FOREVER WILD

THE ADIRONDACK COUNCIL

Defending the East's Last Great Wilderness

November 27, 2006

Dear Mr. Tiedtman,

Here is the information you requested regarding aquatic herbicides as a potential treatment for Milfoil. Hopefully this will be of use to you, and please let us know if we can answer any more questions.

Sincerely, EDGELEY

Erika Edgley
Conservation Assistant

The mission of the ADIRONDACK COUNCIL is to ensure the ecological integrity and wild character of the ADIRONDACK PARK.

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Milfoil chemicals

invasive plants file

Renovate 3: An Aquatic Herbicide

Triclopyr, the active ingredient in the aquatic herbicide Renovate 3, was fully approved for aquatic registration in November of 2002 by the EPA. For quite some time, though, triclopyr has been used terrestrially under the name of Garlon 3A. Renovate 3 is the first aquatic herbicide since 1988 to receive registration by the EPA, however it has yet to receive permit in NYS. According to one source, in its first field season (2003) Renovate 3 was used in 27 states.

The Specimen Label and MSDS (Material Safety Data Sheet) for Renovate 3 provide very good factual data. The Specimen Label was notably changed in 2006 as compared to before involving increased specificity with regards to the "General Use Precautions and Restrictions", further outlining where Renovate 3 can and cannot be used.

The basic premise of how Renovate 3 works is that the triclopyr functions as an "auxin mimic" (San Francisco Estuary Institute). As auxin is a growth hormone in plants, the increased levels of it bring about "disorganized and uncontrolled" growth which, inevitably, leads to plant death. The plant dies from the leaf to root tips, so the death is complete throughout. The process allows for many monocots to survive (including native species such as cattails), as well as "less susceptible" dicots. The herbicide has many targets, both aquatic and terrestrial, and they are listed on page 5 of the Specimen Label.

Renovate 3 differs from SONAR in that it kills plants over a 48-hr period and in more concentrated/smaller areas, while SONAR is used over 60 days and in a more generalized application area. To further localize areas of treatment –whether for specificity or as a medium against currents citizens on Lake Mason in Washington State devised "tents" which they could sink over the affected area and then inject with the herbicide.

In the past, problems with EWM (Eurasian Water Milfoil) herbicide control kept returning to it being, for the most part, only a temporary solution. If high enough concentrations were used so that the EWM would be successfully controlled, many more non-target species ended up being killed off as well. It appears as though the same may be the case for Renovate 3. However, if certain procedures are followed after the initial application then the control is longer-lasting. Follow-up recommendations include hand-picking EWM, the placement of underwater barriers, and "harvesting" of the plants by machine. This may lead one to believe, though, that if this control can be done after the spray, why can't it be done before and cut out the herbicide step altogether?

In November of 2005 the Vermont DEC received a request for the use of Renovate 3 on Lily Pond and Little Lake (2005-CO4, ANC permit application). This was the first request for Renovate 3 in Vermont, although in the early '90's a permit was granted for the use of the active ingredient triclopyr (subjects never completed their task, though, because of too great a public outcry). The newest permit was granted permission in late spring of 2006, and in the process a lot of interesting information was published on both sides of the debate. Comments by the Fisheries Division of the Vermont Fish and Wildlife recommended that the permit be denied, and in doing so offered justifications for their opinion, as well as proposed alternatives to an aquatic herbicide application.

Perhaps most interesting was the Fisheries' stance on EWM, saying that in fact it was not necessarily bad for fish as it offered them a suitable habitat to live in (bass especially).

There are many concerns that arise with the topic of the usage of Renovate 3, and if one were to read the Specimen Label and the MSDS it would be easy to become quickly frightened. However, aside from problems occurring due to misuse and/or accidents, there are still several issues that must be dealt with even if the directions are followed to a "T". These include:

-depletion of dissolved oxygen, brought about by the combined loss of plants producing it as well as its consumption during the decomposition of the dead plant material

-potential loss of habitat for some fish (although some species will gain back habitat...)

-loss of necessary vegetation in the spring for fish when they are small and vulnerable because that is when the herbicide is advised to be sprayed

-annual re-application of Renovate 3 for "several" years to ensure eradication because EWM grows back within a year or so of initial treatment (although, if Renovate 3 was approved in late 2002 and thus not used really until 2003, "several years" would bring one to about 2006, so how would long-term results be known at this time?)

-for application areas where there are potable water intakes, must either set-back application a certain distance (p.5 of Specimen Label) or cease the intake of water for a certain amount of time until the triclopyr levels are acceptable

-if the application set-back is used, it appears as though in certain water bodies the water may be deeper at the set-back point than the EWM likes to grow in (~20'), and thus defeat the point of the application altogether

Table 100. Renovate 3 Functional Potable Water Intake Setback Distances for Floating and Emerged Weeds

	Setback Distance (ft) From Potable Water Intake (Concentration of Triclopyr Acid in Water (ppm ae))				
Area Treated	**0.75 ppm**	**1.0 ppm**	**1.5 ppm**	**2.0 ppm**	**2.5 ppm**
<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

VI. Toxicity to Humans and Other Mammals

Absorption Route

Triclopyr is low in toxicity via the oral route, however the TEA form (Renovate 3) is corrosive to the eyes.

Fate in Mammals and excretion products

Triclopyr is rapidly eliminated via the urine as the unchanged parent comound (EXTOXNET 1996). At higher oral doses, some triclopyr may be eliminated through the feces as the absorption capacity of the intestine is exceeded (EXTOXNET 1996). Reported half-lives for elimination of triclopyr from mammals are 14 hours (dog) and <24 hours (Monkeys) (EXTOXNET 1996). A human elimination half-life of approximately five hours has been suggested (Carmichael 1989).

Mode of action

Triclopyr kills the target weed by mimicking the plant growth hormone auxin (indole acetic acid) and when applied at effective doses, causes uncontrolled and disorganized plant growth that leads to plant death (Tu et al. 2001).

Acute Toxicity

Oral LD_{50}: 630-729 mg/kg in the rat (Kidd & James 1991); 550 mg/kg in the rabbit; 310 mg/kg in the guinea pig (Kidd & James 1991);

Dermal LD_{50}: 2000 mg/kg in the rabbit (EXTOXNET 1996);

Inhalation LC_0: No effect in rats, but the inhalation of some formulations cause nasal irritation; Similar results occurred in the case of the rabbit (EXTOXNET 1996);

Eyes: Slight irritant to the eyes of rabbits (technical); Some formulations caused significant eye irritation. Garlon 3A™ (Renovate) can cause permanent impairment of vision. Effects on the eye can include severe conjunctival irritation, moderate internal redness, and moderate to severe corneal injury (SSPM 2003).

