

EMBRACING EXCELLENCE

LEAN

CONFERENCE CANADA
WINNIPEG | JUNE 6-9, 2022



PRESENTED BY

CANADIAN
MANUFACTURERS
& EXPORTERS

CANADA'S LARGEST LEAN
EVENT IN 2022

EMBRACINGEXCELLENCE.CA



WHEN THERE IS NO ROOM LEFT ON THE WHEY SIDE – A WASTEWATER STORY

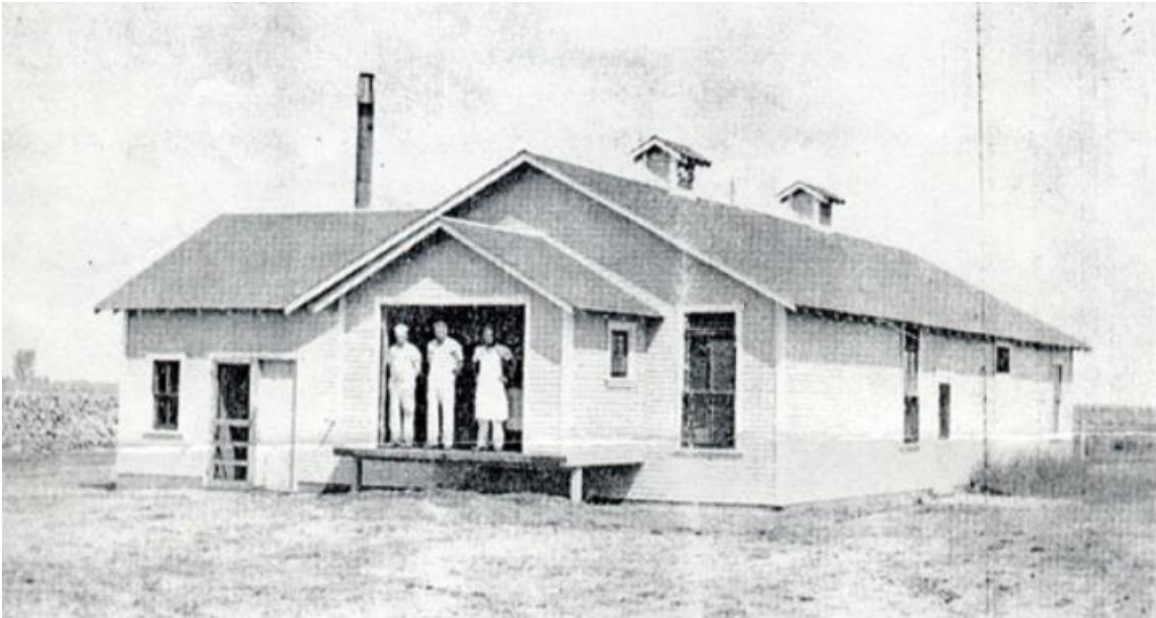
JEN LAWLESS, B. Sc., B.E.H.

Environmental Coordinator

Bothwell Cheese Inc.



