



1

Inhoud

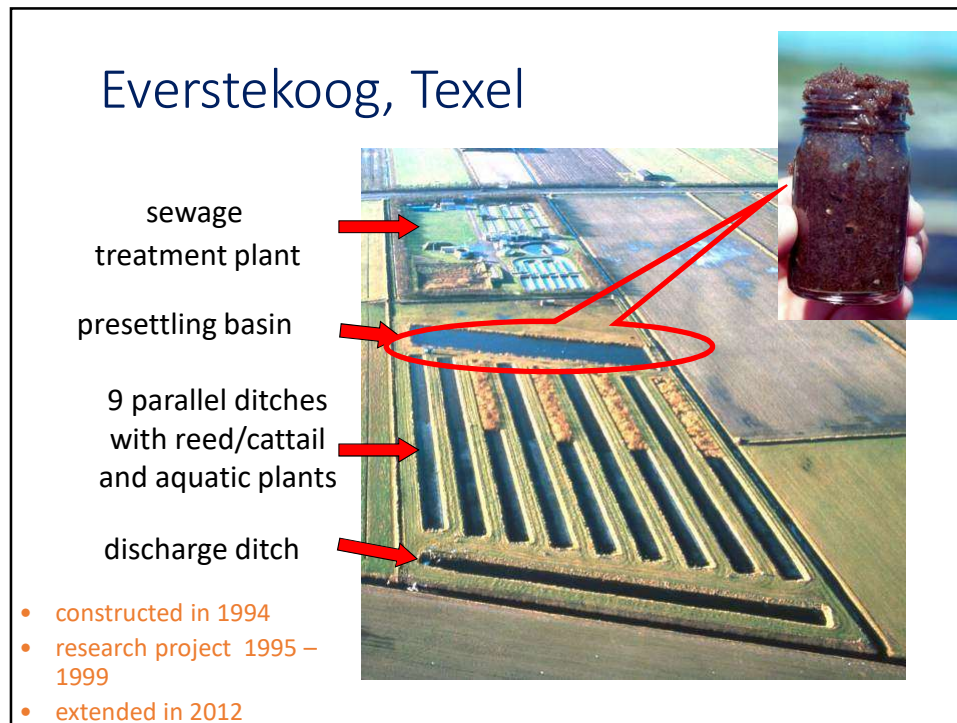
- Ruud zag veel van de wereld
- Joost Bunsma vertelde in Singapore over de Waterharmonica
- Er zijn in de wereld veel Waterharmonica's
 - Maar iedereen noemt ze anders.....
- Zweden ontwierpen Waterharmonica Kristalbad



Sorry

 Ruud Kampf	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:

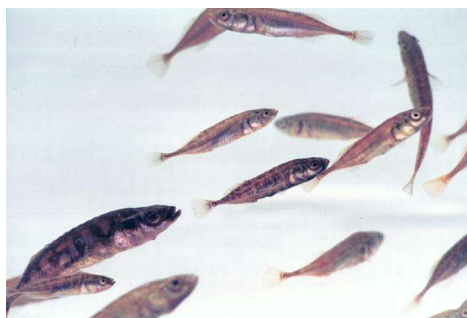
- but only after 3 days retention time
- after 10 days a lot of fish
up to 15 Stickleback per m²



5



Sticklebacks



6

Typical effluent quality oxidation ditch STP

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

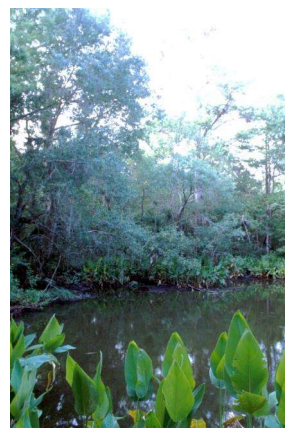
Suspended solids: low

Better than many surface waters !!!

