**Fact Sheet Date: March 12, 1998**

# NEW YORK STATE
# -AQUATIC FACT SHEET-

## Ambient Water Quality Values for Protection of Aquatic Life

**SUBSTANCE:** Endrin **CAS REGISTRY NUMBER:** 72-20-8

| TYPE: | BASIS: | FRESHWATER AMBIENT WATER QUALITY VALUE (ug/L): |
|---|---|---|
| Chronic | Propagation | 0.036 |
| Acute | Survival | 0.086 |

## INTRODUCTION

These values apply to the water column and are derived to protect aquatic life from the effects of waterborne contaminants. Values for the protection of propagation of aquatic life are referred to as Aquatic (Chronic) or A(C) values. Values for the protection of survival of aquatic life are referred to as Aquatic (Acute) or A(A) values.

## SUMMARY OF INFORMATION AND DERIVATION OF VALUE

U.S. EPA (1995a,b) has derived acute and chronic aquatic life criteria for endrin for the Great Lakes Water Quality Initiative (GLI). The Department has reviewed these criteria and determined that they are based on appropriate data and derived according to the scientific procedures in current and proposed 6 NYCRR Part 702. They are thus determined to be appropriate ambient water quality values for protection of aquatic life for New York State.

The attachment to this fact sheet provides U.S. EPA's derivation of the values. U.S. EPA's Criterion Continuous Concentration (CCC) and Criterion Maximum Concentration (CMC) are equivalent to New York's Aquatic (Chronic) and Aquatic (Acute) values respectively.

## REFERENCES

U.S. EPA (Environmental Protection Agency). 1995a. Final Water Quality Guidance for the Great Lakes System. 60 Federal Register: 15366 - 15425. March 23, 1995.

U.S. EPA (Environmental Protection Agency). 1995b. Great Lakes Water Quality Initiative Criteria Documents for the Protection of Aquatic Life in Ambient Water. EPA-820-B-95-004. March 1995.

New York State Department of Environmental Conservation
Division of Water
SJS
January 14, 1997

ATTACHMENT

# GREAT LAKES WATER QUALITY INITIATIVE

## Tier 1 Aquatic Life Criterion for Endrin

The new acceptable acute data for endrin are given in Table H1; no new acceptable chronic data were found. These new data were used with those given in Tables 1 and 2 of the criteria document for endrin (U.S. EPA 1980) to obtain the values given in Table H2. Results in the following publications were used in U.S. EPA (1980) but were not considered acceptable for use here: Katz and Chadwick (1961), Naqui and Ferguson (1968), Nebeker and Gaufin (1964), Gaufin et al. (1965), Jensen and Gaufin (1966), Post and Schroeder (1971), Mount (1962), and Solon (1969).

### Criterion Maximum Concentration (CMC)

The Final Acute Value (FAV) was calculated using the four lowest Genus Mean Acute Values given in Table H2, resulting in a FAV of 0.1728 ug/L. This value did not need to be lowered to protect a commercially or recreationally important species of the Great Lakes System. The CMC was calculated by dividing the FAV by 2, resulting in a CMC of 0.0864 ug/L.

### Criterion Continuous Concentration (CCC)

Insufficient chronic toxicity data were available to calculate a Final Chronic Value (FCV) using the eight-family procedure. Sufficient chronic data were available to calculate a FCV by dividing the FAV by the Final Acute-Chronic Ratio (FACR). Four ACRs were given in U.S. EPA (1980) but the ACR for the fathead minnow was considered unacceptable for use here. ACRs of 1.9 and 18 were determined with saltwater species, whereas an ACR of 3.3 was obtained with a freshwater species (Table H2); the three were within a factor of 9.5. The FACR was calculated as the geometric mean of the other three and was 4.833. The FCV = FAV/FACR = (0.1728 ug/L)/(4.833) = 0.03575 ug/L. This value did not need to be lowered to protect a commercially or recreationally important species of the Great Lakes System. The CCC was 0.03575 ug/L.

### The Criterion

The procedures described in the GLI Tier 1 methodology indicate that, except possibly where a locally important species is very sensitive, aquatic organisms should not be affected unacceptably if the four-day average concentration of endrin does not exceed 0.03575 ug/L more than once every three years on the average and if the one-hour average concentration does not exceed 0.0864 ug/L more than once every three years on the average.

