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Abstract book

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Ecological models in policy advice and evaluation

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Ecological models have been used in the Netherlands to set standard nutrient concentrations and to evaluate planned policy measures. Four examples will be presented.

Why shallow lakes do not recover after phosphorus reduction?
It seemed to be surprising that shallow lakes did not respond as fast as 'one' wished. Even when the Maximum Allowable Concentration of phosphorus was met (0.15 mg P l^{-1}, summer average) the desired ecological status (for instance: clear water, submerged waterplants, pikes that reproduce in the lake) was not reached. The eutrophication model PCLake explained the resilience of the system by modelling the foodweb. This had consequences for the mind-setting in defining standard concentrations for nutrients. Target values had to be much lower than accepted before to reach desired ecological states (0.05 mg P l^{-1}, summer average). Additional measures accelerate recovery, and make it possible to reach clear water, even at enhanced phosphorus concentrations.

Are nation wide standard concentrations for nutrients functional?
Target values in the Netherlands have been derived from datasets of shallow lakes. These values (0.15 mg P l^{-1}, summer average) have been accepted for other water bodies because of the preservation of downstream vulnerable water bodies. If 50% *Lemna* coverage in polder ditches is accepted as a 'good ecological status' PCDitch revealed that ditches had a large range in target concentrations dependent on depth, sediment type and residence time (0.19 – 0.42 mg P l^{-1}, summer average). Dredging, as an additional measure, is not only useful in removing nutrient rich matter, but increases depth too. Both accelerate recovery.

Will manure - and fertiliser policy improve water quality?
Reduction of target N and P surplus have been simulated with sets of coupled models calculating loading end effects in several waterbodies. Only minor effects in regional waters were calculated. In larger waterbodies (rivers, large lakes and the coastal zone of the North Sea the effect was insignificant, even at the reduction of the target P surplus from 40 –1 kg ha^{-1} year^{-1}.

Downstream Protective Standard Values.
Vulnerable downstream waterbodies cannot be safeguarded from eutrophication if upstream concentrations are high (even if this does not endanger the upstream water body). Models have been used to calculate Downstream Protective Standards for River Rhine if the lake IJsselmeer had to be protected: 0.08 mg P l^{-1} (summer average), and 1.8 mg N l^{-1} to safeguard the coastal zone of the North Sea.