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

7

Eco-ponds Florida



8

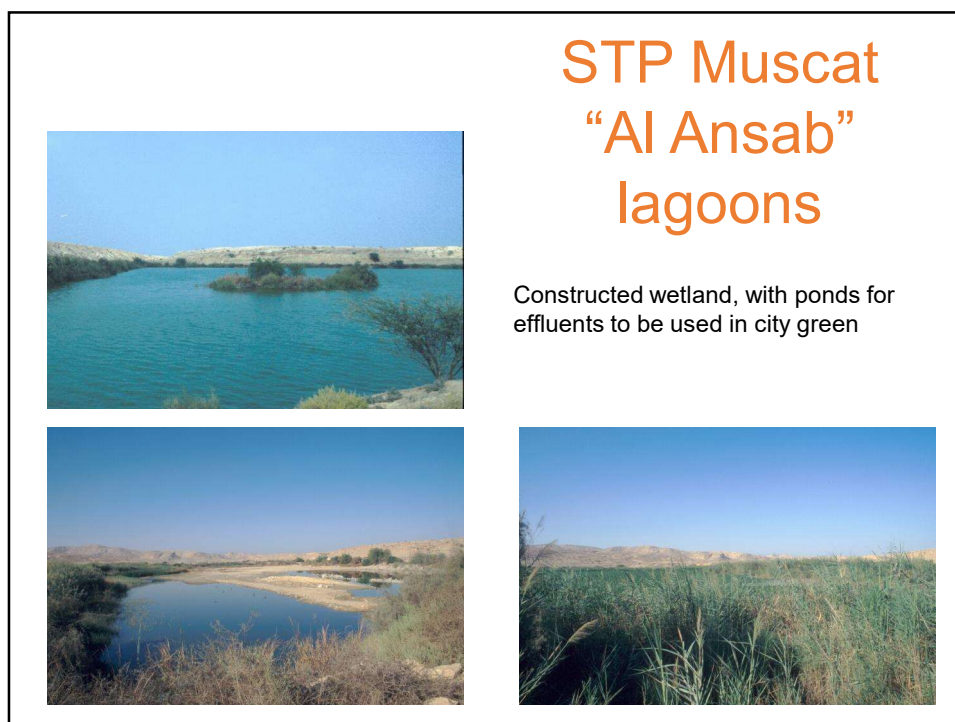


9

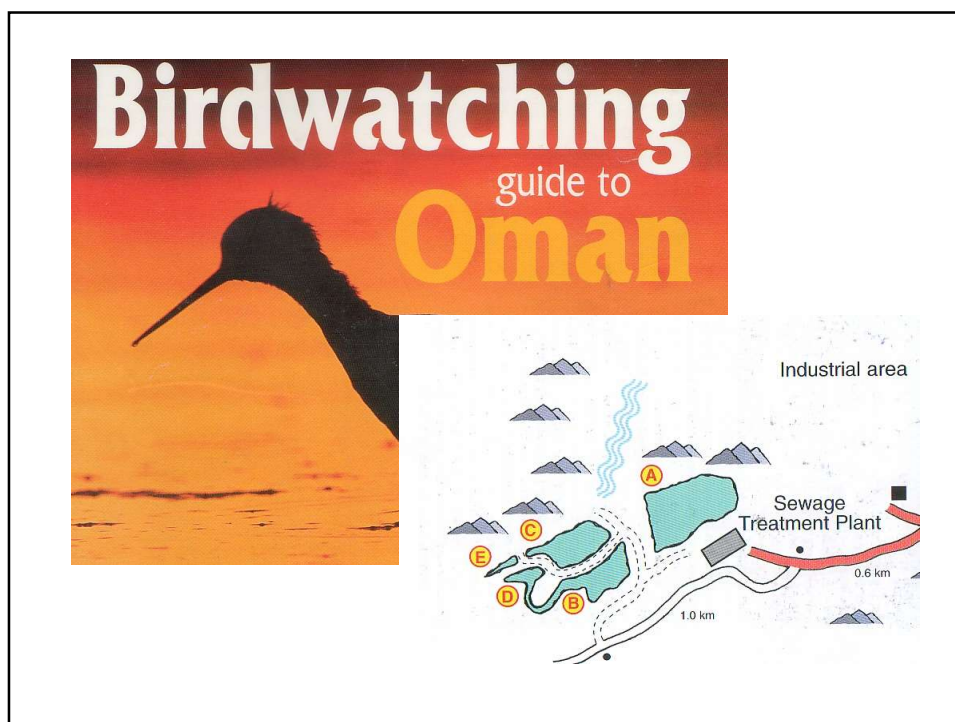
STP Muscat, Oman



10



11



12



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”