Neurotoxicity

No information Available

Chronic Toxicity

Triclopyr added to the diets of both male and female rats for 13 weeks at 20 mg/kg was found to result in the degeneration of the proximal tubules within the kidney (EPA 1998). There are no significant changes in the body weight food consumption or blood chemistry of beagle dogs fed up to 2.5 mg/kg/day of triclopyr over 183 days or in dogs fed 5.0 mg/kg/day over one year (EPA 1998). However, beagle dogs fed 20mg/kg/day of triclopyr showed a decrease in body weight, food consumption, blood chemistry; and liver histopathy. There are also significant increases in the male liver and female kidney weights (EPA 1998).

Carcinogenic Effects

In feeding studies involving rats, ingesting triclopyr displayed no evidence of compound-related tumors in male rats. However, there is a significant increase in the presence of mammary gland adenocarcinomas in female mice and rats fed triclopyr at 36 mg/kg/day for two years (EPA 1998)

The Carcinogenicity Peer Review committee (CPRC) at the U.S. EPA classified triclopyr as a group D carcinogen, that is, one that does not induce oncongenic responses (EPA 1998).

Reproductive effects

Triclopyr fed to rabbits on days 6 to 18 of gestation at doses of 25, 50, and 100 mg/kg/day produced no effects on maternal body weight, litter size or fetal body weight (EXTOXNET 1996). A three generation study involving rats at daily doses of 3, 10 and 30 mg/kg for an 8 to 10 week period prior to breeding of each generation showed no impact of triclopyr on fertility rates (EXTOXNET 1996). Triclopyr does not appear to cause reproductive toxicity (EXTOXNET 1996).

Teratogenic and Developmental Effects

In a study in which pregnant rats were administered moderate to high dose of 50,100

and 200 mg/kg/day on days 6 to 15 of gestation had offspring with mild fetotoxicity, but no birth defects. In another study, there was no teratogenic effects in rabbits treated on days 6 to 18 of gestation at dose rates of 10 and 25 mg/kg/day (EXTOXNET 1996). These data suggest that triclopyr is not teratogenic and does not cause pre-natal developmental effects (EXTOXNET 1996).

Mutagenic Effects

Triclopyr is nonmutagenic in bacterial and cytogenetic assay systems. A mutagenicity study using rats was weakly positive, but a negative result was found in mice, the more sensitive species. Based on these data, triclopyr is not likely mutagenic (EXTOXNET 1996).

Endocrine Effects

No evidence at this time (EPA 1998).

Skin Sensitation

Triclopyr is harmful if absorbed through the skin and prolonged or frequently repeated skin contact may cause allergic reactions in some individuals (SePRO 2003). Triclopyr also causes irreversible eye damage (SePRO 2003).

VII. Routes of Human Exposure

Humans are at risk of being exposed predominantly when handling and administering the herbicide. Triclopyr can be absorbed through the eyes and skin and is harmful if ingested orally (SePRO 2003). The general public could be exposed through the drinking water supply if proper distance regulations are not followed when applying the herbicide to reservoirs, lakes and ponds that contain a functioning potable water intake for human consumption.

In a study by Woodburn et al. (1993), moderate levels of bioaccumulation were noted in crayfish and shellfish (BCF</=4 L/kg) with rapid decreases in tissue levels as the aquatic concentrations of triclopyr decreased (Durkin 2003). Therefore, humans consuming these species in proximate time following an application of triclopyr could lead to oral exposure to the herbicide.

VIII. Environmental Toxicological and Ecological Effects

Birds

The U.S. EPA/OPP has classified triclopyr as being slightly toxic to birds (Durkin 2003). The LD_{50} of the parent compound in the mallard duck is 1698 mg/kg, while the formulated compounds are of a lower toxicity (EXTOXNET 1996). In an eight day study, bobwhite and Japanese quail were administered oral doses and their LD_{50}'s were found to be 2935 ppm and 3278 ppm respectively (EXTOXNET 1996).

Fish

EXTOXNET (1996) reports that triclopyr is slightly to practically nontoxic to fish. However, a study performed by Wan et al. (1987) reported LC50 values of many different species of Salmonids in their juvenile stages ranging from 300-1,000 ug/L. This acute toxicity to juveniles has potential to be detrimental to the regeneration of salmonid populations.

Amphibians

The Pesticide Action Network (2003) reports that triclopyr is not acutely toxic to the frog, Rana brevipoda porosa in its tadpole stage (LC50=100,000 ug/L). However aquatic concentrations of triclopyr ranging from 150-1,200 ug/L triggered mortality in the midneurulation (embyo) life stages of the bullfrog, Rana catesbeiana, the green frog, Rana clamitans, and the leopard frog, Rana pipiens (Pesticide Action Network 2003). Mortality is also observed to be more moderately toxic in the tadpole stages of Rana catesbeiana and Rana Clamitans, with lethal dosages of triclopyr ranging from 2,400-4,800 ug/L. Durkin (2003) specifies in his report that triclopyr formulations are not likely to cause reproductive or teratogenic effects in sublethal concentrations.

Insects

The LD50 value for the honeybee, a standard test organism for assessing the potential effects of pesticides on terrestrial invertebrates were over 100 ug/bee. Based on this result, the U.S. EPA has classified triclopyr as practically nontoxic to bees. However, no additional studies on the toxicity of triclopyr to terrestrial invertebrates have been executed (Durkin 2003).

Aquatic Invertebrates

LC50 values for aquatic invertebrates are not as extensive as those pertaining to fish. However, the available data suggests that aquatic invertebrates are as if not more resistant to triclopyr as fish species. In a study performed by Gersich et al. 1984), Daphia magna was exposed to varying concentrations of triclopyr and from this study, the U.S. EPA/OPP (1998) extrapolated an NOEC of 80.7 mg/L and and LOEC of 149 mg/L as data for their risk assessment of triclopyr (Durkin 2003).

IX. Environmental Fate

Transport and Degradation Pathways

In water, hydrolysis of the salt occurs rapidly and results in the formation of triclopyr acid. Half-lives in water are 2.8-14.1 hours depending on season and water depth. In water, photolysis is the main breakdown process for triclopyr (EXTOXNET 1996).

