UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
PREVENTION, PESTICIDES, AND
TOXIC SUBSTANCES

February 22, 2006

MEMORANDUM

SUBJECT: Section 18 Ecological Risk and Drinking Water Exposure Assessment for the Control of hydrilla using: Penoxsulam PC code: 119031 DPBarcode: D326617

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The EFED has reviewed the emergency exemption request from Florida to use Penoxsulam

Drinking Water

For the drinking water exposure assessment, since this is a direct release into lakes at a concentration stated on the label, estimating the EEC is simply restating the maximum concentration as the concentration that would not be exceeded. The maximum concentration is 150 ppb. The label requires continuous monitoring of concentrations during treatment, therefore, there is reasonable certainty this concentration will not be exceeded. What is uncertain is the probability that treated lakes or ponds would ever be used as drinking water supplies. If 150 ppb suggests a problem, refinement could be conducted by determining if treated water bodies could ever be used as drinking water supplies. An alternative would be that if there is a drinking water problem at 150 ppb, the use could be restricted from any waterbody used as a drinking water source. Since any treatment under this Section 18 would be monitored by the Florida Department of Environmental Protection and Dow Agrosciences, there is reasonable certainty that this method of mitigation would be feasible if necessary.

Ecological Risk

The method of application, ie injection, "undersurface" directly into water bodies indicates essentially no exposure on land including terrestrial food items eaten by birds or mammals or

terrestrial plants. Exposure is possible to birds or mammals eating plants that are in the treated water body or drinking the treated water itself. Exposure through the soil is possible to rooted plants that are in or immediately adjacent to treated water bodies.

Exposure and Risk to Terrestrial Animals:

Exposure to terrestrial food items such as grass and seeds is not expected. Residues on under water plants is assumed to be similar to the concentration in water. So, the concentration in water, 150 ppb, will be compared to avian and mammal toxicity test results. The acute toxicity to birds and mammals are:

Bobwhite quail	LD50 >2025 mg/kg bw
	LC50 >4411 ppm diet
	Chronic NOAEL 231 ppm diet
Mallard duck	LD50 >1900 mg/kg bw
	LC50 > 4310 ppm diet
	Chronic NOAEL 501 ppm diet
Rat	LD50 >5000 mg/kg bw

Comparing the concentration of 150 ppb (0.15 ppm) to these test levels suggests minimal potential for adverse effects via ingestion. Using the RQ calculation of:

$$\frac{\text{Exp}}{\text{Tox}} = \text{RQ}$$

Using an exposure of 0.15 ppm and the dietary LC50 for mallards of >4310 ppm yields a RQ of $<3E10^{-5}$.

Exposure and Risk to Terrestrial Plants:

Drift and runoff to terrestrial habitats of plants is not expected because of the nature of the application. However, terrestrial plants with roots at the edge of treated water bodies might be exposed. The nature of this impact is not quantifiable, but since the target plant is a rooted vascular plant, it may be inferred that other rooted vascular plants growing at the edge of a treated water body might also be affected.

Exposure to Aquatic Animals:

The maximum concentration in water would be 150 ppb. This is much lower than the concentration at which no acute and chronic effects occurred for fish and invertebrates, suggesting low potential for risk.

Fish
Rainbow trout 96-hr LC50 > 102 ppm
Bluegill sunfish 96-hr LC50 > 103 ppm
Common carp 96-hr LC50 > 101 ppm

Aquatic invertebrate
Daphnia magna 48-hr EC50 > 98 ppm

The acute toxicity values are all close to, or greater than 100 ppm. Using the risk quotient calculation of:

$$\frac{\text{Exp}}{\text{Tox}} = \text{RQ}$$

Where Exp = 0.15 ppm
Tox = 98 ppm (Daphnia EC50)
RQ= 0.0015 (much lower than the LOC of 0.05 for endangered invertebrate species)

The most sensitive chronic test result is 10 ppm. Using the same equation, the RQ of 0.015 much lower than the LOC of 1 for chronic effects to endangered and nonendangered aquatic species.

Exposure and Risk to Aquatic Plants

It is assumed that some nontarget aquatic plants might be affected by these treatments. However, the goal is to control invasive hydrilla, which also adversely affects desireable/native species. Whether the net environmental affect is positive or negative is beyond the scope of this assessment. If use of penoxsulam results in elimination of other nontarget plants while it is controlling hydrilla, the net result might be adverse to those affected species.