Table H1. New Acute Values for Endrin

| Species | Method* | Test Duration (hrs) | Acute Value (ug/L) | Reference |
|---|---|---|---|---|
| Cladoceran, Ceriodaphnia reticulata | S,U | 48 | 24 | Elnabarawy et al. 1986 |
| Cladoceran, Daphnia magna | S,U | 48 | 4.2 | Mayer and Ellersieck 1985 |
| Cladoceran, Daphnia magna | S,U | 48 | 59 | Elnabarawy et al. 1986 |
| Cladoceran, Daphnia magna | S,U | 48 | 41 | Mayer and Ellersieck 1985 |
| Cladoceran, Daphnia magna | S,U | 48 | 74 | Mayer and Ellersieck 1985 |
| Cladoceran, Daphnia magna | S,M | 48 | 160 | Thurston et al. 1985 |
| Cladoceran, Daphnia pulex | S,U | 48 | 20 | Mayer and Ellersieck 1985 |
| Cladoceran, Daphnia pulex | S,U | 48 | 30 | Elnabarawy et al. 1986 |
| Annelid, Lumbriculus variegatus | FT,M | 96 | 42.6 | U.S. EPA 1991 |
| Snipe fly, Atherix variegatus | S,U | 96 | 4.6 | Mayer and Ellersieck 1985 |
| Midge, Tanytarsus dissimilis | S,M | 48 | 0.84 | Thurston et al. 1985 |
| Stonefly, Acroneuria pacifica | S,U | 96 | > 0.18** | Mayer and Ellersieck 1985 |
| Crayfish, Orconectes immunis | FT,M | 96 | 89 | Thurston et al. 1985 |
| Damselfly, Ischnura verticalis | S,U | 96 | 2.4 | Mayer and Ellersieck 1986 |
| Damselfly, Ischnura verticalis | S,U | 96 | 2.1 | Mayer and Ellersieck 1986 |
| Yellow perch, Perca flavescens | FT,U | 96 | 0.15 | Mayer and Ellersieck 1986 |

Table H1. New Acute Values for Endrin

| Species | Method* | Test Duration (hrs) | Acute Value (ug/L) | Reference |
|---|---|---|---|---|
| Largemouth bass, Micropterus salmoides | S,U | 96 | 0.31 | Mayer and Ellersieck 1986 |

| | | | | |
|---|---|---|---|---|
| Black bullhead, Ictalurus melas | S,U | 96 | 1.1 | Mayer and Ellersieck 1986 |
| Channel catfish, Ictalurus punctatus | S,U | 96 | 0.32*** | Mayer and Ellersieck 1986 |
| Channel catfish, Ictalurus punctatus | S,U | 96 | 1.1*** | Mayer and Ellersieck 1986 |
| Channel catfish, Ictalurus punctatus | FT,M | 96 | 0.42 | Thurston et al. 1985 |
| Rainbow trout, Oncorhynchus mykiss | S,U | 96 | 0.75*** | Mayer and Ellersieck 1986 |
| Rainbow trout, Oncorhynchus mykiss | FT,M | 96 | 0.3 | Thurston et al. 1985 |
| Goldfish, Carassius auratus | FT,U | 96 | 0.44*** | Mayer and Ellersieck 1986 |
| Goldfish, Carassius auratus | FT,M | 96 | 0.95 | Thurston et al. 1985 |
| Fathead minnow, Pimephales promelas | S,U | 96 | 1.8*** | Mayer and Ellersieck 1986 |
| Fathead minnow, Pimephales promelas | FT,M | 96 | 0.65 | Thurston et al. 1985 |
| Mosquitofish, Gambusia affinis | S,U | 96 | 1.1*** | Mayer and Ellersieck 1986 |
| Mosquitofish, Gambusia affinis | FT,M | 96 | 0.69 | Thurston et al. 1985 |
| Carp, Cyprinus carpio | FT,U | 96 | 0.32 | Mayer and Ellersieck 1986 |
| Bluegill, Lepomis macrochirus | FT,M | 96 | 0.21 | Thurston et al. 1985 |
| Bullfrog tadpole, Rana catesbeiana | FT,M | 96 | 2.5 | Thurston et al. 1985 |

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* FT = flow-through, S = static, U = unmeasured, M = measured.

** Not used in the calculation of the FAV because it is not appropriate to have one of the four lowest GMAVs be a "greater than" value.

