progressive|ae

November 18, 2022

Wixom Lake Improvement Board
c/o Midland County Drain Commissioner's Office
220 West Ellsworth Street
Room 229-30
Midland, MI 48640

Re: Wixom Lake 2022 Trial Treatment Plot Summary

The following is a descriptive summary of the results of the trial plot triclopyr treatments conducted in September of 2022 to control growth of woody vegetation on the former bottomlands of Wixom Lake. These formerly inundated bottomlands were abruptly exposed following the failure of the Edenville dam in May of 2020. The fertile moist bottomlands became ideal substrate for the subsequent germination of cottonwood and willow seeds. Rapid colonization of the bottomlands occurred over the 2020 growing season and has expanded since that time with many other woody and some herbaceous species.

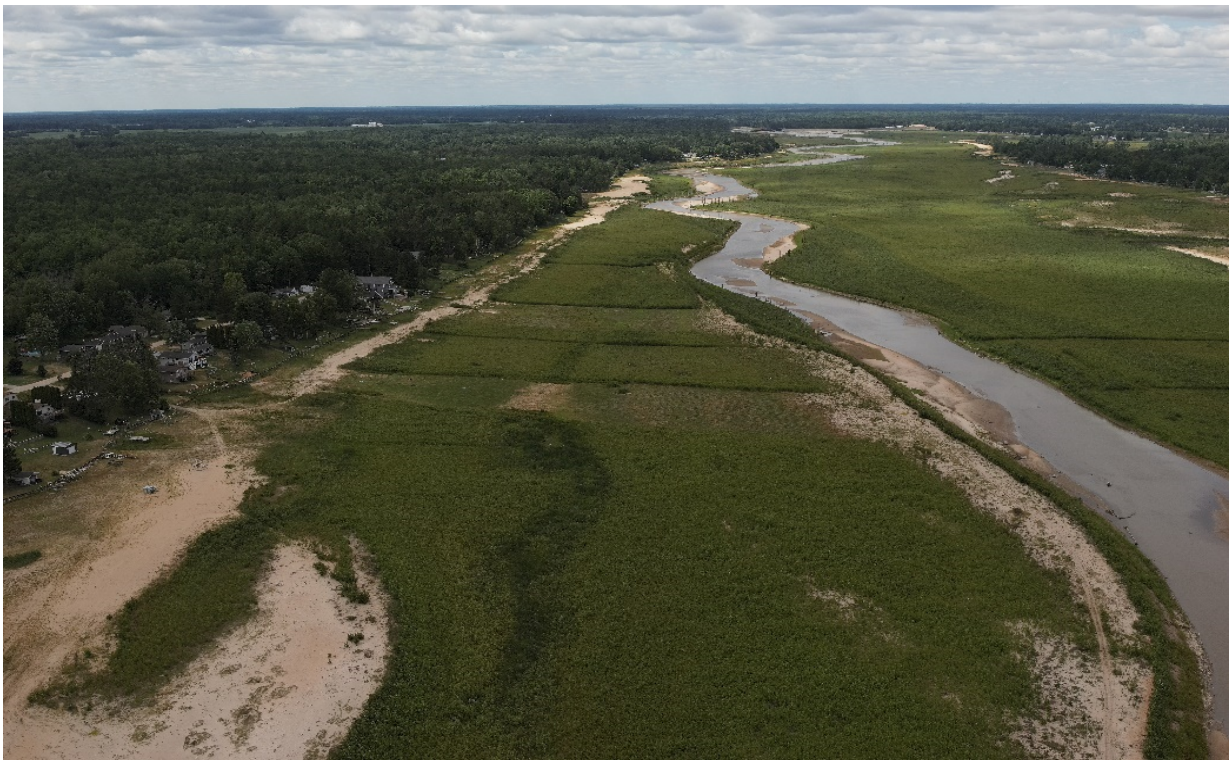


Figure 1. Pre-treatment view of one of the test plot areas.

The Wixom Lake Improvement Board approved a plan to identify select areas of the bottomlands that represented various growth stages and sediment fertility/moisture regimes. The four test plot areas are shown in the attached treatment plot maps and represented a total treatment area of approximately 60 acres. The treatments required acquisition of both National Pollution Discharge Elimination System and Michigan Department of Environment, Great Lakes, and Energy Aquatic Nuisance Control permits. The permits were secured in July of 2022 which allowed for a narrow time window to conduct the treatments in September of 2022.

In planning the treatments, the four test plot areas were mapped out using drone reconnaissance on August 23, 2022 (see attached treatment plot maps). The application company secured by the lake board, PLM Lake & Land Management Corporation, planned and secured a sub-contractor, Hamilton Helicopters, to conduct the aerial treatments using Vastlan (triclopyr choline salt – see attached specimen label) targeting nuisance woody vegetation. The helicopter applications occurred on September 15, 2022, under near ideal conditions (calm winds and temperatures in the 60s). Vastlan was applied at a rate of 6 quarts per acre in a total spray volume of 10 gallons per acre as allowed by the NPDES and ANC permits.

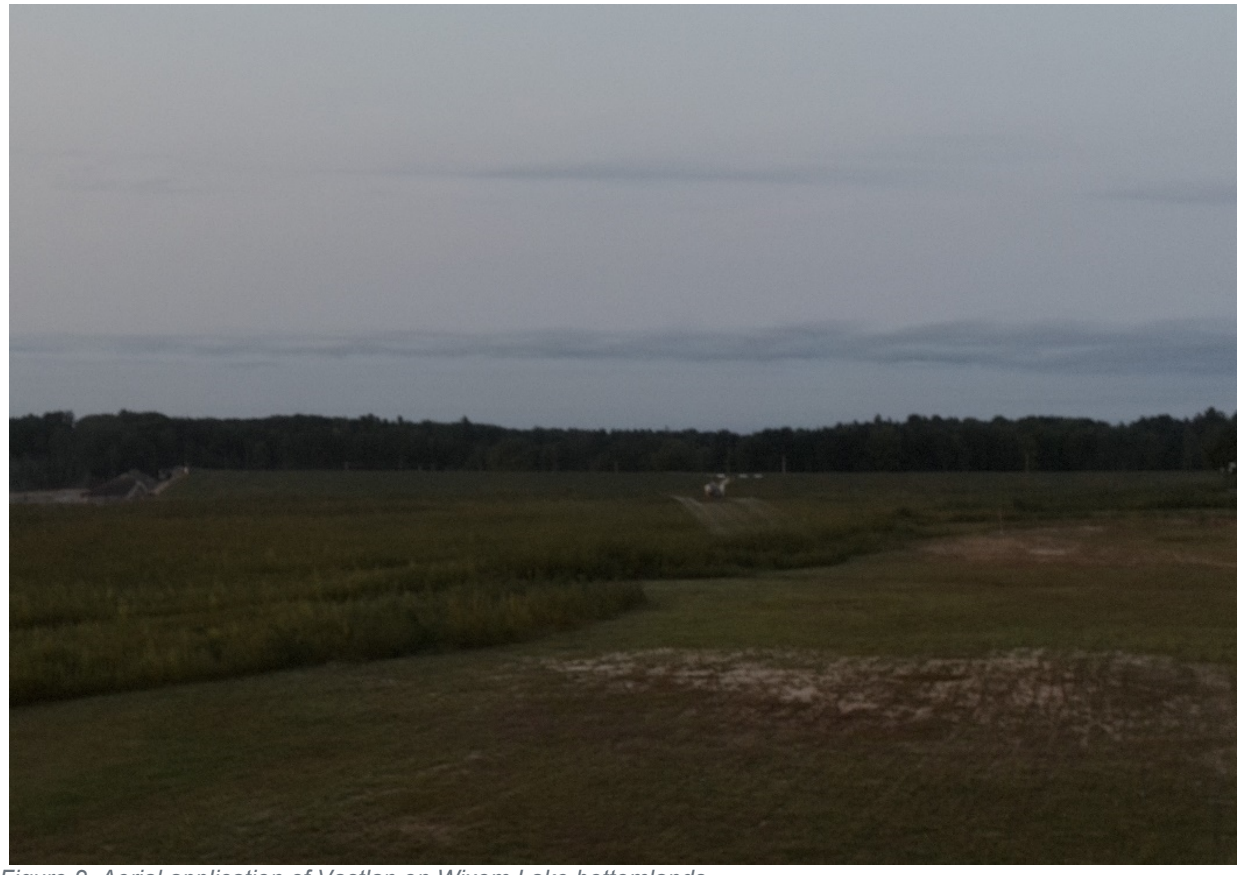


Figure 2. Aerial application of Vastlan on Wixom Lake bottomlands.

Follow-up ground-based visual inspections of the treatment areas and adjacent untreated areas were conducted on October 12, 2022, by a senior biologist from Progressive AE. Attached are some photos of the surveyed areas showing extensive leaf damage (four-weeks post-treatment) throughout the treatment zone. In addition, visual inspection of some of the stems/trunks indicated some damage to the cambium. It is unknown the amount of damage to root structures from the treatments. A follow-up survey is planned for May of 2023 to evaluate re-growth and the percent of root mortality from the September 2022 treatments.

