

Tin

Human Health Risk

Ecological Risk

M - L

Socioeconomic Risk

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Tin is a naturally occurring element that is used in a wide variety of applications. In its inorganic (metallic) form, tin is used in products such as food cans, alloys (brass, pewter, bronze, and solder), and toothpaste (stannous fluoride). Organic tin compounds or organotins are synthesized for use in the manufacture of antioxidants and biocides, including marine paints. Tin is relatively benign in its metallic form and does not accumulate to harmful levels in either humans or ecological systems. Many organotins, however, are toxic to aquatic organisms, causing impaired behavior and reduced growth, reproduction, and survival. Tributyltin, an anti-fouling agent added to marine paint and regulated as a restricted-use pesticide, is markedly toxic to aquatic organisms, and is a suspected endocrine disruptor.

What's at risk?

Aquatic ecosystems are primarily at risk, particularly marine waters with large vessel traffic, marinas, and shipyards. The primary sources of tributyltin (TBT) to the aquatic environment include paint leaching from boat hull surfaces, runoff from sites where boats are painted, and accidental spills. The greatest impacts would be expected in high ship usage areas such as New York-New Jersey Harbor and commercial docks along the Delaware River.

What are the ecological impacts in New Jersey?

Aquatic biota in proximity to heavy usage areas (e.g., commercial docks and berths) are at increased risk from observed concentrations of organotins in the sediments. Evidence of organotin residues in blue mussels may indicate increased risk for mollusk populations in Upper New York Bay. Low concentrations of TBT have resulted in abnormal sexual development in snails, reducing the number of young and reducing the size of the breeding population. These populations will continue to be exposed as organotins leach from incoming ship traffic, release from sediments, and bioaccumulate in the food chain. Currently there is no comprehensive or regular monitoring of TBT levels in biological tissues in New Jersey. Ecosystem-level effects are poorly understood, and additional research is needed to better characterize the long-term and

chronic effects of TBT discharge to the environment. However, exposure is expected to decrease over time as a result of an anticipated international ban on the application of organotins to marine vessels.

What are the socioeconomic impacts in New Jersey?

The socioeconomic risks associated with environmental concentrations of tin were judged to be low.

What's being done?

TBT is regulated as a restricted use pesticide under state and federal laws. In New Jersey, TBT paint can only be applied by certified applicators to vessels 25 meters or larger, or to aluminum hulls. In 1999, the International Maritime Organization passed a resolution banning the application of organotin compounds beginning in 2003.