BOTHWELL CHEESE DAIRY COOPERATIVE



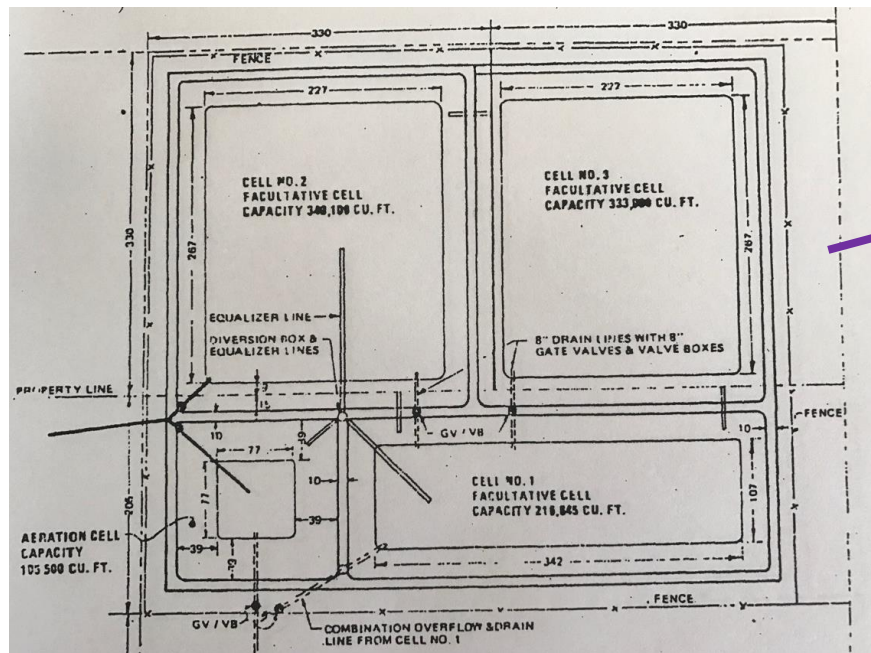
CHEDDAR PRODUCTION



https://stock.adobe.com/ca/images/dairy-products-milk-kefir-cottage-cheese-cheese-whey-butter-milk-sour-cream-and-cream-on-blue-wooden-background-technology-of-making-cheese-and-butter-from-milk/249546413?as_campaign=ftmigration2&as_channel=dpcft&as_campclass=brand&as_source=ft_web&as_camptype=acquisition&as_audience=users&as_content=closure_asset-detail-page

OUR FIRST WASTEWATER TREATMENT

LAGOON – CIRCA 1972



Town of New Bothwell

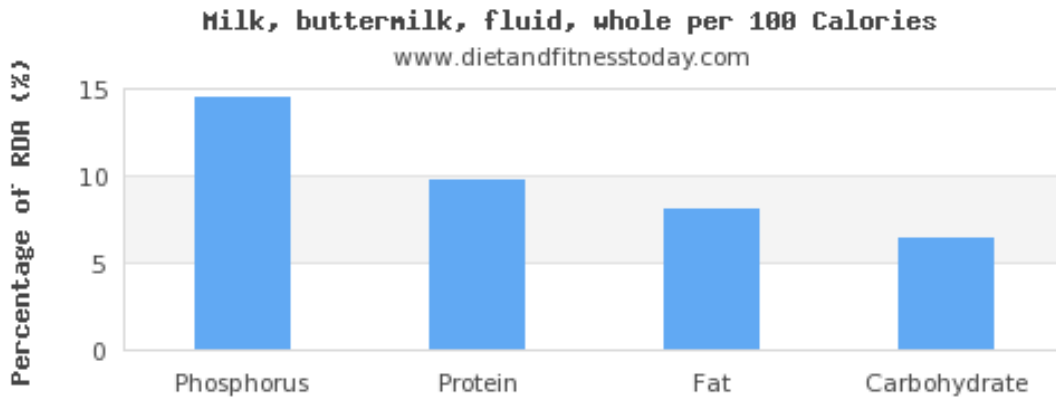
THE ENVIRONMENT ACT
(C.C.S.M. c. E125)

Disposal of Whey Regulation

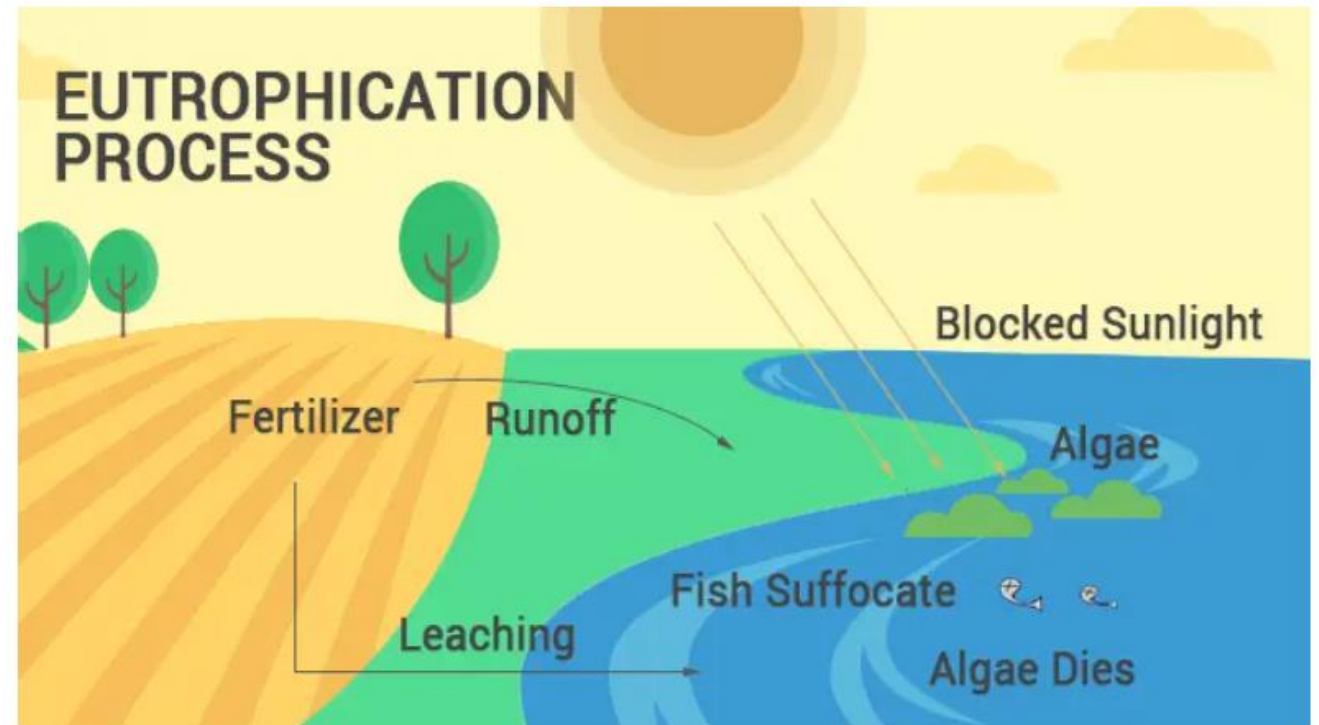
Regulation 90/88 R
Registered January 29, 1988

