



*Rochester Committee
for Scientific Information
Rochester, NY*

*RCSI Bulletin 55
Outboard Motors*

*By: Note to Members
August 13, 1969*

THE ROCHESTER COMMITTEE FOR SCIENTIFIC INFORMATION
P. O. Box 5236, River Campus Station
Rochester, New York 14627

Water Pollution # 55(13)

August 13, 1969

Outboard Motors

Summary

One of the effects of affluence and leisure time has been an enormous growth in the number and size of outboard motors, and an accompanying increase in the amount of use. The amount of gasoline and oil used on lakes of New York has probably tripled in the last 15 years. Petroleum pollution in small quantities affects odor and taste of water, taste of fish, and the health of numerous organisms of the fabric of the aquatic community. At the present time there is little regulation of outboard pollution.

Cause and Effects

Outboard motors are almost universally of the 2-cycle type because of the comparatively light weight/horsepower ratio which is attainable with it. Oil is mixed with the gasoline, and both are burned with enormous wastage, at least 10-20% waste being minimal, and 40% waste is not uncommon. These unburned petroleum products are discharged close to the surface of water. The discharge includes roughly 40% non-volatile petroleum, 20% volatile, 20% lead, and over 20% phenols. Lead and phenols are recognized poisons, but the effect of the oils is complex. Oils spread rapidly and extensively on the water surface. The results which have been noted include:

1. Inhibition of the growth of diatoms and other algae, partly from the coating of their cells.
2. Stimulation in some growth of bacteria.
3. Tainted fish taste.
4. Unpleasant odor or taste of drinking water.
5. A decrease in oxygen (which is consumed in the natural oxidation of the petroleum).

Oxygen is one of the most critical requirements for a clean natural community.

Fresh oil is destroyed fairly rapidly, with a half-life of about two weeks during warm weather. However, extremely small amounts cause noticeable effects: 8 gallons in a million gallons of water for a season will produce tainted fish, one gallon in a million will result in an odor of water, and the damage to diatoms can ruin an oyster crop.

Furthermore, the effects are not altogether transient, since a residual fuel odor can be established. It has been estimated that the residual level of one part per million may be reached in Lake George in eight years.¹

¹ Many of the facts for this report were obtained from two articles in the New York State Conservationist, June-July 1968. Vol. 22, No. 6, 6-8 & 34.

* Water Pollution by Outboard Motors by Ronald Stewart and H. H. Howard, and How Outboard Contribute to Water Pollution by Alex Muratori, Jr.

There are advanced developmental studies which would improve the 2-cycle engine by feeding its exhaust back into its combustion chambers to be reburned. Not only would pollution be reduced but fuel would be saved. Nevertheless, it is quite unrealistic to expect these developments to solve the problem. Present motors will not be replaced soon by new, more expensive, heavier ones. Also, increased boating can easily cancel any gain in reduction.

Regulation

It is a general impression that regulation in the use of outboard motors is a very touchy subject in New York. For the most part, no regulation is attempted. It is exceptional that the city of Rochester has restricted the use of its Hemlock and Canadice Lake Reservoirs to boats of 16 feet in length and motors of 10 horsepower. (Previously, the shoreline had been cleared of residences.) The regulation produced a small storm of protest and pressure was applied to the Director of Water, Mr. Roger C. McPherson, but it has been held firmly. In contrast, Conesus Lake, which is a reservoir for three water districts, and bears the AA Classification of the State (drinking water) has no restriction on outboard motors. It may be noted, too, that Conesus is considered to be a highly productive lake for fish.

It may seem strange that no complaints have been registered from Conesus Lake. The odor from the exhaust of high powered boats operating at a high speed (for skiing, frequently) is noticeably unpleasant on the shore, and there is an undocumented opinion that taste problems were beginning to be noticed in the water of Avon, which withdraws near the outlet of the lake. The lack of outcry may not reflect good conditions, but an insensitivity to deterioration of environment: one does not think to blame gasoline for an off-taste if it is noticed. Dr. Francis Williamson of the Smithsonian Institution aptly stated the situation, "The trouble is that you CAN get accustomed to a bad environment."