Endangered Species

The level of exposure to terrestrial plants and animals, and aquatic animals is unlikely to result in potential risk from direct effects to endangered species. Listed aquatic plants might be affected if exposed. However, according to the Section 18 application prepared by Florida Dept of Ag and Consumer Services, there are no freshwater aquatic plant species in Florida, so based on that, no effects to endangered plants are likely.

There is also a potential for indirect effects to animals that depend on aquatic plants that might be affected by these treatments. Listed animal species most likely to be associated with aquatic habitats are the bald eagle (feeds on fish), the wood stork (feeds on fish) and the snail kite (feeds on apple snails which use water during their reproductive cycle). The degree to which controlling weeds and potentially affecting non-target plants might have an indirect effect on the food sources (fish and the apple snail reproductive cycle) of these listed endangered species is uncertain and has not been investigated. So, while there are potential effects no analysis has been conducted to show Likely to Adversely Affect or Not Likely to Adversely Affect.

Conclusions:

Risk from direct effects to terrestrial plants and animals is unlikely. Risk from direct effects to aquatic animals is unlikely. The ecological impact from this Section 18 use of penoxsulam to control hydrilla would be limited to nontarget aquatic plants and possibly nontarget rooted plants

growing along the edge of the treated water body, and while it has the potential to indirectly effect endangered birds, no analysis has been done to conclude effects are likely.

Unique Taxa Count by State for Selected Crops

No species exclusions.

Minimum of 1 Acre

aquatic plants

Florida

aquatic plants

		Dicot	
	Bird		Monocot
Florida	9	30	2
Affected Counties:	23	13	9
Affected States:	1	1	1
Affected Species:	9	30	2

Grand Summary

	Bird	Dicot	Monocot
Total Counties:	23	13	9
Total States:	1	1	1
Unique Species:	9	30	2

41 species

Sparrow, Florida Grasshopper	Ammodramus savannarum floridanus	Bird
Kite, Everglade Snail	Rostrhamus sociabilis plumbeus	Bird
Scrub-Jay, Florida	Aphelocoma coerulescens	Bird
Sparrow, Cape Sable Seaside	Ammodramus maritimus mirabilis	Bird
Plover, Piping	Charadrius melodus	Bird
Eagle, Bald	Haliaeetus leucocephalus	Bird
Stork, Wood	Mycteria americana	Bird
Caracara, Audubon's Crested	Polyborus plancus audubonii	Bird
Woodpecker, Red-cockaded	Picoides borealis	Bird
Buckwheat, Scrub	Eriogonum longifolium var. gnaphalifolium	Dicot
Fringe Tree, Pygmy	Chionanthus pygmaeus	Dicot
Bonamia, Florida	Bonamia grandiflora	Dicot
Blazing Star, Scrub	Liatris ohlingerae	Dicot
Mustard, Carter's	Warea carteri	Dicot
Bellflower, Brooksville	Campanula robinsiae	Dicot
Harebells, Avon Park	Crotalaria avonensis	Dicot
Hypericum, Highlands Scrub	Hypericum cumulicola	Dicot
Jacquemontia, Beach	Jacquemontia reclinata	Dicot
Lead-plant, Crenulate	Amorpha crenulata	Dicot
Lupine, Scrub	Lupinus aridorum	Dicot
Milkpea, Small's	Galactia smallii	Dicot
Gourd, Okeechobee	Cucurbita okeechobeensis ssp. okeechobeensis	Dicot
Sandlace	Polygonella myriophylla	Dicot
Wireweed	Polygonella basiramia	Dicot
Wings, Pigeon	Clitoria fragrans	Dicot
Whitlow-wort, Papery	Paronychia chartacea	Dicot
Water-willow, Cooley's	Justicia cooleyi	Dicot
Warea, Wide-leaf	Warea amplexifolia	Dicot
Spurge, Garber's	Chamaesyce garberi	Dicot

Pawpaw, Four-petal	Asimina tetramera	Dicot
Spurge, Deltoid	Chamaesyce deltoidea ssp. deltoidea	Dicot
Pawpaw, Beautiful	Deeringothamnus pulchellus	Dicot
Rosemary, Short-leaved	Conradina brevifolia	Dicot
Polygala, Tiny	Polygala smallii	Dicot
Polygala, Lewton's	Polygala lewtonii	Dicot
Plum, Scrub	Prunus geniculata	Dicot
Ziziphus, Florida	Ziziphus celata	Dicot
Pawpaw, Rugel's	Deeringothamnus rugelii	Dicot
Aster, Florida Golden	Chrysopsis floridana	Dicot
Beargrass, Britton's	Nolina brittoniana	Monocot
Seagrass, Johnson's	Halophila johnsonii	Monocot

No species were excluded.