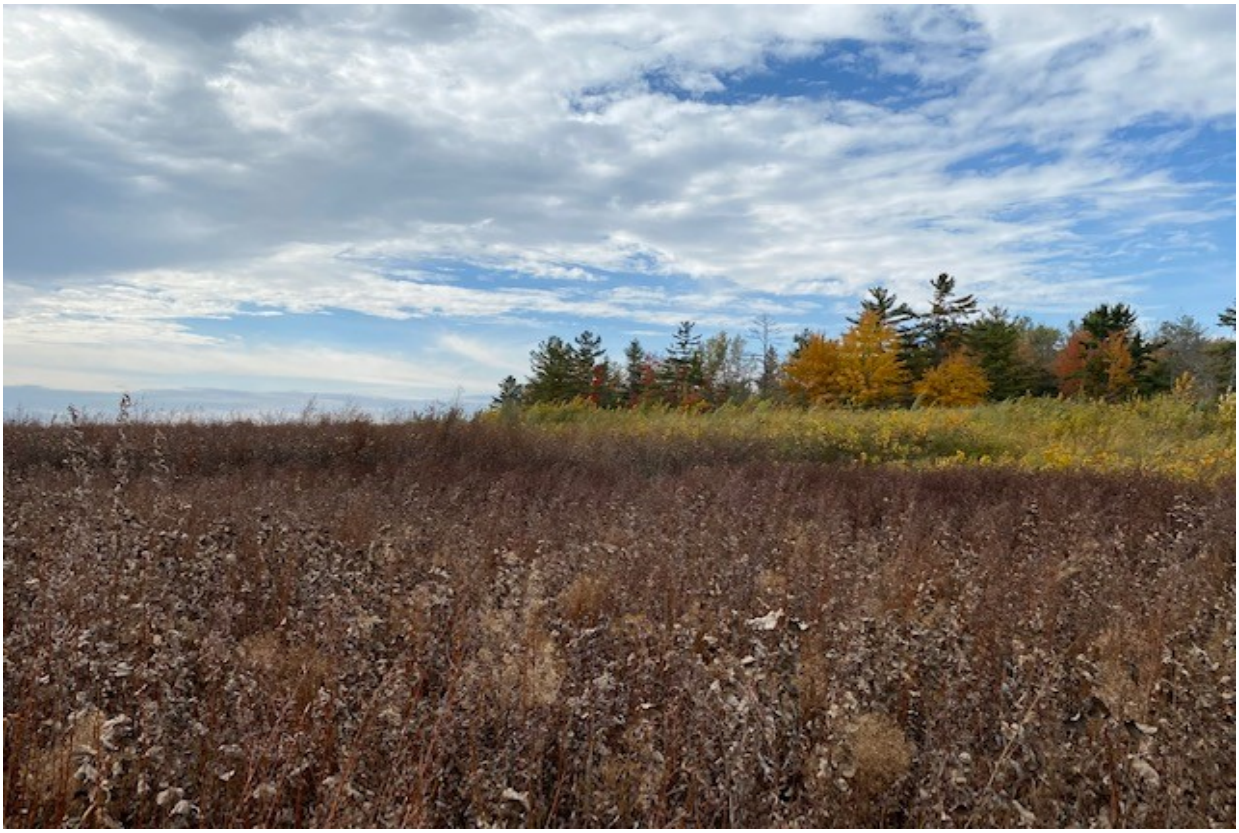


Figure 3. Distinct damage line along edge of treatment zone.

Figure 4. Extensive leaf damage on willow and cottonwood saplings.

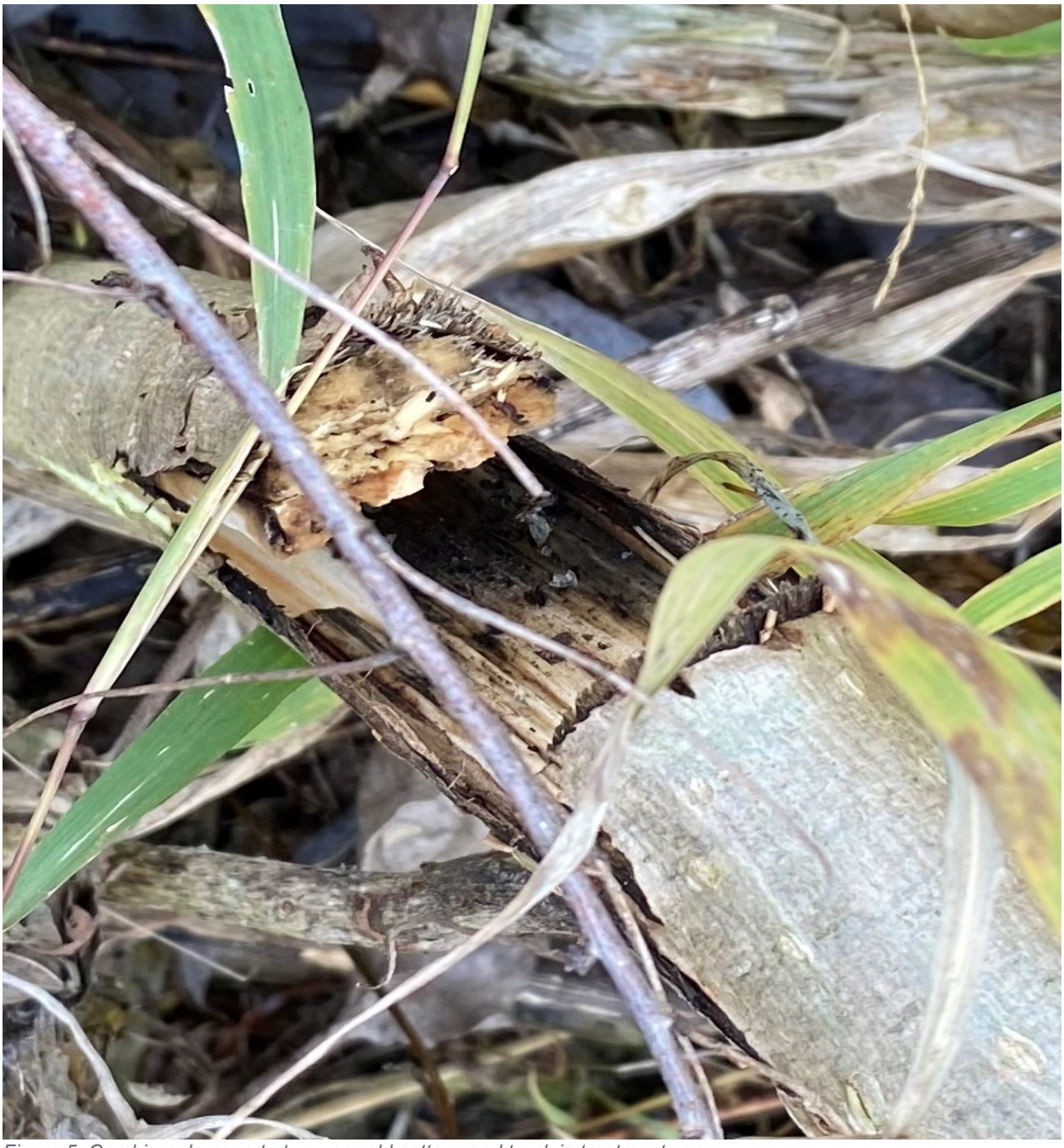


Figure 5. Cambium damage to two-year old cottonwood trunk in treatment zone.

