousand Oaks, Port Hueneme, and Ventura. Immediately adjacent to the northwest of NBVC Point Mugu are two duck hunting clubs: the Point Mugu Game Reserve and the Ventura County Game Reserve. The Pacific Ocean and Ormond Beach lie directly southwest and west of the site, respectively. NBVC’s weed management operations are based out of Point Mugu, California, and service all areas of NBVC.

NBVC Port Hueneme is located on the coast of Ventura County, California, adjacent to the cities of Port Hueneme and Oxnard. Port Hueneme is surrounded by the City of Oxnard to the east and north, and is bordered by Channel Islands Harbor on the west (See Exhibit 1). NBVC Port Hueneme was established early in the Second World War (1942) to train, stage, and supply the Seabees. As the only Navy deep-water port between San Diego and Seattle, the Port of Hueneme has served as major shipping and staging center for construction equipment and material to military operations.

San Nicolas Island was put under administrative control of NBVC in Oct of 2005. NBVC began providing pest control services through contracted staff on 01 October 2009. A Partner Pest Management Plan for NBVC San Nicolas Island is found in the NBVC Integrated Pest Management Plan (IPMP) (see Appendix 1).

NBVC utilizes an Integrated Pest Management (IPM) Program strategy to minimize the amount of chemicals used in pest control on base. The goal of the overall plan is to prevent the introduction of invasive plants and disease vectors and enhance quality of life through pest prevention. IPM is implemented for Force Health Protection, pest protection of all buildings, enhancement of force protection and wildfire protection through weed management, and protecting federally listed species as required by the Endangered Species Act (ESA). The IPM Program consists of the following activities: 1) Education and outreach efforts targeted toward the tenants and residents in ways to facilitate source reduction and prevent new introductions; 2)

Surveillance for new invasive species or expansion of known existing populations; and 3)  
Application of pesticides to control or eliminate invasive populations.

Only NBVC Point Mugu and NBVC Port Hueneme apply aquatic herbicides for the purpose of controlling vegetation in channels within the jurisdiction of the Los Angeles Regional Water Quality Control Board (RWQCB). NBVC San Nicolas Island will not be referred to in this permit application.

As required under Section VIII of the permit, NBVC is submitting this document as its Aquatic Pesticide Application Plan for review and approval by the State Water Resources Control Board (SWRCB) and RWQCB. Topic descriptions from Section VIII of the permit are included in *bold italics*.

# 1 Description of the Water Bodies

*Description of the water body(ies) or water body systems being controlled.*

The water body systems at NBVC subject to aquatic herbicide applications are flood control channels that convey storm water during rain events. Therefore, these flood control channels must be kept clear of aquatic weeds to prevent flooding. At NBVC Port Hueneme a portion of these channels are hydraulically connected to Port Hueneme harbor under normal conditions, and the upper most reaches are hydraulically connected only under extreme high tides. At NBVC Point Mugu, the flood control channels are hydraulically connected to Calleguas Creek Reach 1. See Figures 1 and 2 for maps of channel/waterways at NBVC Point Mugu and NBVC Port Hueneme.

