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Waterharmonica internationaal

Presentation · November 2019

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Ruud Kampf

Rekel/water

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Climatescan: open source tool mapping SUDS around the globe [View project](#)



Nature based Nitrogen and Phosphorus Removal from 'Waste Water Treatment Plants effluent in developing countries [View project](#)

Waterschap De Oostvaardersplassen

stowa

Ontwikkelingen

Waterharmonica's internationaal

Ruud Kampf

Symposium 'Natuurlijke Zuiveringstechnieken'
13 november 2019

Rekel/water

Rekel Kenya

Ruud Kampf: Rekel/water, www.rekel.nl/water, r@rekel.nl +31649450214

1

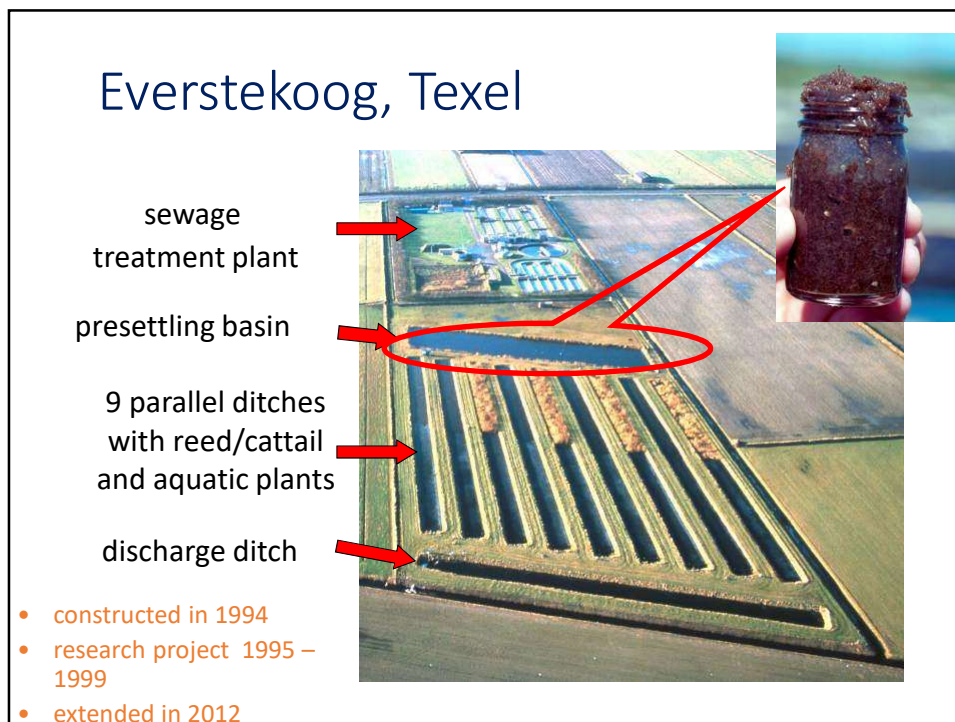
Inhoud

- Ruud zag veel van de wereld
- Joost Bunsma vertelde in Singapore over de Waterharmonica
- Er zijn in de wereld veel Waterharmonica's
 - Maar iedereen noemt ze anders.....
- Zweden ontwierpen Waterharmonica Kristalbad

Sorry

	221 flights 75 domestic 146 international	450,079 miles 724,332 km 18.1x around Earth	1,014 h 39 min 42.3 days 6 weeks	89 tons CO₂ 4.91 kg methane 4.02 kg nitrous oxide
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2



3



4

Fish in the Eversteekoog constructed wetland



in first pond no fish

fish in ditches:

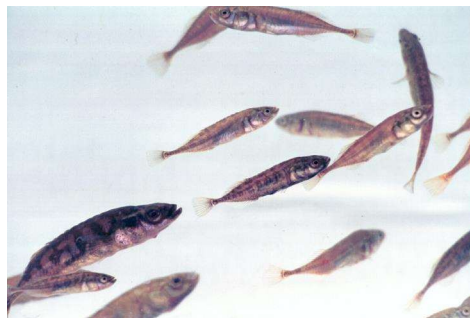
- but only after 3 days retention time
- after 10 days a lot of fish
up to 15 Stickleback per m²



5



Sticklebacks



6

Typical effluent quality oxidation ditch STP

BOD: 2 - 3 mg/l
NH4: 0.1 - 1 mg/l
NO3: 3 mg/l

Suspended solids: low

Better than many surface waters !!!

But for example faecal coli: 400 - 800 per ml !

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Eco-ponds Florida



8



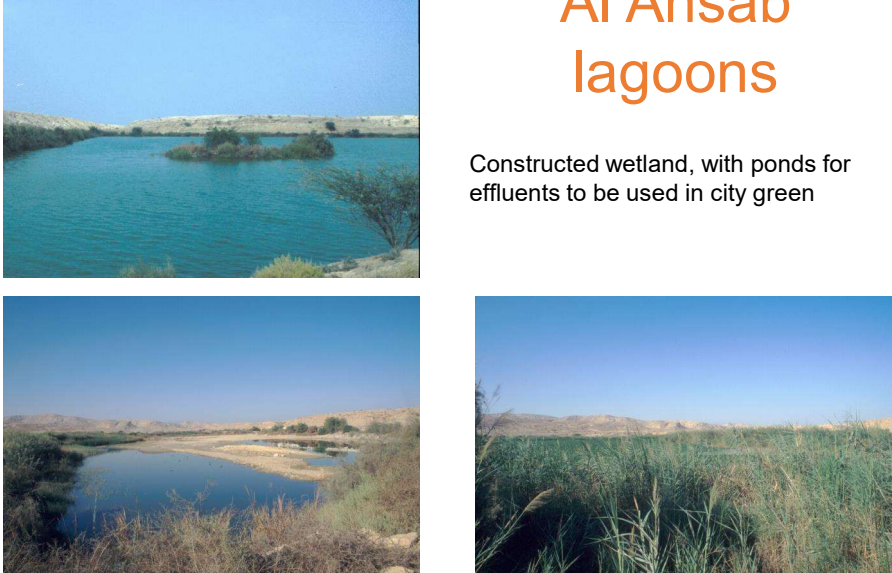
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STP Muscat, Oman



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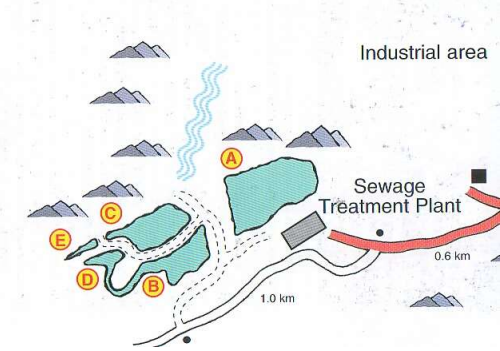
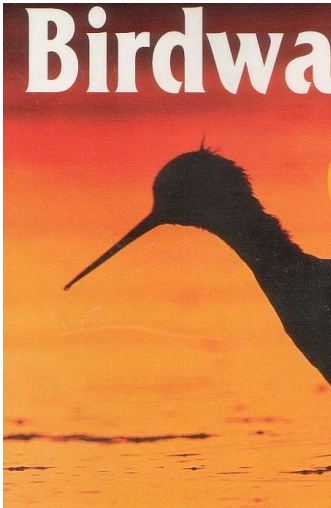
STP Muscat "Al Ansab" lagoons



Constructed wetland, with ponds for effluents to be used in city green

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Birdwatching guide to Oman



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STP Muscat "Al Ansab" lagoons



"the man-made ponds at Al Ansab Sewage treatment Plant, the top birding spot of the Capital area of Muscat"



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Kommetjie, Capetown

Carrousel, ca. 20.000 p.e.