Sincerely,

Paul J. Hausler
Water Resources Practice Leader

PJH/ecy
P:\55290102\WIP DOCUMENTS\Wixom Lake 2022 Treatment Plot Summary.docx

PROJECT LOCATION

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

CHURCH CAMP TREATMENT AREA

TREATMENT AREA = 10 ACRES

N

No Scale

progressive ae

Document Path: C:\drone\Wixom Lake\Treatment Maps.mxd

PROJECT LOCATION

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

HERON COVE TREATMENT AREA

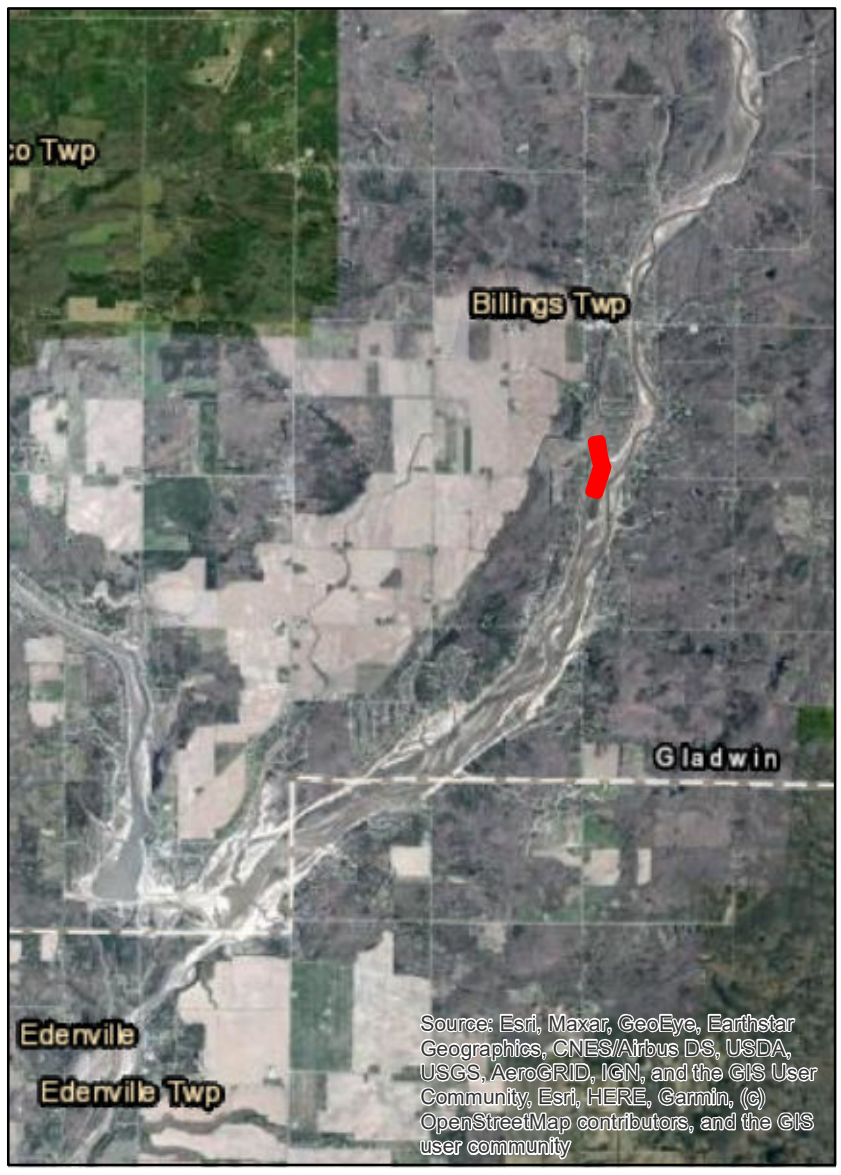
TREATMENT AREA = 19.8 ACRES

N

No Scale

progressive ae

PROJECT LOCATION



Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

MUDDY BAY TREATMENT AREA

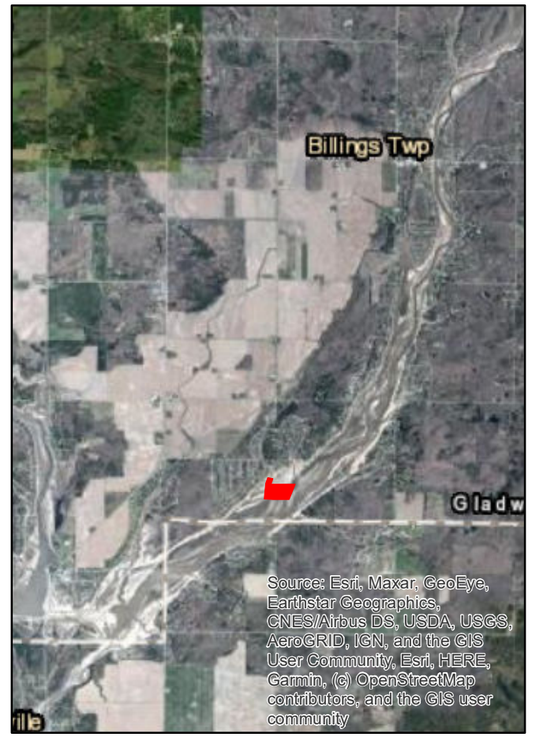
TREATMENT AREA = 8.5 ACRES

N

No Scale

progressive ae

PROJECT LOCATION



Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

VENICE BEACH TREATMENT AREA

TREATMENT AREA = 19.8 ACRES

N

NO SCALE

progressive ae

Specimen Label

TRICLOPYR CHOLINE	GROUP	4	HERBICIDE

CORTEVA™ agriscience

Vastlan®

HERBICIDE

For the control of woody plant species and annual and perennial broadleaf weeds on

- **range and permanent grass pastures, grasses grown for hay, Conservation Reserve Program (CRP) sites;**
- **forest sites, conifer and tree plantations, and Christmas tree plantations;**
- **non-crop areas for example, airports, barrow ditches, communication transmission lines or structures, manufacturing and storage sites, electrical power and utility rights-of-way, fencerows, gravel pits, industrial sites, military lands, mining and drilling areas, non-irrigation ditch banks, oil and gas pads, parking lots, petroleum tank farms, pipelines, railroads, roadsides, storage areas, storm water retention areas, substations, unimproved rough turf grasses, vacant lots and other non-crop residential areas, and around farm buildings;**
- **natural areas (open space) for example, campgrounds, parks, prairie management, trails and trailheads, recreation areas, wildlife openings and wildlife habitat and management areas;**
- **including grazed areas on these sites; and**
- **aquatic sites**

For use in New York State, comply with Section 24(c) Special Local Need labeling for Vastlan, SLN NY-160004.

Active Ingredient:	
Triclopyr choline: 2-[(3,5,6-trichloro-2-pyridinyl)oxy] acetic acid, choline salt	54.72%
Other Ingredients	45.28%
Total	100.0%

Acid equivalent: triclopyr – 39.02% - 4 lb/gal

Precautionary Statements

Hazard to Humans and Domestic Animals

EPA Reg. No. 62719-687

Keep Out of Reach of Children

WARNING

May be fatal if swallowed • Causes substantial but temporary eye injury • Prolonged or frequently repeated skin contact may cause allergic reactions in some individuals.

Do not get in eyes, on skin, or on clothing. Wash thoroughly after handling and before eating, drinking, chewing gum, using tobacco, or using the toilet. Remove and wash contaminated clothing before reuse.

Personal Protective Equipment (PPE)

Applicators and other handlers must wear:

- Protective eyewear
- Long-sleeved shirt and long pants
- Shoes plus socks
- Waterproof gloves

Discard clothing and other absorbent materials that have been drenched or heavily contaminated with this product's concentrate. Do not reuse them.

Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables exist, 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 the 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:

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

First Aid

If in eyes: Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a poison control center or doctor for treatment advice.

If swallowed: Call a poison control center or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by a poison control center or doctor. Do not give anything by mouth to an unconscious person.

Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact 1-800-992-5994 for emergency medical treatment information.

Environmental Hazards

Do not contaminate water when cleaning equipment or disposing of equipment washwaters. Under certain conditions, treatment of aquatic weeds can result in oxygen depletion or loss due to decomposition of dead plants, which may contribute to fish suffocation. This loss can cause fish suffocation. Therefore, to minimize this hazard, do not treat more than one-third to one-half of the water area in a single operation and wait at least 10 to 14 days between treatments. Begin treatment along the shore and proceed outwards in bands to allow fish to move into untreated areas. Consult with the State agency for fish and game before applying to public water to determine if a permit is needed.

This chemical has properties and characteristics associated with chemicals detected in groundwater. The use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in groundwater contamination.

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.

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 24 hours.

Agricultural Use Requirements (Cont.)

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:

- Protective eyewear
- Coveralls
- Shoes plus socks
- Waterproof gloves

Non-Agricultural Use Requirements

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

Entry Restrictions for Non-WPS Uses: For applications to non-cropland areas, do not allow entry into areas until sprays have dried, unless applicator and other handler PPE is worn.

Storage and Disposal

Do not contaminate water, food, or feed by storage and disposal. Open dumping is prohibited.
Pesticide Storage: Agitate before use.
Pesticide Disposal: Wastes resulting from the use of this product must be disposed of on site or at an approved waste disposal facility.

Nonrefillable containers 5 gallons or less:
Container Handling: Nonrefillable container. Do not reuse or refill this container. Offer for recycling if available or puncture and dispose of in a sanitary landfill, or by incineration, or by other procedures allowed by state and local authorities.

Triple rinse or pressure rinse container (or equivalent) promptly after emptying. **Triple rinse** as follows: Empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container 1/4 full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times. **Pressure rinse** as follows: Empty the remaining contents into application equipment or a mix tank and continue to drain for 10 seconds after the flow begins to drip. Hold container upside down over application equipment or mix tank or collect rinsate for later use or disposal. Insert pressure rinsing nozzle in the side of the container, and rinse at about 40 psi for at least 30 seconds. Drain for 10 seconds after the flow begins to drip.