Google

PHOSPHOROUS & NITROGEN IN WASTEWATER



<http://www.dietandfitnesstoday.com/phosphorus-in-whole-milk.php>

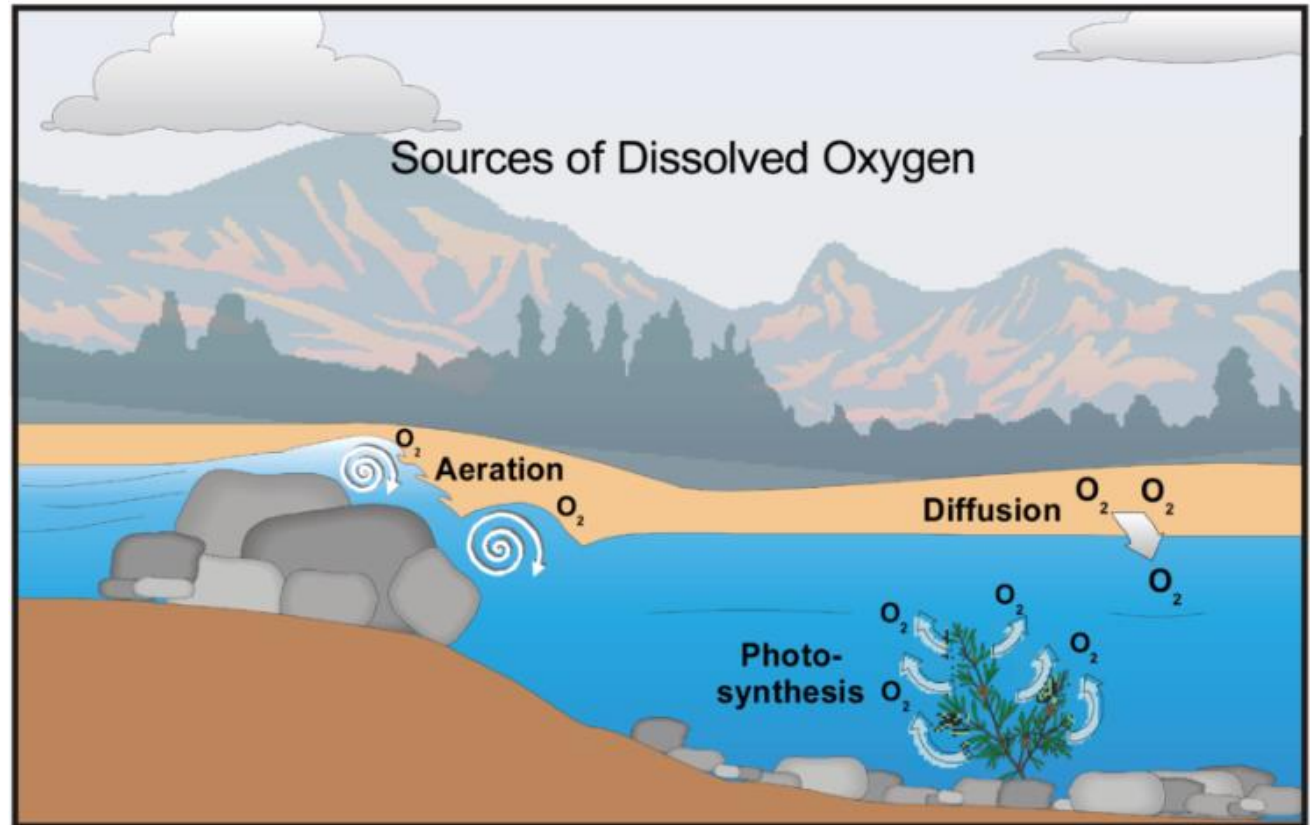


<http://www.dietandfitnesstoday.com/phosphorus-in-whole-milk.php>

BIOLOGICAL OXYGEN DEMAND IN WASTEWATER

