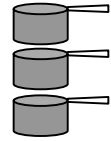


Limiting nutrient analogy: Baking cookies

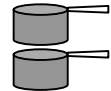
Recipe:



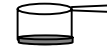
3 cups flour



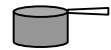
0.5 cup eggs



2 cups sugar



0.1 cup baking soda



1 cup butter

Questions:

- If you start with equal amounts of all ingredients, which one is the limiting?
- If someone brings you more of that ingredient, which ingredient will now be limiting?
- If you start with 60 cups of flour, 50 cups of sugar, 10 cups of butter, 10 cups of eggs and 2 cups of baking soda, which ingredient will be limiting?

Canadian Research and Development Magazine 1970:

“Has the international joint commission...been a party to what may prove to have been the most incredible scientific/political hoax in the history of Canadian and American Relations? What hoax? Do you believe phosphates are the key nutrient in the process of eutrophication? You are wrong! You have hung phosphates without a fair trial.”

Proctor and Gamble:

“The problem of man-caused eutrophication is the most complex subject in our world. It truly encompasses the ‘mystery of life on earth.’ Thus we are attempting to understand and answer the questions: Why do plants grow? How can we retard or stop their growth?”

Northwestern Ontario – Experimental Lake 226

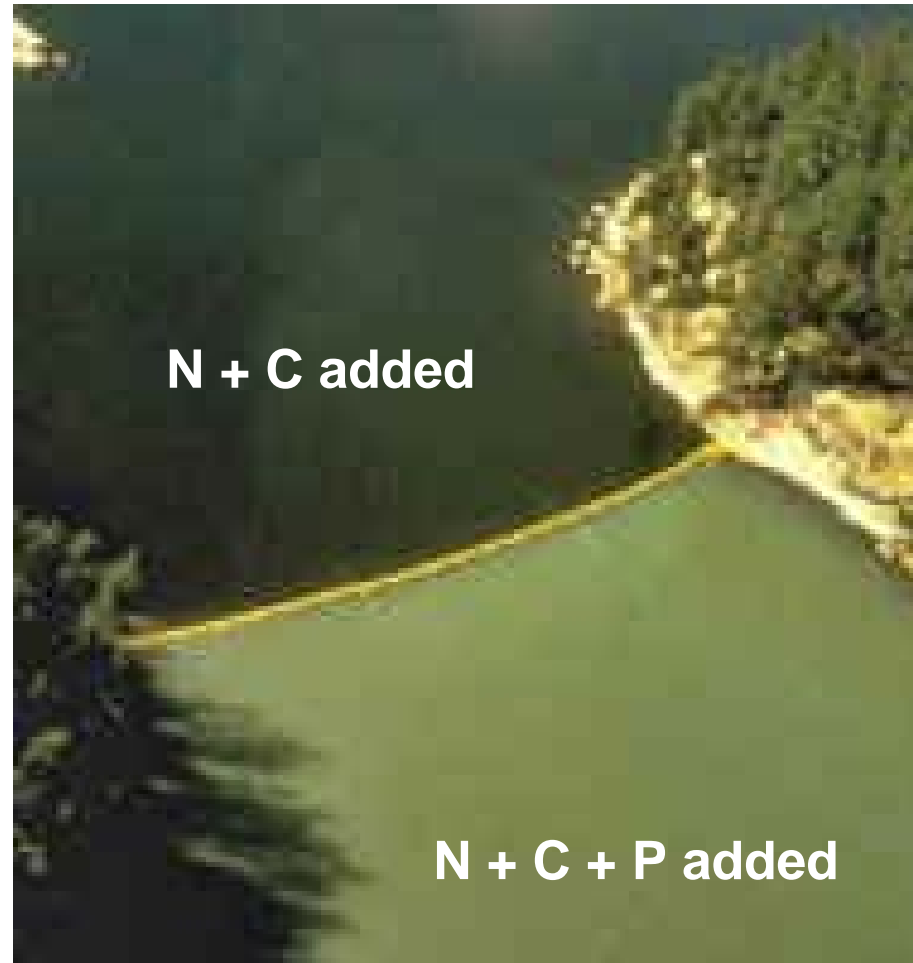


Image courtesy of Oceans and Fisheries, Canada.