Figure 1. NBVC Point Mugu weed control channel/waterway sites

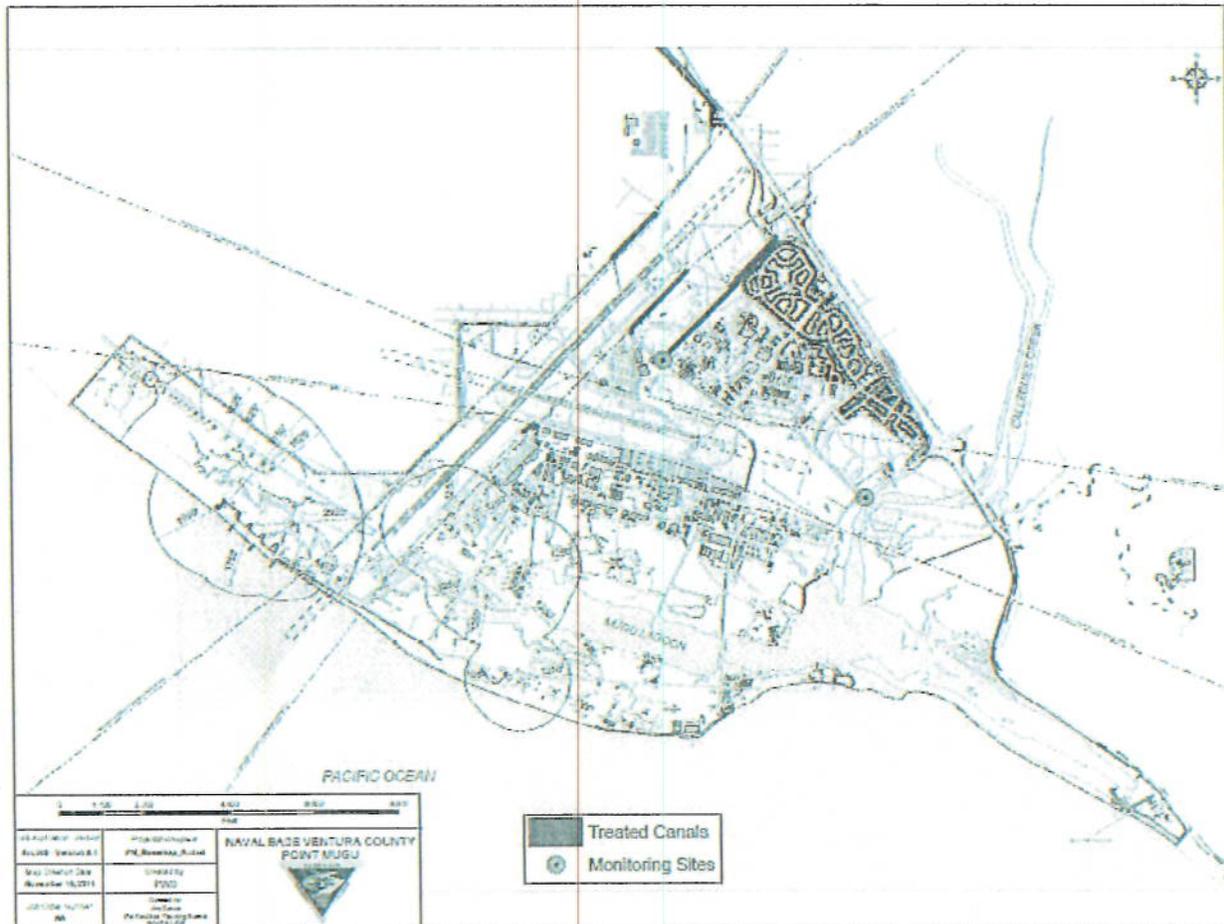
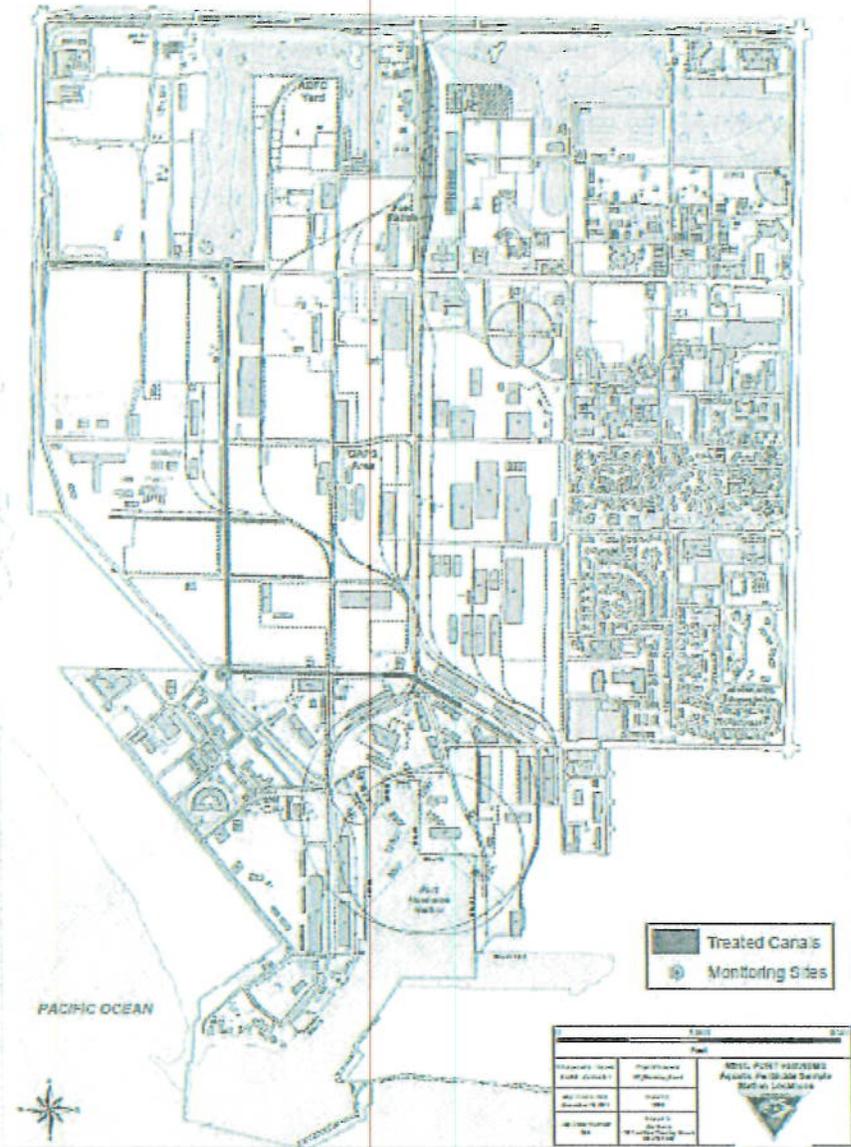


Figure 2. NBVC Port Hueneme weed control channel/waterway sites



## 2 Description of the Treatment Area

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### *Description of the treatment area in the water system*

The treatment areas at both installations are concrete or soil sided channels with soft bottoms. Target plant species grow in the channel bottoms. At NBVC Point Mugu, the channels emanate from off base, collecting fresh water run-off from agricultural fields. Ultimately, the channels connect to Calleguas Creek Reach 1. The channels receive tidal waters from Calleguas Creek Reach 1 making them relatively saline. At NBVC Port Hueneme channels receive fresh water surface flows from urbanized areas and connect to Port Hueneme Harbor. Tidal waters flow both ways mostly at the lower set of channels. The upper channels are relatively high and would only receive tidal waters during an extreme storm event.

The target plant species are sprayed above the waterline. No herbicide is placed directly into water to control aquatic plant species. Plant populations are sprayed only where the density of plants is adequate to slow or block water flow. Water moves in two directions in these channels based on fresh water run-off from adjacent agricultural fields, rainfall, and tides. Aside from flood control, the other driver for applying herbicides is to eliminate the potential for birds to nest near the NBVC Point Mugu airfield. Bird Air Strike Hazards (BASH) threatens the safety of the pilots that fly to and from NBVC Point Mugu. Timing for the application of herbicides to target plant species occurs during low tide/low water periods. This minimizes contact between applied herbicides and the water surface. Since no chemical is applied directly to the water, the treatment area is the area immediately around the emerged target plants.

### 3 Description of Weeds

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*Description of types of weed(s) and algae that are being controlled and why;*

There are two main species of aquatic vegetation that require control in the flood control channels, Cattail (*Typha* sp.) and Bulrush (*Scirpus* sp.). These two plants grow rapidly and block water conveyance in flood channels creating potentially dangerous conditions on base. Other plant species that are controlled by the application of aquatic herbicides include, but are not limited to, Perennial Pepperweed (*Lepidium latifolium*) and Poison Hemlock (*Conium maculatum*). Both are state listed noxious weeds. For the safety of personnel and residents, and for the ability to carry out the military mission, these flood control channels must be maintained to convey the maximum amount of water expected from annual rain events. These plant types will be referred to as “plants” throughout the remainder of this document.