Table 22.1
BOD of some milk products

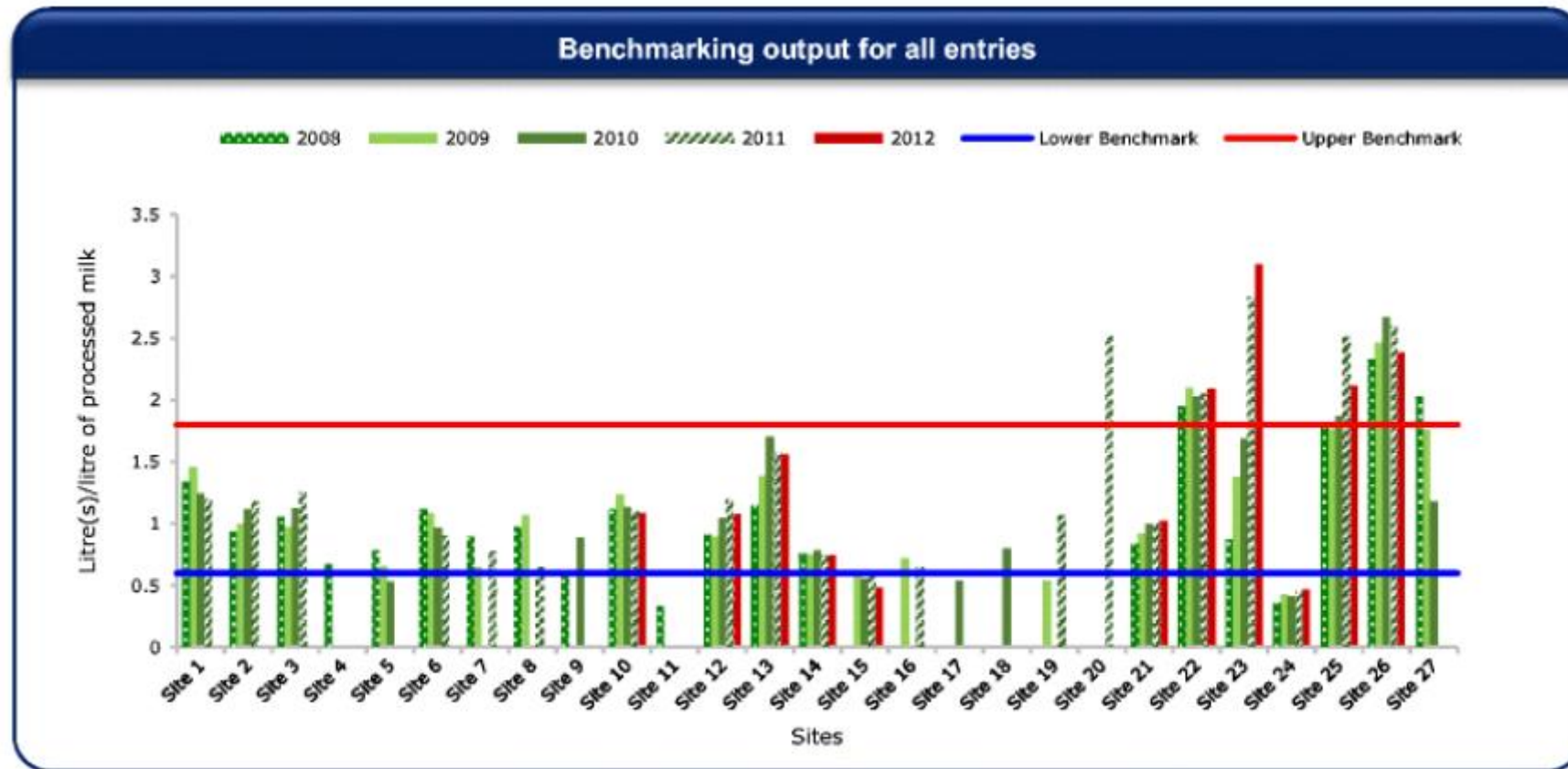
Product	BOD ₅ mg/ l
Cream, 40% fat	400 000
Whole milk, 4% fat	120 000
Skimmilk, 0.05% fat	70 000
Whey, 0.05% fat	40 000
Whey conc., 60% DM	400 000