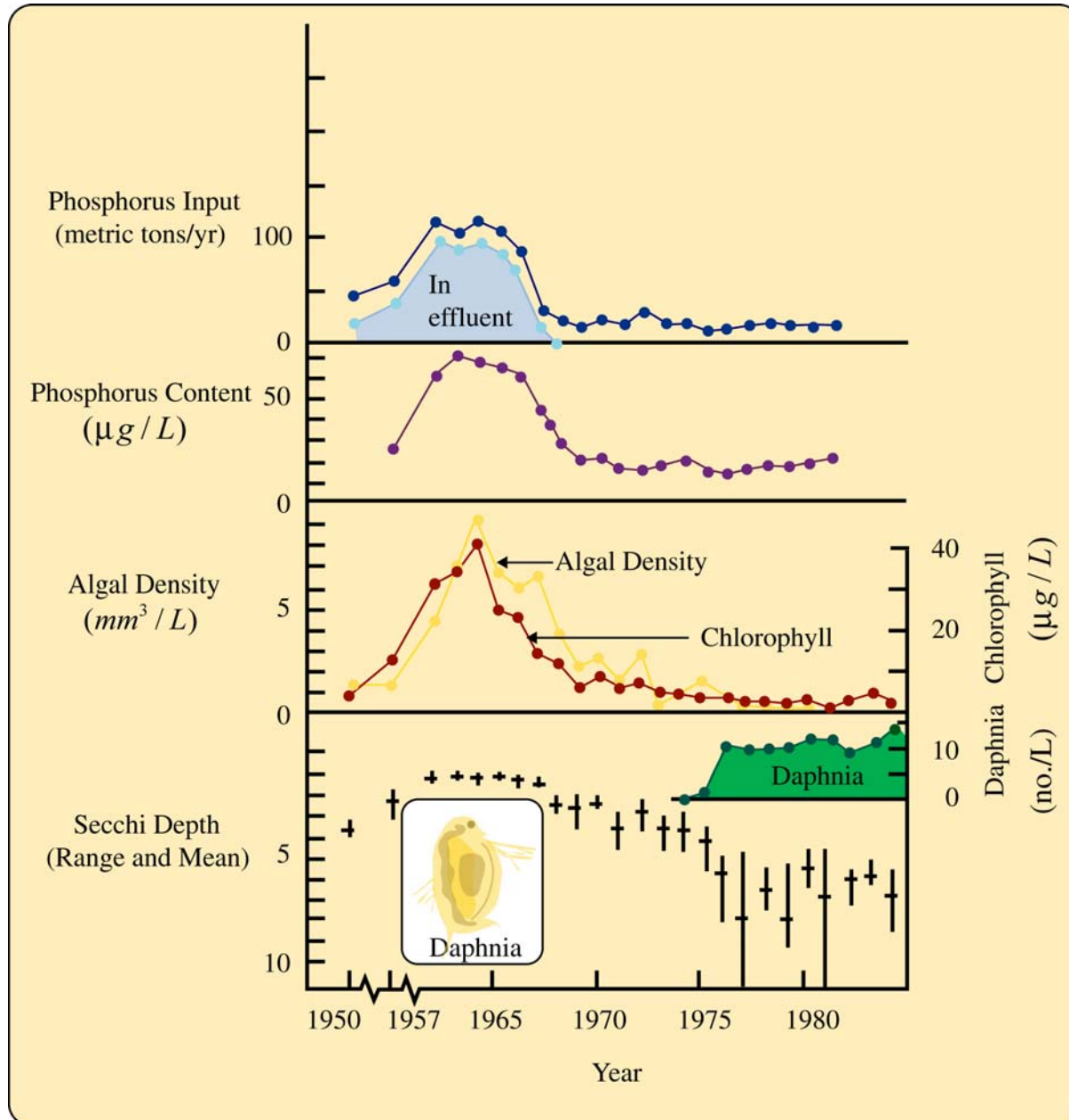
http://www.dfo-mpo.gc.ca/home-accueil_e.htm