## **4 Algaecide and Aquatic Herbicide Products Used**

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*The method in which algaecide and aquatic herbicide products or types of algaecides and aquatic herbicides expected to be used and if known their degradation byproducts, and if applicable, the adjuvants and surfactants used*

The only aquatic pesticide used is Aquamaster for which the active ingredient is glyphosate. The only adjuvant added is a nonionic surfactant, No Foam A (CA Reg. No. 1050775-50015), formulated for use in aquatic habitats. This herbicide is applied according to label instructions, directly on target plant species. It is applied by either a backpack sprayer or truck mounted spraying rig.

## 5 Decision Factors

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### *Discussion of the factors influencing the decision to select algaecide and aquatic herbicide applications for algae and weed control*

NBVC pest management operates under the IPMP, July 2010. This document details the roles and responsibilities of Management, Administration, Communications, Scientific/ Technical, and Operations staff in responding to pest species control. The IPMP establishes specific thresholds for the initiation of physical and chemical control based on threat to human health, military mission, and ecosystem impacts.

There are mechanical methods for controlling/removing target plant species. However, these either do not effectively stop growth from entering the waterways, or they are highly disturbing to the soils in which the plants are located. Simply cutting the above ground portion of the target plants does not prevent root growth from entering the main flood control channel. Removing the plants by digging or pulling disturbs the sediments, creates other environmental impacts and would require additional permitting through the Clean Water Act for the release of sediments in waters of the United States.

Safety is another consideration for personnel entering the waterways. Many of these channels are steep-sided and therefore dangerous to enter by foot. Controlling weeds inside of the channels can be done safely from the edge of the channel by using spray equipment (either backpack or truck mounted).

The herbicide and surfactant used are Environmental Protection Agency (EPA) approved for wetland use. Consideration is taken as to the timing of the application to coincide with low tide periods. Additionally, the herbicide will not be applied within 24 hours of a rain event to avoid, as much as possible, contact with water within the flood control channel. Care is taken to spray the individual plants vice broadcast spraying over water surfaces. No spraying occurs in wind speeds that exceed 4 miles per hour. These practices help to minimize the amount of herbicide used in the environment.

Visual surveys of the channels are conducted by experienced contracted personnel to determine the amount of blockage at each of the treated flood control channels. Depending on rainfall, temperature, or other environmental factors, plant growth varies throughout the year. Given those variables, plants are sprayed approximately every 3 – 4 months to ensure they do not grow to a point where they block water flow.

## 6 Control Structures

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*If applicable, list the gates or control structures to be used to control the extent of receiving waters potentially affected by algaecide and aquatic herbicide application and provide an inspection schedule of those gates or control structures to ensure they are not leaking*

There are no control structures in the treatment area that regulate water flow limiting plant growth in the flood control channels. There are tide gates at the end of the flood control channel systems before entrance to Port Hueneme or Calleguas Creek.

## 7 Short-Term Exceptions

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*If the Discharger has been granted a short-term or seasonal exception under State Water Board Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays,\* and Estuaries of California (Policy) section 5.3 from meeting acrolein and copper receiving water limitations, provide the beginning and ending dates of the exception period, and justification for the needed time for the exception. If algaecide and aquatic herbicide applications occur outside of the exception period, describe plans to ensure that receiving water criteria are not exceeded because the Dischargers must comply with the acrolein and copper receiving water limitations for all applications that occur outside of the exception period.*

NBVC does not have an exception.

## 8 Monitoring

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*The monitoring program described in the APAP must consider watershed specific attributes and waste constituents, based on the characteristics of applications within the Coalition's or Discharger's area, as well as the receiving water quality conditions. Developing the details of a monitoring design requires clearly defining several inputs to the design and then organizing these in a logical framework that supports effective decision making about indicators, monitoring locations, and monitoring frequency. The logical framework should describe:*

***1. The basic geographic and hydrographic features of the area, particularly application points and the pathways(s) of residue flows.***

Monitoring locations are identified in Figures 1 and 2. The locations were selected based on the direction of flow of receiving water and were identified as sites that would best represent application and treatment areas. Safety considerations and access due to military operation restrictions were also considered during the sample location selection process.

At NBVC Port Hueneme, two sample locations were selected since the treated flood control channels are contiguous and flow to a central point. The GPS coordinates for NBVC Port Hueneme sample station 1 are (34.168723278, -119.214949590), and for station 2 (34.156778, -119.215012).

At NBVC Point Mugu, two sample locations were selected based on location of treated areas and the direction of flow in the flood control channels. The GPS coordinates for NBVC Point Mugu sample station 1 are (34.122693357, -119.109334672), and for station 2 are (34.112916909, -119.092059717).

***2. Algaecides and aquatic herbicides application practices and how they are distributed in space and time.***

Backpack sprayers and truck mounted and/or towable spray rigs are used to apply the herbicide. Only target plants are sprayed, no spraying occurs in the water or on the ground where there is no vegetation. Variables contributing to frequency / scheduling of herbicide applications include rain, temperatures, and seasonal variances. When target plant growth exceeds the height requirements of the contract (12 inches), treatment is implemented. The maximum treatments scheduled for any one year is 4 times. There are years when only 2 treatments might occur.

***3. Relevant knowledge about the transport, fates, and effects of algaecides and aquatic herbicides, including best- and worst-case scenarios.***

Target plants that are emergent are sprayed directly with herbicide. Spraying does not occur on windy and/or rainy days or if rain is predicted within 24 hours. Therefore, most if not all, of the product is applied only to the target plant species and does not enter the water. A worst case scenario would be an unexpected rain storm washing all or part of the product off of the target plants into the waterway. NBVC works to maintain the flood control channels in such a way so that minimal product is required for each treatment.