https://diaspereira.weebly.com/uploads/5/6/3/9/5639534/dairy_handbook.pdf

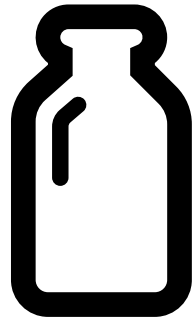
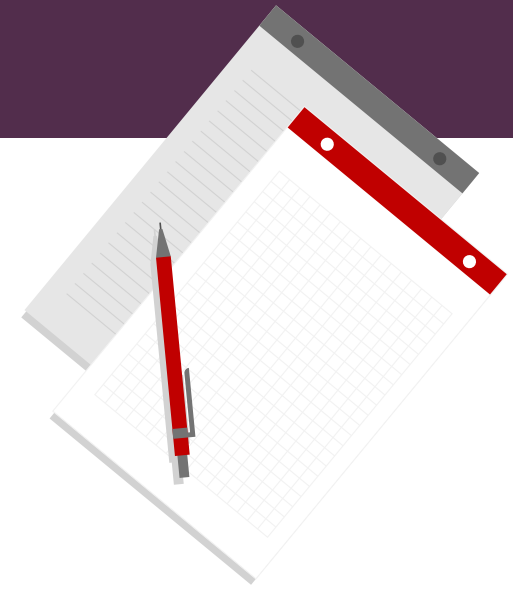
https://www.vernier.com/experiment/esi-16_biochemical-oxygen-demand/

WASTEWATER VOLUMES IN DAIRIES



<https://link.springer.com/article/10.1007/s41101-017-0036-0/figures/4>

WASTEWATER OUTPUT AS A KPI



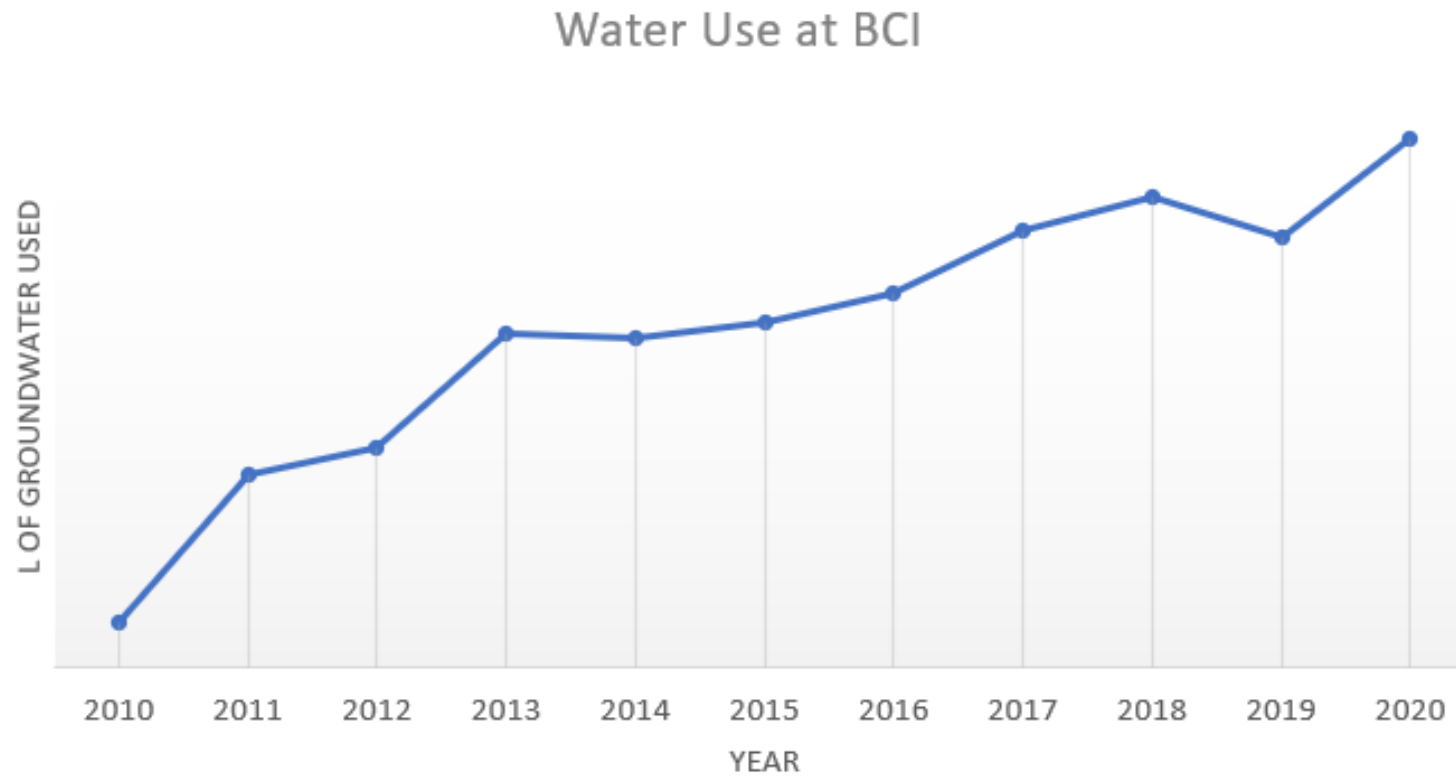
1 : ?