Note: image usage policy: http://www.dfo-mpo.gc.ca/copyright/copyright_e.htm

Schindler

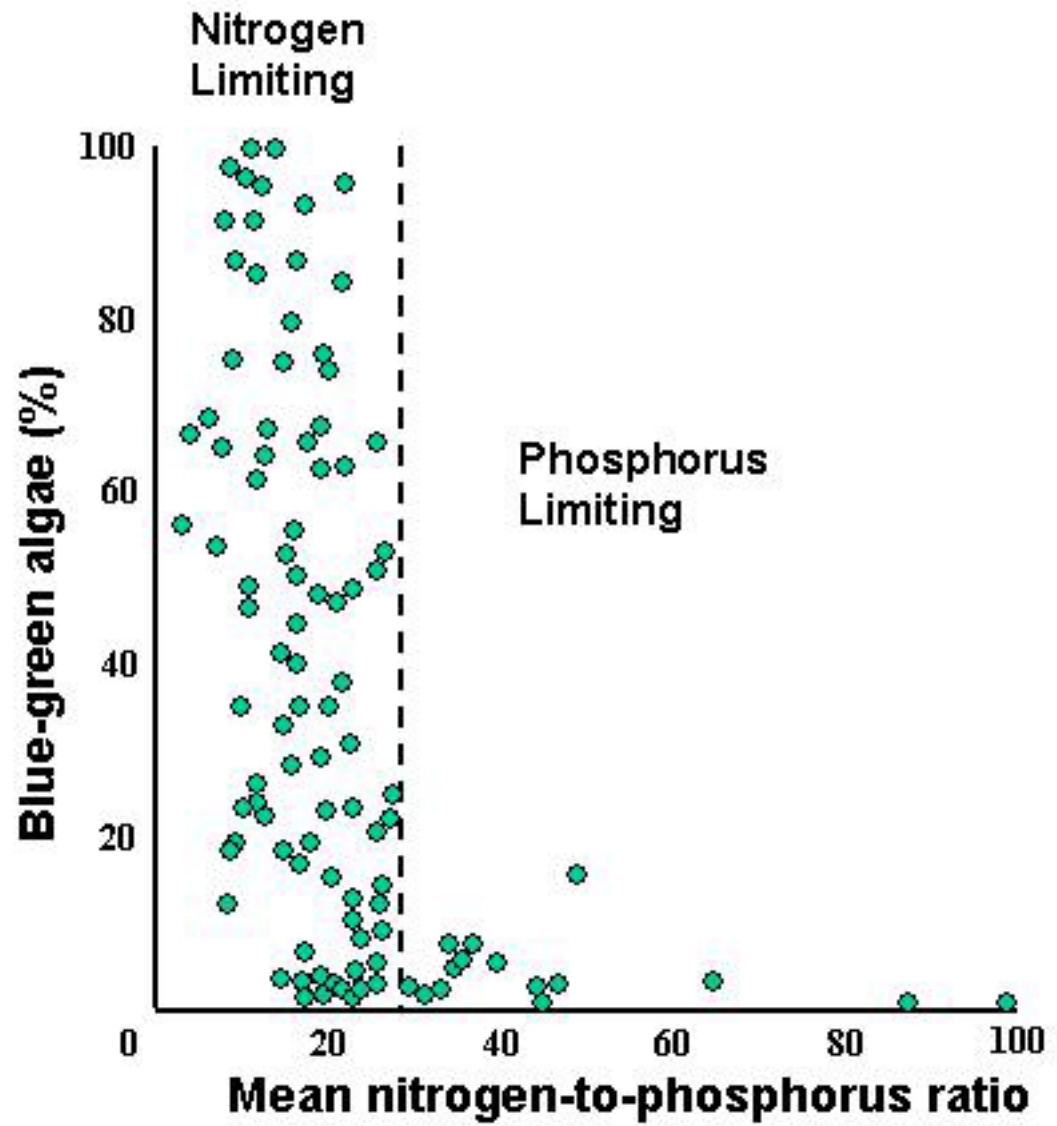
September 4, 1973

Pollution and Recovery in Lake Washington