Refillable containers 5 gallons or larger:
Container Handling: Refillable container. Refill this container with pesticide only. Do not reuse this container for any other purpose. Cleaning the container before final disposal is the responsibility of the person disposing of the container. Cleaning before refilling is the responsibility of the refiller. To clean the container before final disposal, empty the remaining contents from this container into application equipment or a mix tank. Fill the container about 10% full with water. Agitate vigorously or recirculate water with the pump for two minutes. Pour or pump rinsate into application equipment or rinsate collection system. Repeat this rinsing procedure two more times.

Nonrefillable containers 5 gallons or larger:
Container Handling: Nonrefillable container. Do not reuse or refill this container. Offer for recycling if available or puncture and dispose of in a sanitary landfill, or by incineration, or by other procedures allowed by state and local authorities.

Triple rinse or pressure rinse container (or equivalent) promptly after emptying. **Triple rinse** as follows: Empty the remaining contents into application equipment or a mix tank. Fill the container 1/4 full with water. Replace and tighten closures. Tip container on its side and roll it back and forth, ensuring at least one complete revolution, for 30 seconds. Stand the container on its end and tip it back and forth several times. Turn the container over onto its other end and tip it back and forth several times. Empty the rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Repeat this procedure two more times. **Pressure rinse** as follows: Empty the remaining contents into application equipment or a mix tank and continue to drain for 10 seconds after the flow begins to drip. Hold container upside down over application equipment or mix tank or collect rinsate for later use or disposal. Insert pressure rinsing nozzle in the side of the container, and rinse at about 40 psi for at least 30 seconds. Drain for 10 seconds after the flow begins to drip.

Product Information for All Use Sites

Use Vastlan® for the control of woody plants and broadleaf weeds in range and pasture, grasses grown for hay, Conservation Reserve Program (CRP) sites; forest sites, conifer and tree plantations, and Christmas tree plantations; non-crop areas for example, airports, barrow ditches, communication transmission lines or structures, manufacturing and storage sites, electrical power and utility rights-of-way, fencerows, gravel pits, industrial sites, military lands, mining and drilling areas, non-irrigation ditch banks, oil and gas pads, parking lots, petroleum tank farms, pipelines, railroads, roadsides, storage areas, storm water retention areas, substations, unimproved rough turf grasses, vacant lots and other non-crop residential areas, and around farm buildings; natural areas (open space) for example, campgrounds, parks, prairie management, trails and trailheads, recreation areas, wildlife openings and wildlife habitat and management areas and aquatic sites.

Obtain Required Permits: Consult with appropriate state or local water authorities before applying this product to public waters. State or local public agencies may require permits.

Use Precautions

When making applications to control unwanted plants on banks or shorelines of moving water sites, minimize overspray to open water.

It is permissible to treat non-irrigation ditch banks, seasonally dry wetlands (such as flood plains, deltas, marshes, swamps, or bogs), and transitional areas between upland and lowland sites.

It is the pesticide user's responsibility to ensure that all products in the listed mixtures are registered for the intended use. Users must follow the most restrictive directions for use and precautionary statements of each product in the tank mixture.

Use Restrictions

For use in New York State, comply with Section 24(c) Special Local Need labeling for Vastlan, SLN NY-160004.

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

Do not apply Vastlan directly to, or otherwise permit it to come into direct contact with, grapes, tobacco, vegetable crops, flowers, or other desirable broadleaf plants. Do not permit spray mists containing Vastlan to drift onto such plants.

Do not apply to salt water bays or estuaries.

Do not apply directly to un-impounded rivers or streams.

Do not apply where runoff water may flow onto agricultural land as injury to crops may result.

Do not apply with a mistblower.

Irrigation waters:

Do not apply on ditches or canals currently being used to transport irrigation water or that will be used for irrigation within 4 months following treatment. It is permissible to treat non-irrigation ditch banks and the outer banks of irrigation ditches.

Water treated with Vastlan may not be used for irrigation purposes for 120 days after application or until residue levels of Vastlan are determined by laboratory analysis, or other appropriate means of analysis, to be 1 ppb or less.

Seasonal Irrigation Waters: Vastlan may be applied during the off-season to surface waters that are used for irrigation on a seasonal basis provided that there is a minimum of 120 days between applying Vastlan and the first use of treated water for irrigation purposes, or until residue levels of Vastlan are determined by laboratory analysis, or other appropriate means of analysis, to be 1 ppb or less.

Irrigation Canals/Ditches: Do not apply Vastlan to irrigation canals/ditches unless the 120-day restriction on irrigation water usage can be observed or residue levels of Vastlan are determined by laboratory analysis, or other appropriate means of analysis, to be 1 ppb or less.

Restrictions for Potable Water Intakes for Emerged Aquatic Weed Control – Lakes, Reservoirs, Ponds:
See chart below for specific setback distances near functioning potable water intakes.
Note: Existing potable water intakes which are no longer in use, such as those replaced by potable water wells or connections to a municipal water system, are not considered to be functioning potable water intakes. These setback restrictions do not apply to terrestrial applications made adjacent to potable water intakes.

	Vastlan Application Rate			
Area Treated	**1.5 qt/acre**	**3 qt/acre**	**4.5 qt/acre**	**6 qt/acre**
(acres)	**Setback Distance (ft)**			
4	0	200	400	500
>4 - 8	0	200	700	900
>8 - 16	0	200	700	1000
>16	0	200	900	1300

To apply Vastlan around and within the distances noted above from a functioning potable water intake, the intake must be turned off until the triclopyr level in the intake water is determined to be 0.4 parts per million (ppm) or less by laboratory analysis or immunoassay.

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

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

Restrictions for Potable Water Intakes for Submerged Weed Control – Lakes, Reservoirs, Ponds:
For applications of Vastlan to control submerged weeds in lakes, reservoirs, or ponds that contain a functioning potable water intake for human consumption, see the chart below to determine the minimum setback distances of the application from the functioning potable water intakes.

Area Treated (acres)	**Concentration of Triclopyr Acid in Water (ppm ae)**				
	0.75 ppm	1 ppm	1.5 ppm	2 ppm	2.5 ppm
	Required Setback Distance (ft) from Potable Water Intake				
<4	300	400	600	800	1000
>4 – 8	420	560	840	1120	1400
>8 – 16	600	800	1200	1600	2000
>16 – 32	780	1040	1560	2080	2600
>32 acres, calculate a setback using the formula for the appropriate rate	Setback (ft) = (800*ln (acres) – 160)/3.33	Setback (ft) = (800*ln (acres) – 160)/2.50	Setback (ft) = (800*ln (acres) – 160)/1.67	Setback (ft) = (800*ln (acres) – 160)/1.25	Setback (ft) = (800*ln (acres) – 160)

Example Calculation 1: to apply 2.5 ppm Vastlan to 50 acres:

Setback in feet = (800 x ln (50 acres) - 160
= (800 x 3.912) – 160
= 2970 feet

Example Calculation 2: to apply 0.75 ppm Vastlan to 50 acres:

Setback in feet = (800 x ln (50 acres) - 160
3.33
= (800 x 3.912) – 160
3.33
= 892 feet

Note: Existing potable water intakes which are no longer in use, such as those replaced by potable water wells or connections to a municipal water system, are not considered to be functioning potable water intakes. These setback restrictions do not apply to terrestrial applications made adjacent to potable water intakes.

To apply Vastlan around and within the distances noted above from a functioning potable water intake, the intake must be turned off until the triclopyr level in the intake water is determined to be 0.4 parts per million (ppm) or less by laboratory analysis or immunoassay.

Maximum Use Rates

- Apply no more than 6 lb ae of triclopyr (6 quarts of Vastlan) per acre per year on aquatic sites.
- Apply no more than 2 lb ae of triclopyr (2 quarts of Vastlan) per acre per growing season on range and pasture sites, including rights-of-way, fence rows or any area where grazing or harvesting of hay is allowed.
- On forestry sites, Vastlan may be used at rates up to 6 lb ae of triclopyr (6 quarts of Vastlan) per acre per year.
- For all terrestrial use sites other than range, pasture, forestry sites, and grazed/hayed areas, the maximum application rate is 9 lb ae of triclopyr (9 quarts of Vastlan) per acre per year.
- See Maximum Labeled Rate versus Spray Volume per Acre table below for relationship between mixing rate, spray volume and maximum application rate.

Maximum Labeled Rate versus Spray Volume per Acre

Total Spray Volume (gal/acre)	**Maximum Rate of Vastlan**		
	Range and Pasture Sites[1] (gal/100 gal of spray)	**Forestry Sites[2] (gal/100 gal of spray)**	**Non-Cropland Sites[3] (gal/100 gal of spray)**
400	Do not use	0.375	0.57
300	Do not use	0.5	0.75
200	Do not use	0.75	1.125
100	0.5	1.5	2.25
50	1	3	4.5

Maximum Labeled Rate versus Spray Volume per Acre (Cont.)

