

U.S. EPA Waste Minimization Priority Chemicals

- ⌘ 1,2,4-Trichlorobenzene
- ⌘ 1,2,4,5-Tetrachlorobenzene
- ⌘ 2,4,5-Trichlorophenol
- ⌘ 4-Bromophenyl phenyl ether
- ⌘ Acenaphthene
- ⌘ Acenaphthylene
- ⌘ Anthracene
- ⌘ Benzo(g,h,i)perylene
- ⌘ Dibenzofuran
- ⌘ **Dioxins**/Furans (considered one chemical on this list)

U.S. EPA Waste Minimization Priority Chemicals

- ⌘ Endosulfan, alpha & Endosulfan, beta
(considered one chemical on this list)
- ⌘ Fluorene
- ⌘ Heptachlor & Heptachlor epoxide (considered
one chemical on this list)
- ⌘ **Hexachlorobenzene**
- ⌘ Hexachlorobutadiene
- ⌘ **Hexachlorocyclohexane, gamma-**
- ⌘ Hexachloroethane
- ⌘ Methoxychlor
- ⌘ **Naphthalene**

⌘ PAH Group (as defined in TRI)

⌘ Pendimethalin

⌘ Pentachlorobenzene

⌘ Pentachloronitrobenzene

⌘ Pentachlorophenol

⌘ Phenanthrene

⌘ Pyrene

⌘ Trifluralin

⌘ **Metals and Metal Compounds**

⌘ **Cadmium**

⌘ **Lead**

⌘ **Mercury**

DIOXIN



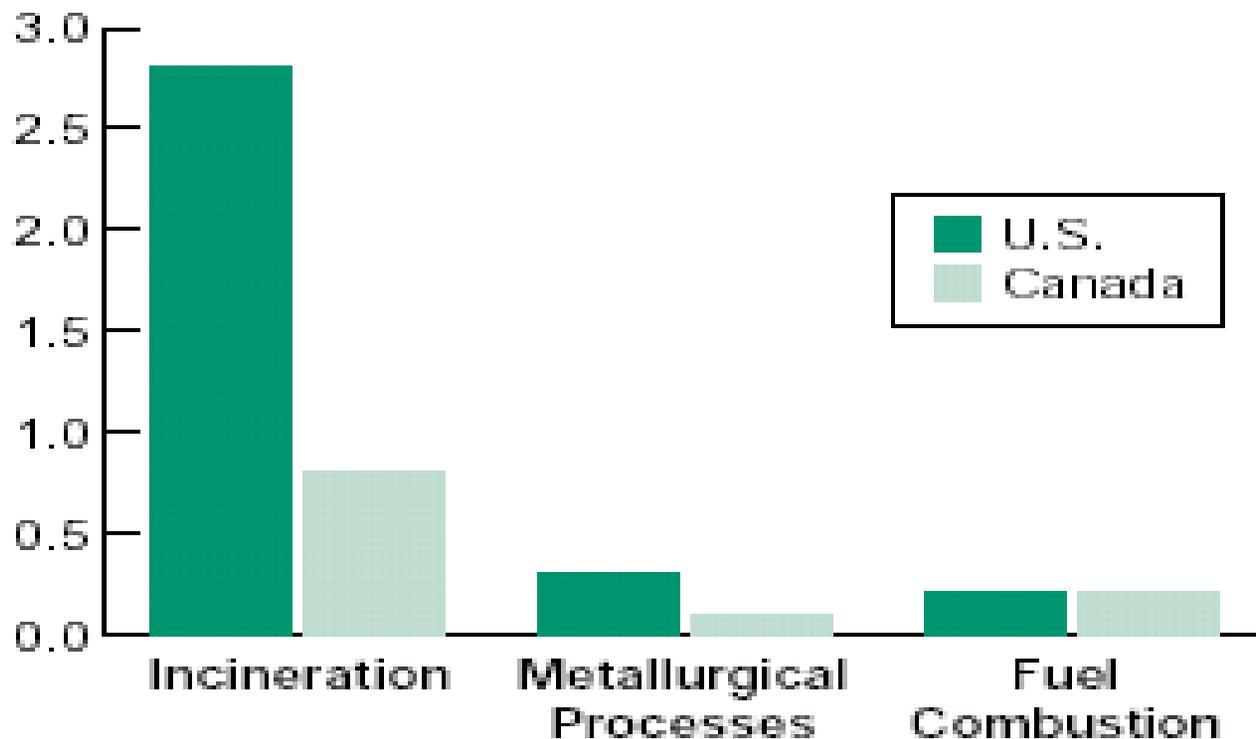
⌘ CHARACTERISTICS

- ⌘ By-product of combustion w/chlorine present
- ⌘ Enters GL through water discharge & atmosphere
- ⌘ Largest source of dioxin to L. Superior & Michigan is from LRTBP