In soil and groundwater environments, the salt formulations quickly convert to triclopyr acid, which in turn is rapidly degraded to a relatively nontoxic salt (EXTOXNET

1996). This salt is effectively degraded further by soil microorganisms and has a relatively moderate persistence in soil environments. The half-life of triclopyr compounds in soil range from 30-90 days depending on soil environment conditions, with an average of 46 days (EXTOXNET 1996). In a study by the U.S. Forest service (1984) the half life of one of the breakdown products (trichloropyridinol) was examined in 15 different soil types. The range of half lives was 8 to 279 days, with 12 of the soil types having half lives of less than 90 days. It is hypothesized that longer half-lives may be a result of colder and/or more arid conditions (EXTOXNET 1996).

Mode of Action

Triclopyr kills the target weed by mimicking the plant growth hormone auxin (indole acetic acid) and when applied at effective doses, causes uncontrolled and disorganized plant growth that leads to plant death (Tu et al. 2001).

X. Toxicity Values for Select Aquatic Species

Table 101. Triclopyr (TEA) LC50 Values for Rainbow Trout

Species	Life Stage	Study Time	Endpoint	LC50 (mg/L)	Source
Oncorhynchus mykiss (Rainbow trout)	53mm; 1.1g	24h	mortality	366	Batchelder 1973
		48h	mortality	265	
		72h	mortality	249	
		96h	mortality	240	
	41mm; 0.7g	24h	mortality	457	Wan et al. 1987
		48h	mortality	435	
		72h	mortality	420	
		96h	mortality	420	

Table 102. Triclopyr (TEA)LC50 Values for Bluegill Sunfish

Species	Life Stage	Study Time	Endpoint	LC50 (mg/L)	Source
Lepomis macrochirus (Bluegill Sunfish)	38mm; 1.003g	24h	mortality	512	Batchelder 1973
		48h	mortality	471	
		72h	mortality	471	
		96h	mortality	471	
	27.7mm; 0.6g	24h	mortality	N/A	McCarty et al. 1978
		48h	mortality	N/A	
		72h	mortality	N/A	
		96h	mortality	891	

Table 103. Triclopyr (TEA) LC50 Values for Fathead Minnow

Species	Life Stage	Study Time	Endpoint	LC50 (mg/L)	Source
Pimephales promelas (Fathead Minnow)	16-31mm; 0.22g	24h	mortality	570	Mayes et al. 1983; Mayes et al. 1984
		48h	mortality	570	
		72h	mortality	570	
		96h	mortality	546	
	31mm; 0.54g	24h	mortality	N/A	McCarty et al. 1978
		48h	mortality	N/A	
		72h	mortality	N/A	
		96h	mortality	947	

Table 104. Triclopyr (TEA) LC50 Values for Coho Salmon

Species	Life Stage	Study Time	Endpoint	LC50 (mg/L)	Source
Oncorhynchus kisutch (Coho Salmon)	NR	96h	mortality	167	Compliance Services International 2001
	NR	31 days	mortality	167	

Table 105. Triclopyr (TEA) LC50 Values for Sockeye Salmon

Species	Life Stage	Study Time	Endpoint	LC50 (mg/L)	Source
Onkorhynchus nerka (Sockeye Salmon)	NR	96h	mortality	112	Compliance Services International 2001
	NR	31 days	mortality	112	

Table 106. Triclopyr (TEA) LC50 Values for Chinook Salmon

Species	Life Stage	Study Time	Endpoint	LC50 (mg/L)	Source
Oncoryhnchus tshawytcha (Chinook Salmon)	NR	96h	mortality	182	Compliance Services International 2001
	NR	31 days	mortality	182	

Table 107. Triclopyr (TEA) LC50 Values for Water Flea

Species	Life Stage	Study Time	Endpoint	LC50 (mg/L)	Source
Daphnia magna (Water Flea)	NR	acute bioassay	mortality	1,496	Durkin 2003
		48h	mortality	133	
		48h	mortality	1,110	
	<24hrs.	24h	mortality	203	McCarty 1977
		48h	mortality	133	

Note on Amphibians

No laboratory work has been conducted on the effects of triclopyr TEA on amphibians.

XI. Method Detection Limits

Table 108. Triclopyr Method Detection Limits

Analytical Method	MDL	Medium	Reference
GC-MS	0.01 ppm	Soil/Sediment	http://www.epa.gov/oppbead1/methods/ecms2z.htm
LC-MS	200 ppm	Sediment	Yee et al. 2004
Immunoassay	190 ppm	Water	http://www.epa.gov/oppbead1/methods/ecms2z.htm
GC-MS	100 ppm	Water	
GC-ECD	0.05 ppm	Water	

XII. Manufacturer Contact Info

SePro Corporation
11550 N. Meridian Street, Suite 600
Carmel, IN 46032, USA
Emergency Phone: 317-580-8282
General Phone: 317-580-8282

XIII. Summary Table

Table 109. Triclopyr Summary Table

Primary Use	For control of emerged, submersed and floating 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 (SePRO, 2003). Applications rates are 1.6 - 6lbs/acre.
Mechanism of Toxicity	Triclopyr kills the target weed by mimicking the plant growth hormone auxin (indole acetic acid) and when applied at effective doses, causes uncontrolled and disorganized plant growth that leads to plant death (Tu et al. 2001).
Solubility	acetone = 581; acetonitrile = 92.1; hexane = 0.09; ethyl acetate = 271 (Tomlin, 2000)
Fate	In water, hydrolysis of the salt occurs rapidly and results in the formation of triclopyr. Half-lives in water are 2.8-14.1 hours depending on season and water depth. In water, photolysis is the main breakdown process for triclopyr (EXTOXNET 1996). In soil and groundwater environments, the salt formulations quickly convert to triclopyr acid, which in turn is rapidly degraded to a relatively nontoxic salt (EXTOXNET 1996). This salt is effectively degraded further by soil microorganisms and has a relatively moderate persistence in soil environments. The half-life of triclopyr compounds in soil range from 30-90 days depending on soil environment conditions, with an average of 46 days (EXTOXNET 1996). There is little evidence of bioconcentration.
Confounding Factors	Much longer half-life of triclopyr in soil than in water. Herbicide break-down is significantly slower in anaerobic environments.
Data Gaps	Amphibian data is not available for the TEA formulation of triclopyr. NOEC and LOEC data is also sparse.

Specimen Label

Renovate* 3

Aquatic Herbicide

Aquatic Sites: For control of emersed, submersed and floating aquatic plants in aquatic sites such as ponds, lakes, reservoirs, non-irrigation canals, seasonal irrigation waters 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.