14

Kommetjie ponds for after treatment



15



4 ponds



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Cape Town, huge effluent ponds Cape Flats Waste Water Treatment Works



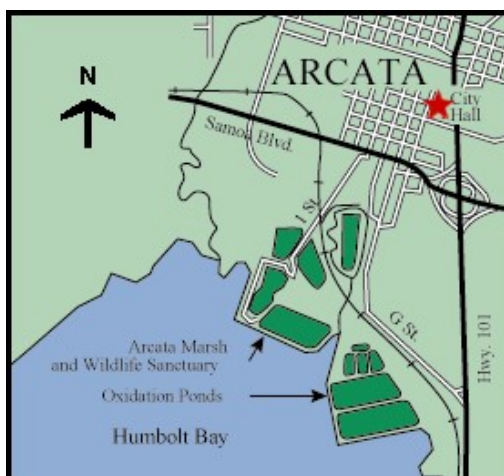
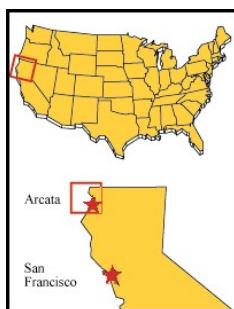
“This large sewage works of 306 ha is one of the best birding spots close to Cape Town”

17

Arcata Residents

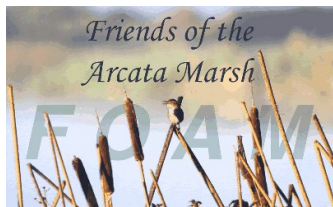


“Flush With Pride”



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ARCATA MARSH INTERPRETIVE CENTER



to stimulate understanding of the Arcata Marsh Wildlife Sanctuary, it's relationship with Arcata's integrated wastewater treatment system.....



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Arcata Welcomes Birders

Birding



*at the
Arcata Marsh and Wildlife Sanctuary*



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Arcata Marsh, aerial view



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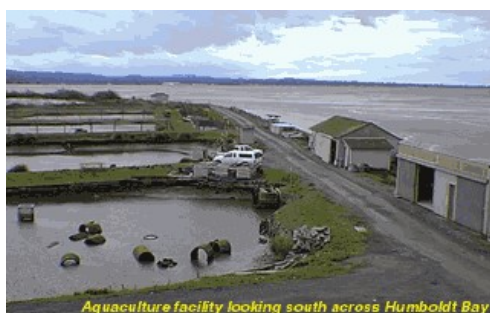


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Arcata Aquaculture Project

City of Arcata, Humboldt State University

THE BENEFITS OF WASTEWATER



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Inhoud

- Ruud zag veel van de wereld
- Joost Bunsma vertelde in Singapore over de Waterharmonica
 - Er zijn in de wereld veel Waterharmonica's
 - Maar iedereen noemt ze anders.....
 - Zweden ontwierpen Waterharmonica Kristalbad

Board meeting of the
Global Water Research Coalition (GWRC)
Singapore
29 May 2014

Joost Bunsma, Stowa, The Netherlands

The Waterharmonica



Ruud Kampf, Rekel/water

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➔ Natural (biological) processes in today's infrastructure

Board meeting of the
Global Water Research Coalition (GWRC)
Singapore
29 May 2014

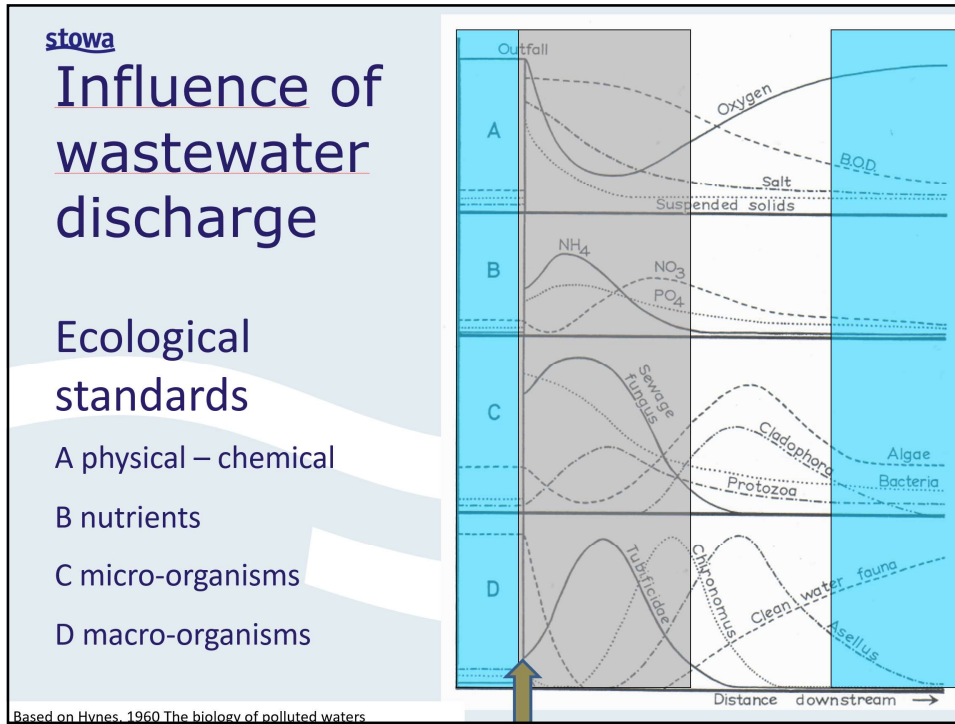
Joost Bunsma, Stowa, The Netherlands

The Waterharmonica

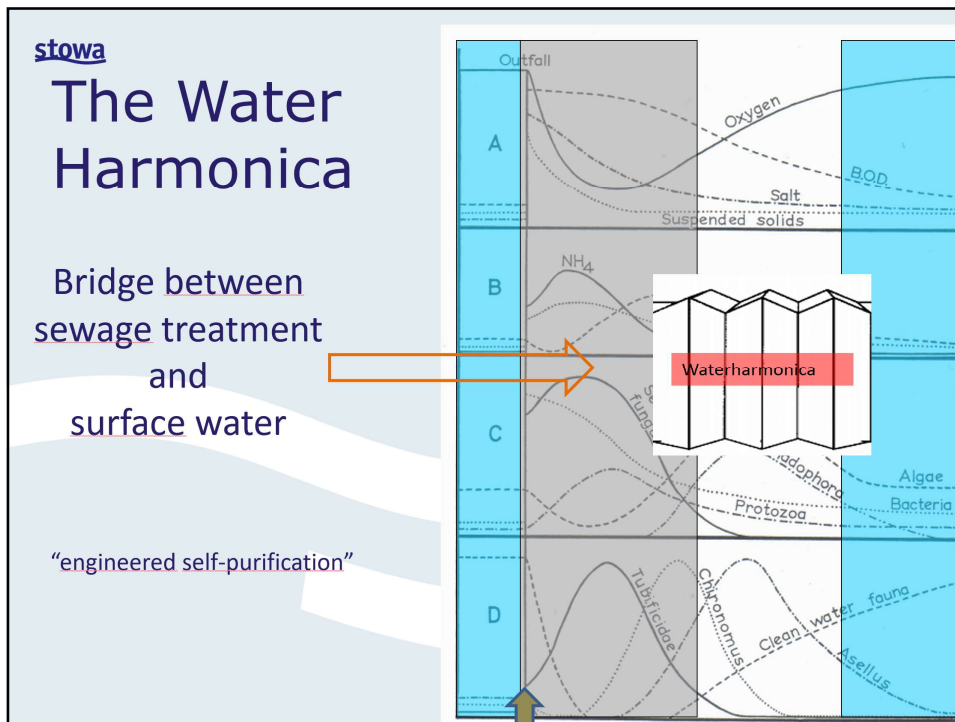
Thanks to
Ruud Kampf,
Rekel/water
The Netherlands



