

Aqualân Grou

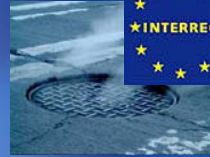
Presentation: April 24, 2009
Location: Amsterdam

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(Sr. Wastewater engineer)

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Background Department WWT of the Waterboard Fryslân



- 1 miljoen population equivalents
- 90 billion liter wastewater per year!!
- ca. 800 km sewer system (Wetterskip)
- ca. 270 pump stations (Wetterskip)
- 29 WWTPs

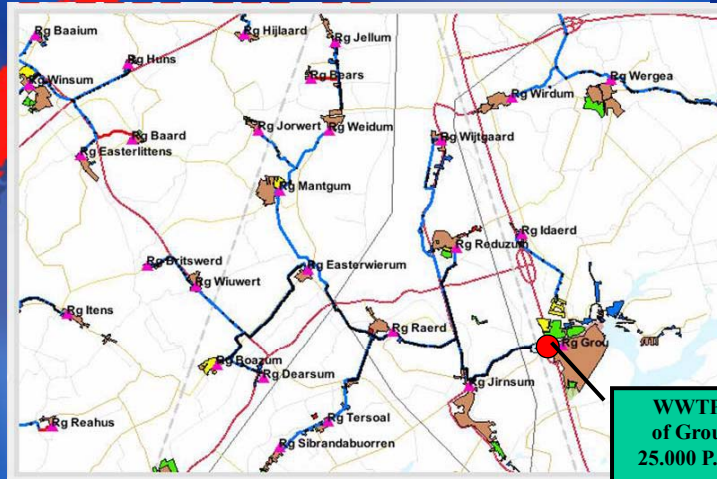


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Waterboard Fryslân



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WWTP
of Grou
25.000 P.E.

Why Aqualân Grou ?

History:

- Theo Claassen and Ruud Kampf; the “Dynamic Duo” as driving force
- Interreg UWC project = money!
- Space available at WWTP Grou and short distance and highway to Leeuwarden



Realisation Aqualân Grou

- 25% effluent WWTP Grou (pilot!)
- 3 daphnia ponds, 4 reed ditches and a pike pond



September 2004



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May 2006



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July 2006



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May 2007



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2008 mission completed!



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The Goals of “Aqualan Grou”

GOALS:

- Learning the potential of the wetland system
 - N and P removal
 - Disinfection
 - Removal of other compounds (heavy metals etc.)
 - Maintenance and control costs
 - Potential improvement of surface water quality
- Combining the wetland system with spawning ground for pike
- First step in bridging the gap between the emission approach and water quality thinking
- Stimulation of “Water Cycle” education (promote public awareness)



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The lay out and dimensions of Aqualân Grou



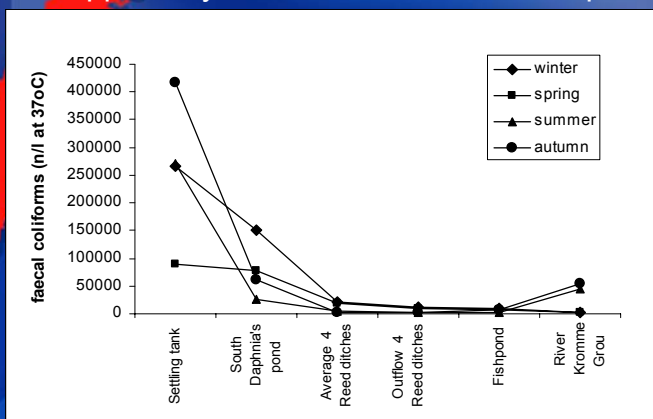
Details:

- In use since 2006
- Treats 20-25% of the - effluent from WWTP Grou
- Flow approx.: 50 m³/hour, 1.200 m³/day
- Load 0.1 m³/m²/day

1. Settling tank
2. 3 Daphnia's ponds (HRT = 3d)
3. 4 Reed ditches (HRT= 2d)
5. Pike pond (HRT = 2d)
6. The river "Kromme Grou"