Active Ingredient	
triclopyr: 3,5,6-trichloro-2-pyridinyloxyacetic acid, triethylamine salt	44.4%
Inert Ingredients	55.6%
TOTAL	100.0%

Acid equivalent: triclopyr - 31.8% - 3 pound/gallon.

Keep Out of Reach of Children

DANGER / PELIGRO

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

Precautionary Statements

Hazards to Humans and Domestic Animals

Corrosive. Causes irreversible eye damage. Harmful if swallowed or absorbed through skin. Prolonged or frequently repeated skin contact may cause allergic reaction in some individuals.

Do not get in eyes or on skin or clothing.

Personal Protective Equipment (PPE)

Applicators and other handlers must wear:

- Long-sleeved shirt and long pants
- Shoes plus socks
- Protective eyewear
- Chemical resistant gloves (≥14 mils) such as butyl rubber, natural rubber, neoprene rubber or nitrile rubber

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, use detergent and hot water. Keep and wash PPE separately from other laundry.

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 poison control center or doctor for treatment advice.
If on skin or clothing	• Take off contaminated clothing. • Rinse skin immediately with plenty of water for 15 - 20 minutes. • 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.
In case of emergency endangering health or the environment involving this product, call **INFOTRAC** at **1-800-535-5053**.

Note to Physician: Probable mucosal damage may contraindicate the use of gastric lavage.

Note to Applicator: Allergic skin reaction is not expected from exposure to spray mixtures of Renovate herbicide when used as directed.

Notice: Read the entire label. Use only according to label directions. **Before using this product, read Warranty Disclaimer, Inherent Risks of Use, and Limitation of Remedies at end of label booklet. If terms are unacceptable, return at once unopened.**

For product information, visit our web site at **www.sepro.com**.

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

EPA Reg. No. 62719-37-67690
TPL 081805

*Trademark of Dow AgroSciences LLC and manufactured exclusively for **SePRO Corporation** Carmel, IN 46032 U.S.A.

Engineering Controls

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

User Safety Recommendations

Users should:

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

ENVIRONMENTAL HAZARDS

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.

PHYSICAL OR CHEMICAL HAZARDS

Combustible. Do not use or store the product near heat or open flame.

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 12 hours.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water, is:

- Coveralls
- Shoes plus socks
- Protective eyewear
- Chemical-resistant gloves (≥ 14 mils) such as butyl rubber, natural rubber, neoprene rubber or nitrile rubber

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 FOR REFILLABLE CONTAINERS: Store above 28° F or agitate before use.
PESTICIDE DISPOSAL: Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.
CONTAINER DISPOSAL FOR REFILLABLE CONTAINERS: Seal all openings which have been opened during use. Return the empty container to a collection site designated by SePRO Corporation. If the container has been damaged and cannot be returned according to the recommended procedures, contact SePRO Corporation at 1-800-419-7779 to obtain proper handling instructions.
CONTAINER DISPOSAL (METAL): Do not reuse container. Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or by other procedures approved by state and local authorities.
CONTAINER DISPOSAL (Plastic): Do not reuse container. Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or by incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.
General: Consult federal, state, or local disposal authorities for approved alternative procedures.

GENERAL INFORMATION FOR AQUATIC AND WETLAND SITES

Renovate 3 herbicide is recommended for control of emersed, submersed and floating aquatic plants in aquatic sites such as ponds, lakes, reservoirs, non-irrigation canals, seasonal irrigation waters 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.

GENERAL USE PRECAUTIONS AND RESTRICTIONS

In Arizona: The state of Arizona has not approved Renovate 3 for use on plants grown for commercial production, specifically forests grown for commercial timber production, or on designated grazing areas.

When applying this product in tank mix combination, follow all applicable use directions, precautions and limitations on each manufacturer's label.

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

Water treated with Renovate 3 may not be used for irrigation purposes for 120 days after application or until Renovate residue levels are determined by laboratory analysis, or other appropriate means of analysis, to be 1.0 ppb or less.

Seasonal Irrigation Waters: Renovate 3 may be applied during the off-season to surface waters that are used for irrigation on a seasonable basis, provided that there is a minimum of 120 days between Renovate 3 application and the first use of treated water for irrigation purposes or until Renovate 3 residue levels are determined by laboratory analysis, or other appropriate means of analysis, to be 1.0 ppb or less.

Irrigation Canal/Ditches: DO NOT apply Renovate 3 to irrigation canals/ditches unless the 120 day restriction on irrigation water usage can be observed or Renovate 3 residue levels are determined by laboratory analysis, or other appropriate means of analysis, to be 1.0 ppb or less.

Do not apply Renovate 3 directly to, or otherwise permit it to come into direct contact with grapes, tobacco, vegetable crops, flowers, or other desirable broadleaf plants, and do not permit spray mists containing it to drift into them.

- **Do not** apply to salt water bays or estuaries.
- **Do not** apply directly to un-impounded rivers or streams.
- **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 irrigation and non-irrigation ditch banks.
- **Do not** apply where runoff water may flow onto agricultural land as injury to crops may result.
- When making applications to control unwanted plants on banks or shorelines of moving water sites, minimize overspray to open water.
- The use of a mist blower is not recommended.

Grazing and Haying Restrictions

Except for lactating dairy animals, there are no grazing restrictions following application of this product.

- **Grazing Lactating Dairy Animals:** Do not allow lactating dairy animals to graze treated areas until the next growing season following application of this product.
- Do not harvest hay for 14 days after application.
- Grazed areas of non-cropland and forestry sites may be spot treated if they comprise no more than 10% of the total grazable area.

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

AVOIDING INJURIOUS SPRAY DRIFT

Applications should be made only when there is little or no hazard from spray drift. Very 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 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.

Aerial Application: For aerial application near susceptible crops, apply through a Microfoil[1] or Thru-Valve boom[1], or use a drift control additive labeled for aquatic use. 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 thickening agents labeled for use in aquatics or applications made with the Microfoil or Thru-Valve boom. Keep spray pressures low enough to provide coarse spray droplets. Spray boom should be no longer than 3/4 of the rotor length. Do not use a thickening agent with the Microfoil or Thru-Valve booms, or other systems that cannot accommodate thick sprays. Spray only when the wind velocity is low (follow state regulations). Avoid application during air inversions. If a spray thickening agent is used, follow all use recommendations and precautions on the product label.

[1] 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 SePRO Corporation 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 SePRO Corporation, in selecting and determining how to use its equipment.