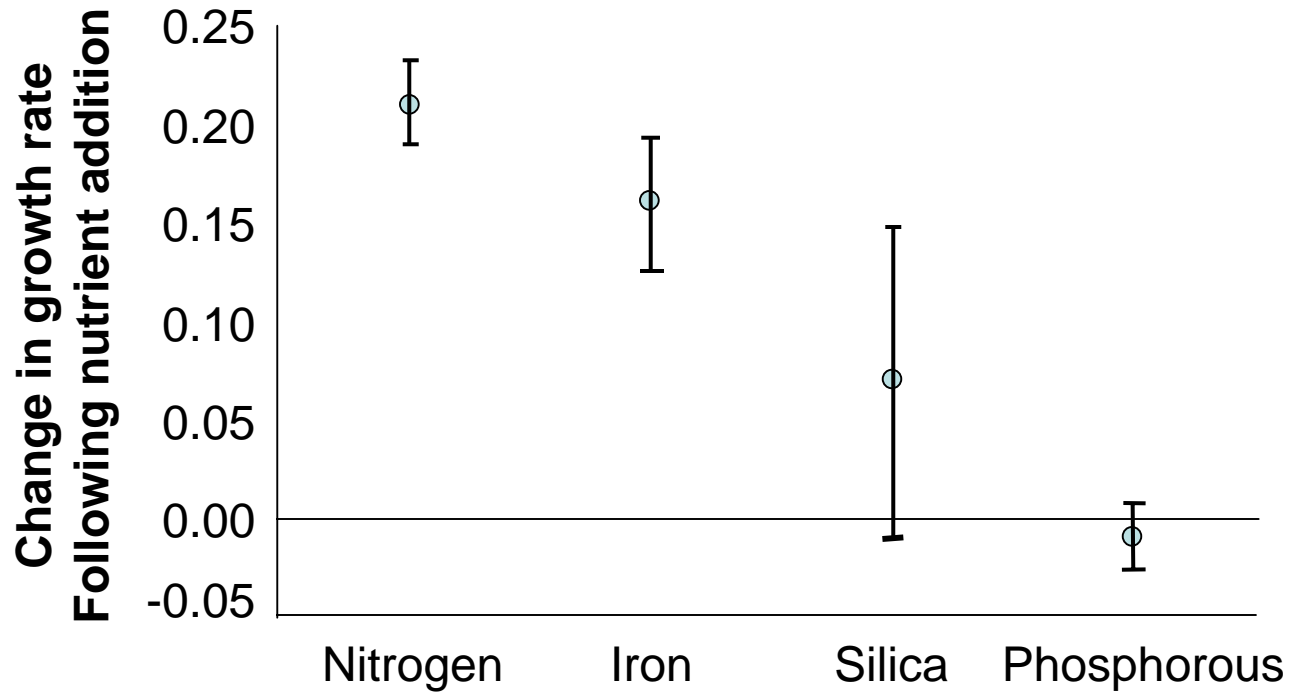
Adapted from
Krebs Figure 23.24

Source: Edmondson, 1991 (Figure 1.8)



Adapted from Krebs Figure 25.14

Marine phytoplankton samples



Adapted from Krebs Figure 25.9