

Great Lakes Shoreline Erosion on the Rise?

The Great Lakes are freshwater lakes, but they are large enough to share many of the coastal dynamics of the seacoast, including significant shoreline erosion.

The water levels in the Great Lakes fluctuate for a variety of reasons. An obvious factor is variation in the input from precipitation and associated runoff to the lakes. Winds and storm surges temporarily raise local lake levels. Evaporation, water consumption in areas adjacent to the lakes, and outflow reduce water levels. Outflow from one lake to the next is through dams, locks, and power-generation facilities. Lake levels can, therefore, be regulated artificially, and the International Joint Commission makes policy decisions concerning lake-level adjustments.

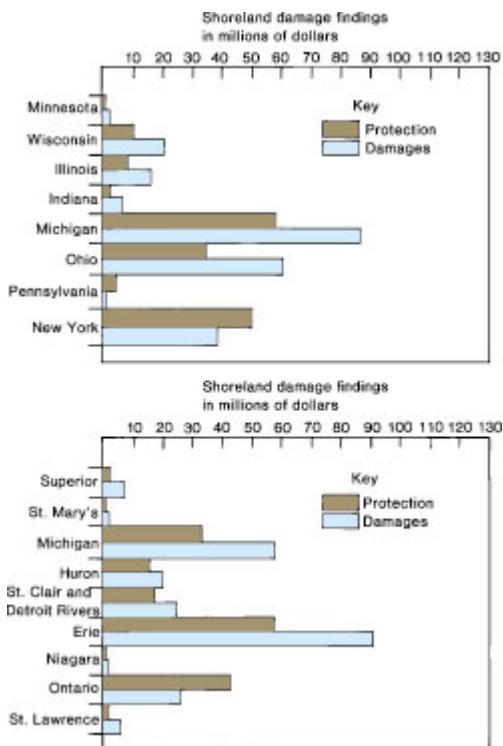


Figure 2 - Damages from periods of high water on the Great Lakes. These expenses reflect 1973 price levels. (A) Cost of shoreland damage during 1972-74, 1975, and 1976, according to state. The total cost of protective measures plus damages was \$401 million. (B) Cost of shoreland damage during 1972-74,

1975, and 1976, by lake area. Total damages were \$231 million; total cost of protective measures was \$170 million.

Periods of high water peaked in 1929, the early 1950s, 1968-69 (on Lakes Superior and Erie), and 1973-74. A 1971 study showed more than one-third of the Great Lakes' coastline to be eroding significantly, despite the presence in some places of shoreline protection structures. The low-lying beaches may expand during periods of low water and shrink as water levels rise, but the march of the cliffs is in one direction only: inland. In those places most severely under attack, cliff edge retreat has occurred at rates averaging more than 2 meters (6 feet) per year for over a decade. The costs and impacts of high water levels, especially when areas of extensive development are threatened, are enormous (figure 2). The problems have been recognized, and solutions sought, for many years. But shoreline protection is, at best, expensive and, particularly when the water keeps rising, of limited long-term value.

The mid-1980s were another time of abnormally high water in the Great Lakes. Since 1987, lake levels have subsided somewhat. It remains to be seen if the waters will soon begin to rise again. Still, even if the water continues to subside, the cliffs will hardly restore themselves!