Spray Drift Management

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

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

1. The distance of the outer most operating nozzles on the boom must not exceed 3/4 the length of the rotor.
2. Nozzles must always point backward parallel with the air stream and never be pointed downwards more than 45 degrees.

Where states have more stringent regulations, they should be observed.

The applicator should be familiar with and take into account the information covered in the following Aerial Drift Reduction Advisory. [This information is advisory in nature and does not supersede mandatory label requirements.]

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).

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: For some use patterns, reducing the effective boom length to less than 3/4 of the wingspan or rotor length may further reduce drift without reducing swath width.

Application Height: Applications should not be made at a height greater than 10 feet above the top of the largest plants unless a greater height is required for aircraft safety. Making applications at the lowest height that is safe reduces 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 2-10 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, 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, Renovate 3 should be used in thickened (high viscosity) spray mixtures using a 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. A labeled thickening agent may be used to reduce drift.

PLANTS CONTROLLED BY RENOVATE 3

Woody Plant Species

alder	cascara	maples
arrowwood	ceanothus	mulberry
ash	cherry	oaks
aspen	Chinese Tallow	poison ivy
bear clover (bearmat)	chinquapin	poison oak
beech	choke cherry	poplar
birch	cottonwood	salt-bush (*Baccharis spp.*)
blackberry	crataegus (hawthorn)	sweetgum
blackgum	locust	waxmyrtle
Brazilian pepper	Maleleuca (seedlings)	willow

Annual and Perennial Broadleaf Weeds

burdock	ligodium	tropical sodaapple
Canada thistle	plantain	vetch
curly dock	smartweed	wild lettuce
elephant ear	tansy ragwort	

Aquatic Weeds

alligatorweed	milfoil species	purple loosestrife
American lotus	Nuphar (spatterdock)	waterhyacinth
American frogbit	parrotfeather[1]	waterlily
aquatic sodaapple	pickerelweed	water primrose
Eurasian watermilfoil	pennywort	Phragmites
		watershield

[1]Retreatment may be needed to achieve desired level of control.

Application Methods

FLOATING AND EMERGED WEEDS

For control of waterhyacinth, alligatorweed (see specific directions below), and other susceptible emerged and floating herbaceous weeds and woody plants, apply 1 1/2 to 6 lb. ae triclopyr (2 to 8 quarts of Renovate 3) 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 lb. ae triclopyr (8 quarts of Renovate 3) per acre per annual growing season.

Use of a non-ionic surfactant in the spray mixture is recommended to improve control. Follow all directions and use precautions on the aquatic surfactant label.

Apply when plants are actively growing.

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

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.

Waterhyacinth (*Eichhornia crassipes*)

Apply Renovate 3 at 1 1/2 to 6 lb. ae triclopyr (2 to 8 quarts of Renovate 3) per acre to control waterhyacinth. Apply when plants are actively growing. Use the higher rate in the rate range when the weed mass is dense. It is important to thoroughly wet all foliage with the spray mixture. Use of a non-ionic surfactant in the spray mixture is recommended. A repeat treatment may be needed to control regrowth or plants missed in the previous treatment.

Alligatorweed (*Alternanthera philoxeroides*)

Apply Renovate 3 at 2 to 6 lb. ae triclopyr (3 to 8 quarts of Renovate 3) per acre to control alligatorweed. It is important to thoroughly wet all foliage with the spray mixture. For best results, it is recommended that an approved non-ionic aquatic surfactant be added 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.

Precautions for Potable Water Intakes -- Lakes, Reservoirs, Ponds:

For applications of Renovate 3 to control floating and emerged weeds in lakes, reservoirs or ponds that contain a functioning potable water intake for human consumption, see chart below to determine the minimum setback distances of the application from the functioning potable water intakes.

Renovate 3 Application Rate, qt/acre

Area Treated (acres)	Setback Distance (ft)			
	2 qt/acre	4 qt/acre	6 qt/acre	8 qt/acre
<4	0	200	400	500
>4 - 8	0	200	700	900
>8 - 16	0	200	700	1000
>16	0	200	900	1300

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 Renovate 3 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 (*Myriophyllum spicatum*) and other susceptible submerged weeds in ponds, lakes, reservoirs, and in non-irrigation canals or ditches that have little or no continuous outflow, apply Renovate 3 as either a surface or subsurface application. Rates should be selected according to the rate chart below to provide a triclopyr concentration of 0.75 to 2.5 ppm ae in treated water. Higher rates in the rate range are recommended in areas of greater water exchange. These areas may require a repeat application. However, total application of Renovate 3 must not exceed an application rate of 2.5 ppm 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.

Subsurface Application

Apply desired amount of Renovate 3 per acre directly into the water through boat-mounted distribution systems. It is recommended that when treating target plants that are 6 feet below the surface of the water, trailing hoses are to be used along with an aquatic approved sinking agent. (Except California).

Surface Application

Apply the desired amount of Renovate 3 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 0.905 x target concentration (ppm) = gallons of Renovate per surface acre treated.

Example: to achieve a 2.0 ppm concentration of triclopyr in water averaging 4 feet deep

4 x 0.905 x 2.0 ppm = 7.2 gallons of Renovate/surface acre treated.

Concentration of Triclopyr Acid in Water (ppm ae)

Water Depth (ft)	Gallons of Renovate 3 per Surface Acre at Specified Depth				
	0.75 ppm	1.0 ppm	1.5 ppm	2.0 ppm	2.5 ppm
1	0.7	0.9	1.4	1.8	2.3
2	1.4	1.8	2.7	3.6	4.6
3	2.1	2.7	4.1	5.4	6.8
4	2.7	3.6	5.4	7.2	9.1
5	3.4	4.5	6.8	9.0	11.3
6	4.1	5.4	8.1	10.9	13.6
7	4.8	6.3	9.5	12.7	15.8
8	5.5	7.2	10.9	14.5	18.1
9	6.1	8.1	12.2	16.3	20.4
10	6.8	9.0	13.6	18.1	22.6
15	10.2	13.6	20.4	27.2	33.9
20	13.6	18.1	27.2	36.2	45.3

Precautions for Potable Water Intakes – Lakes, Reservoirs, Ponds:

For applications of Renovate 3 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.

Concentration of Triclopyr Acid in Water (ppm ae)

Area Treated (acres)	Required Setback Distance (ft) from Potable Water Intake				
	0.75 ppm	1.0 ppm	1.5 ppm	2.0 ppm	2.5 ppm
≤ 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 Renovate 3 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 Renovate 3 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 Renovate 3 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.