#### ***4. Description of the designated beneficial uses in each water body***

The flood control channels are not listed in the Water Quality Control Plan Los Angeles Region Basin Plan (Basin Plan). However, at NBV Point Mugu the flood control channels are hydraulically linked to Calleguas Creek Reach 1. At NBVC Port Hueneme the flood control channels are hydraulically linked to Port Hueneme.

Calleguas Creek Reach1 connects to the flood control channels at NBVC Point Mugu and is listed in the Basin Plan as having beneficial uses. Calleguas Creek Reach 1 is listed as having existing beneficial uses for navigation, non-contact recreation, commercial (limited), estuary habitat, marine habitat, wildlife habitat, preservation of biological habitats, preservation of rare and endangered species, fish migration, fish spawning, shellfish harvesting and wetlands. Mugu Lagoon is listed as having the potential beneficial uses under contact recreation.

Port Hueneme Harbor is listed as having existing beneficial uses of industrial process supply, navigation, contact and non-contact recreation, commerce, marine habitat and wildlife habitat.

#### ***5. Relevant knowledge about the action of cumulative and indirect effects***

Research by Syracuse Environmental Research Associates indicates there are little to no known cumulative effects of glyphosate on aquatic organisms. The surfactant used is approved by EPA for use in wetlands. Since the products are sprayed directly onto the target plant species, there is minimal addition of these chemicals to the water systems.

#### ***6. Mechanisms through which algaecides and aquatic herbicides applications could lead to designated use impacts, given the basic features of the area***

Based on the small volume of herbicide applied and low frequency of applications, there is no anticipated designated use impact to flood control channel tributaries (Port Hueneme / Mugu Lagoon).

#### ***7. Known and potential impacts of algaecides and aquatic herbicides applications on water quality, ranked in terms of relative risk, based on factors such as magnitude, frequency and duration***

Based on the small volume of herbicide applied and low frequency of applications, any impact to water quality would be minimal and of short duration. The impact would include a short time period when the active and non-active ingredients could be detected in the flood control channels.

#### ***8. Sufficient number of sampling areas to assess the entire Discharger's or Coalition's area of influence***

At NBVC Port Hueneme, 2 locations cover both the upper and lower set of interconnected channels to ensure sampling occurs in the lower more saline channels and the upper more fresh water channels. At NBVC Point Mugu sampling locations are representative of the western set of channels where water enters the base from adjacent farmland and at the far eastern end of the channels before water exits the base at Calleguas Creek Reach 1.

**9. A description of sampling methods and a sampling schedule.**

Samples will be collected using sampling procedures which minimize loss of monitored constituents during sample collection and analysis and maintain sample integrity. The sampler will be trained in accordance with Occupational Safety and Health Administration (OSHA) 40 hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training.

All laboratory analyses shall be conducted at a laboratory certified for such analyses by the California Department of Public Health (CDPH). The analyses will be conducted in accordance with the U.S. Environmental Protection Agency (USEPA) (Title 40 Code of Federal Regulations part 136). Hardness will be determined by the calculation noted in the permit or titration method. Monitoring instruments and devices will be properly maintained and calibrated to ensure accurate readings.

Monitoring records will be submitted in the form of a laboratory generated report or field log form. The records will include date, location, time, sampling or measurements, personnel who performed sampling, date of analyses, individual who performed analyses, analytical technique / method used and the results of analyses.

*Samples will be collected at designated monitoring locations for each type of monitoring listed below:*

**Background Monitoring**

A sample will be collected just prior (up to 24-hours in advance of application) to the application event to monitor the background sampling parameters.

**Event Monitoring**

A sample will be collected immediately after the application event or shortly after application, but after sufficient time has elapsed such that treated water will have entered the adjacent or downstream area.

**Post-Event Monitoring**

A sample will be collected within one week after the application event.

**Sampling Parameters**

The sampling parameters were selected based on the active ingredient contained in Aquamaster (glyphosate); the only aquatic herbicide used at NBVC (see Table 1).

**Table 1. Sampling Parameters**

SAMPLE TYPE	CONSTITUENT/ PARAMETER	SAMPLE METHOD	LABORATORY METHOD	FREQUENCY
Visual	1. Site description (pond, lake, open waterway, channel, estimate of percent covered by vegetation, etc.) 2. Appearance of	Visual Observation	Not Applicable	All applications at all sites

	waterway (sheen, color, clarity, etc.) 3. Weather conditions (fog, rain, wind, etc.)			
<b>Physical</b>	1. Temperature 2. Turbidity 3. Electrical conductivity / salinity	Grab (3' below the surface, or mid-depth if water body is < 6')	USEPA Guidelines	Selected Monitoring Sites Background, Event, and Post-Event Monitoring
<b>Chemical</b>	1. Glyphosate 2. Nonylphenol 3. pH 4. Dissolved Oxygen 5. Hardness	Grab (3' below the surface, or mid-depth if water body is < 6')	USEPA Guidelines	Selected Monitoring Sites Background, Event, and Post-Event Monitoring

Samples will be analyzed for glyphosate to determine the concentration of isopropylamine salt of glyphosate. Nonylphenol is an ingredient in the adjuvant No Foam A.

### ***Reporting***

An annual report will be submitted to the RWQCB by March 1<sup>st</sup> as required by Water Quality Order No. 20130002-DWQ.

## 9 Sample Contamination

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*Description of procedures used to prevent sample contamination from persons, equipment, and vehicles associated with algaecide and aquatic herbicide application.*

Contract personnel applying aquatic herbicides at NBVC are required to be California certified Vector Control Technicians and follow Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) regulations. The use of personal protective equipment (PPE) is mandatory in order to help ensure the safety of workers. During monitoring events, personnel collecting samples are required to wear PPE including latex gloves. Once samples are collected and closed to the environment (sample caps replaced), the bottles are stored in a cooler containing blue ice for transport to the laboratory.

## 10 Description of BMP's

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### *Description of the BMPs to be implemented.*

#### *a. Measures to prevent algaecide and aquatic herbicide spill and for spill containment during the event of a spill*

Applicators have spill prevention and containment gear on their vehicles. Herbicides are not mixed at NBVC.