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Emerging problem

- ⇒ (Fresh) water shortage
 - ⇒ Agriculture
 - ⇒ Industry
 - ⇒ Drinking water
- ⇒ There is no waste water
- ⇒ Waste water is a 'new' source
- ⇒ Reuse is a reason to treat waste water

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Natural link in the watercycle

Waterharmonica: the natural link between drinking water and surface water

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Conclusions

An established concept, a way of thinking

Obtained a place in Dutch national policy plans


Research and monitoring
➤ Experience is growing

Presentation on the Board meeting of the Global Water Research Coalition (GWRC) Singapore
29 May 2014 by Joost Bunsma of Stowa

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stowa

Added value



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Volledige voordracht:
http://www.waterharmonica.nl/publikaties/2014_05_29_Singapore_Waterharmonica_Bunsmas_Stowa_2pp.pdf

Presentation on the Board meeting of the Global Water Research Coalition (GWRC) Singapore
29 May 2014 by Joost Bunsma of Stowa

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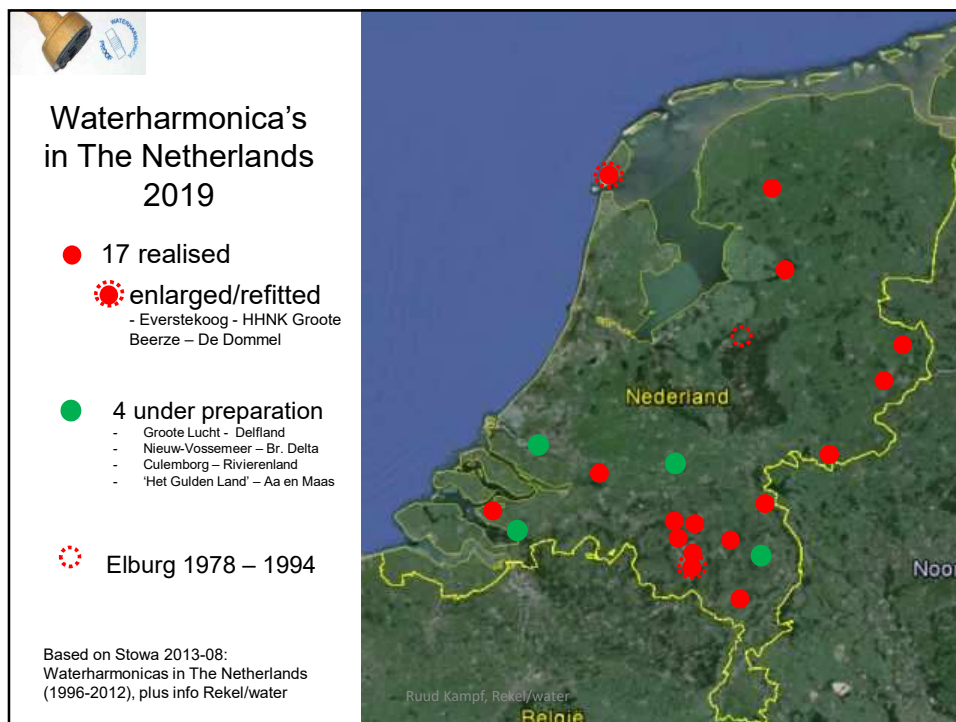
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Ruud Kampf, Rekel/water

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Maar hoe zit dat, is de Waterharmonica uniek?

Technical Workshop
 The integration of reclaimed water in water resource management: the fostering role of the territorial region
 Lloret de Mar (Costa Brava, Girona)
 19-20 October 2005

The Empuriabrava WWTP

From Lluís Sala, Consorci de la Costa Brava

Empuriabrava

2005

Ruud Kampf, Rekel/water

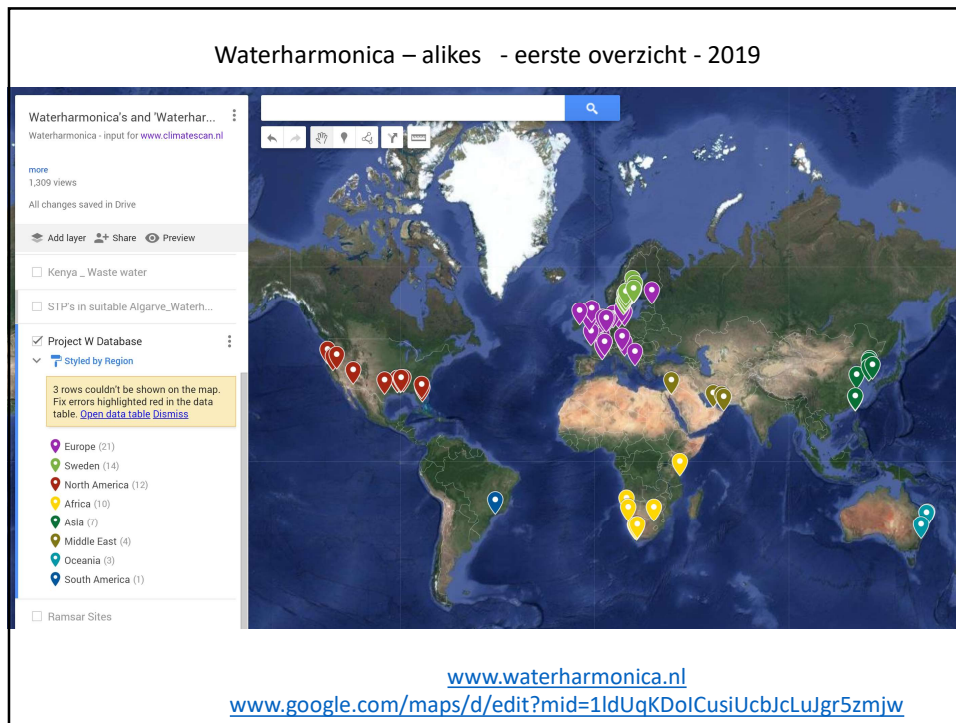
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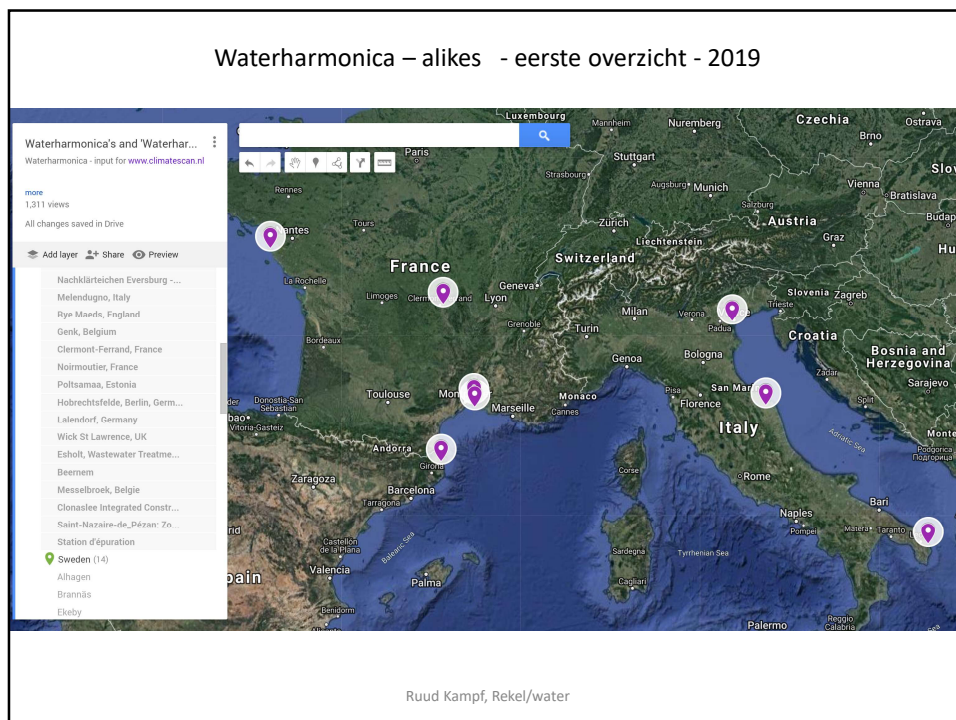
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Waterharmonica – alikes - eerste overzicht - 2019