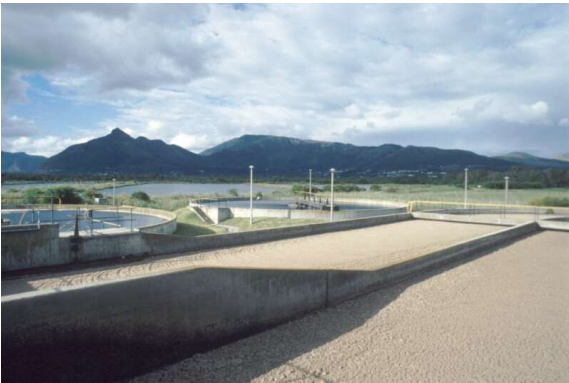




13

Kommetjie, Capetown

Carrousel, ca. 20.000 p.e.



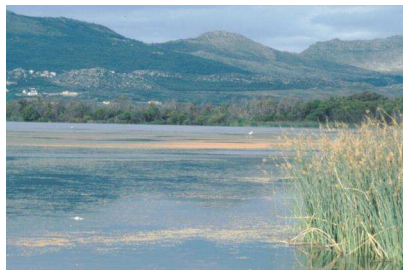


14

Kommetjie ponds for after treatment



15



4 ponds



16

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

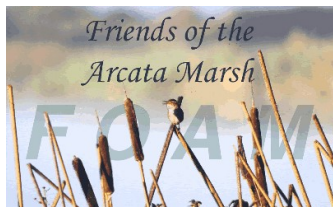


“Flush With Pride”



18

ARCATA MARSH INTERPRETIVE CENTER



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



19

Arcata Welcomes Birders

Birding



*at the
Arcata Marsh and Wildlife Sanctuary*



Godwits at the Arcata Marsh



20

Arcata Marsh, aerial view



21



22

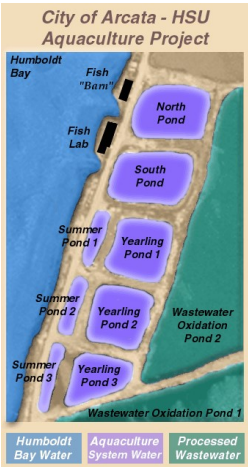


23

Arcata Aquaculture Project

City of Arcata, Humboldt State University

THE BENEFITS OF WASTEWATER



24

Inhoud

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 - 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

25

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➔ Natural (biological) processes in today's infrastructure