#### *b. Measures to ensure that only an appropriate rate of application consistent with product label requirements is applied for the targeted weeds or algae*

Channels are measured for length/width to determine the maximum amount of pesticide required. Accurate assessments of total product required come from historic herbicide use. For example, there are approximately 346,000 sq ft of water area at NBVC Port Hueneme to be maintained. This represents the total channel area on base. However, not all areas of the channel are treated. The total area is surveyed for plant growth, but only the areas that actually have plant growth blocking the waterway are noted and treated.

The approximate amounts of herbicide (Aquamaster) used at each installation is listed below. The amount of adjuvant is not noted below but is used in accordance with label requirements for the product.

--NBVC Port Hueneme: 2.5 gallons (gals) per treatment approximately 4 times per year, equaling 10-12 gals total per year.

--NBVC Point Mugu: 8 gals per treatment approximately 4 times per year, equaling 32 gals total per year.

Contractors are required to follow all label directions when applying herbicides. Contractors are licensed with the State of California as California Vector Control Technicians. Supervisors review application records daily to ensure appropriate amounts of material are being used. All safety, handling, and use requirements and instructions are followed per pesticide product labels and Material Safety Data Sheet (MSDS). This is an existing practice at NBVC, and is required to comply in accordance with DoD Instruction 4150.07. All pesticide applicators receive annual safety and spill training in addition to their continuing education. All errors in application and spills are reported to the proper authority.

NBVC and contracted staff monitor application equipment on a daily basis to ensure it remains in proper working order. Spill mitigation devices are placed in all spray vehicles and herbicide storage areas to respond to spills. Employees are trained annually on spill prevention and response. All safety, handling, and use requirements and instructions are followed per pesticide product labels and MSDS.

Spray equipment is calibrated each year. All safety, handling, and use requirements and instructions are followed per pesticide product labels and MSDS.

The California Vector Control Technician Certification and Continuing Education Guidelines (CDPH, 2007) describes all topics that vector control technicians are trained and certified in. Applicators are required to complete pesticide training annually.



## 11 Examination of Possible Alternatives

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*Dischargers should examine the alternatives to algaecide and aquatic herbicide use to reduce the need for applying algaecides and herbicides. Such methods include:*

*a. Evaluating the following management options, in which the impact to water quality, impact to non-target organisms including plants, algaecide and aquatic herbicide resistance, feasibility, and cost effectiveness should be considered:*

*i. No action* – This would induce flooding over airfield, major industrial areas, and other critical areas of military installations, impacting the bases ability to perform its national security mission.

*ii. Prevention* – This would include completely channelizing the waterways (installing concrete bottoms and sides where lacking) and using machinery to keep waterways clear of sediments that might allow plants to take root.

*iii. Mechanical or physical methods* - Most of the channels are steep sided, therefore employing mechanical or physical methods would create dangerous working conditions for contract personnel.

*iv. Cultural methods* – There are no cultural methods to reduce/remove plants from the flood controls channels.

*v. Biological control agents* – This alternative at best would reduce the numbers of plants in a given population, but do not eliminate them completely. There is also the possibility of host-jumping with biological control agents.

*vi. Algaecides and aquatic herbicides* – NBVC uses the least toxic of herbicides formulated for the target plant species. Selected application rates, timing, and frequencies are based on what is minimally required to accomplish the task.

*If there are no alternatives to algaecides and aquatic herbicides, Dischargers shall use the minimum amount of algaecides and aquatic herbicides that is necessary to have an effective control program and is consistent with the algaecide and aquatic herbicide product label requirements.*

## 12 References

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Department Of Defense (DoD), DoD Instruction 4150.07, the Pest Management Program (May 2008)

Durkin, Patrick R. Glyphosate: Human Health and Ecological Risk Assessment, Final Report. Syracuse Environmental Research Associates (SERA) TR-052-22-03b, March 25, 2011

Naval Facilities Engineering Command Southwest (NAVFAC), 2010, Naval Base Ventura County Integrated Pest Management Plan (July 2010 Revision)

## **Appendix 1 – Integrated Pest Management Plan**

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# MATERIAL SAFETY DATA SHEET

NO FOAM® A

Page 1 of 4

Issue Date: 10/99

## SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

### Chemical Product

NO FOAM® A

CA Reg. No. CA-54705-50004-AA

Common Name: Surfactant (Adjuvant).

Chemical Description: Liquid mixture of nonionic surfactants.

TSCA/CAS No.: This product is a mixture – there is no specific CAS No.

### Manufactured For

Lawn and Garden Products, Inc.

P. O. Box 35000

Fresno, CA 93745-5000

### Emergency Phone Numbers

Emergency Telephone: DAYS: (559) 499-2100 EVES.: (559) 435-2163

CHEMTREC (24-Hour Emergency Number): (800) 424-9300

EPA National Response Center: (800) 424-8802

## SECTION 2. HAZARDOUS INGREDIENTS

CHEMICAL	CAS NO.	%	TLV OR PEL	RQ (lbs)
POE Nonylphenols	26027-38-3 9016-45-9	80.0	N.A.*	N.P.*
Isopropyl Alcohol	67-63-0	9.0	400 ppm (PEL)	N.P.

\* N.A. - Not Available.

\* N.P. - Not Pertinent.

## SECTION 3. EMERGENCY/HAZARDS OVERVIEW

Viscous, orange liquid. Avoid contact with strong alkalis at high temperatures, acids, oxidizing agents, or materials reactive with hydroxyl compounds. Burning may result in formation of carbon oxides. Not D.O.T. regulated.

HEALTH: 2

REACTIVITY: 0

FLAMMABILITY: 1

ENVIRONMENT: 1

(0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme)

## SECTION 4. FIRST AID

- Eyes: Flush immediately with water for at least 15 minutes. Do not rub eyes. Get immediate medical attention.
- Skin: Wash thoroughly with soap and water. Remove contaminated clothing and wash before reuse. See a physician if skin becomes irritated.
- Ingestion: If conscious and alert, administer water to dilute. Do not induce vomiting. Call a physician or Poison Control Center immediately.
- Inhalation: Move to fresh air. If breathing becomes difficult, call a physician.