WETLAND SITES

Wetlands include flood plains, deltas, marshes, swamps, bogs, and transitional areas between upland and lowland sites. Wetlands may occur within 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 these sites, follow use directions and application methods on this label for terrestrial sites associated with wetland areas.

Use Precautions
Minimize overspray to open water when treating target vegetation in and around non-flowing, quiescent or transient water. When making applications to control unwanted plants on banks or shorelines of flowing water, minimize overspray to open water. **Note:** Consult local public water control authorities before applying this product in and around public water. Permits may be required to treat such areas.

Purple Loosestrife (*Lythrum salicaria*)
Purple loosestrife can be controlled with foliar applications of Renovate 3. For broadcast applications, a minimum range of 4 1/2 to 6 lb ae triclopyr (6 to 8 quarts of Renovate 3) per acre is recommended. Apply Renovate 3 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 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 using a backpack sprayer, a spray mixture containing 1% to 1.5% Renovate 3 or 5.1 to 7.6 fl oz of Renovate 3 per 4 gallons of water should be used. All purple loosestrife plants should be thoroughly wetted.

Phragmites (*Phragmites australis*)
Phragmites can be selectively controlled with foliar applications of Renovate 3. For broadcast applications, a minimum of 2 1/4 lb ae triclopyr (3 quarts of Renovate 3) per acre is recommended. For optimum control, apply Renovate 3 when phragmities is the early stage 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 using a backpack sprayer, a spray mixture containing 1% to 1.5% Renovate 3 or 5 to 7.6 fl oz of Renovate 3 per 4 gallons of water should be used. All Phragmities 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 using Thru-Valve or Microfoil boom only.

- **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.

TERRESTRIAL SITES ASSOCIATED WITH WETLAND AREAS
- Apply no more than 2 lb ae triclopyr (2/3 gallon of Renovate 3) per acre per growing season on range and pasture sites, including rights-of-way, fence rows or any area where grazing or harvesting is allowed.
- On forestry sites, Renovate 3 may be used at rates up to 6 lb ae of triclopyr (2 gallons of Renovate 3) per acre per year.

Use Renovate 3 at rates of 3/4 to 6 lb ae triclopyr (1/4 to 2 gallons of Renovate 3) 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. Use only water suitable for spraying. Use of a labeled non-ionic surfactant is recommended for all foliar applications. When using surfactants, follow the use directions and precautions listed on the surfactant manufacturer's label. Use the higher recommended concentrations of surfactant in the spray mixture when applying lower spray volumes per acre. The recommended order of addition to the spray tank is water, spray thickening agent (if used), additional herbicide (if used), and Renovate 3. A labeled aquatic 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.

Before using any recommended tank mixtures, read the directions and all use precautions on both labels.

For best results, applications should be made when woody plants and weeds are actively growing. When hard to control species such as ash, blackgum, choke cherry, maples, or oaks are prevalent and during applications made in late summer when the plants are mature and during drought conditions, use the higher rates of Renovate 3.

When using Renovate 3 in combination with a 2,4-D herbicide approved for aquatic use, such as DMA 4 IVM, generally the higher rates should be used for satisfactory brush control.

Use the higher dosage rates when brush approaches 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.

High Volume Foliage Treatment
For control of woody plants, use Renovate 3 at the rate of 3 to 6 lb ae triclopyr (1 to 2 gallons of Renovate 3) per 100 gallons of spray solution, or Renovate 3 at 3/4 to 3 lb ae triclopyr (1 to 4 quarts of Renovate 3) may be tank mixed with 1/4 to 1/2 gallons of 2,4-D 3.8 lb amine, like DMA 4 IVM, diluted to make 100 gallons of spray solution. Apply at a volume of 100 to 400 gallons of total spray per acre depending on size and density of woody plants. Coverage

should be thorough to wet all leaves, stems, and root collars. (See General Use Precautions and Restrictions.) Do not exceed the maximum allowable use rate of 6 lb ae of triclopyr (2 gallons of Renovate 3) per acre per growing season.

Low Volume Foliage Treatment
To control susceptible woody plants, apply up to 15 lb. ae triclopyr (5 gallons of Renovate 3) in 10 to 100 gallons of finished spray. The spray concentration of Renovate 3 and total spray volume per acre may 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 General Use Precautions and Restrictions). For best results, a labeled aquatic surfactant should be added to all spray mixtures. 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.

Cut Surface Treatments (Woody Plants)
To control unwanted trees and other listed woody plants, apply Renovate 3, either undiluted or diluted in a 1 to 1 ratio with water as directed below.

With Tree Injector Method
Applications should be made by injecting 1/2 milliliter of undiluted Renovate 3 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.**

With Hack and Squirt Method
Make cuts with a hatchet or similar equipment at intervals of 3 to 4 inches between centers at a convenient height around the tree trunk. Spray 1/2 milliliter of undiluted Renovate 3 or 1 milliliter of the diluted solution into each cut.

With Frill or Girdle Method
Make a single girdle through the bark completely around the tree at a convenient height. 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 Renovate 3. The cambium area next to the bark is the most vital area to wet.

Terms and Conditions of Use

If terms of the following Warranty Disclaimer, Inherent Risks of Use, and Limitation of Remedies are not acceptable, return unopened package at once to the seller for a full refund of purchase price paid. Otherwise, use by the buyer or any other user constitutes acceptance of the terms under Warranty Disclaimer, Inherent Risks of Use and Limitations of Remedies.

Warranty Disclaimer

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

Inherent Risks Of Use

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

Limitation of Remedies

To the fullest extent permitted by law, SePRO Corporation shall not be liable for losses or damages resulting from this product (including claims based on contract, negligence, strict liability, or other legal theories) shall be limited to, at SePRO Corporation's election, one of the following:

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

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

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

Transportation and Medical Emergency Phone: **1-800-535-5053 (INFOTRAC)**
General Phone: 317-580-8282

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Renovate® 3 Herbicide

SePRO Corporation Carmel, IN 46032-4565

8. EXPOSURE CONTROL/PERSONAL PROTECTION

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

EXPOSURE GUIDELINE(S):

Ethanol (ethyl alcohol): ACGIH TLV and OSHA PEL are 1000 ppm. ACGIH classification is A4.
3,5,6- Trichloro-2-pyridyloxyacetic acid (Triclopyr), triethylamine salt: The Industrial Hygiene Guideline is 2 mg/M3 as acid equivalent; Skin.
Triethylamine: ACGIH TLV is 1 ppm TWA, 3 ppm STEL, Skin. OSHA PEL is 10 ppm TWA, 15 ppm STEL.