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

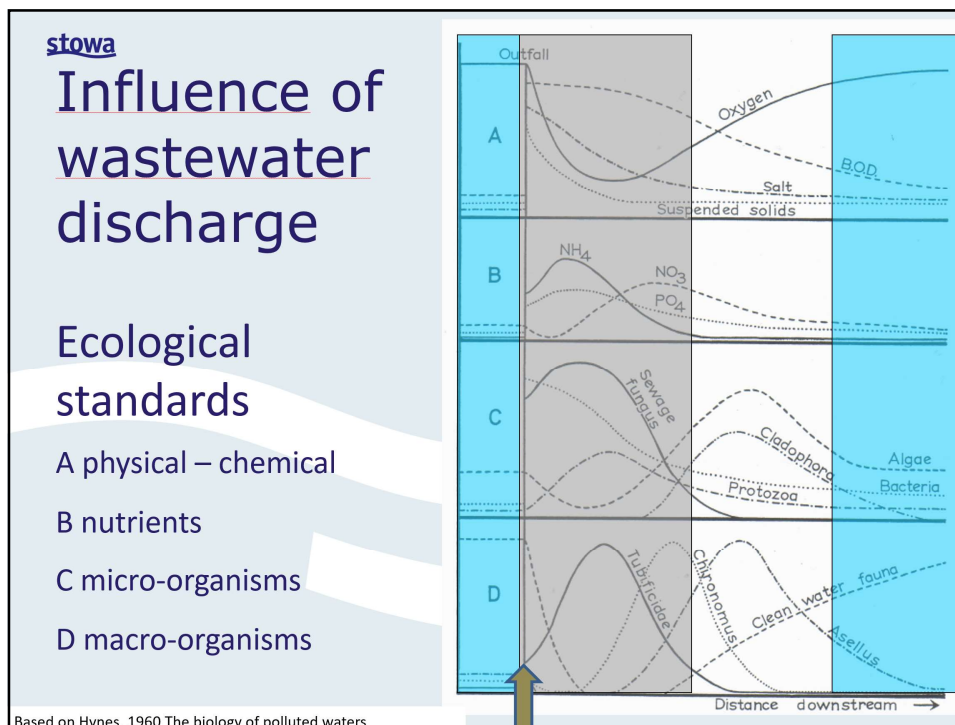
Joost Bunsma, Stowa, The Netherlands

The Waterharmonica

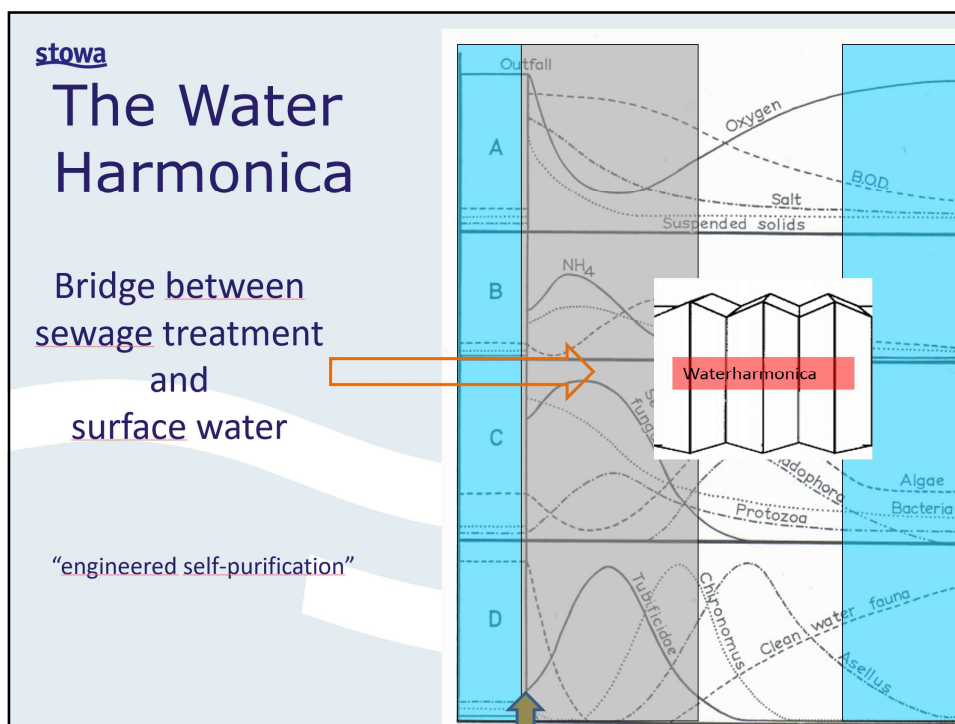
Thanks to
Ruud Kampf,
Rekel/water
The Netherlands