**SECTION 5. FIRE AND EXPLOSION HAZARDS**

Flash Point:	101°F.
Test Method:	ASTM-D93
LEL Flammable Limits:	Not available.
UEL Flammable Limits:	Not available.
Autoignition Temperature:	Not pertinent.
Flammability Classification:	Combustible.
Known Hazardous Products of Combustion:	None.
Properties that Initiate/Contribute to Intensity of Fire:	None.
Potential For Dust Explosion:	None.
Reactions that Release Flammable Gases or Vapors:	Not known.
Potential For Release of Flammable Vapors:	None.
Unusual Fire & Explosion Hazards:	None.
Extinguishing Media:	Foam, CO <sub>2</sub> , dry chemical, water.
Special Firefighting Procedures:	Wear positive pressure, self-contained breathing apparatus and goggles. Avoid smoke inhalation. Contain any liquid runoff.

**SECTION 6. SPILLS AND LEAKS**

Containment:	Prevent product spillage from entering drinking water supplies or streams.
Clean Up:	Collect liquid or absorb onto absorbent material and package for disposal.
Evacuation:	Not necessary.

**SECTION 7. STORAGE AND HANDLING**

Storage:	Store in plastic or stainless steel container in a cool, well-ventilated, dry place at temperatures above 40°F. Do not store near food or feeds. Do not stack pallets more than two (2) high.
Transfer Equipment:	Transfer product using chemical-resistant plastic or stainless steel tanks, pumps, valves, etc.
Work/Hygienic Practices:	Keep out of reach of children. Avoid contact with eyes, skin and clothing. Avoid inhalation of spray mists. Wash thoroughly with water after handling.

**SECTION 8. PERSONAL PROTECTIVE EQUIPMENT**

Eyes:	Chemical dust/splash goggles or full-face shield to prevent eye contact. As a general rule, do not wear contact lenses when handling.
Skin:	Impervious gloves and clothes.
Respiratory:	Not normally needed. If use generates an aerosol mist or respiratory irritation, use NIOSH-approved dust/mist respirator (such as 3M #8710).
Ventilation:	Recommended but no TLV established.

**SECTION 9. PHYSICAL AND CHEMICAL DATA**

Appearance:	Viscous, orange liquid.
Odor:	Mild alcohol odor.
pH:	6.8
Vapor Pressure:	0.75 (psi)
Vapor Density (Air = 1):	> 1.0
Boiling Point:	88.9°C (192°F)
Freezing Point:	Not available.
Water Solubility:	Miscible.
Density:	8.76 lbs./gal.
Evaporation Rate:	Not available.
Viscosity:	Not available.
% Volatile:	Not available.
Octanol/Water Partition Coefficient:	Not available.
Saturated Vapor Concentration:	Not available.

**SECTION 10. STABILITY AND REACTIVITY**

Stability:	Stable.
Conditions To Avoid:	Avoid contact with strong alkalis at high temperatures, acids, oxidizing agents, or materials reactive with hydroxyl compounds.
Incompatibility:	Not available.
Hazardous Decomposition Products:	Burning may result in formation of carbon oxides.
Hazardous Polymerization:	Will not occur.

**SECTION 11. POTENTIAL HEALTH EFFECTS**

<u>Acute Effects:</u>	
Eyes:	Moderate irritant. Vapors or mist may cause redness and burning.
Skin:	Mild irritant, especially from prolonged exposure. Causes redness, drying and cracking.
Ingestion:	LD <sub>50</sub> (Rat) > 3500 kg/mg.
Inhalation:	None expected but aerosol mist may cause mild irritation of nasal mucous membranes.
<u>Subchronic Effects:</u>	None known.
<u>Chronic Effects:</u>	None known.

**SECTION 12. ECOLOGICAL INFORMATION**

Algal/Lemna Growth Inhibition:	Not known.
Toxicity to Fish and Invertebrates:	Not known.
Toxicity to Plants:	Not known.
Toxicity in Birds:	Not known.

**SECTION 13. DISPOSAL**

Do not contaminate lakes, streams, ponds, estuaries, oceans or other waters by discharge of waste effluents or equipment washwaters. Dispose of waste effluents according to state and local regulations. Also, chemical additions or other alterations of this product may invalidate any disposal information in this MSDS. Therefore, consult local waste regulators for proper disposal. Do not discharge.

**SECTION 14. TRANSPORTATION**

D.O.T.:

Not D.O.T. Regulated.

Other Shipping Description:

Adhesives, Adjuvants, Spreaders or Stickers, Liquid.  
NMFC Item 4612, LTL Class 60**SECTION 15. REGULATORY INFORMATION**CERCLA: None.SARA TITLE III, Section 313 Toxic Chemicals: None.PROPOSITION 65 (CA): None.**SECTION 16. OTHER**

All information appearing in this document was based on data provided by third party sources and was compiled to comply with the Federal Hazard Communication Standard and the California Hazardous Substances Information and Training Act. The information is believed to be accurate as of the preparation date, but is not warranted as being the final authority in the use of this product. This information does not purport to be legal or medical advice.

No Foam is a registered trademark of Creative Marketing & Research, Inc.

**MONSANTO COMPANY**  
Material Safety Data Sheet  
Commercial Product

**1. PRODUCT AND COMPANY IDENTIFICATION**

**Product name**

AquaMaster® Herbicide

**EPA Reg. No.**

524-343

**Product use**

Herbicide

**Chemical name**

Not applicable.

**Synonyms**

None.