⌘ HEALTH EFFECTS

- ⌘ Carcinogen
- ⌘ Neurodevelopmental effects
- ⌘ Altered immune functions
- ⌘ CNS disorders
- ⌘ Disrupts liver & kidneys
- ⌘ Reproductive effects
- ⌘ Birth Defects

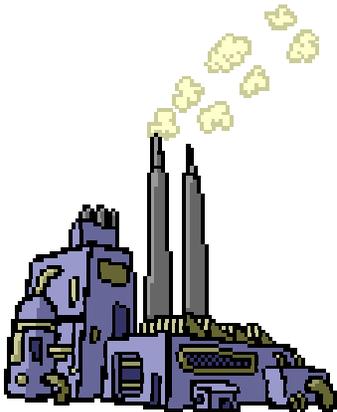
Contribution of Different Source Sectors to Atmospheric Deposition of Dioxin to the Great Lakes (pg TEQ deposited/km²)(person/year)



Source: Michigan Department of Natural Resources, 1984 and U.S. Geological Survey, 1999 (data unavailable for 1991-97).

Did You Know?

95% of dioxin in the environment comes from incinerators burning chlorinated waste.



HEXACHLOROBENZENE (HCB)



⌘ CHARACTERISTICS

- ⌘ Pesticide, industrial chemical & by product of chlorinated products & burning fuel/wastes
- ⌘ LRTBP

⌘ HEALTH EFFECTS

- ⌘ Possible carcinogen to humans
- ⌘ Disrupts hormone function
- ⌘ Liver damage
- ⌘ Damages thyroid, kidneys, blood & immune system

HEXACHLOROCYCLOHEXANE (gamma)



by Sean Delonas
New York Post - Jan. 18, 1995

- ⌘ Commonly referred to as Lindane
- ⌘ Insecticide
- ⌘ Banned in the state of California
- ⌘ Widely used as a head lice treatment (KWELL)
- ⌘ Contributed to heart disorders, lung irritation, blood disorders, headaches, convulsions, and changes in sex hormones.

NAPHTHALENE



- ⌘ Commonly used to make products that repel moths.
- ⌘ Red blood cell damage, nausea, vomiting, diarrhea, and blood in urine.
- ⌘ Alternative product – cedar boards.

CADMIUM



- ⌘ By-product from smelting zinc, lead, or copper ores.
- ⌘ By-product commonly used in metal plating and to make pigments, batteries, and plastics.
- ⌘ Long term exposure can cause kidney and lung damage.
- ⌘ Remember to recycle your rechargeable batteries!

LEAD



- ⌘ Used mostly to make batteries.
- ⌘ Also used to make ammunition, pipes, and roofing materials.
- ⌘ In the past, it was used to make paint and gasoline.
- ⌘ Can cause reduced birth weight, brain and kidney damage.
- ⌘ Remember to recycle your rechargeable batteries!

MERCURY



- ⌘ Found naturally in the environment and can exist in several forms, as elemental mercury, and organic and inorganic mercury.
- ⌘ Can combine with other chemicals to form compounds.
- ⌘ Used in thermostats, thermometers, barometers, batteries, fluorescent lights and lamps, dental amalgams, and for electrical power.

MERCURY



- ⌘ You can be exposed to mercury by eating contaminated fish or shellfish.
- ⌘ Methylmercury is likely to build up in the tissues of certain fish.
- ⌘ Can affect CNS, cause brain and kidney damage, chest pains, difficulty breathing, nausea, severe stomach pain, developmental problems...
- ⌘ Look for mercury free products and limit your exposure in your food choices.

