But will wetlands function through the winter in our cold climate?

Are there cold climate wetlands that have been in operation for more than 10 years?

There exist databases that have collected available data on many hundreds of treatment wetlands in hot, temperate, and cold climates. This data has been analysed and is the basis for designing treatment wetlands worldwide. An example of an area where treatment wetlands that have been used for 20 or more years is in the Yukon and Northwest Territories where several systems have been polishing lagoon effluent since the mid 1960's and are still operational.

CH2MHILL

Is a constructed wetland a potential treatment solution for my community or industry?

While wetlands are not appropriate for all wastewater or stormwater treatment situations, they can be worthwhile in certain situations. The use of natural treatment systems must consider the contaminant and hydraulic loadings. And some level of pretreatment is required, so this is not a stand-alone system. Availability of sufficient land area is a requirement. However, as technology has advanced, wetland systems of smaller footprints are being constructed.

CH2M HILL has been and continues to be the leader in natural treatment systems and will be pleased to consider your potential application. A constructed wetland is one of many treatment technologies that we can assist you with for meeting your treatment needs.

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Natural Treatment Systems

Frequently Asked Questions on Constructed Wetlands for Wastewater and Stormwater Polishing

Constructed Wetlands - FAQ

Clients often have questions about constructed wetlands. Here we offer a few answers to those questions.

Will there be increased mosquito production?

Wetlands do produce mosquitoes since they feature relatively quiet water. However, compared to natural wetlands, treatment wetlands tend to produce fewer mosquitoes as they typically do not go through a drying cycle during the summer and predators of the mosquito larvae remain active throughout the breeding season.

Will the treatment wetland generate odours?

Water discharging from the pre-treatment system (lagoon or wastewater treatment plant [WWTP]) into the wetland is typically of a high enough quality that the potential of odours being generated by the treatment wetland is remote. A well designed constructed wetland that is operated as instructed and properly maintained will not create odour issues for adjacent property owners.

Will a further upgrade of the lagoon/WWTP and wetland system be required in the future to meet the flows at the predicted growth rate?

In many cases, an upgrade will eventually be required. But by adding the wetland, the lagoon/WWTP and wetland effluent discharges can be monitored allowing for an accurate prediction of when the future upgrade will be needed. Construction of additional wetland cells as contaminant and flow loadings increase may further postpone or eliminate the requirement for an upgrade to a conventional WWTP. This more passive approach to wastewater treatment represents a cost savings for construction and operations and maintenance before the upgrade is needed. It also makes good use of existing WWTP components and simply augments them.

What will the treatment wetland look like? Will it have a negative impact on the aesthetics of the area?

Treatment wetlands are lush green expanses of vegetation supporting a myriad of wildlife. They tend to add to the aesthetics of the areas where they have been constructed. With the attraction of wildlife and the thick emergent marsh that will mimic and possibly exceed the productivity of natural wetlands, it will provide a natural looking setting in keeping with, and blending into, the surrounding area.

How long will it be after construction is completed before the wetland is operational and functioning at the design capacity?

Once the plants are established - typically in the first year - the system is functional and will exceed the design capacity of some parameters or fall short on others. The system will reach steady-state performance within about 3 years of operation.

Are wetlands seasonally operated systems? Can the wetland continue to function during the winter?

The wetland will continue to work during the winter, although at a different pace. Uptake of contaminants into the plant tissue slows down in winter but this represents a small fraction of the treatment that occurs within the wetland. Other processes like sedimentation, sorption, and biological removal by bacteria that live in the wetland are the primary methods of contaminant reduction and the removal efficiency of many parameters are temperature independent. For example the effectiveness of a treatment wetland during summer and winter conditions for reduction of biochemical oxygen demand (BOD_5), total suspended solids (TSS), and total phosphorus (TP) will remain relatively unchanged from summer to winter since these processes are not as temperature dependent. However, the reduction of ammonia-nitrogen (NH_4-N) is dependant on bacteria in the wetland water column and bacteria will increase their rate of removal of NH_4-N during the summer and decrease during the winter. This must be considered when the wetland is designed.

Does the wetland reach a point when the sediment builds up to a level where it needs to be removed?

For typical septic tank or lagoon effluent wastewater characteristics, the wetland could continue to treat the treated lagoon effluent for many decades since the sediment build-up rate is less than 1 cm per year. The main reason for removing built up sediment would be if the freeboard within the wetland is reduced to a level that is no longer considered acceptable. Simply raising the berm height by importing fill material may provide several more decades of treatment capacity.

Can treatment wetlands be located next to residential properties?

There are numerous examples of residential properties that are adjacent to treatment wetlands. In Ontario, the Town of Brighton, the City of Toronto, and the City of Kingston all fall in this category. In Quebec are several dozen and throughout Kentucky there are more than 1,000 sites that use a treatment wetland to polish septic tank discharge. Several dozen farming operations have built a treatment wetland on their property to treat feedlot runoff and milkhouse washwater, and many are within clear view of the owner's home. The town of Lac Simon in Quebec has a hotel that has a wetland adjacent to their hotel within 20 m of the side of the building that treats wastewater from their septic tank. And in Alberta, one small community has a 150 ha wetland built adjacent to it and neighbouring farm properties that is embraced by the community. The Wakodahatchee Wetland in Palm Beach County, Florida is a treatment wetland that covers 16 ha with an extensive boardwalk that is considered the preeminent birding location in the county boasting thousands of visitors annually. It is surrounded by a middle to upper class residential development that see it as a positive asset and make good use of it.

Will the wetland impact the groundwater quality?

Since wetlands typically are required to have an impermeable liner, there is little, if any, potential of the wetland water entering the groundwater beneath it. Some wetland systems have been built on permeable soils without liners and have developed an impermeable layer within one or two seasons. Wetlands tend to be self sealing.

How does a wetland impact the business community?

Wetlands typically have a positive impact on businesses and becomes incorporated into their marketing strategy.

School Children Help to Seed the Brighton Wetland with Cattails

Great Blue Heron

Viewing Platform at the ICI Canada Ltd. Treatment Wetland