Total Spray Volume (gal/acre)	**Maximum Rate of Vastlan**		
	Range and Pasture Sites[1] (gal/100 gal of spray)	**Forestry Sites[2] (gal/100 gal of spray)**	**Non-Cropland Sites[3] (gal/100 gal of spray)**
40	1.25	3.75	5.63
30	1.67	5	7.5
20	2.5	7.5	11.25
10	5	15	22.5

[1]Do not exceed the maximum use rate of 2 lb ae of triclopyr (2 quarts of Vastlan)/acre/year.
[2]Do not exceed the maximum use rate of 6 lb ae of triclopyr (6 quarts of Vastlan)/acre/year.
[3]Do not exceed the maximum use rate of 9 lb ae of triclopyr (9 quarts of Vastlan)/acre/year on non-cropland use sites other than rangeland, pasture, forestry, and grazed/hayed areas.

Use the higher dosage rates in the chart when woody plants approach an average of 15 feet in height or when the brush covers more than 60% of the area to be treated. If lower rates are used on hard to control species, resprouting may occur the year following treatment.

Haying Restrictions

Haying (harvesting of dried forage)

- Do not harvest hay for 14 days after application.

Slaughter Restriction: During the season of application, withdraw livestock from grazing treated grass at least 3 days before slaughter.

Avoiding Injurious Spray Drift

Make applications only when there is little or no hazard from spray drift. Small quantities of spray, which may not be visible, may seriously injure susceptible plants. Do not spray when wind is blowing toward susceptible crops or ornamental plants that are near enough to be injured. It is suggested that a continuous smoke column at or near the spray site or a smoke generator on the spray equipment be used to detect air movement, lapse conditions, or temperature inversions (stable air). If the smoke layers or indicates a potential of hazardous spray drift, do not spray.

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.

Aerial Application:
The following drift management requirements must be followed to avoid off-target drift movement from aerial applications with aerial applications:

1. The distance of the outer most operating 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 must be observed.

The applicator should be familiar with and take into account the information covered in the following Aerial Drift Reduction Advisory, below.

Aerial Drift Reduction Advisory
Information on 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 Inversions).

For aerial application on rights-of-way or other areas near susceptible crops, apply through a Microfoil† or Thru-Valve boom†, or use an agriculturally labeled drift control additive. Other drift reducing systems or thickened sprays prepared by using high viscosity inverting systems may be used if they are made as drift-free as mixtures containing agriculturally labeled thickening agents or applications made with the Microfoil or Thru-Valve boom. Do not use a thickening agent with the Microfoil or Thru-Valve booms, or other systems that cannot accommodate thick sprays. If a spray thickening agent is used, follow all use directions and precautions on the product label.

†Reference within this label to a particular piece of equipment produced by or available from other parties is provided without consideration for use by the reader at its discretion and subject to the reader's independent circumstances, evaluation, and expertise. Such reference by Dow AgroSciences is not intended as an endorsement of such equipment, shall not constitute a warranty (express or implied) of such equipment, and is not intended to imply that other equipment is not available and equally suitable. Any discussion of methods of use of such equipment does not imply that the reader should use the equipment other than is advised in directions available from the equipment's manufacturer. The reader is responsible for exercising its own judgment and expertise, or consulting with sources other than Dow AgroSciences, in selecting and determining how to use its equipment.

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 the recommended practice. Significant deflection from 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.

Boom Length: The distance of the outer most operating nozzles on the boom must not exceed 75% of wingspan or rotor diameter.

Application Height: Applications should not be made at a height greater than 10 feet above the top of the largest plants unless a greater height is required for aircraft safety. Making applications at the lowest height that is safe reduces 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 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 to 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 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: Applications should not occur during a local, low level 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 the smoke from a ground source or an aircraft smoke generator. Smoke that layers and moves laterally in a concentrated cloud (under low wind conditions) indicates an inversion, while smoke that moves upward and rapidly dissipates indicates good vertical air mixing.

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

Ground Equipment: To aid in reducing spray drift, Vastlan should be used in thickened (high viscosity) spray mixtures using an agriculturally labeled drift control additive, high viscosity invert system, or equivalent as directed by the manufacturer. With ground equipment, spray drift can be reduced by keeping the spray boom as low as possible; by applying 20 gallons or more of spray per acre; by keeping the operating spray pressures at the lower end of the manufacturer's recommended pressures for the specific nozzle type used (low pressure nozzles are available from spray equipment manufacturers); and by spraying when wind velocity is low (follow state regulations). In hand-gun applications, select the minimum spray pressure that will provide adequate plant coverage (without forming a mist). Do not apply with nozzles that produce a fine-droplet spray.

High Volume Leaf-Stem Treatment: To minimize spray drift, do not use pressure exceeding 50 psi at the spray nozzle and keep sprays no higher than brush tops. An agriculturally labeled thickening agent may be used to reduce drift.

Use Information

Use Vastlan at rates of 0.75 to 9 quarts of Vastlan per acre to control broadleaf weeds and woody plants. In all cases, use the amount specified in enough water to give uniform and complete coverage of the plants to be controlled. Refer to Maximum Use Rates paragraph - follow defined rates restrictions based on use sites and whether or not grazing or haying is involved.

Surfactants
For best results, use a surfactant with foliar applications and apply when woody plants and weeds are actively growing. When hard to control species such as ash, blackgum, choke cherry, elm, maples, oaks, pines, or winged elm are prevalent and during applications made in late summer when the plants are mature or during drought conditions, use the higher rates of Vastlan alone or in combination with Milestone, Opensight, Tordon® or other herbicides to broaden the spectrum of activity.

Tank Mixing
Before using any recommended tank mixtures, read the directions and all use precautions and restrictions on all labels in the tank mix. Prior to large scale batch mixing, conduct a "jar test" for spray mixture compatibility by mixing each component in the required order and proportion in a clear glass jar. **Note:** If tank mixing with glyphosate herbicides, mix the Vastlan with at least 75% of the total spray volume desired and ensure that Vastlan is well mixed before adding the glyphosate herbicides to avoid incompatibility. When using Vastlan in combination with Freelexx, 2,4-D amine (like DMA 4 IVM) or low volatile ester herbicides, generally the higher rates should be used for satisfactory brush control.

A surfactant should be added to the spray tank last or as recommended on the product label. If combined with emulsifiable concentrate herbicides, moderate continuous adequate agitation is required.
It is the pesticide user's responsibility to ensure that all products are registered for the intended use. Read and follow the applicable restrictions and limitations and directions for use on all product labels involved in tank mixing. Users must follow the most restrictive directions for use and precautionary statements of each product in the tank mixture.

Broadcast Applications With Ground Equipment
Apply using equipment that will ensure uniform coverage of the spray volumes applied. To improve spray coverage, add a non-ionic surfactant. See Maximum Labeled Rate versus Spray Volume per Acre table below for relationship between mixing rate, spray volume and maximum application rate.

Aerial Application
Aerial sprays should be applied using suitable drift control. (See Use Precautions and Restrictions.) Add a non-ionic surfactant. See Maximum Labeled Rate versus Spray Volume per Acre table above for relationship between mixing rate, spray volume and maximum application rate.

Woody Plant Control With Ground Equipment for Noncropland sites

High Volume Foliage Treatment

For control of woody plants, use Vastlan at the rate of 3 to 9 quarts per 100 gallons of spray solution, or Vastlan at 0.75 to 3 quarts may be tank mixed with Freelexx, 2,4-D (like DMA 4 IVM, or low volatile esters), or products such as Milestone, Opensight, Tordon* and diluted to make 100 gallons of spray solution. Apply at a volume of 100 to 400 gallons of total spray per acre depending upon size and density of woody plants. Applications should be sufficient to provide thorough plant coverage. (See Use Precautions and Restrictions.) Do not exceed maximum allowable use rates per acre.

* Tordon is not registered for use in the states of California and Florida. This product is a restricted use pesticide. Check to ensure tank mix partners are state registered before use. See this product label for more information.

Low Volume Foliage Treatment

To control susceptible woody plants, apply up to 9 quarts of Vastlan in 10 to 100 gallons of finished spray. The maximum volume of the finish spray applied to an acre is limited by the maximum use rate per site type (See Maximum Use Rate section - Range and Pasture, Grazing, Haying sites 2 lb ae, Forestry and aquatic sites 6 lb ae, and all other sites 9 lb ae triclopyr). For best results, a surfactant should be added to all spray mixtures. The spray concentration of Vastlan and total spray volume per acre should be adjusted according to the size and density of target woody plants and kind of spray equipment used. With low volume sprays, use sufficient spray volume to obtain uniform coverage of target plants including the surfaces of all foliage, stems, and root collars (see Use Precautions and Restrictions). Match equipment and delivery rate of spray nozzles to height and density of woody plants. When treating tall, dense brush, a truck mounted spray gun with spray tips that deliver up to 2 gallons per minute at 40 to 60 psi may be required. Backpack or other types of specialized spray equipment with spray tips that deliver less than 1 gallon of spray per minute may be appropriate for short, low to moderate density brush.

