



Two-Stroke Engines Pollute Too Much

The two-stroke engine, found on 75 percent of all boats and personal watercraft, causes 1.1 billion pounds of hydrocarbon emissions per year. These high emissions are attributed to the design inefficiency of the two-stroke engine, which has remained essentially unchanged since the 1940s.

Consider the following facts:

- ▶ Between 25 and 30 percent of the fuel and required oil that conventional two-strokes use is ejected unburned through the tailpipe and into the marine ecosystem.
- ▶ In the United States, approximately 75 percent of all engineized boats and personal watercraft (or 14 million units) are powered by two-stroke engines.²
- ▶ Every year marine two-stroke engines spill 15 times more oil and fuel into waterways than did the Exxon Valdez.³
- ▶ The California Air Resources Board found that a seven-hour ride on a personal watercraft powered by a conventional two-stroke engine produces the same amount of smog-forming emissions as over 100,000 miles driven in a modern passenger car.⁴

Sources:

¹ National Marine Manufacturers Association.

² Andre Mele, *Polluting for Pleasure*, Norton, New York, 1993; also, EPA, *Ibid*.

³ Eric Nelson, "Polluting for Pleasure?", *Sail Magazine*, November 1994, 26.

⁴ California Air Resources Board, "Fact Sheet: New regulations for gasoline marine engines," February 1999.

A Serious Health and Environmental Threat

- ▶ Petrochemicals released from two-stroke engines float on the surface microlayer and settle within the estuarine and shallow ecosystems of bays, lakes, rivers, and oceans, where marine life is youngest and most vulnerable. These areas are the base of the food chain, inhabited by fish eggs, larvae, algae, crab, lobster, shrimp, and zoo-plankton.
- ▶ Research demonstrates that chromosomal damage, reduced growth, and high mortality rates of fish occur at extremely low levels of hydrocarbon pollution. Scientists believe that such pollution may bioaccumulate, poisoning much of the marine environment.
- ▶ In addition, oil and fuel from two-stroke engines is being released into municipal reservoirs -- our drinking water -- through motorized boating activity. Dangerous hydrocarbon levels exist in US and foreign waterways sampled. More waterways will approach dangerous concentrations as boating activity continues to proliferate. The only viable solution is to stop the discharge.

Projected Cumulative HC Emissions
(derived from EPA data)