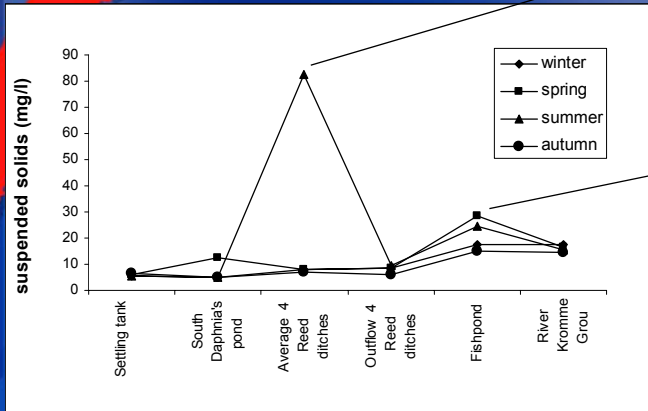
Faecal coliforms at 37 °C.

- Average very high removal during all seasons.
- Most effective removal (98%) during autumn and summer
- Apparently fastest removal rate in daphnia ponds



Suspended solids

Average low levels during all seasons.
 Creation of (dead and living) organic material.
 Spring is most effective period in revitalization.

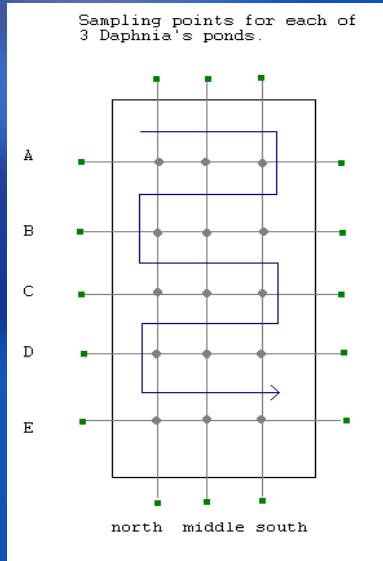


Algae bloom in summer 2007

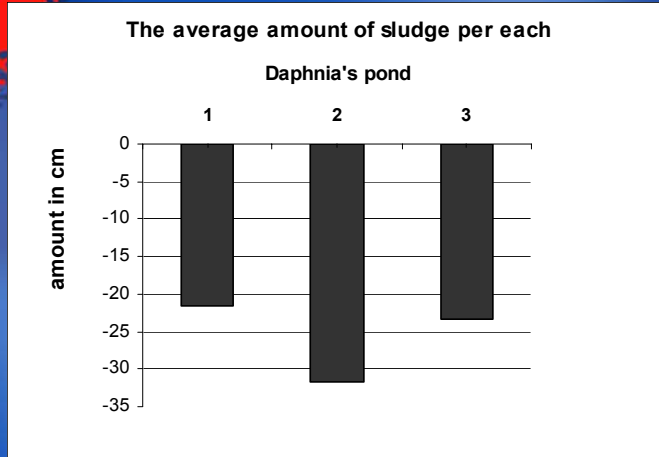
Turbulence Caused by fish?



Sampling sludge accumulation Daphnia ponds



Sludge accumulation in the Daphnia ponds



Aqualân Grou: fish species 9 Juli 2008

| Fish species | Daphnia pond | End of reed | Fish pond |
|--------------------------|--------------|-------------|-----------|
| Baars | | | 9 |
| Blânkvoorn | | | 54 |
| Kleine modderkruiper | | | 4 |
| Paling | | | 2 |
| Ruisvoorn | | | 6 |
| Tiendornige stekelbaars | 0 | 23 | 1 |
| Zeelt | | | 5 |
| Brasem | | | 2 |
| Driedoornige stekelbaars | | | 1 |
| Snoek | | | 3 |
| Giebel | | | 2 |
| Kolblei | | | 2 |
| Riviergrondel | | | 6 |

European Water Frame Work Directive: Biodiversity!!!!!!

Overview results Aqualân Grou



- + 98% E-coli removal
(below bathing water quality demand !!)
- + Oxygen increase from 3 → 9 mg/l
- + Biodiversity increase in pike pond
- +/- 30-40% N removal
- +/- slight increase of suspended solids
- only 10-20% P removal
- 30 cm sludge accumulation in two year

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Mesocosm research Grou

Goals:

- Try to understand the mechanism of Daphnia ponds
- Focus on disinfection and suspended solids

Results:

- 98% E-coli removal at HRT 4 days
- Mesocosm tanks contain apparently more Daphnia than in the Daphnia ponds





QUESTIONS??



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