United States


Mexico

The Wakodahatchee Wetlands
Palm Beach Florida

Ruud Kampf, Rekel/water

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Doorlinken kan verdere info geven



Wakodahatchee Wetlands
Palm Beach Florida

The Wakodahatchee Wetlands
Palm Beach Florida

The Wakodahatchee
Wetlands

The Wakodahatchee Wetlands
Palm Beach Florida

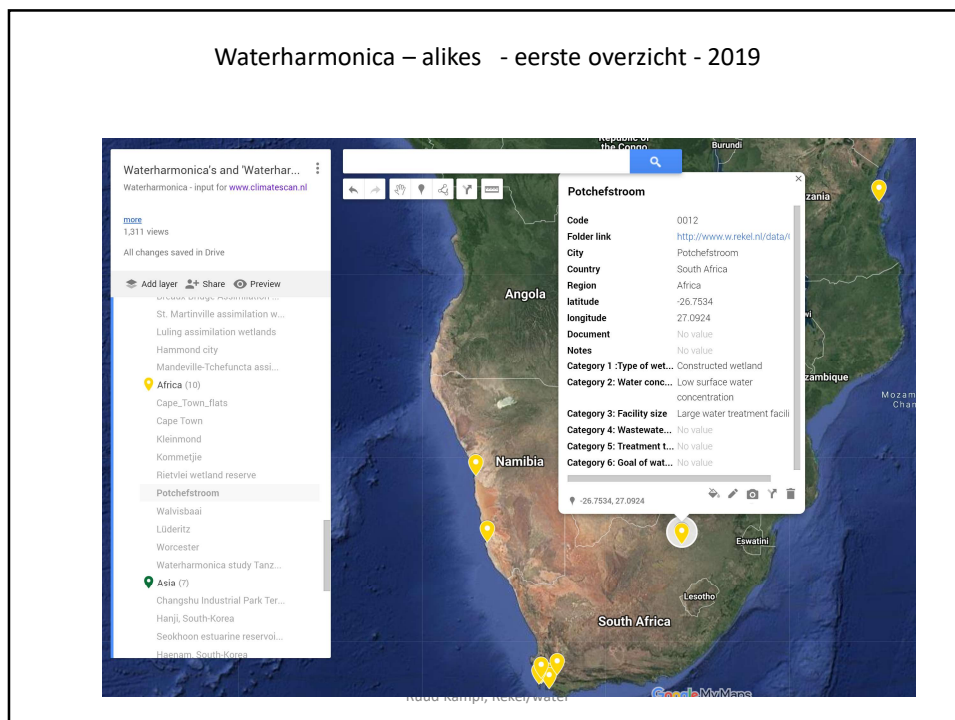
Hegen-Ranch Rd

Palm Beach
County Parks and Re...

The Wakodahatchee Wetlands
Palm Beach Florida

Ruud Kampf, Rekel/water

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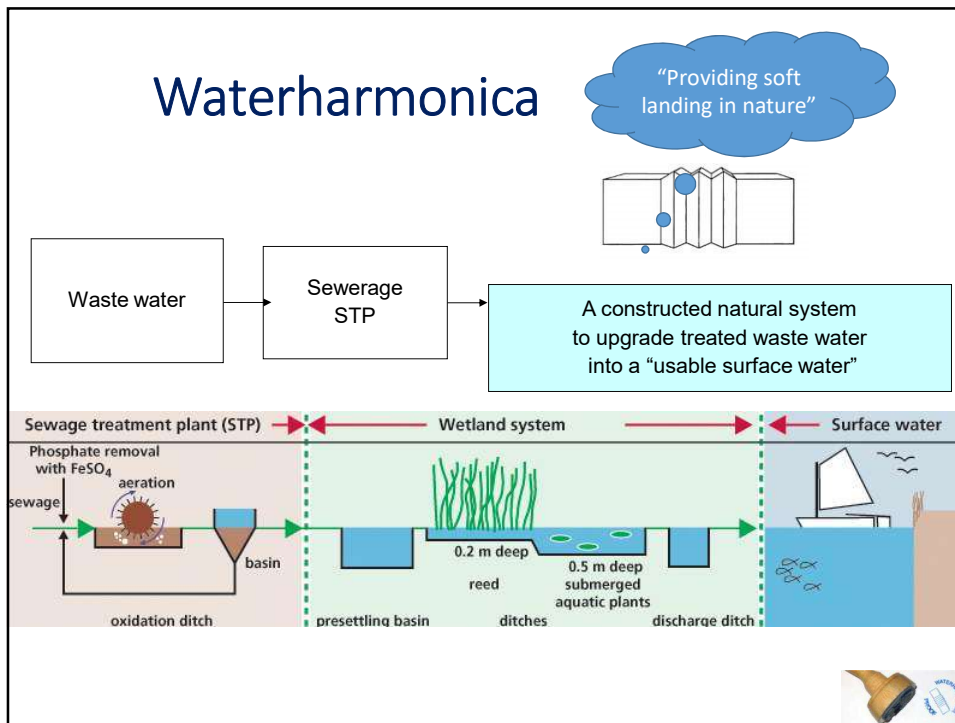
In The Netherlands we do have something called Waterharmonica