Milk L

WW L



WATER USE AT BCI OVER THE YEARS



LAND APPLICATION OF WHEY



WHEY AS A SOURCE OF PROTEIN FOR PIGS



<https://www.thepigsite.com/articles/water-acidification-to-improve-piglet-health-and-performance-5-takeaways>

2012 – ULTRA FILTRATION SYSTEM



2016 – REVERSE OSMOSIS & POLISHER SYSTEM



WHERE DOES THE COW WATER GO?



2018 - DISSOLVED AIR FLOATATION SYSTEM



DAF - IMPACT ON EFFLUENT QUALITY

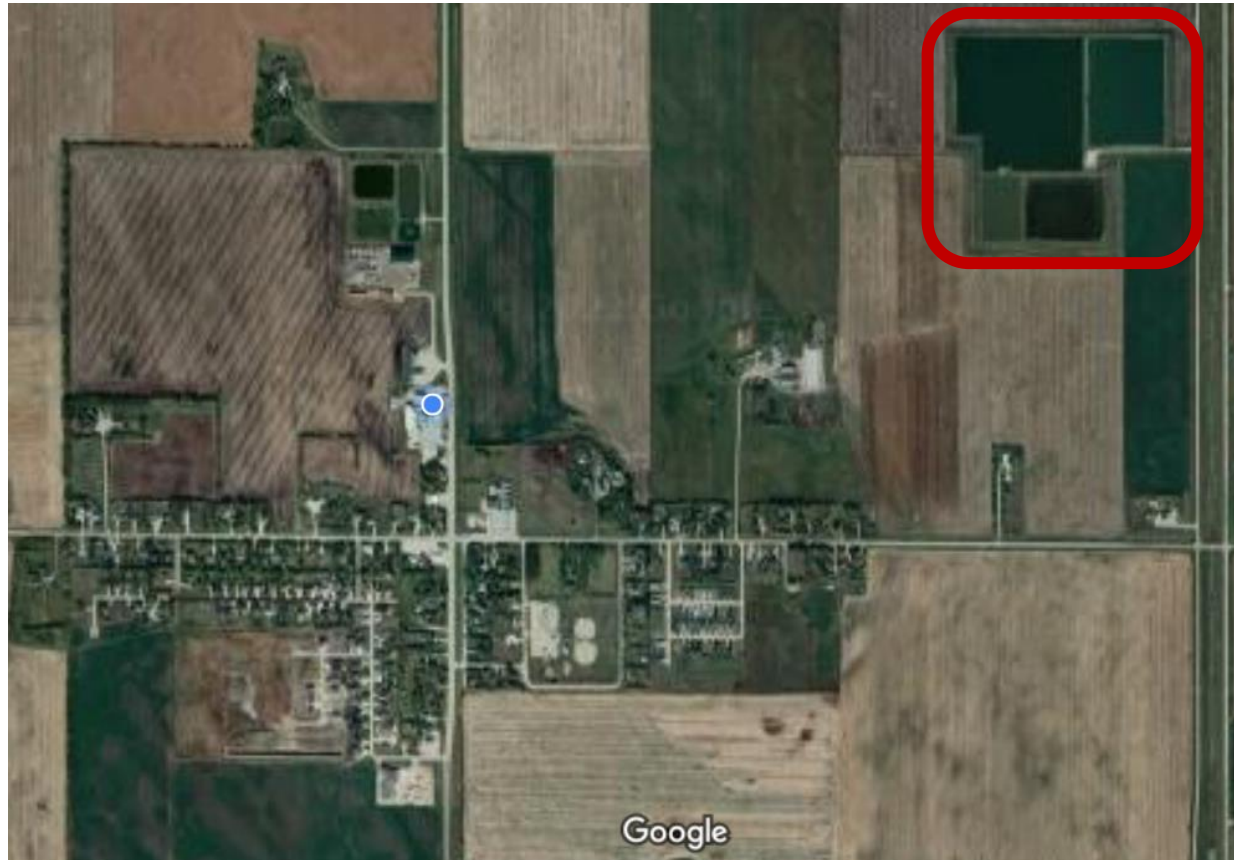
Untreated



Treated



WHERE DOES THE DAF EFFLUENT GO?



