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Managing Eutrophication in the Great Lakes: the Primary Production Story

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The original models used to set target phosphorus loads were based on the Vollenweider model on total phosphorus loads and primary production. At the time the model was developed, primary production in the Western Basin of Lake Erie was approximately 360 gC/m²/y, and despite achieving target loadings of 11,000 tonnes per year, primary production has remained at this level. Although chlorophyll a levels have decreased over the this period, it would appear that the response of the lake to point source P controls was to turnover carbon more quickly in water columns with deeper euphotic depths. These observations suggest that treating the lakes as simple batch reactor models linking nutrient input and algal production, we need to move towards novel models with the capacity to predict compositional changes as the algal communities respond to multiple stressors such as species invasions and climate change.