Tank Mixing: As a low volume foliar spray, up to 9 quarts of Vastlan may be applied in tank mix combination with Tordon* or Graslan L* in 10 to 100 gallons of finished spray. The maximum volume of the finish spray applied to an acre is limited by the maximum use rate per site type (See Maximum Use Rate section - Range and Pasture, Grazing, Haying sites 2 lb ae, Forestry and aquatic sites 6 lb ae, and all other sites 9 lb ae triclopyr).

* Tordon and Graslan L are not registered for use in the states of California and Florida. These products are restricted use pesticides. See product labels for more information.

Foliage Treatment (Non-Grazed/Non-Hayed Areas)

Use 6 to 9 quarts of Vastlan alone or in a tank mix combination with other herbicides such as Freelexx, 2,4-D (like DMA 4 IVM, or low volatile esters) or Milestone, Opensight, Tordon*, or Graslan L* and apply in a total spray volume of 10 to 30 gallons per acre. Use the higher rates and volumes when plants are dense or under drought conditions.

Interspersed areas in non-grazed/hayed rights-of-ways that may be subject to grazing or haying may be spot treated with this rate if the treated area comprises no more than 10% of the total grazed/hayed area.

* Tordon and Graslan L are not registered for use in the states of California and Florida. These products are restricted use pesticides. See product labels for more information.

Foliage Treatment (Range and Pasture and Grazed/Hayed Areas)

Use 1 to 2 quarts of Vastlan per acre. Apply as a broadcast spray in a total volume of 10 gallons or more per acre. Apply anytime the weeds are actively growing. Tank mixtures can be made with other herbicides registered for use on grazed/hayed sites such as Milestone, Opensight, PastureGard HL, Surmount, Freelexx, or Tordon* or Graslan L.*

* Tordon and Graslan L are not registered for use in the states of California and Florida. These products are restricted use pesticides. Check to ensure tank mix partners are state registered before use. See product labels for more information.

Weed Resistance Management

Triclopyr, the active ingredient in this product, is a Group 4 herbicide based on the mode of action classification system of the Weed Science Society of America. Any weed population may contain or develop plants resistant to Group 4 herbicides. Resistant weeds may dominate the weed population if these herbicides are used repeatedly in the same field. Such resistant weed plants may not be effectively managed using Group 4 herbicides but may be effectively managed utilizing other herbicides alone or in mixtures from different herbicide Groups that are labeled for control of these weeds and/or by using cultural or mechanical practices. Consult your local company representative, state cooperative extension service, professional consultants, or other qualified authorities to determine appropriate actions for treating specific resistant weeds.

Best Management Practices:

Proactively implementing diversified weed control strategies to minimize selection for weed populations resistant to one or more herbicides is recommended. A diversified weed management program may include the use of multiple herbicides with different modes of action and overlapping weed spectrum with or without tillage operations and/or other cultural practices. Research has demonstrated that using the labeled rate and directions for use is important to delay the selection for resistant weeds. Scouting after a herbicide application is important because it can facilitate the early identification of weed shifts and/or weed resistance and thus provide direction on future weed management practices. One of the best ways to contain resistant weed populations is to implement measures to avoid allowing weeds to reproduce by seed or to proliferate vegetatively. Cleaning equipment between sites and avoiding movement of plant material between sites will greatly aid in reducing the spread of resistant weed seed.

Woody Plants and Weeds Controlled

alder
arrowwood
ash
aspen
Australian pine
bear clover (bearmat)
beech
birch
blackberry
blackgum
Brazilian pepper
broom, Scotch, French, Spanish, Portugese
cascara
ceanothus
cherry
chinquapin
choke cherry
cottonwood
crataegus (hawthorn)
Douglas fir
dogwood
elderberry
elm
gallberry
gorse
hazel
hornbean
kudzu[1]
locust
madrone
maples
melaleuca (seedlings)
mulberry
oaks
persimmon
pine
poison ivy
poison oak
poplar
Russian olive 1/
salt-bush (*Baccharis* spp.)
salt cedar[2]
salmonberry
sassafras
scotch broom
sumac
sweetbay magnolia
sweetgum
sycamore
tanoak
thimbleberry
tulip poplar
waxmyrtle
western hemlock
wild rose
willow
winged elm

[1]For complete control, re-treatment may be necessary.
[2]Use cut surface treatments for best results.

Annual and Perennial Broadleaf Weeds

bindweed
burdock
Canada thistle
chicory
clover
curly dock
dandelion
field bindweed
ground ivy
lambsquarter
lespedeza
Mexican petunia
plantain
purple loosestrife 2/
oxalis
ragweed
smartweed
Spanish needles/ common beggarthicks
tansy ragwort
thistle
tropical soda apple
vetch
wedelia
wild lettuce

Aquatic Weeds

alligatorweed
American lotus
American frogbit
aquatic sodaapple
Eurasian watermilfoil
milfoil species
nuphar (spatterdock)
parrotfeather*
phragmites 3/
pickerelweed
pennywort
purple loosestrife
Waterhyacinth
Waterlily
Waterprimose
Watershield

*Re-treatment may be needed to achieve desired level of control.

1/ Russian olive

Apply Vastlan at 3 quarts per acre plus Milestone® and a non-ionic surfactant at 0.25 to 0.5% v/v or 1 quart/acre of crop oil concentrate or methylated seed oil. Treatments can be made to small (usually less than 6 feet in height) trees or to regrowth of trees after cutting, mowing, or shredding operations. For foliar applications, apply until foliage is wet, but not to runoff. When treating regrowth of mowed trees, allow time for the plants to re-grow and develop adequate leaf area for a foliar application. This may mean the application will need to be done the year after cutting or, at least, in September or October after mowing the previous winter or early spring.

These treatments may need to be re-applied in subsequent years to achieve the desired level of long term control if trees resprout after the initial treatment

2/ Purple Loosestrife
Purple loosestrife can be controlled with foliar applications of Vastlan. For broadcast applications, use a minimum of 4.5 to 6 quarts of Vastlan per acre. Apply Vastlan when purple loosestrife is at the bud to mid-flowering stage of growth. Follow-up applications for control of regrowth should be made the following year in order to achieve increased control of this weed species. For all applications, a non-ionic surfactant should be added to the spray mixture. Follow all directions and use precautions on the label of the surfactant. Thorough wetting of the foliage and stems is necessary to achieve satisfactory control. A minimum spray volume of 50 gallons per acre is needed for ground broadcast applications.

If using a backpack sprayer, a spray mixture containing 0.75% to 1.25% Vastlan should be used. All purple loosestrife plants should be thoroughly wetted.

3/ Phragmites (*Phragmites australis*)
Phragmites can be selectively controlled with foliar applications of Vastlan. For broadcast applications, a minimum of 2 1/4 lb ae of triclopyr (2 1/4 quarts of Vastlan) per acre should be used. For optimum control, apply Vastlan when phragmites is in the early state of growth, 1/2 to 3 feet in height, prior to seed head development. Follow-up applications for control of regrowth may be made the following year in order to achieve increased control of this weed species. For all applications, a non-ionic surfactant labeled for aquatics should be added to the spray mixture. Follow all directions and use precautions on the label of the surfactant. Thorough wetting of the foliage and stems is necessary to achieve satisfactory control. A minimum spray volume of 50 gallons per acre is recommended for ground broadcast applications.

If a backpack sprayer is used, a spray mixture containing 0.75% to 1.25% of Vastlan should be used. All phragmites foliage should be thoroughly wetted.

Aerial application by helicopter may be needed when treating restoration sites that are inaccessible, remote, difficult to traverse, isolated, or otherwise unsuited to ground application, or in circumstances where invasive exotic weeds dominate native plant populations over extensive areas and efforts to restore native plant diversity are being conducted. By air, apply in a minimum spray volume of 30 gallons per acre.

Cut Surface Treatments

Individual plant treatments such as cut surface applications may be used on any use site listed on this label at a maximum use rate of 6 or 9 quarts of Vastlan (6 lb ae on forestry sites and 9 lb ae of triclopyr on other sites) per acre. These types of applications are made directly to ungrazed parts of plants and, therefore, are not restricted by the grazing maximum rate of 2 quarts of Vastlan (2 lb ae of triclopyr) per acre on a grazed site.

To control unwanted hardwood trees such as elm, maple, oak and conifers in labeled sites, apply Vastlan, either undiluted or diluted in a 1 to 1 ratio with water, as directed below.

Tree Injector Method
Apply by injecting 1/2 milliliter of undiluted Vastlan or 1 milliliter of the diluted solution through the bark at intervals of 3 to 4 inches between centers of the injector wound. The injections should completely surround the tree at any convenient height. **Note: No Worker Protection Standard worker entry restrictions or worker notification requirements apply when this product is injected directly into plants.**

Hack and Squirt Method
Make cuts around the tree trunk at a convenient height with a hatchet or similar equipment so that the cuts overlap slightly and make a continuous circle around the trunk. Spray 1/2 milliliter of undiluted Vastlan or 1 milliliter of the diluted solution into the pocket created between the bark and the inner stem/trunk by each cut.