2021 – INVESTIGATED NEW PROJECTS

DIRECT INJECTION WELL – AQUIFER RECHARGE

- Wanted to recharge the ground water
- Rejected by the government
- Hydrogeology does not support

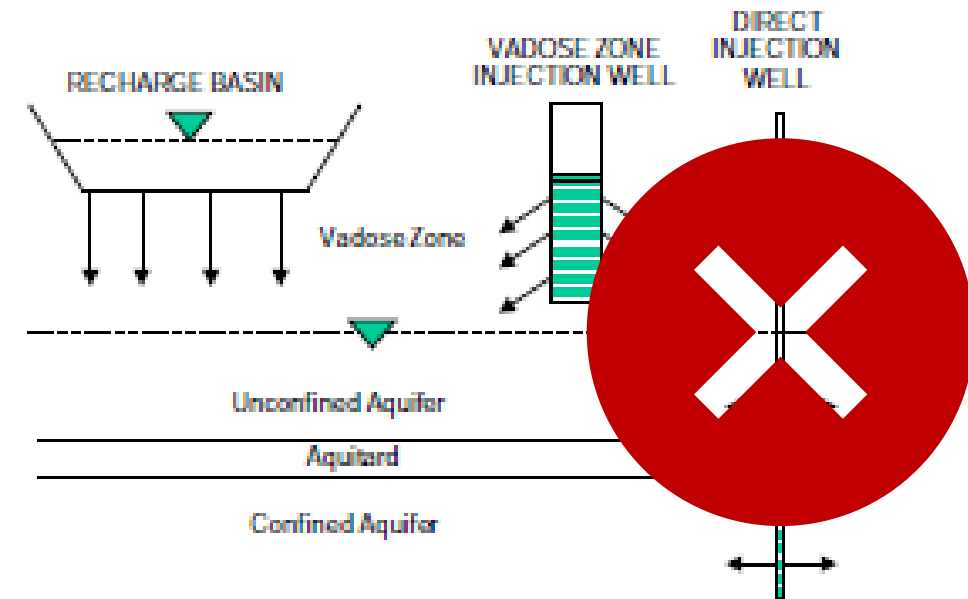


Figure 2-5
Commonly used methods in managed aquifer recharge

<https://www.epa.gov/sites/default/files/2019-08/documents/2012-guidelines-water-reuse.pdf>

2021 – INVESTIGATED NEW PROJECTS

PEAT BOG REHYDRATION WITH RO PERMEATE

- Wanted to “give back” to the environment
- Investigated with Ducks Limited & private party
- Was not deemed feasible