MERCURY

Species	Range (ppm)	Average (ppm)
Domestic Samples		
Catfish	ND - 0.16	ND
Cod	ND-0.17	0.13
Crab	ND-0.27	0.13
Flounder	ND	ND
Hake	ND	ND
Halibut	0.12 - 0.63	0.24
Pollock	ND	ND
Salmon (canned)	ND	ND
Salmon (fresh or frozen)	ND	ND
Shark	0.30 - 3.52	0.84
Swordfish	0.36 - 1.68	0.88
Tuna (canned)	ND - 0.34	0.20
Tuna (fresh or frozen)	ND - 0.76	0.38
Import Samples		
Pollock	ND - 0.78	0.16
Shark	ND - 0.70	0.36
Swordfish	0.80 - 1.61	0.86
Tuna (canned)	ND - 0.39	0.14
Tuna (fresh of frozen)	ND - 0.75	0.27

- ⌘ Any level $< .10$ ppm is shown as ND
- ⌘ Acceptable FDA action level is 1ppm.
- ⌘ 1994 FDA study of commercially harvested fish.

Chemicals recently taken off the priority list



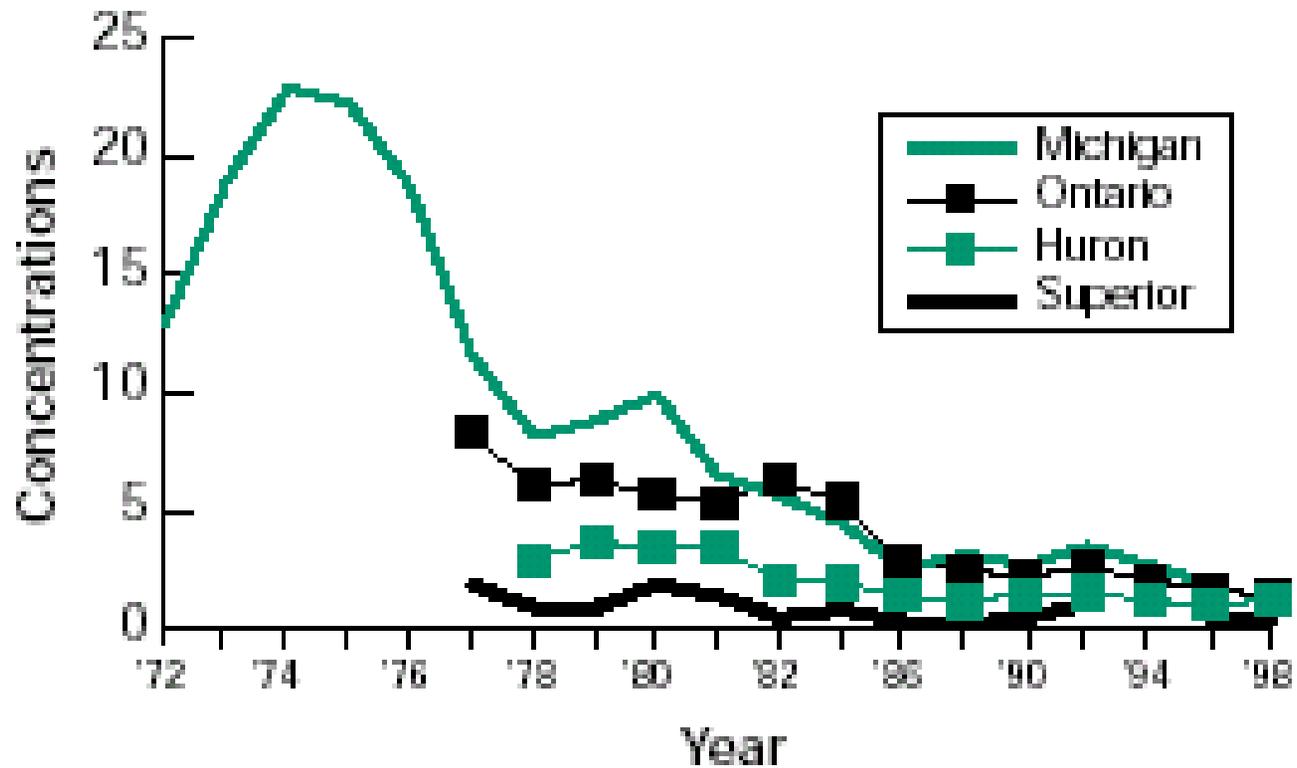
⌘ Toxaphene –

- ☑ Insecticide used primarily on cotton.
- ☑ Most uses banned in U.S. in 1982.

⌘ PCBs

- ☑ Insulating fluid in electrical transformers.
- ☑ Fire resistant, low volatility.
- ☑ Banned in most industrial countries in the late 1970s.