 www.stowa.nl
www.waterharmonica.nl

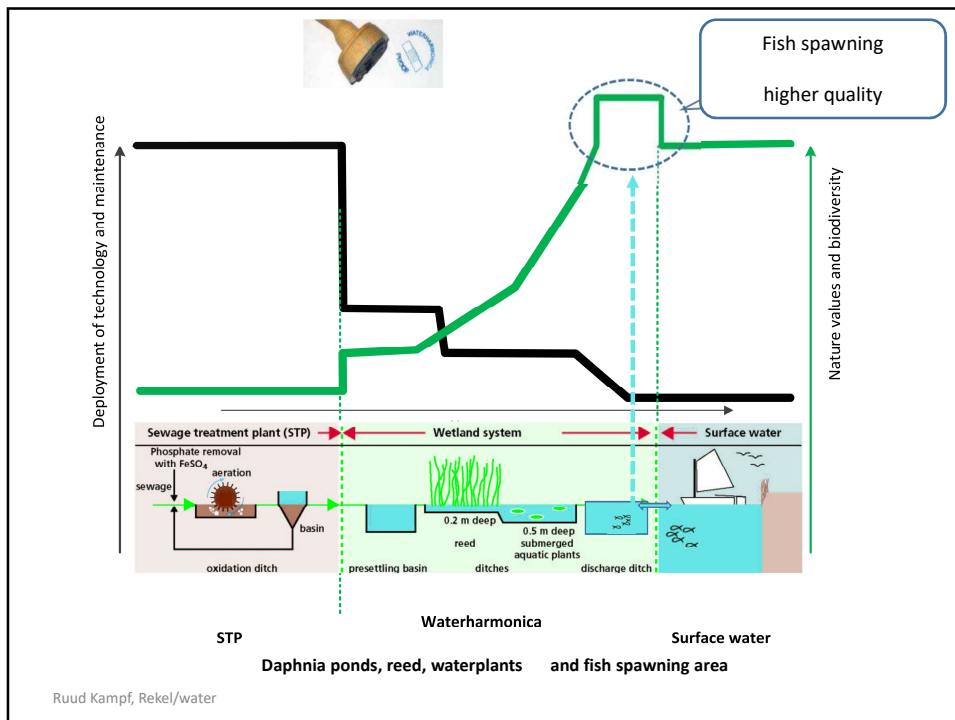



Rekel/water

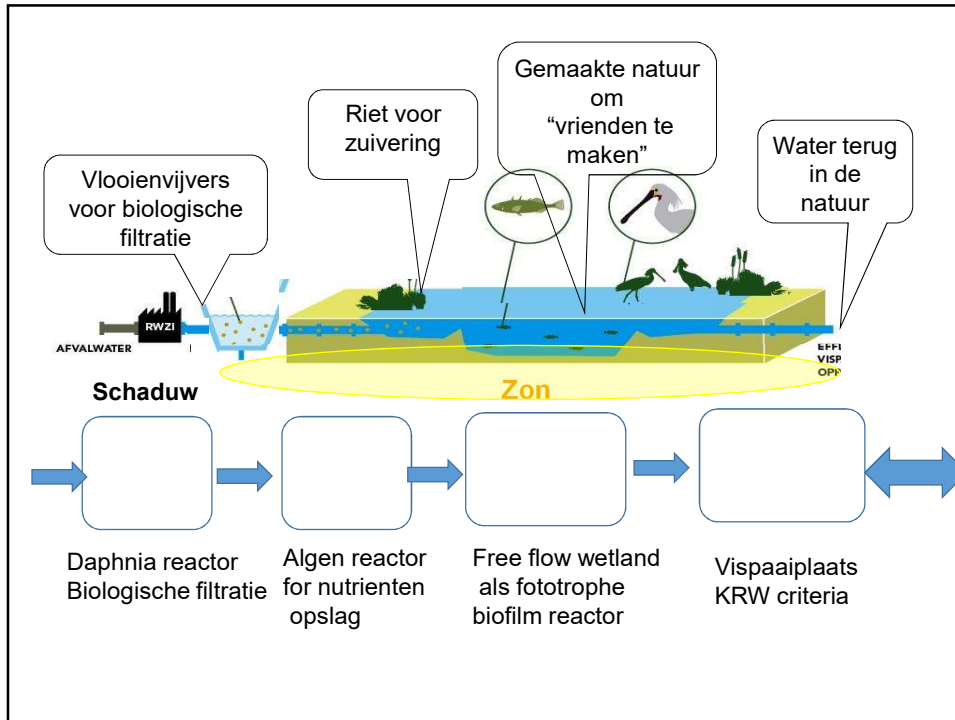
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Process technology constructed wetlands

- Oxidation ditch / carousel:
 - like polluted surface water
- Constructed wetland for effluent polishing:
 - like cleaner surface water
- Processes are comparable
 - settling, adsorption, (photo catalytic) biofilms, diffusion, growth, decay, etc.

→ combination van (bio)procestechnology, agriculture, biology, etc.

→ ecological engineering: www.IEES.CH

 **[EcoEng-online]**
 International Ecological Engineering Society

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“Kwekelbaarsjes”

growing **Daphnia** on treated wastewater
of the STP De Cocksdorp

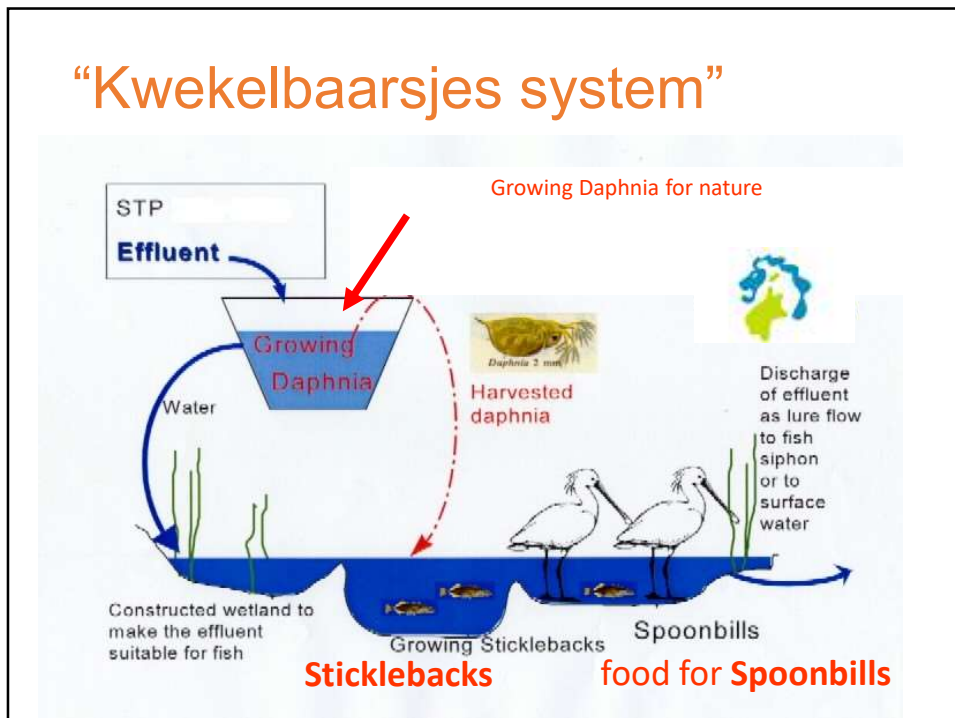


to grow **Sticklebacks**



as food for **Spoonbills**

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Groot verschil

Inrichting

Technisch vs natuurlijk

Zachte landing in de natuur

Verdere uitwerking:

Windesheim Creative Waterharmonica Team:

Ruud Kampf, Rekel/water

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Inhoud

- Ruud zag veel van de Waterharmonica's in Zweden...
 - 2009: WRS makes detailed design
 - 2011: WRS visits the NL and WRD/Kristalbad project
- Joost Bunsma vertelde in Singapore over de Waterharmonica
- Er zijn in de wereld veel Waterharmonica's
 - Maar iedereen noemt ze anders.....
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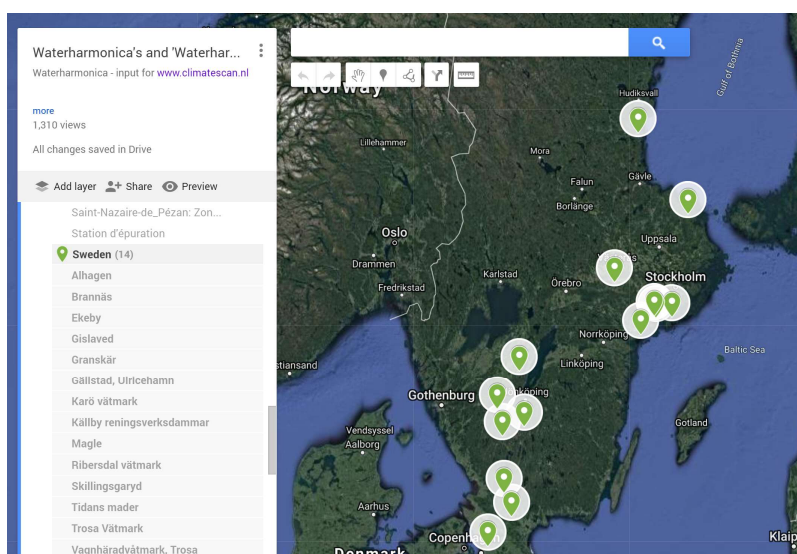
Ruud Kampf, Rekel/water

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Waterharmonica – alikes - eerste overzicht - 2019

En er zijn 14 Waterharmonica's in Zweden

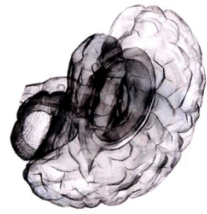
[link](#)



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Youtube: https://youtu.be/1Xu-nb1o_oU



Concept Waterbrain:


BrainWave Source of Life and Water Concepts made for a Chinese city




By the Creative Chinese Water Team

Bekhuis Advies
 Adviesbureau buitenruimte

Ruud Kampf, Rekel/water



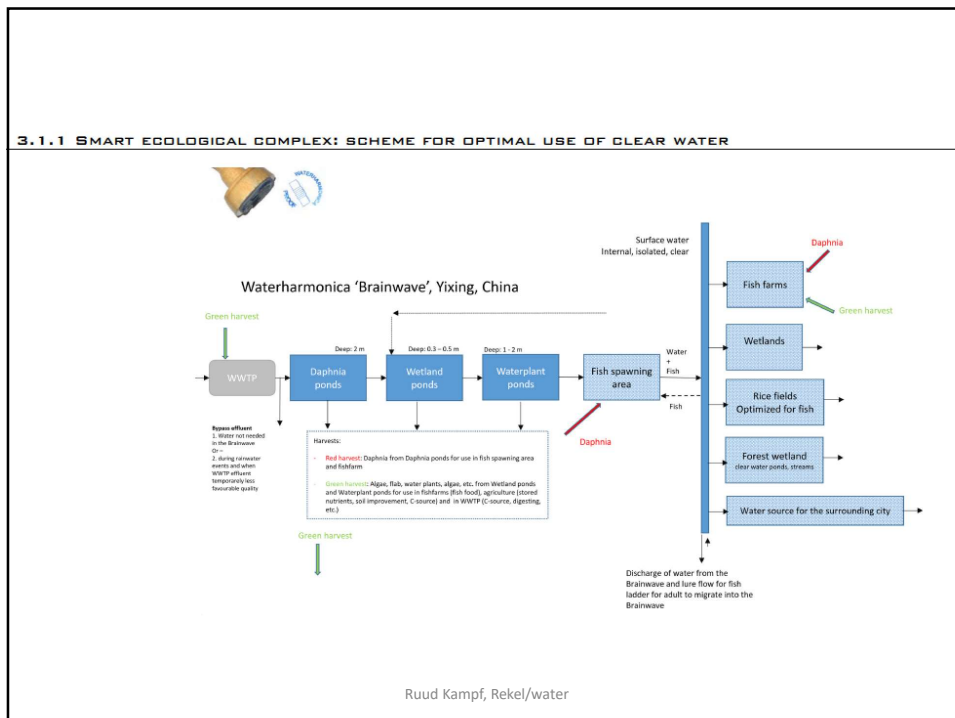
Rekel/water



Waterharmonica 活水链
 Partner of
 NUcoRICH
 in Eastern Africa

<https://makan.nl/en/landschap/yixing-brainwave-waterharmonica-china/>

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Swedish-Dutch cooperation

Zweedse Waterharmonica connectie



Kristalbad – practical experiences, why a Waterharmonica?
 Wetland jubilee, Nynäshamn conference
 May 22-24 2013
 Peter van der Wiele, Water board Regge and Dinkel (WRD), Almelo, The Netherlands

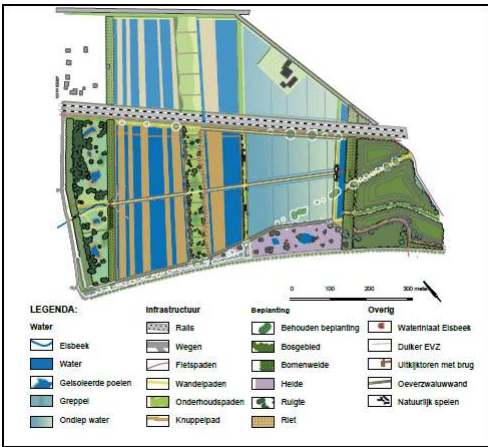
Introduction

- Swedish contacts (Kristalbad related):
 - WRD, 2006: WRD visits Wetland Research Centre (Weisner, Fleischer, Thiere); field trips
 - 2007: Weisner visits WRD, preparation of first sketch design
 - 2009: WRS-WRD audio conference (Andersson) & data exchange
 - 2009: WRS comments on draft design
 - 2009: WRS makes detailed design
 - 2011: WRS visits the NL and WRD/Kristalbad project



Ruud Kampf, Rekel/water

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Kristalbad

Land reformation plan ca. 40 ha

Project cost € 5.055.772

Innovation subsidy € 2.527.886

In operation 2013

5 functions integrated in one area

1. Water buffer: 187.000 m³
2. Ecological zone between cities of Enschede and Hengelo
3. Convert effluent into an “ecological sound water”
4. Spacial planning
5. Recreation and nature close to the two cities

bronnen:
 Senter-Novem KRW-innovatie programma
<http://www.berfotribune.nl/images/stories/kristalbad-flyer.pdf>
 Ruud Kampf, Rekel/water