*** Not used in the calculation of the SMAV because data were available for this species from a "FT,M" test.

Table H2. Ranked Genus Mean Acute Values for Endrin

| Rank* | Genus Mean Acute Value (ug/L) | Species | Species Mean Acute Value (ug/L) | Species Mean Acute-Chronic Ratio |
|---|---|---|---|---|
| 27 | 64 | Mayfly, Hexagenia bilineata | 64 | ----- |
| 26 | 53 | Crayfish, Orconectes nais | 32 | ----- |
| | | Crayfish, Orconectes immunis | 89 | ----- |
| 25 | 43 | Annelid, Lumbriculus variegatus | 43 | ----- |
| 24 | 38 | Cladoceran, Daphnia magna | 59 | ----- |
| | | Cladoceran, Daphnia pulex | 24 | ----- |
| 23 | 34 | Cladoceran, Simocephalus serrulatus | 34 | ----- |
| 22 | 24 | Cladoceran, Ceriodaphnia reticulata | 24 | ----- |
| 21 | 4.6 | Snipe fly, Atherix variegatus | 4.6 | ----- |
| 20 | 3.0 | Amphipod, Gammarus fasciatus | 3.1 | ----- |
| | | Amphipod, Gammarus lacustris | 3.0 | ----- |
| 19 | 2.5 | Bullfrog tadpole Rana catesbeiana | 2.5 | ----- |
| 18 | 2.1 | Damselfly, Ischnura verticalis | 2.1 | ----- |
| 17 | 1.6 | Guppy, Poecilia reticulata | 1.6 | ----- |
| 16 | 1.5 | Isopod, Asellus brevicaudus | 1.5 | ----- |

Table H2. Ranked Genus Mean Acute Values for Endrin

| Rank* | Genus Mean Acute Value (ug/L) | Species | Species Mean Acute Value (ug/L) | Species Mean Acute-Chronic Ratio |
|---|---|---|---|---|
| 15 | 1.3 | Glass shrimp, Palaemonetes kadiakensis | 1.3 | ----- |

| | | | | |
|---|---|---|---|---|
| 14 | 0.95 | Goldfish,<br>Carassius auratus | 0.95 | ----- |
| 13 | 0.85 | Flagfish,<br>Jordanella floridae | 0.85 | 3.3 |
| 12 | 0.84 | Midge,<br>Tanytarsus dissimilis | 0.84 | ----- |
| 11 | 0.76 | Stonefly,<br>Claassenia sabulosa | 0.76 | ----- |
| 10 | 0.69 | Mosquitofish,<br>Gambusia affinis | 0.69 | ----- |
| 9 | 0.68 | Black bullhead,<br>Ictalurus melas | 1.1 | ----- |
| | | Channel catfish,<br>Ictalurus punctatus | 0.42 | ----- |
| 8 | 0.57 | Coho salmon,<br>Oncorhynchus kisutch | 0.51 | ----- |
| | | Chinook salmon,<br>Oncorhynchus tshawytscha | 1.2 | ----- |
| | | Rainbow trout,<br>Oncorhynchus mykiss | 0.3 | ----- |
| 7 | 0.54 | Stonefly,<br>Pteronarcella badia | 0.54 | ----- |
| 6 | 0.49 | Fathead minnow,<br>Pimephales promelas | 0.49 | ----- |
| 5 | 0.32 | Common carp,<br>Cyprinus carpio | 0.32 | ----- |
| 4 | 0.31 | Largemouth bass,<br>Micropterus salmoides | 0.31 | ----- |

Table H2. Ranked Genus Mean Acute Values for Endrin

| Rank* | Genus Mean Acute Value (ug/L) | Species | Species Mean Acute Value (ug/L) | Species Mean Acute-Chronic Ratio |
|---|---|---|---|---|
| 3 | 0.25 | Stonefly,<br>Pteronarcys californica | 0.25 | ----- |
| 2 | 0.21 | Bluegill,<br>Lepomis macrochirus | 0.21 | ----- |
| 1 | 0.15 | Yellow perch,<br>Perca flavescens | 0.15 | ----- |

* Ranked from most resistant to most sensitive based on Genus Mean Acute Value.

FAV = 0.1728 ug/L

CMC = FAV/2 = 0.0864 ug/L

FACR = 4.833

FCV = FAV/FACR = (0.1728 ug/L)/(4.833) = 0.03575 ug/L = CCC

References

Elnabarawy, M.T., A.N. Welter, and R.R.Robideau. 1986. Relative Sensitivity of Three Daphnid Species to Selected Organic and Inorganic Chemicals. Environ. Toxicol. Chem. 5:393-398.

Mayer, F., and M.R. Ellersieck. 1986. Manual of Acute Toxicity: Interpretation and Data Base for 410 Chemicals and 66 Species of Freshwater Animals. USDI Publication 160.

Thurston, E.V., T.A Gilfoil, E.L Meyn, R.K. Zajdel, T.I. Aoki and G.D. Veith. 1985. Comparative Toxicity of Ten Organic Chemicals to Ten Common Aquatic Species. Water Res. 19:1145-1155.

U.S. EPA. 1980. Ambient Water Quality Criteria for Endrin. EPA 440/5-80-047. National Technical Information Service, Springfield, VA.

U.S. EPA. 1991. Acute 96-hr Flow-Through Freshwater Exposures with Endrin and Dieldrin Using an Annelid (Lumbriculus variegatus). Unpublished data.