PCB Concentrations in Lake Trout (ug/g wet weight)



Chemicals recently taken off the priority list



⌘ DDT

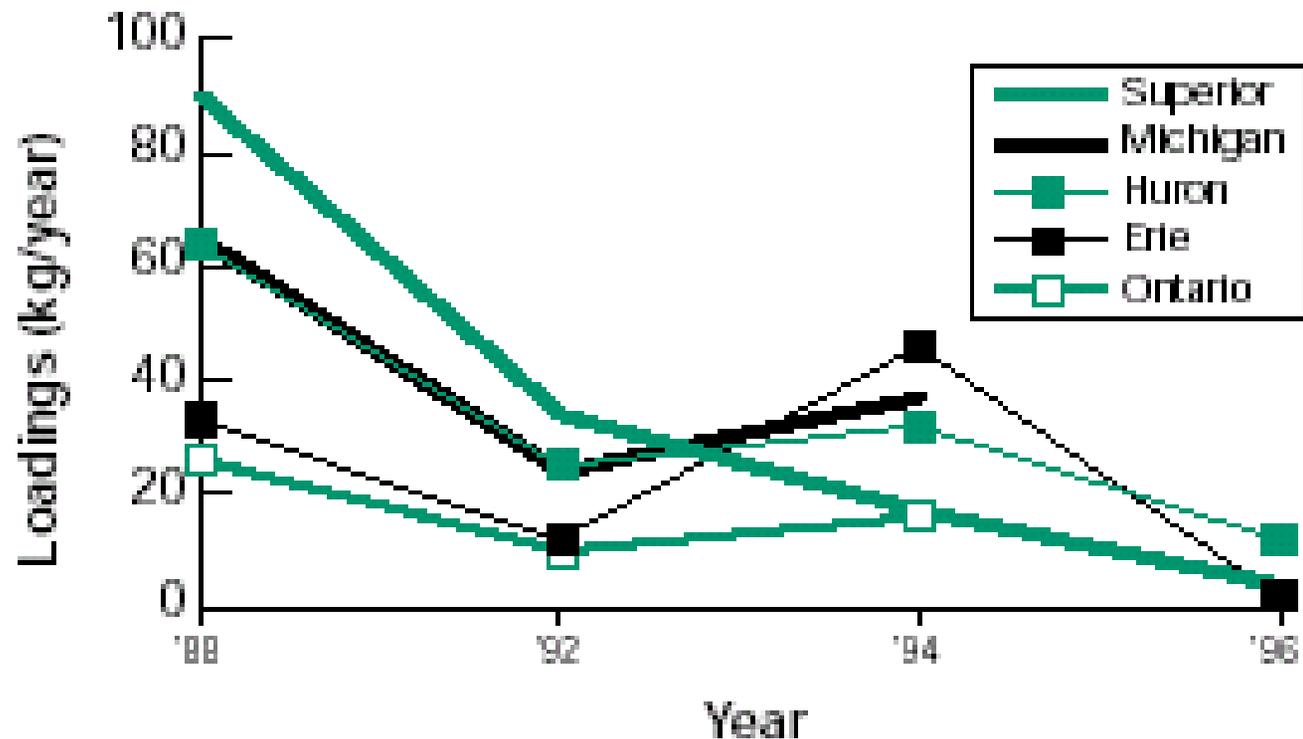
- ☑ Insecticide used primarily in agriculture.
- ☑ Banned in U.S. & Canada
- ☑ LRTBP

⌘ Aldrin & Dieldrin

- ☑ Closely related chemicals widely used for controlling soil & vector insects
- ☑ Banned in most developed countries
- ☑ LRTBP



Estimates of DDT (wet and dry) Loadings to the Great Lakes



Source: U.S. Environmental Protection

Chemicals recently taken of the priority list



⌘ Chlordane

- ☑ Insecticide used predominantly on fire ants
- ☑ Full life > 20 years

⌘ Mirex

- ☑ Fire retardant & fire ant control
- ☑ $1/2$ life > 10 years in sediment
- ☑ Breaks down into more potent toxic, photomirex, in sunlight