**Company**

MONSANTO COMPANY, 800 N. Lindbergh Blvd., St. Louis, MO, 63167

Telephone: 800-332-3111, Fax: 314-694-5557

**Emergency numbers**

FOR CHEMICAL EMERGENCY, SPILL LEAK, FIRE, EXPOSURE, OR ACCIDENT Call CHEMTREC - Day or Night: 1-800-424-9300 toll free in the continental U.S., Puerto Rico, Canada, or Virgin Islands. For calls originating elsewhere: 703-527-3887 (collect calls accepted).

FOR MEDICAL EMERGENCY - Day or Night: +1 (314) 694-4000 (collect calls accepted).

**2. COMPOSITION/INFORMATION ON INGREDIENTS**

**Active ingredient**

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

**Composition**

COMPONENT	CAS No.	% by weight (approximate)
Isopropylamine salt of glyphosate	38641-94-0	53.8
Water	7732-18-5	46.2

**OSHA Status**

This product is not hazardous according to the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

**3. HAZARDS IDENTIFICATION**

**Emergency overview**

**Appearance and odour (colour/form/odour):** Colourless - Amber / Liquid, (viscous) / Odourless

**CAUTION!**

**Potential health effects**

**Likely routes of exposure**

Skin contact, eye contact, inhalation

**Eye contact, short term**

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

**Skin contact, short term**

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

**Inhalation, short term**

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

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

---

#### 4. FIRST AID MEASURES

##### Eye contact

Immediately flush with plenty of water.  
If easy to do, remove contact lenses.

##### Skin contact

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

##### Inhalation

Remove to fresh air.

##### Ingestion

Immediately offer water to drink.  
Do NOT induce vomiting unless directed by medical personnel.  
If symptoms occur, get medical attention.

##### Advice to doctors

This product is not an inhibitor of cholinesterase.

##### Antidote

Treatment with atropine and oximes is not indicated.

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#### 5. FIRE-FIGHTING MEASURES

##### Flash point

none

##### Extinguishing media

Recommended: Water, foam, dry chemical, carbon dioxide (CO<sub>2</sub>)

##### Unusual fire and explosion hazards

None.  
Environmental precautions: see section 6.

##### Hazardous products of combustion

Carbon monoxide (CO), phosphorus oxides (P<sub>x</sub>O<sub>y</sub>), nitrogen oxides (NO<sub>x</sub>)

##### Fire fighting equipment

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

---

#### 6. ACCIDENTAL RELEASE MEASURES

##### Personal precautions

Use personal protection recommended in section 8.

##### Environmental precautions

SMALL QUANTITIES:  
Low environmental hazard.

**LARGE QUANTITIES:**

Minimise spread.  
Keep out of drains, sewers, ditches and water ways.  
Notify authorities.

**Methods for cleaning up**

**SMALL QUANTITIES:**

Flush spill area with water.

**LARGE QUANTITIES:**

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

Refer to section 13 for disposal of spilled material.

---

## 7. HANDLING AND STORAGE

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

**Handling**

Avoid contact with skin and eyes.  
When using do not eat, drink or smoke.  
Wash hands thoroughly after handling or contact.  
Thoroughly clean equipment after use.  
Do not contaminate drains, sewers and water ways when disposing of equipment rinse water.  
Refer to section 13 for disposal of rinse water.  
Emptied containers retain vapour and product residue.

**Storage**

Minimum storage temperature: -15 °C  
Maximum storage temperature: 50 °C  
Compatible materials for storage: stainless steel, aluminium, fibreglass, plastic, glass lining  
Incompatible materials for storage: galvanised steel, unlined mild steel, see section 10.  
Keep out of reach of children.  
Keep away from food, drink and animal feed.  
Keep only in the original container.  
Partial crystallization may occur on prolonged storage below the minimum storage temperature.  
If frozen, place in warm room and shake frequently to put back into solution.  
Minimum shelf life: 5 years.

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## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

**Airborne exposure limits**

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

**Engineering controls**

No special requirement when used as recommended.

**Eye protection**

No special requirement when used as recommended.

**Skin protection**

No special requirement when used as recommended.

**Respiratory protection**

No special requirement when used as recommended.

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

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## 9. PHYSICAL AND CHEMICAL PROPERTIES

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

Colour/colour range:	Colourless - Amber
Form:	Liquid, (viscous)
Odour:	Odourless
Flash point:	none
Specific gravity:	1.206 @ 20 °C / 15,6 °C
Solubility:	Water: Completely miscible.
pH:	4.6 - 4.8 @ 63 g/l
Partition coefficient (log Pow):	< 0.000 (active ingredient)

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## 10. STABILITY AND REACTIVITY

**Stability**

Stable under normal conditions of handling and storage.

**Hazardous decomposition**

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

**Materials to avoid/Reactivity**

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

---

## 11. TOXICOLOGICAL INFORMATION

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

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

**Mutagenicity**

**Micronucleus test(s):**

Not mutagenic.

**Ames test(s):**

Not mutagenic with and without metabolic activation.

**Isopropylamine salt of glyphosate (62%)**

**Acute oral toxicity**

Rat, LD50 (limit test): > 5,000 mg/kg body weight

Practically non-toxic.

FIFRA category IV.

No mortality.

**Mouse, LD50 (limit test):** > 5,000 mg/kg body weight  
Practically non-toxic.  
FIFRA category IV.  
No mortality.

**Acute dermal toxicity**

**Rabbit, LD50 (limit test):** > 5,000 mg/kg body weight  
Practically non-toxic.  
FIFRA category IV.  
No mortality.

**Skin Irritation**

**Rabbit, 6 animals, Draize test:**  
Days to heal: 3  
Primary Irritation Index (PII): 0.0/8.0  
Essentially non irritating.  
FIFRA category IV.

**Acute inhalation toxicity**

**Rat, LC50, 4 hours, aerosol:** > 4.24 mg/L  
Practically non-toxic.  
FIFRA category IV.  
No mortality. Maximum attainable concentration.