Frill or Girdle Method
Make a single girdle through the bark completely around the tree at a convenient height. The frill should allow for the herbicide to remain next to the inner stem and absorb into the plant. Wet the cut surface with undiluted or diluted solution.

Both of the above methods may be used successfully at any season except during periods of heavy sap flow of certain species - for example, maples.

Stump Treatment
Spray or paint the cut surfaces of freshly cut stumps and stubs with undiluted Vastlan. The cambium area next to the bark is the most vital area to wet.

Chemical Mowing

Vastlan may be applied to the cut surfaces of weed or brush stubble under the deck of a rotary mower such as the Brown Brush Monitor or other equipment that is designed to uniformly apply the herbicide. This method of application may be used for control of annual and perennial broadleaf weeds and for suppression and stem density reduction of woody species. Apply when growing conditions are favorable and there is active plant growth.

Application

Broadleaf Weed Control: Apply at labeled rates for Vastlan under the section “Broadcast Applications with Ground Equipment - Broadleaf Weed Control”. Apply the specified rate in a minimum spray volume of 3 gallons per acre. Follow label directions for herbicides that may be applied in tank mix combination with Vastlan to improve weed control or broaden the spectrum of weeds controlled.

Woody Plant Control: For suppression and stem density reduction of woody species, use 2.25 to 4.5 quarts of Vastlan in a minimum spray volume of 5 gallons per acre. Follow label directions under the woody plant control for herbicides that may be applied in tank mix combination with Vastlan to improve control or broaden the spectrum of woody plants controlled.

Tank mixing: For possible increased effectiveness of this treatment, Vastlan may be tank mixed with other herbicides such as Milestone, Tordon*, Graslan L* or imazapyr. Follow all product use directions and do not exceed maximum labeled use rates.

* Tordon and Graslan L are not registered for use in the states of California and Florida. These products are restricted use pesticides. See product labels for more information.

Forest Management Applications

For best control from broadcast applications of Vastlan, add a surfactant and use a spray volume which will provide thorough plant coverage. Recommended spray volumes are usually 10 to 25 gallons per acre by air or 10 to 100 gallons per acre by ground. For spray volumes less than 50 gallons per acre the addition of a non-ionic surfactant will improve spray coverage. Nozzles or additives that produce larger droplets of spray may require higher spray volumes to maintain brush control.

Forest Site Preparation
Use up to 6 quarts of Vastlan alone and apply in a total spray volume of 10 to 30 gallons per acre or Vastlan may be used in a tank mix with other herbicides such as Graslan L*, Freelexx, or 2,4-D amine or low volatile ester in a total spray volume of 10 to 30 gallons per acre. Use a non-ionic surfactant for all foliar applications.

*Graslan L is not registered for use in the states of California and Florida. This product is a restricted use pesticide. Check to ensure tank mix partners are state registered before use. See product label for more information.

Note: Conifers planted sooner than one month after treatment with Vastlan at less than 4 lb ae of triclopyr (4 quarts of Vastlan) per acre or sooner than two months after treatment at 4 to 6 lb ae of triclopyr (4 to 6 quarts of Vastlan) per acre may be injured. When tank mixtures of herbicides are used for forest site preparation, labels for all products in the mixture must be consulted and the longest waiting period before conifer planting must be used.

Directed Spray Applications in Tree Plantations such as for Conifer Release
To release conifers or desirable trees from competing vegetation, mix 3 to 6 quarts of Vastlan in enough water to make 100 gallons of spray mixture. To improve spray coverage, add a non-ionic surfactant. The spray mixture should be directed onto foliage of competitive vegetation using knapsack or backpack sprayers with flat fan nozzles or equivalent any time after vegetation has reached full leaf size, but before autumn coloration. When treating woody plants, it is best if the majority of treated plants are less than 6 feet in height to ensure adequate spray coverage. Use care to direct spray away from contact with foliage of conifers and desirable vegetation as injury or death could occur.

Note: Spray may cause temporary damage and growth suppression where contact with conifers occurs; however, injured conifers should recover and grow normally. Over-the-top spray applications can kill pines.

Broadcast Applications for Conifer Release in the Northeastern United States
To release spruce, fir, red pine and white pine from competing hardwoods, such as red maple, sugar maple, striped maple, alder, birch (white, yellow or gray), aspen, ash, pin cherry and *Rubus* spp. and perennial and annual broadleaf weeds, use Vastlan at rates of 1.5 to 3 quarts per acre alone or with Freelexx, 2,4-D (like DMA 4 IVM), or a low volatile ester to provide no more than 4 lb ae per acre from both products. Apply in late summer or early fall after conifers have formed their over wintering buds and hardwoods are in full leaf and prior to autumn coloration.

Broadcast Applications for Douglas-fir Release in the Pacific Northwest and California

To release Douglas-fir from susceptible competing vegetation such as broadleaf weeds, alder, blackberry, or Scotch broom, apply Vastlan at 1 to 1.5 quarts per acre alone or in combination with other herbicides to broaden the spectrum of activity. Apply in early spring after hardwoods begin growth and before Douglas-fir bud break ("early foliar" hardwood stage) or after Douglas-fir seasonal growth has "hardened off" (set winter buds) in late summer, but while hardwoods are still actively growing. When treating after Douglas-fir bud set, apply prior to onset of autumn coloration in hardwood foliage. **Note:** Treatments applied during active Douglas-fir shoot growth (after spring bud break and prior to bud set) may cause injury to Douglas-fir trees.

Christmas Tree Plantations

Use Vastlan for the control of woody plants and annual and perennial broadleaf weeds in established Christmas tree plantations. For best results, apply when woody plants and weeds are actively growing. Vastlan does not control weeds which have not emerged at the time of application. If lower rates are used on hard to control woody species, resprouting may occur the year following treatment. Brush over 8 feet tall is difficult to treat efficiently using hand equipment such as backpack or knapsack sprayers. When treating large brush or trees or hard to control species such as ash, blackgum, choke cherry, elm, hazel, madrone, maples, oaks or sweetgum, and for applications made during drought conditions or in late summer when the leaves are mature, use the higher rates of Vastlan or use cut surface applications (see Cut Surface section above). For foliar applications, use a surfactant and apply in enough water to give uniform and complete coverage of the plants to be controlled. Applications made under drought conditions may provide less than desirable results.

Use Precautions:

- Newly seeded turf (alleyways, etc.) should be mowed two or three times before treatment with Vastlan.
- Use Vastlan where legumes, such as clover, are present only if injury and possible control of legumes can be tolerated.

Use Restrictions:

- Do not use on newly seeded grass until well established as indicated by vigorous growth and development of secondary root system and tillering
- Do not reseed Christmas tree areas treated with Vastlan for a minimum of three weeks after application.
- Apply Vastlan only to established Christmas trees that were planted at least one full year prior to application.
- **Do not apply with 2,4-D containing products.**

Application

Apply in late summer or early autumn after terminal growth of Christmas trees has hardened off but before leaf drop of the target weeds. Apply at a rate of 0.75 to 1.75 quarts of Vastlan per acre as a foliar spray directed toward the base of Christmas trees. Use sufficient spray volume to provide uniform coverage of target plants (20 to 100 gallons per acre). Application rates of Vastlan directed for Christmas trees will only suppress some well established woody plants that are greater than 2 to 3 years old (see table below). Broadcast sprays may also be applied in bands between the rows of planted trees. Use spray equipment that will ensure uniform coverage of the desired spray volume.

Vastlan can cause needle and branch injury to Christmas trees. To minimize injury to Christmas trees, direct sprays so as to avoid or minimize contact with foliage. Blue spruce, white spruce, balsam fir, and Frasier fir are less susceptible to injury than white pine and Douglas-fir.

Application Rates and Species Controlled (or also see list above):

Vastlan		
0.75 quart/acre	1.25 to 1.5 quarts/acre	1.75 quarts/acre
clover dandelion dock, curly lambsquarters lespedeza plantain, broadleaf plantain, buckhorn ragweed, common vetch	bindweed, field (TG) blackberry[1] chicory (s) fireweed ivy, ground lettuce, wild oxalis poison ivy smartweed (TG) thistle, Canada (TG) violet, wild Virginia creeper[1]	arrowwood (SDL) aspen beech (SDL) birch (SDL) chinquapin cottonwood (SDL) elderberry grape, wild mulberry (SDL) poplar (SDL) sassafras (SDL) sumac (SDL) sycamore (SDL)

(TG) Top growth control, retreatment may be necessary
(S) Suppression
(SDL) Seedlings less than 2 to 3 years old
[1]Use 1.5 quarts per acre rate

Directed Applications

To control hardwoods such as red maple, sugar maple, striped maple, sweetgum, red and white oaks, ash, alder, birch, aspen, and pin cherry, mix 0.19 to1 pint of Vastlan in enough water to make 3 gallons of spray mixture. For directed applications, do not exceed 6 quarts of Vastlan per acre per year. To improve coverage, add a non-ionic agricultural surfactant to the spray. This spray mixture should be directed onto foliage of competitive hardwoods using knapsack or backpack sprayers with flat fan nozzles or equivalent any time after hardwoods have reached full leaf size, but before autumn coloration (when plants are actively growing). The majority of treated hardwoods should be less than 8 feet in height to ensure adequate spray coverage. **Note:** To prevent Christmas tree injury, care should be taken to direct spray away from contact with Christmas tree foliage.