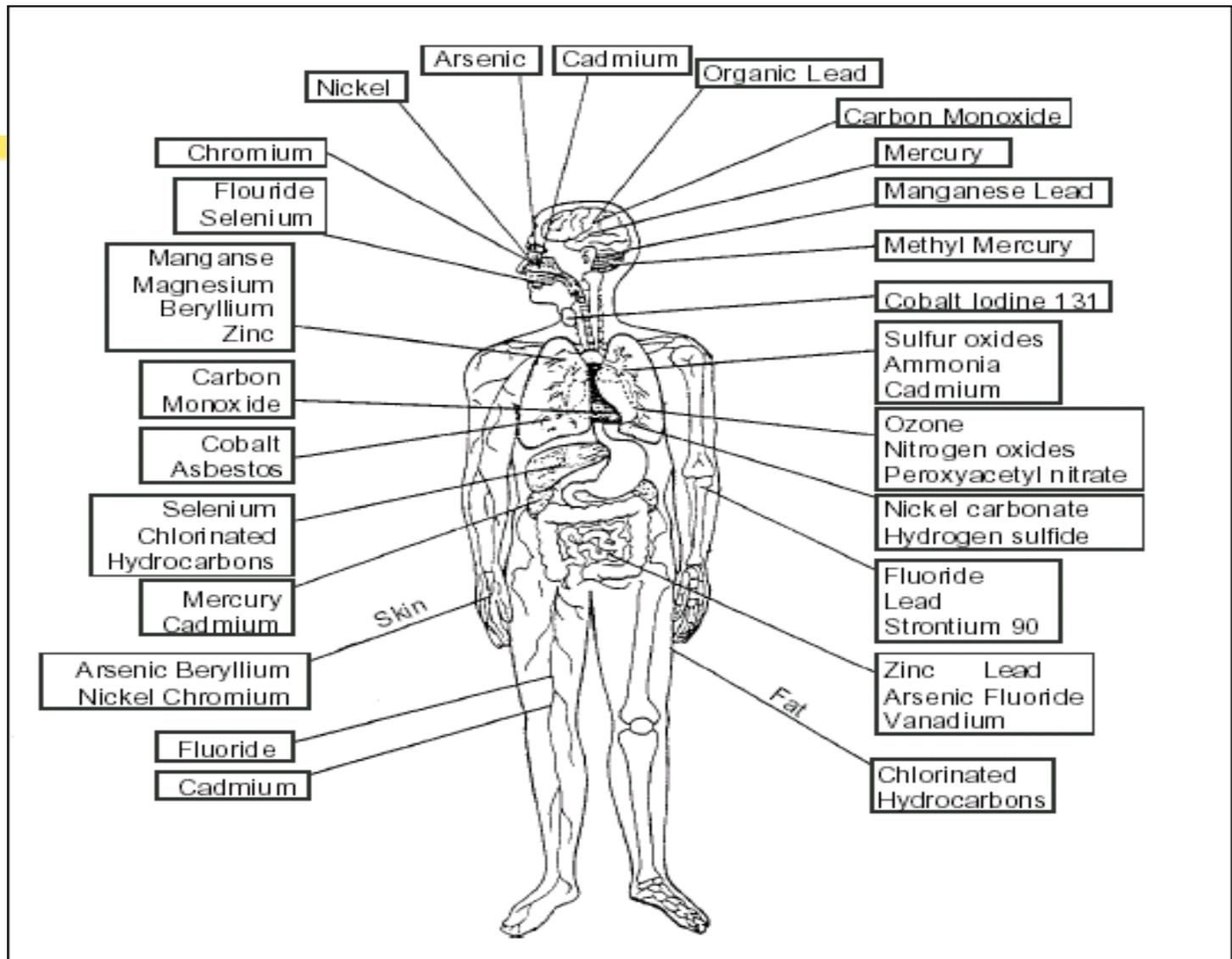


Figure 10. Health Effects of Environmental Pollutants

Species	Reproductive Effects	Eggshell Thinning	Generational Effects	Deformities	Organ Damage	Behavioral Changes	Hormonal Changes	Metabolic Changes "wasting"	Immune Suppression	Tumors
Bald Eagle	•	•	•	•		•		•		
Beluga Whale	•			•	•		•		•	•
Black-crowned Night Heron	•	•		•						
Caspian Tern	•		•	•		•		•		
Chinook-Coho Salmon	•				•		•			•
Common Tern	•				•	•		•		
Double-crested Cormorant	•	•	•	•	•	•		•		
Forster's Tern	•		•	•	•	•		•		
Herring Gull	•	•	•	•	•	•	•	•	•	
Lake Trout	•		•		•	•		•		
Mink	•		•		•			•		
Osprey	•	•								

Source: U.S. Department of Health and Human Services, ATSDR "Public Health Implications of Persistent Toxic Substance in the Great Lakes and St. Lawrence Basin."

