

# **Multipurpose wetlands for agricultural water protection - guidelines of wetland planning and construction**

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## **INTRODUCTION**

Constructed wetlands (CWs) are known to have an ability to retain nutrients and other harmful substances from the waters that flow through them. Usually, the main objective of is to decrease nitrogen (N) and phosphorus (P) loading, and hence eutrophication of surface waters. Wetlands can have also many advantages for rural landscape and ecological diversity of agricultural environment. When constructing wetlands for treating diffuse loading, combining also other interests in the planning in an early stage is essential for sustainable solutions.

The number of CWs as water protection measures is anticipated to grow in the near future in Finland. For this need, the latest scientific and experiential knowledge was compiled as renewed planning guidelines. In this project, the objective was to formulate and present detailed design and dimensioning guidelines of multipurpose-CWs for planners.

The knowledge included in the guidelines is based on the authors' 10-year experiences on CW research and planning as well as on intense co-operation with different interest groups.

## **CONTENT OF GUIDELINES**

The characteristics of CWs have to be designed concerning environmental objectives, local conditions and constructing methods (excavating, damming etc). The nutrient-retaining processes in a CW largely depend on water residence time. Also the conditions defined by the form of different parts of the CW play a role. Hence, adequately dimensioned (by choice more than 2% of the above watershed) and multiform CWs are recommended. The latter recommendation refers to deep and shallow parts, vegetation zones, curved shorelines, gently sloping banks, spits of land, islets etc. The guidelines deal solely with agricultural multipurpose-CWs, which combine the water protection targets with several other objectives like improved landscape, increased biodiversity, flood management, recreational use and hunting. In the guidelines these issues are discussed and good planning solutions are presented.

## **CONCLUSION**

By applying landscape design and ecological considerations in the early stage of CW planning, the technical demands of load reduction performance can be connected with many other benefits. The renewed CW planning guidelines take into account a wide variety of these aspects and will thus be an invaluable tool for the Finnish CW planners.