A "skin" notation following the exposure guideline refers to the potential for dermal absorption of the material including mucous membranes and the eyes either by contact with vapors or by direct skin contact. It is intended to alert the reader that inhalation may not be the only route of exposure and that measures to minimize dermal exposures should be considered.

ENGINEERING CONTROLS: Provide general and/or local exhaust ventilation to control airborne levels below the exposure guidelines.

RECOMMENDATIONS FOR MANUFACTURING, COMMERCIAL BLENDING, AND PACKAGING WORKERS:

EYE PROTECTION: Use chemical goggles. Eye wash fountain should be located in immediate work area. If vapor exposure causes eye discomfort, use a NIOSH approved full-face respirator.

SKIN PROTECTION: When prolonged or frequently repeated contact could occur, use chemically protective clothing resistant to this material. Selection of specific items such as faceshield, gloves, boots, apron or full-body suit will depend on operation.

RESPIRATORY PROTECTION: Atmospheric levels should be maintained below the exposure guideline. When respiratory protection is required for certain operations, use a NIOSH approved air-purifying respirator.

APPLICATORS AND ALL OTHER HANDLERS: Refer to the product label for personal protective clothing and equipment.

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Light purple/pink liquid
ODOR: Ammonia-like odor
BOILING POINT: Not determined
VAPOR PRESSURE: Not determined
VAPOR DENSITY: Not applicable
SOLUBILITY IN WATER: Miscible
SPECIFIC GRAVITY: 1.135 (68/68°F)

10. STABILITY AND REACTIVITY

STABILITY (Conditions to avoid): Avoid sources of ignition if temperature is near or above flash point.

INCOMPATIBILITY (Specific materials to avoid): Any oxidizing agent. Consult manufacturer for specific cases.

HAZARDOUS DECOMPOSITION PRODUCTS: Nitrogen oxides and hydrogen chloride may be formed under fire conditions.

HAZARDOUS POLYMERIZATION: Not known to occur.

11. TOXICOLOGICAL INFORMATION

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

EYE: May cause severe irritation with corneal injury, which may result in permanent impairment of vision, even blindness. Chemical burns may occur. Vapor of amines may cause swelling of the cornea resulting in visual disturbances such as blurred or hazy vision. Bright lights may appear to be surrounded by halos. Effects may be delayed and typically disappear spontaneously. When tested on animals, dilutions of this material were less irritating to eyes than the undiluted products.

SKIN : Prolonged or repeated exposure may cause skin irritation, even a burn. When tested on animals, dilutions of this material were less irritating to skin than the undiluted product. Prolonged or frequently repeated skin contact may cause allergic skin reactions in some individuals. With the dilute mix, no allergic skin reaction is expected. A single prolonged exposure is not likely to result in the material being absorbed through the skin in harmful amounts. The LD_{50} for skin absorption in rabbits is >5000 mg/kg.

INGESTION: Low toxicity if swallowed. The oral LD_{50} for rats is 2574 mg/kg (male) and 1847 mg/kg (female). Small amounts swallowed incidental to normal handling operations are not likely to cause injury; however, swallowing larger amounts may cause injury. Ingestion may cause gastrointestinal irritation or ulceration.

Material Safety Data Sheet

SePRO

Transportation and Medical Emergency Phone: **1-800-535-5053 (INFOTRAC)**
General Phone: 317-580-8282

EPA Reg. No.: 62719-37-67690
Creation Date: 01/22/2003
Revision Date: 07/18/2006

Renovate® 3 Herbicide

SePRO Corporation Carmel, IN 46032-4565

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT: Renovate 3 Herbicide

COMPANY IDENTIFICATION:
SePRO Corporation
11550 North Meridian Street, Suite 600
Carmel, IN 46032-4562
www.sepro.com
Information Phone: 317-580-8282 (Monday - Friday: 8:00 am to 5:00 pm EST)

2. COMPOSITION / INFORMATION ON INGREDIENTS

Triclopyr ((3,5,6-trichloro-2-pyridinyl)oxy)acetic acid), triethylamine salt	CAS # 057213-69-1	44.4%
Inert Ingredients, Total, Including		55.6%
Ethanol	CAS # 000064-17-5	
Triethylamine (N,N-Diethylethanamine)	CAS # 000121-44-8	
Ethylenediaminetetraacetic Acid (EDTA)	CAS # 000060-00-4	

3. HAZARDOUS IDENTIFICATIONS

EMERGENCY OVERVIEW
Hazardous Chemical. Light purple-pink liquid, ammonia-like odor. May cause eye irritation with corneal injury. May cause skin irritation. LD_{50} for skin absorption is >5000 mg/kg. Oral LD_{50} is 1847-2574 mg/kg. Toxic and irritating gases may be formed during fire conditions.

EMERGENCY PHONE NUMBER: 800-535-5053

4. FIRST AID MEASURES

EYES: Wash immediately and continuously with flowing water for at least 30 minutes. Remove contact lenses after the first 5 minutes and continue washing. Obtain prompt medical consultation, preferably from an ophthalmologist.

SKIN: Wash skin with plenty of water.

INGESTION: Do not induce vomiting. Give one cup (8 ounces or 240 ml) of water or milk if available and transport to a medical facility. Do not give anything by mouth to an unconscious person.

INHALATION: No emergency medical treatment necessary.

NOTE TO PHYSICIAN: Due to irritant properties, swallowing may result in burns/ulceration of mouth, stomach and lower GI tract with subsequent stricture. Aspiration of vomitus may cause lung injury. Suggest endotracheal/esophageal control if lavage is done. If burn is present treat as any thermal burn, after decontamination. Exposure to amine vapors may cause minor transient edema of the corneal epithelium (glaucopsia) with blurred vision, blue haze, and halos around bright objects. Effects disappear in a few hours and temporarily reduce ability to drive vehicles. No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

5. FIRE FIGHTING MEASURES

FLASH POINT: 110°F (43°C)
METHOD USED: TCC

FLAMMABLE LIMITS:
LFL: Not determined
UFL: Not determined

EXTINGUISHING MEDIA: Alcohol foam and Carbon dioxide.

FIRE AND EXPLOSION HAZARDS: Toxic, irritating vapors may be formed or given off if product is involved in fire. Although product is water-based, it has a flash point due to the presence of small amounts of ethanol and triethylamine.

FIREFIGHTING EQUIPMENT/INSTRUCTIONS: Use positive-pressure, self-contained breathing apparatus and full protective clothing.

