Ulrika Magnea, Roberta Sciascia, Francesco Paparella, Rocco Tiberti and Antonello Provenzale. 2013. A model for high-altitude alpine lake ecosystems and the effect of introduced fish. Ecological modelling, 251: 211-220.

We discuss a simplified mathematical model for alpine lake ecosystems, describing the summer (i.e. ice-free period) dynamics of phosphorus, phytoplankton, three zooplankton compartments and fish abundance. Model output is compared with measurements of total phosphorus, chlorophyll-a and zooplankton biomass recorded in twelve high-altitude mountain lakes in the Gran Paradiso National Park (northwestern Italy) during the summer season from 2006 to 2009. Model results are consistent with measured data, indicating the appropriateness of this modeling approach for quantitatively studying mountain lake ecosystems and their response to environmental changes. The comparison between the results obtained for lakes without fish and those where the allochthonous brook trout (Salvelinus fontinalis) was introduced clearly indicates the strong impact of fish stocking in alpine lakes.