



Constructed Wetlands

Treatment of Agricultural Wastewater

What is an agricultural constructed wetland?

Constructed wetlands (CWs) are engineered, man-made systems designed to simulate a natural wetland that pre-treats wastewater through processes such as; filtration, settling, absorption, adsorption, and bacterial decomposition. A constructed agricultural wetland is used to treat agricultural wastewater before it reaches nearby waterways. There are two main types of agricultural wetlands; (i) surface flow (where a water surface is present) and (ii) subsurface flow (where the wastewater is treated below the soil surface). Constructed wetlands can offer a low-cost, low-energy alternative to other wastewater treatment technologies and are often compatible with most farming operations.

What have they been used to treat?

Constructed wetlands have been used to treat a variety of types of wastewater such as:

- manure runoff
- tile drainage effluent
- domestic waste
- industrial waste (i.e. potato wash water, aquaculture wash water, etc.)

Agricultural wastewater parameters that have been treated using these systems have included; biological oxygen demand, total nitrogen, ammonium-nitrogen, nitrate, total phosphorus, soluble reactive phosphorus, fecal coliform, E.coli, etc.

Why are agriculture constructed wetlands important?

Constructed wetlands are important wastewater treatment systems because they intercept and partially remediate wastewater before it leaves the farm in surface runoff or through groundwater infiltration. Constructed wetlands have been recognized in provincial environmental farm plans because of the important role they can play.

Benefits of an agricultural constructed wetland

- manage runoff and flood waters
- relatively low maintenance and construction costs
- increase on-farm biodiversity
- aesthetically pleasing to the landscape
- prevent eutrophication
- can function year-round
- used to treat a variety of wastewater types

Can they be used to treat wastewater in cold climates?

Much of the current research investigating the use of wetlands has monitored their treatment efficiency during warm climate conditions. Wetlands have been found to be very effective at treating a variety of wastewater types under warm climate conditions (greater than 5°C), however little is known about their treatment effectiveness under cold conditions such as here in the Atlantic region during the winter months. Current research has investigated ways to optimize their treatment effectiveness under cold climate conditions (below 0°C). Results thus far have shown great success when managed properly with over 90% mass removals for biological oxygen demand, total nitrogen, ammonium-nitrogen, nitrate, total phosphorus, soluble reactive phosphorus, fecal coliform, E.coli, etc.



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