**Skin sensitization**

**Guinea pig, Buehler test:**  
Positive incidence: 0 %

**N-(phosphonomethyl)glycine; {glyphosate}**

**Mutagenicity**

**In vitro and in vivo mutagenicity test(s):**  
Not mutagenic.

**Repeated dose toxicity**

**Rabbit, dermal, 21 days:**  
NOAEL toxicity: > 5,000 mg/kg body weight/day  
Target organs/systems: none  
Other effects: none

**Rat, oral, 3 months:**  
NOAEL toxicity: > 20,000 mg/kg diet  
Target organs/systems: none  
Other effects: none

**Chronic effects/carcinogenicity**

**Mouse, oral, 24 months:**  
NOEL tumour: > 30,000 mg/kg diet  
NOAEL toxicity: ~ 5,000 mg/kg diet  
Tumours: none  
Target organs/systems: liver  
Other effects: decrease of body weight gain, histopathologic effects

**Rat, oral, 24 months:**  
NOEL tumour: > 20,000 mg/kg diet  
NOAEL toxicity: ~ 8,000 mg/kg diet  
Tumours: none  
Target organs/systems: eyes  
Other effects: decrease of body weight gain, histopathologic effects

**Toxicity to reproduction/fertility**

**Rat, oral, 3 generations:**  
NOAEL toxicity: > 30 mg/kg body weight  
NOAEL reproduction: > 30 mg/kg body weight  
Target organs/systems in parents: none  
Other effects in parents: none

Target organs/systems in pups: none

Other effects in pups: none

**Developmental toxicity/teratogenicity**

**Rat, oral, 6 - 19 days of gestation:**

NOAEL toxicity: 1,000 mg/kg body weight

NOAEL development: 1,000 mg/kg body weight

Other effects in mother animal: decrease of body weight gain, decrease of survival

Developmental effects: weight loss, post-implantation loss, delayed ossification

Effects on offspring only observed with maternal toxicity.

**Rabbit, oral, 6 - 27 days of gestation:**

NOAEL toxicity: 175 mg/kg body weight

NOAEL development: 175 mg/kg body weight

Target organs/systems in mother animal: none

Other effects in mother animal: decrease of survival

Developmental effects: none

---

## 12. ECOLOGICAL INFORMATION

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

Data obtained on components are summarized below.

**Isopropylamine salt of glyphosate (62%)**

**Aquatic toxicity, fish**

**Bluegill sunfish (*Lepomis macrochirus*):**

Acute toxicity, 96 hours, static, LC50: > 1,000 mg/L

Practically non-toxic.

**Rainbow trout (*Oncorhynchus mykiss*):**

Acute toxicity, 96 hours, static, LC50: > 1,000 mg/L

Practically non-toxic.

**Aquatic toxicity, invertebrates**

**Water flea (*Daphnia magna*):**

Acute toxicity, 48 hours, static, EC50: 930 mg/L

Practically non-toxic.

**Aquatic toxicity, algae/aquatic plants**

**Green algae (*Scenedesmus subspicatus*):**

Acute toxicity, 72 hours, static, ErC50 (growth rate): 166 mg/L

Practically non-toxic.

**Soil organism toxicity, invertebrates**

**Earthworm (*Eisenia foetida*):**

Acute toxicity, 14 days, LC50: > 5,000 mg/kg dry soil

Practically non-toxic.

**N-(phosphonomethyl)glycine: {glyphosate}**

**Avian toxicity**

**Bobwhite quail (*Colinus virginianus*):**

Dietary toxicity, 5 days, LC50: > 4,640 mg/kg diet

No more than slightly toxic.

**Mallard duck (*Anas platyrhynchos*):**

Dietary toxicity, 5 days, LC50: > 4,640 mg/kg diet

No more than slightly toxic.

**Bobwhite quail (*Colinus virginianus*):**

Acute oral toxicity, single dose, LD50: > 3,851 mg/kg body weight

Practically non-toxic.

**Arthropod toxicity**

**Honey bee (*Apis mellifera*):**

Oral, 48 hours, LD50: 100 µg/bee

**Honey bee (*Apis mellifera*):**

Contact, 48 hours, LD50: > 100 µg/bee

Practically non-toxic.

**Bioaccumulation**

**Bluegill sunfish (*Lepomis macrochirus*):**

Whole fish: BCF: < 1

No significant bioaccumulation is expected.

**Dissipation**

**Soil, field:**

Half life: 2 - 174 days

Koc: 884 - 60,000 L/kg

Adsorbs strongly to soil.

**Water, aerobic:**

Half life: < 7 days

---

**13. DISPOSAL CONSIDERATIONS**

**Product**

Not classified as hazardous waste by the Resource, Conservation and Recovery Act (RCRA), 40 CFR 261.

Recycle if appropriate facilities/equipment available.

Burn in special, controlled high temperature incinerator.

Keep out of drains, sewers, ditches and water ways.

Follow all local/regional/national/international regulations.

Consult your attorney or appropriate regulatory officials for information on disposal.

**Container**

Triple or pressure rinse empty containers.

Pour rinse water into spray tank.

Store for collection by approved waste disposal service.

Dispose of as non hazardous industrial waste.

Do NOT re-use containers.

Follow all local/regional/national/international regulations.

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**14. TRANSPORT INFORMATION**

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

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

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**15. REGULATORY INFORMATION**

**TSCA Inventory**

All components are on the US EPA's TSCA Inventory

**SARA Title III Rules**

Section 311/312 Hazard Categories

Not applicable.

Section 302 Extremely Hazardous Substances

Not applicable.

Section 313 Toxic Chemical(s)

Not applicable.

CERCLA Reportable quantity  
Not applicable.

## 16. OTHER INFORMATION

The information given here is not necessarily exhaustive but is representative of relevant, reliable data.

Follow all local/regional/national/international regulations.

Please consult supplier if further information is needed.

For more information refer to product label.

Please consult Monsanto if further information is needed.

In this document the British spelling was applied.

® Registered trademark of Monsanto Company or its subsidiaries.

	Health	Flammability	Instability	Additional Markings
NFPA	0	1	1	

0 = Minimal hazard, 1 = Slight hazard, 2 = Moderate hazard, 3 = Severe hazard, 4 = Extreme hazard

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

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

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