Aquatic and Wetland Sites

Use Vastlan for control of emersed, submersed and floating aquatic plants in aquatic sites such as ponds, lakes, reservoirs, non-irrigation canals, and ditches which have little or no continuous outflow, marshes and wetlands, including broadleaf and woody vegetation on banks and shores within or adjacent to these and other aquatic sites.

Obtain Required Permits: Consult with appropriate state or local water authorities before applying this product to public waters. State or local public agencies may require permits.

Aquatic Application Methods

Use a non-ionic surfactant in the spray mixture to improve control with foliar applications. Follow all directions and use precautions on the aquatic surfactant label.

Surface Application

Use a spray boom, handgun or other similar suitable equipment mounted on a boat or vehicle. Thorough wetting of foliage is essential for maximum effectiveness. Use 20 to 200 gallons per acre of spray mixture. Special precautions such as the use of low spray pressure, large droplet producing nozzles, or addition of a labeled thickening agent may minimize spray drift in areas near sensitive crops.

Aerial Application (Helicopter Only)

Apply with a helicopter using a Microfoil or Thru-Valve boom, or a drift control additive in the spray solution. Apply in a minimum of 10 gallons of total spray mix per acre. Do not apply when weather conditions favor drift to sensitive areas. See label section on aerial application directions and precautions.

Floating and Emerged Weeds

Apply when plants are actively growing. For control of waterhyacinth, alligatorweed (see specific directions below), and other susceptible emerged and floating herbaceous weeds and woody plants, apply 1.5 to 6 quarts of Vastlan per acre as a foliar application using surface or aerial equipment. Use higher rates in the rate range when plants are mature, when the weed mass is dense, or for difficult to control species. Repeat as necessary to control regrowth and plants missed in the previous operation, but do not exceed a total of 6 quarts of Vastlan per acre per annual growing season.

Aquatic Weeds

alligatorweed	parrotfeather[1]	purple loosestrife
aquatic sodaapple	phragmites	waterprimrose
Eurasian watermilfoil	pickerelweed	
milfoil species	pennywort	

[1]Re-treatment may be needed to achieve desired level of control.

Alligatorweed

Apply Vastlan at 2 to 6 quarts per acre to control alligatorweed. It is important to thoroughly wet all foliage with the spray mixture. For best results, add an approved non-ionic aquatic surfactant to the spray mixture. Alligatorweed growing outside the margins of a body of water can be controlled with this treatment. However, alligatorweed growing in water will only be partially controlled. Top growth above the water will be controlled, but the plant will likely regrow from tissue below the water surface.

Restrictions for Potable Water Intakes for Emerged Aquatic Weed Control – Lakes, Reservoirs, Ponds:

See chart below for specific setback distances near functioning potable water intakes.

Note: Existing potable water intakes which are no longer in use, such as those replaced by potable water wells or connections to a municipal water system, are not considered to be functioning potable water intakes. These setback restrictions do not apply to terrestrial applications made adjacent to potable water intakes.

	Vastlan Application Rate			
Area Treated	**1.5 qt/acre**	**3 qt/acre**	**4.5 qt/acre**	**6 qt/acre**
(acres)	**Setback Distance (ft)**			
4	0	200	400	500
>4 - 8	0	200	700	900
>8 - 16	0	200	700	1000
>16	0	200	900	1300

To apply Vastlan around and within the distances noted above from a functioning potable water intake, the intake must be turned off until the triclopyr level in the intake water is determined to be 0.4 parts per million (ppm) or less by laboratory analysis or immunoassay.

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

Submerged Weeds

For control of Eurasian watermilfoil and other susceptible submerged weeds in ponds, lakes, reservoirs, and in non-irrigation canals or ditches that have little or no continuous outflow, apply Vastlan as either a surface or subsurface application. Select rates according to the rate chart below to provide a triclopyr concentration of 0.75 to 2.5 ppm ae in treated water. Use higher rates in the rate range in areas of greater water exchange. These areas may require a repeat application. However, total application of Vastlan must not exceed an application rate of 2.5 ppm of triclopyr for the treatment area per annual growing season.

Apply in spring or early summer when Eurasian watermilfoil or other submersed weeds are actively growing.

Areas near susceptible crops or other desirable broadleaf plants may be treated by subsurface injection applied by boat to avoid spray drift.

Surface Application
Apply the desired amount of Vastlan as either a concentrate or a spray mixture in water. However, use a minimum spray volume of 5 gallons per acre. Do not apply when weather conditions favor drift to sensitive areas.

Average water depth (feet) x 0.678 x target concentration (ppm) = gallons of Vastlan per surface acre treated.

Example: to achieve a 2 ppm concentration of triclopyr in water averaging 4 feet deep

4 x 0.678 x 2 ppm = 5.4 gallons of Vastlan per surface acre treated

	Concentration of Triclopyr Acid in Water (ppm ae)				
	0.75 ppm	**1 ppm**	**1.5 ppm**	**2 ppm**	**2.5 ppm**
Water Depth (ft)	**Gallons of Vastlan per Surface Acre at Specified Depth**				
1	0.5	0.7	1.0	1.4	1.7
2	1.0	1.4	2.0	2.7	3.4
3	1.5	2.0	3.1	4.1	5.1
4	2.0	2.7	4.1	5.4	6.8
5	2.5	3.4	5.1	6.8	8.5
6	3.1	4.1	6.1	8.1	10.2
7	3.6	4.7	7.1	9.5	11.9
8	4.1	5.4	8.1	10.8	13.6
9	4.6	6.1	9.2	12.2	15.3
10	5.1	6.8	10.2	13.6	17.0
15	7.6	10.2	15.3	20.3	25.4
20	10.2	13.6	20.3	27.1	33.9

Subsurface Application
Apply desired amount of Vastlan per acre directly into the water through boat-mounted distribution systems. When treating target plants that are 6 feet below the surface of the water, trailing hoses should be used along with an aquatic approved sinking agent (except California).

Restrictions for Potable Water Intakes for Submerged Weed Control – Lakes, Reservoirs, Ponds:
For applications of Vastlan to control submerged weeds in lakes, reservoirs or ponds that contain a functioning potable water intake for human consumption, see the chart below to determine the minimum setback distances of the application from the functioning potable water intakes.

Area Treated (acres)	Concentration of Triclopyr Acid in Water (ppm ae)				
	0.75 ppm	1 ppm	1.5 ppm	2 ppm	2.5 ppm
	Required Setback Distance (ft) from Potable Water Intake				
<4	300	400	600	800	1000
>4 – 8	420	560	840	1120	1400
>8 – 16	600	800	1200	1600	2000
>16 – 32	780	1040	1560	2080	2600
>32 acres, calculate a setback using the formula for the appropriate rate	Setback (ft) = (800*ln (acres) – 160)/3.33	Setback (ft) = (800*ln (acres) – 160)/2.50	Setback (ft) = (800*ln (acres) – 160)/1.67	Setback (ft) = (800*ln (acres) – 160)/1.25	Setback (ft) = (800*ln (acres) – 160)

Example Calculation 1: to apply 2.5 ppm Vastlan to 50 acres:

Setback in feet = (800 x ln (50 acres) - 160
= (800 x 3.912) – 160
= 2970 feet

Example Calculation 2: to apply 0.75 ppm Vastlan to 50 acres:

$$\text{Setback in feet} = \frac{(800 \times \ln(50 \text{ acres}) - 160}{3.33}$$

$$= \frac{(800 \times 3.912) - 160}{3.33}$$

= 892 feet

Note: Existing potable water intakes which are no longer in use, such as those replaced by potable water wells or connections to a municipal water system, are not considered to be functioning potable water intakes. These setback restrictions do not apply to terrestrial applications made adjacent to potable water intakes.

To apply Vastlan around and within the distances noted above from a functioning potable water intake, the intake must be turned off until the triclopyr level in the intake water is determined to be 0.4 parts per million (ppm) or less by laboratory analysis or immunoassay.

Wetland Sites

Wetlands include flood plains, deltas, marshes, swamps, bogs, and transitional areas between upland and lowland sites. Wetlands may occur within noncropland, rangeland, pastures, forests, wildlife habitat restoration and management areas and similar sites as well as areas adjacent to or surrounding domestic water supply reservoirs, lakes and ponds.

For control of woody plants and broadleaf weeds in wetland sites, follow use directions and application methods on this label for terrestrial sites.

Note: Consult local public water control authorities before applying this product in and around public water. Permits may be required to treat such areas.

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