26



27



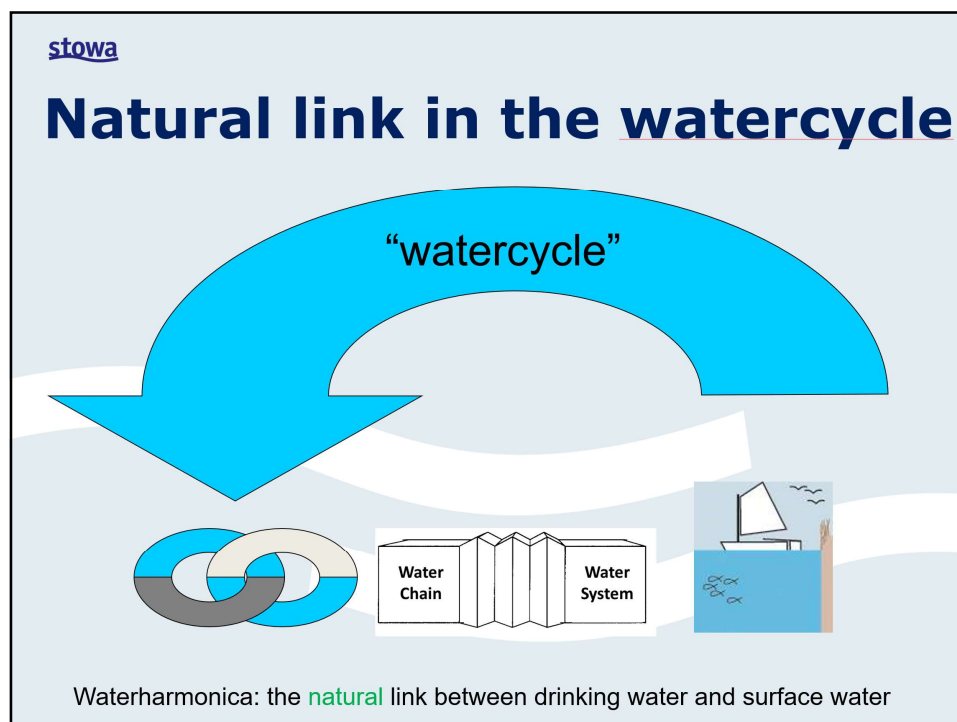
28

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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

29



30

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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

31

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Added value



32



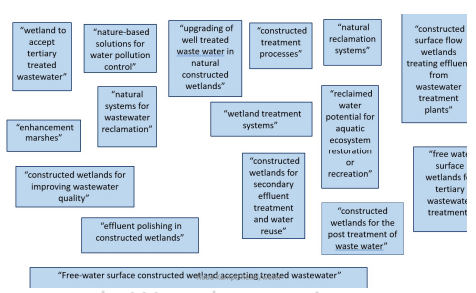
Volledige voordracht:
http://www.waterharmonica.nl/publikaties/2014_05_29_Singapore_Waterharmonica_Bunsma_Stowa_2pp.pdf

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

33

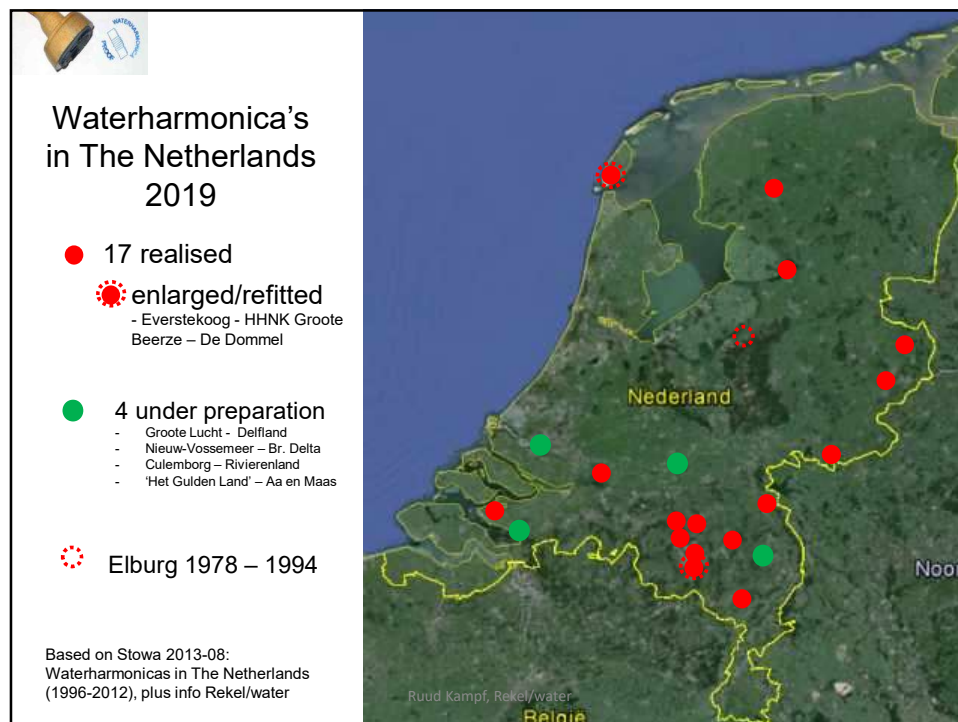
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Ruud Kampf, Rekel/water