6. ACCIDENTAL RELEASE MEASURES

ACTION TO TAKE FOR SPILLS/LEAKS: Contain small spills and absorb with an inert material such as clay or dry sand. Report large spills to **INFOTRAC** at **1-800-535-5053** and contact SePRO Corporation.

7. HANDLING AND STORAGE

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE:
Handling:
Keep out of reach of children. Causes irreversible eye damage. Harmful if inhaled or absorbed through skin. Prolonged or frequently repeated skin contact may cause allergic skin reaction in some individuals. Avoid contact with eyes, skin, clothing, breathing vapor, or spray mist. Users should wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet.

Storage:
Store above 28°F or agitate before use. Store in original container. See product label for handling/storage precautions relative to the end use of this product.

INHALATION: Brief exposure (minutes) is not likely to cause adverse effects.

SYSTEMIC (OTHER TARGET ORGAN) EFFECTS: Excessive exposure may cause liver or kidney effects.

CANCER INFORMATION: Triclopyr did not cause cancer in laboratory animal studies. This material contains ethanol. Epidemiology studies provide evidence that drinking of alcoholic beverages (containing ethanol) is associated with cancer, and IARC has classified alcoholic beverages as carcinogenic to humans.

TERATOGENICITY (BIRTH DEFECTS): For triclopyr, birth defects are unlikely. Even exposures having an adverse effect on the mother should have no effect on the fetus. Ethanol has been shown to cause birth defects and toxicity to the fetus in laboratory animal tests. It has also been shown to cause human fetotoxicity and/or birth defects when ingested during pregnancy.

REPRODUCTIVE EFFECTS: For triclopyr, in laboratory animal studies, effects on reproduction have been seen only at doses that produced significant toxicity to the parent animals. Ingestion of large amounts of ethanol has been shown to interfere with fertility in human males.

MUTAGENICITY: For triclopyr and ethanol: in-vitro mutagenicity studies were negative. For triclopyr: animal mutagenicity studies were negative. For ethanol: animal mutagenicity studies were negative in some cases and positive in other cases.

12. ECOLOGICAL INFORMATION

ENVIRONMENTAL FATE:

MOVEMENT & PARTITIONING: Based largely or completely on information for triclopyr. Bioconcentration potential is low (BCF <100 or Log Pow <3).

DEGRADATION & PERSISTENCE: Biodegradation under aerobic static laboratory conditions is high (BOD20 or BOD28/ThOD >40%). 20-Day biochemical oxygen demand (BOD20) is 0.30 p/p. Theoretical oxygen demand (ThOD) is calculated to be 0.75 p/p.

ECOTOXICOLOGY: Material is slightly toxic to aquatic organisms on an acute basis (LC_{50}/EC_{50} is between 10 and 100 mg/L in most sensitive species).

Acute EC_{50} for shell deposition inhibition	Eastern oyster *(Crassostrea virginica)*	56-87 mg/L
Acute LC_{50}	Rainbow trout *(Oncorhynchus mykiss)*	400 mg/L
Acute LC_{50}	Channel catfish *(Ictalurus punctatus)*	446 mg/L
Acute LC_{50}	Pink shrimp *(Penaeus duorarum)*	895 mg/L
Growth inhibition EC_{50}	Green alga *(Selenastrum capricornutum)*	45 mg/L

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: Do not contaminate food, feed, or water by storage or disposal. Excess wastes are toxic. Improper disposal or excess wastes are a violation of federal law. If wastes resulting from the use of this product cannot be disposed of according to label instructions, dispose of these wastes at an approved facility. Contact your state pesticide or environmental control agency, or the hazardous waste representative at the nearest EPA regional office for guidance.

14. TRANSPORT INFORMATION

U.S. DEPARTMENT OF TRANSPORTATION (DOT) INFORMATION:

For non-bulk shipments by land:
This material is not regulated for transport.

For bulk shipments by land:
Proper Shipping Name: COMBUSTIBLE LIQUID, N.O.S (TRIETHYLAMINE, ETHANOL) / COMBUSTIBLE LIQUID/NA1993/PGIII

For shipment by air or vessel:
Proper Shipping Name: FLAMMABLE LIQUIDS, N.O.S (TRIETHYLAMINE, ETHANOL)

Class	3
UN Number	UN 1993
Packing Group	III

For additional shipping information contact SePRO Corporation at 317-580-8282 and speak with the Logistics Manager.

Material Safety Data Sheet

Transportation and Medical Emergency Phone: **1-800-535-5053 (INFOTRAC)**
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Renovate® 3 Herbicide

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15. REGULATORY INFORMATION

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

U.S. REGULATIONS

SARA 313 INFORMATION: This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372:

Chemical Name	CAS Number	Concentration
N,N-Diethylethanamine	000121-44-8	3%

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

- An Immediate Health Hazard
- A Delayed Health Hazard
- A Fire Hazard

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

STATE RIGHT-TO-KNOW: The following product components are cited on certain state lists as mentioned. Non-listed components may be shown in the composition section of the MSDS.

Chemical Name	CAS Number	List
Ethylenediamine Tetraacetic Acid	000060-00-4	NJ3 PA1 PA3
Ethanol	000064-17-5	NJ1 NJ3 PA1
N,N-Diethylethanamine	000121-44-8	NJ1 NJ3 PA1 PA3

NJ1=New Jersey Special Health Hazard Substance (present at > or = to 0.1%).
NJ3=New Jersey Workplace Hazardous Substance (present at greater than or equal to 1.0%).
PA1=Pennsylvania Hazardous Substance (present at > or = to 1.0%).
PA3=Pennsylvania Environmental Hazardous Substance (present at > or = to 1.0%).

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

NATIONAL FIRE PROTECTION ASSOCIATION RATINGS:

Category	Rating
Health	3
Flammability	2
Reactivity	0

COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT (CERCLA, OR SUPERFUND): This product contains the following substance(s) listed as "Hazardous Substances" under CERCLA which may require reporting of releases:

Chemical Name	CAS Number	RQ	% in Product
Triethylamine	000121-44-8	5000	3%
Ethylenediaminetetra-acetic Acid (ETDA)	000060-00-4	5000	2.3%

RCRA Categorization Hazardous Code: Triethylamine = U404

16. OTHER INFORMATION, USES AND RESTRICTIONS

MSDS STATUS: New – 01/22/2003
Revised – 07/18/2006

The Information Herein Is Given In Good Faith, But No Warranty, Express or Implied, Is Made. Consult SePRO Corporation for Further Information.