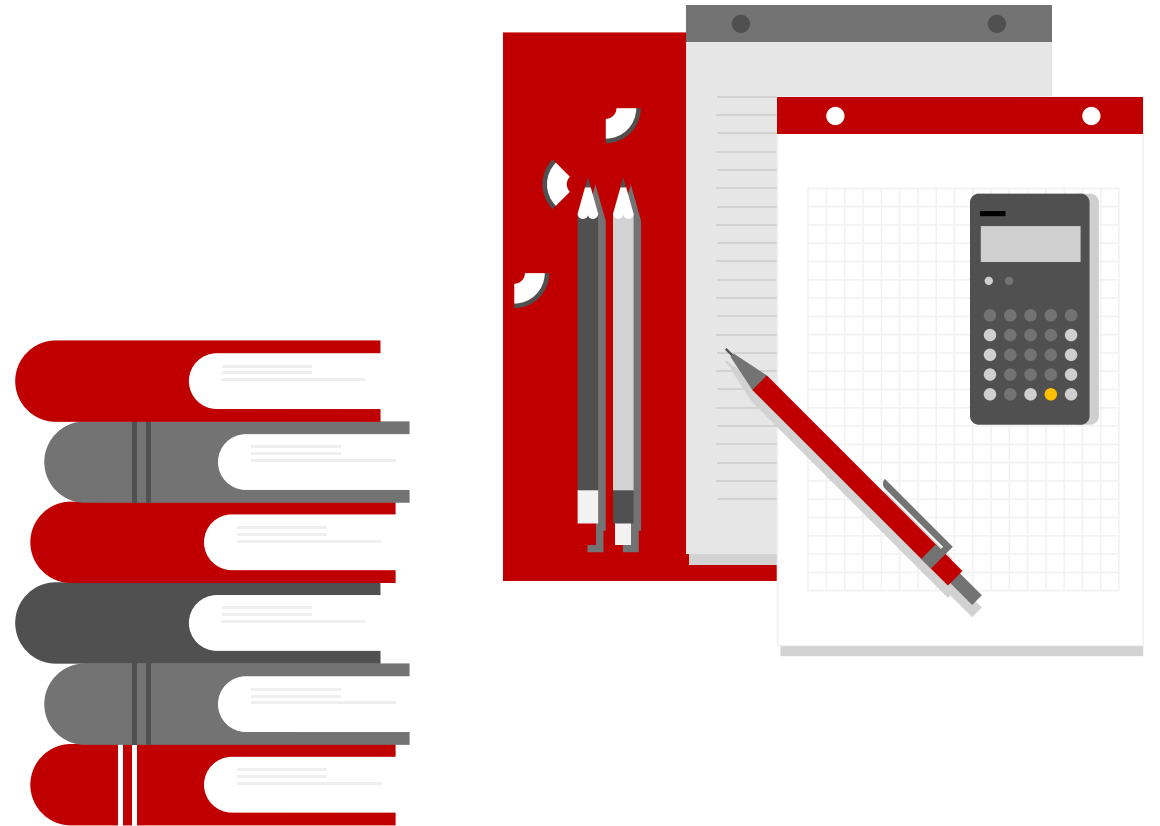
<https://www.treehugger.com/why-you-should-care-about-peat-bogs-4863716>

2022 – INTERNAL REUSE OF WATER

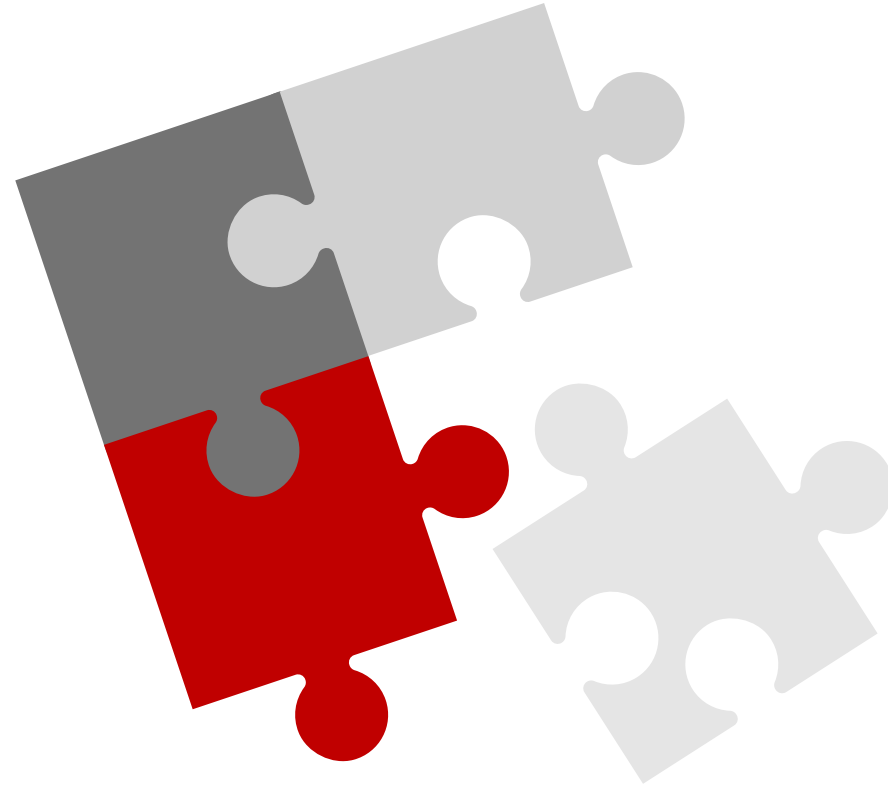
STORAGE AND RE-USE IN HOUSE

Task list:

- Ensure food safety is not compromised
- Determine appropriate use based on:
 - Water quality
 - Volume of demand and supply
 - Pattern of demand and supply



FINAL THOUGHTS



THANK YOU!

WHEN THERE IS NO ROOM LEFT ON THE
WHEY SIDE – A WASTEWATER STORY

Jen Lawless

Bothwell Cheese Inc.

Jen.Lawless@BothwellCheese.com