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Kristalbad



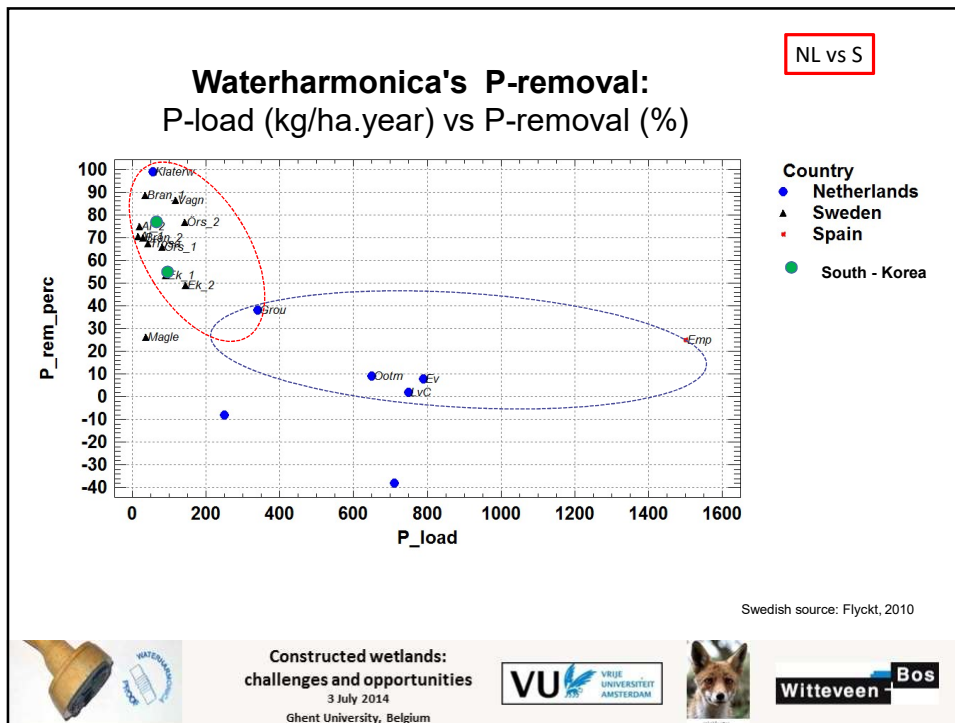
Ruud Kampf, Rekel/water

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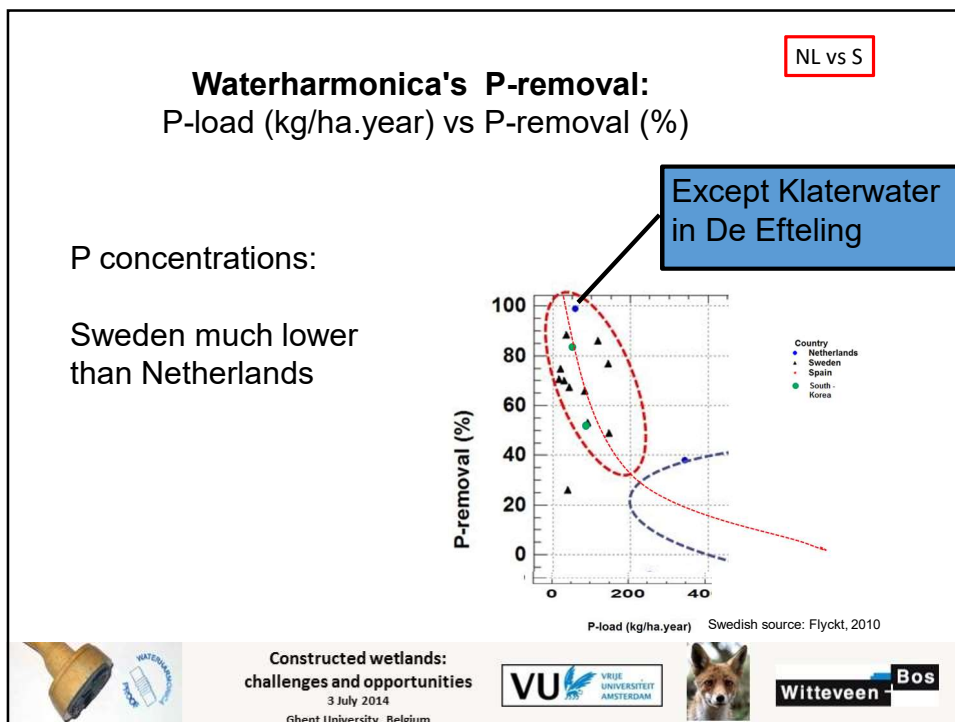


Ruud Kampf, Rekel/water

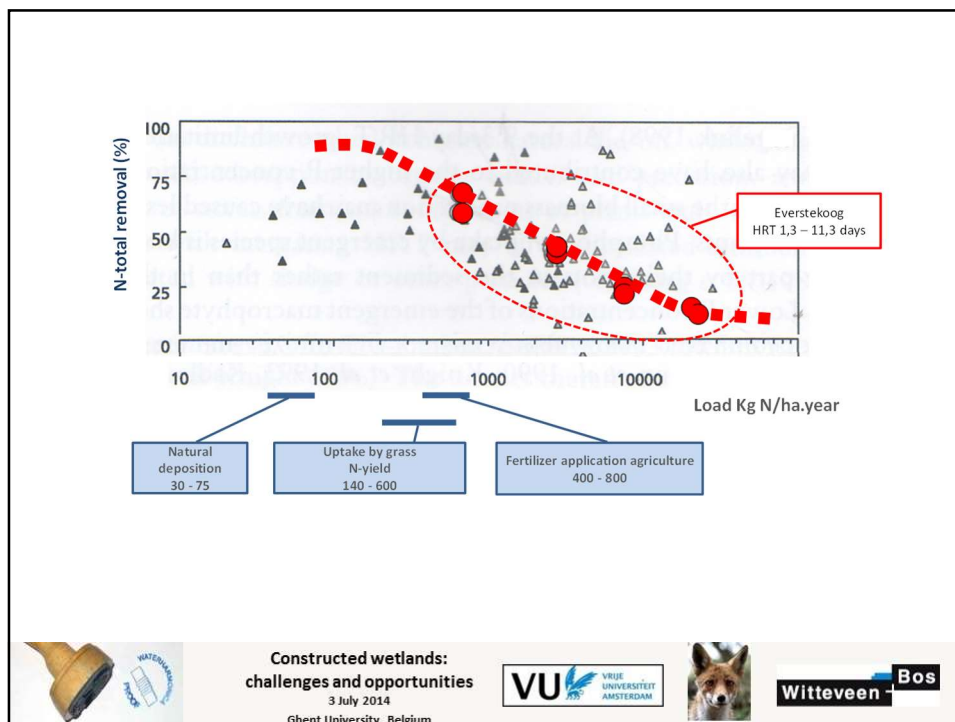
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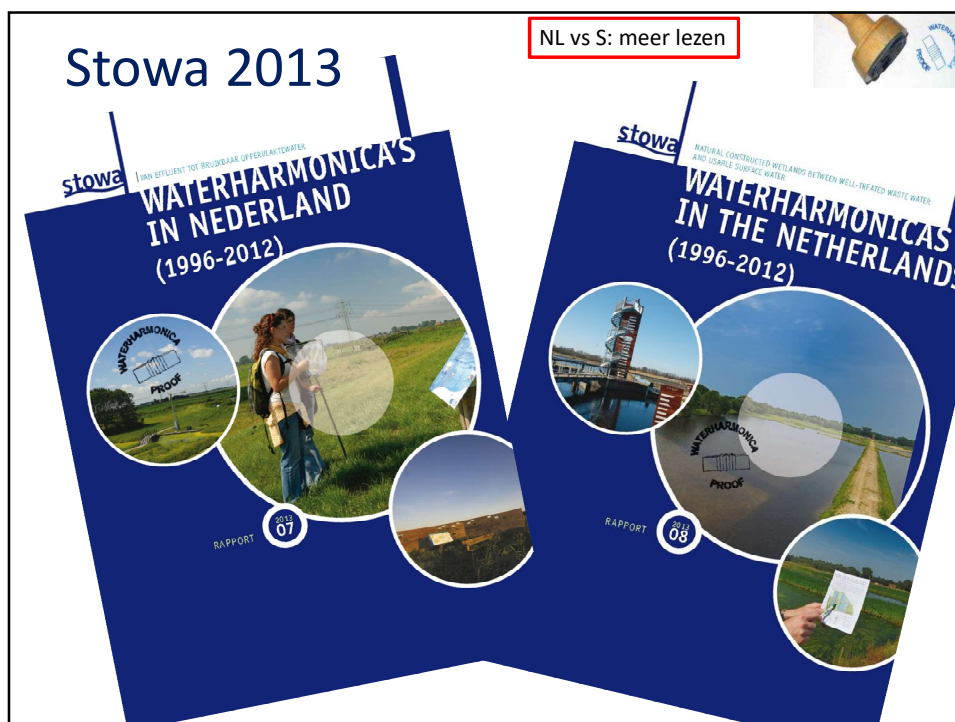
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våtmarksguiden START SKÖTSEL GODA EXEMPEL LÄNKAR OM GUIDEN Q

