

populations were low but by the winter of 1979-1980 winter fishing for lake trout was very successful (summarized in Yan and Dillon 1982).

9.2.3 Economic Aspects of Lake Liming

Estimating the total cost of liming aquatic systems is very difficult but some unit cost figures are available for Sweden, New York State, Norway and Nova Scotia. Generally there are three categories of cost associated with liming programs: supply of chemicals, distribution of chemicals, and monitoring of the systems before and after the applications.

9.2.3.1 Costs in Sweden

Although the costs in Sweden cannot be expected to apply directly in North America, they serve as a guide in estimating North American costs. Results from their 5-year experimental program which dealt with over 700 lakes (Bengtsson et al. 1980) have given good cost estimates. The cost of limestone application, including materials and distribution ranged from 500 to 1100 Skr (\$115-253 Cdn.) per metric ton using eight different spreading methods. The average cost for the whole program was about \$140 Cdn. per metric ton. Manual applications had the lowest cost of about \$115 Cdn. per metric ton while aerial applications were the most expensive at about \$250 Canadian per metric ton (National Fisheries Board and National Environmental Protection Board 1981). The cost of scientific surveys to document effects can range from a very small amount for some pH and alkalinity measurements to several thousand dollars. In Sweden, the average cost of research has been about \$16,000 for each project. However, each project may have more than one lake or river involved.

9.2.3.2 Costs in Norway

Limited cost information is available but a total experimental cost of \$80,000 for each of the five study lakes has been projected. In addition there is support from universities with separate funding and support from local residents.

9.2.3.3 Costs in New York State

New York State Department of Environmental Conservation has been adding limestone to 16 small lakes (0.5 to 3 ha) and started a 40 ha lake in 1979. They found the costs of limestone application to range from \$60 U.S. to \$225 U.S. per hectare for a 3-year treatment (\$20 to \$75 U.S./ha.yr). They conducted a very limited technical evaluation of the lakes. The lakes were essentially devoid of fish to start with and the objectives were to establish put-and-take brook trout fisheries.