Table 1. The variety of health effects that have been observed in creatures in the Great Lakes basin.

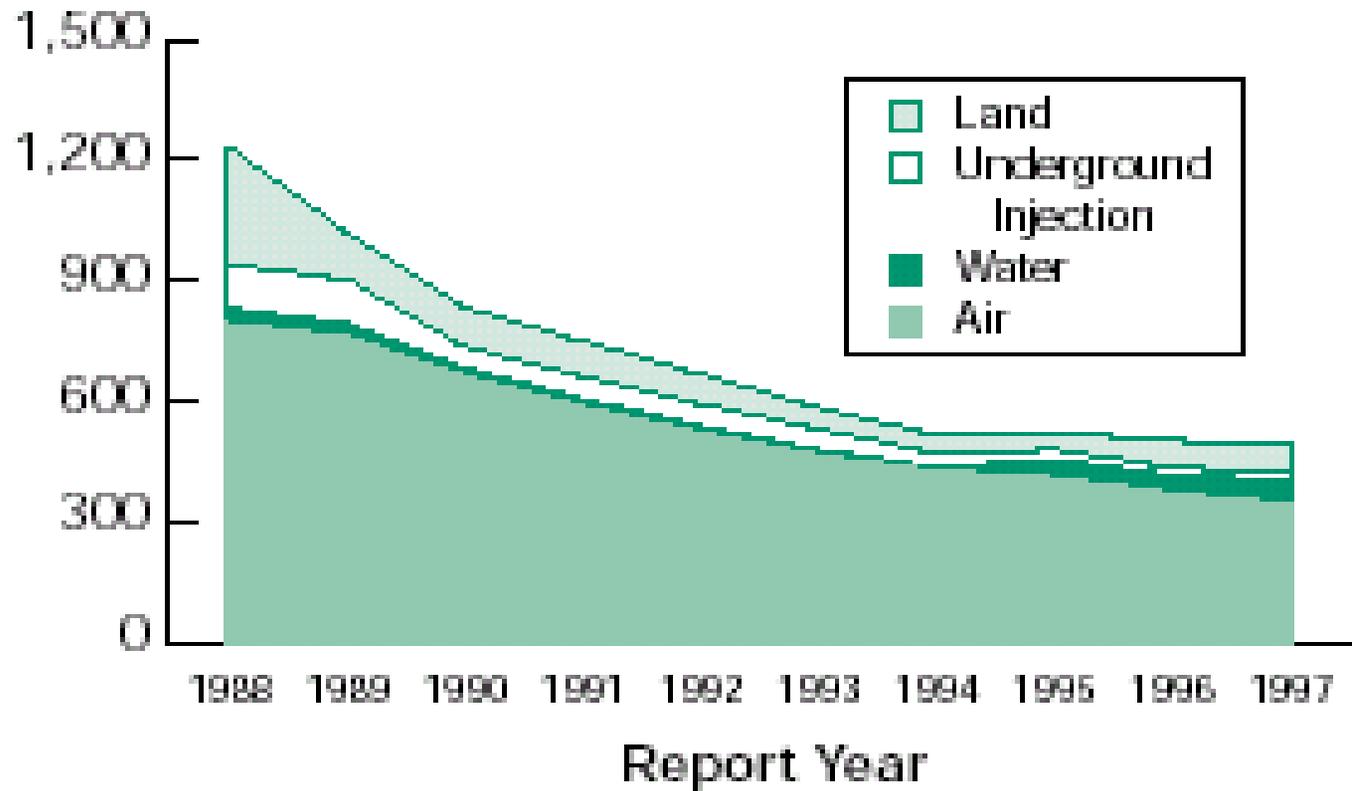


Tumor on long-nosed sucker found in the Great Lakes.

credit: Center for Great Lakes and Aquatic Species



Toxic Chemical Release Inventory Great Lakes States Total Release by Media 1988-1997



Source: U. S. Environmental Protection Agency, Envirofacts Data Warehouse.

What's Your Risk?



- ⌘ Learn more about hazardous air pollutants in your community
- ⌘ www.epa.gov/tri/
- ⌘ www.scorecard.org