Wetland conference 2013

Wetland jubilee in Nynäshamn 22-24 May 2013
– Documentation from the conference and other relevant material

Integrated constructed wetlands in Ireland

- > Rory Harrington: Landscape-scale water management in Ireland: The integrated constructed wetland (ICW) concept.
- > Film about Irish water management

Waterharmonica in The Netherlands

- > Ruud Kampf & Rob van den Boomen: 15 years with Waterharmonica in The Netherlands
- > Peter van der Wiele: Kristalbad – practical experiences, why a Waterharmonica?
- > Report: Waterharmonicas in the Netherlands (1996-2012)
- > Film: Kristalbad
- > Webpage: www.waterharmonica.nl

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- > Film: [Kristalbad](#)
- > Webpage: www.waterharmonica.nl

- > Rapport: Reningsvåtmarkernas betydelse för fågellivet (in Swedish/på svenska)
- > Poster: Rikare fågelliv i våtmarken (in Swedish/på svenska)
- > Allhagens våtmark i Nynäshamn – artikel i Fåglar i Stockholmstrakten nr 1:2012

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Besluit

- Er zijn heel wat Waterharmonica's in de wereld
- De naam Waterharmonica brengt structuur en vergemakkelijkt international samen werken!

 **Laten we dat doen**

Ruud Kampf, Rekel/water

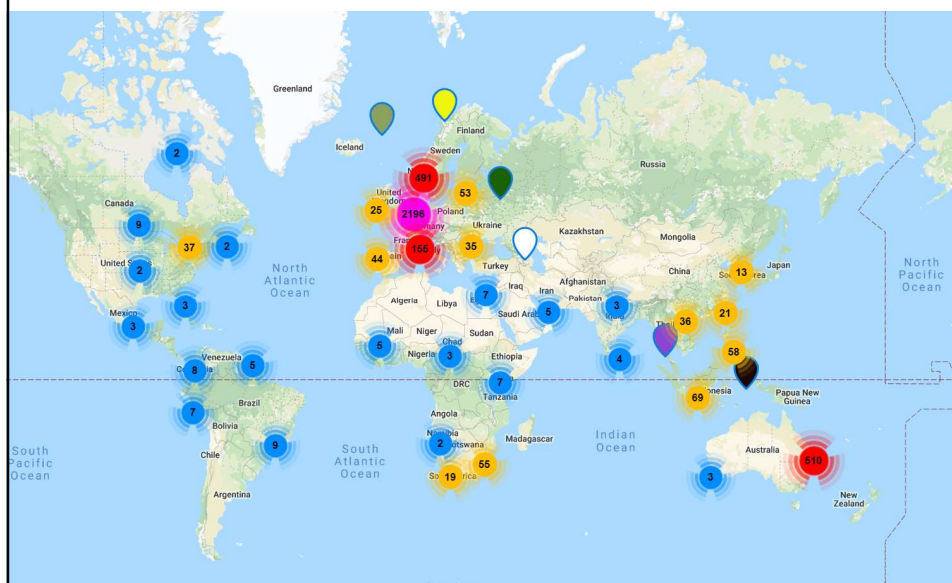
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Met dank aan Yasmine van der Linde, Farhan Meke,
Simone van den Hoven, Evert Schuurman, Aron Braakman
Windesheim
Creative Waterharmonica Team:




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Climate scan: climatescan.nl/map



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Ruud Kampf
Owner of Rekel/Water and Rekel/Kenya Ltd
Consultant nature based methods for water reuse
Waterharmonica, Biological sanitation, Circular process engineering, etc.
Retired researcher Ecological Engineering Watermel, Amsterdam
Still to finish PhD Vrije Universiteit, department Animal Ecology, Amsterdam
Phone: +31 72 502 2998, mobile:+31 649 45 021, mobile Kenya: +254 718 14 99 44
Email: r@rekel.nl
Skype: rekel.nl



Researchgate: https://www.researchgate.net/profile/Ruud_Kampf
LinkedIn: <https://www.linkedin.com/in/ruudkampf/>
Photo's on Flickr: <https://www.flickr.com/photos/24911097@N03/collections>
Waterharmonica photo's on Flickr: <https://www.flickr.com/photos/waterharmonica/collections>

Some recent projects, presentations:
Waterharmonica: www.waterharmonica.nl


Stowa report Waterharmonica in the developing world: www.stowa.nl/publicaties/waterharmonica-developing-world
Stowa report Waterharmonica in The Netherlands: www.stowa.nl/publicaties/waterharmonicas-netherlands-1996-2012
YIXING BRAINwave Source of Life and Water concepts: makan.nl/en/landschap/yixing-brainwave-waterharmonica-china/

Internal water management:
The role of wetlands in the urban water cycle, from Amsterdam to Kisumu, towards a green circular economy , or actually: how to deal with carbon in urban construct wetlands: www.rekel.nl/water/landen/kenya/kisumu/

The role of Water Service Providers (WSP) in the urban water cycle towards a green circular economy in Kenya, seen from The Netherlands: www.waterharmonica.nl/publicaties/2019_10_3d_waspa_nairobi/The%20role%20of%20WASPA_2019_05_10_final_Kampf.pdf

From White to Green: a circular approach in a small Cooperative Dairy in Ndumbeni, Kenya: [link](#)
Can the Cotton Oil industry in Mali take the lead in solving water, sanitation and waste problems with a circular approach with the community?: [link](#)

Partner of NJUcoRICH in Eastern Africa
<http://www.cn-naturaj.com/CN/cooper.html>
The Waterharmonica in China: NJUcoRICH - Nanjing University Research Institute (Changshu) Co., Ltd
Waterharmonica 活水链



Ruud Kampf, Rekel/water