

Treatment of Feedlot Runoff using Constructed Wetlands



Chinook Feeders Ltd.

- Chinook Feeders Ltd. is a large, custom feedlot located in the M.D of Foothills.
- They were concerned with the build-up of phosphorus in the soil where they disposed of captured feedlot runoff.
- The purpose of this project is to reduce phosphorus concentration in captured runoff by directing flow through a constructed wetland.
- Treated wastewater can then be irrigated in a sustainable manner.

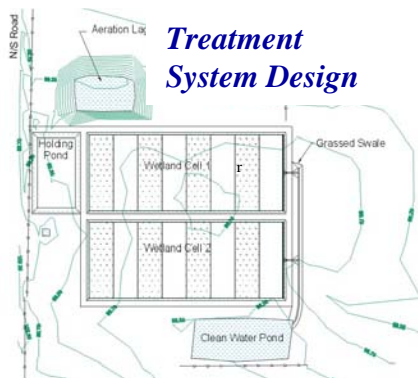
Feedlot Runoff Quality

Feedlot runoff quality is too strong for wetland treatment. It consists of high concentrations of ammonia, phosphorus and organic matter.

Ammonia (NH ₃ -N)	129 mg/L
Total phosphorus (TP)	65 mg/L
Oxygen demand (BOD ₅)	547 mg/L
Suspended solids (TSS)	967 mg/L

Aeration

- Aeration stimulates aerobic “oxygen-loving” microbes that consume organic material and nutrients. Ammonia is lost to the atmosphere and/or converted to nitrate in the lagoon. This will prevent rapid filling of the wetland and increase survivability of wetland vegetation.



Treatment System Design

Wetland

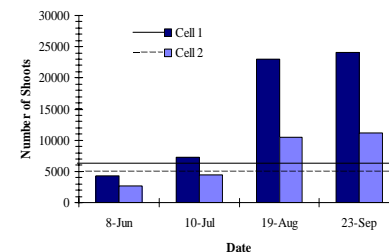
- The constructed wetland consists of two cells, each 1 ha in size. The wetland facilitates settling of solids, attenuates phosphorus in soil, microbes and plants, and transforms contaminants into less harmful forms.



Preliminary Results

- The wetland was planted in May 2000 with 10,000 cattails. Since then, vegetation has increased 4 times in Cell 1 and doubled in Cell 2. Figure 1 shows the vegetation establishment during the summer. The dashed and solid lines show the original number of shoots planted in each wetland cell.

Figure 1



- Samples taken from the outlet of each wetland cell show that Ammonia was reduced by 90%, Total Phosphorus by 44%, Total Suspended Solids by 45%, and Biochemical Oxygen Demand by 70%. As vegetation continues to grow, treatment efficiency is expected to increase.



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