34



35

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

Empuriabrava
2005

The Empuriabrava WWTP

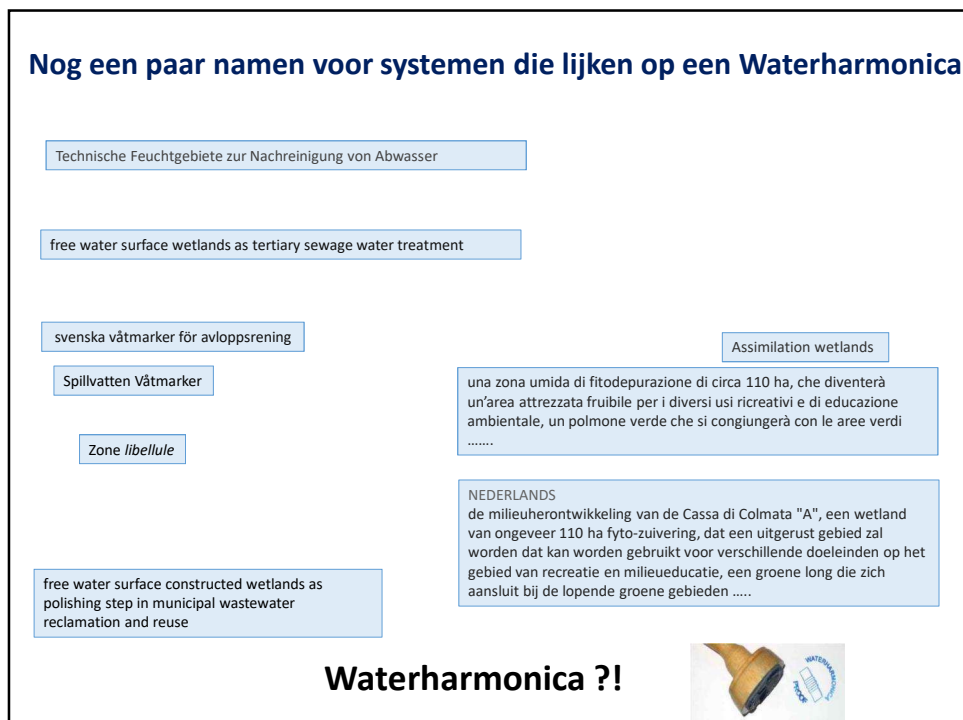
From Lluís Sala, Consorci de la Costa Brava

Ruud Kampf, Rekel/water

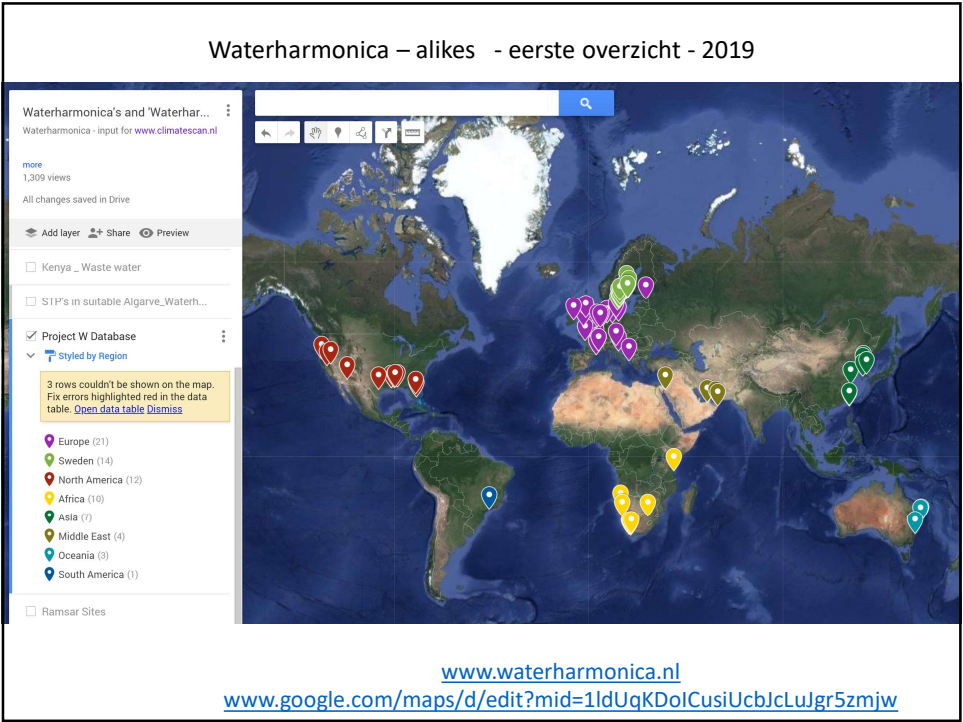
36



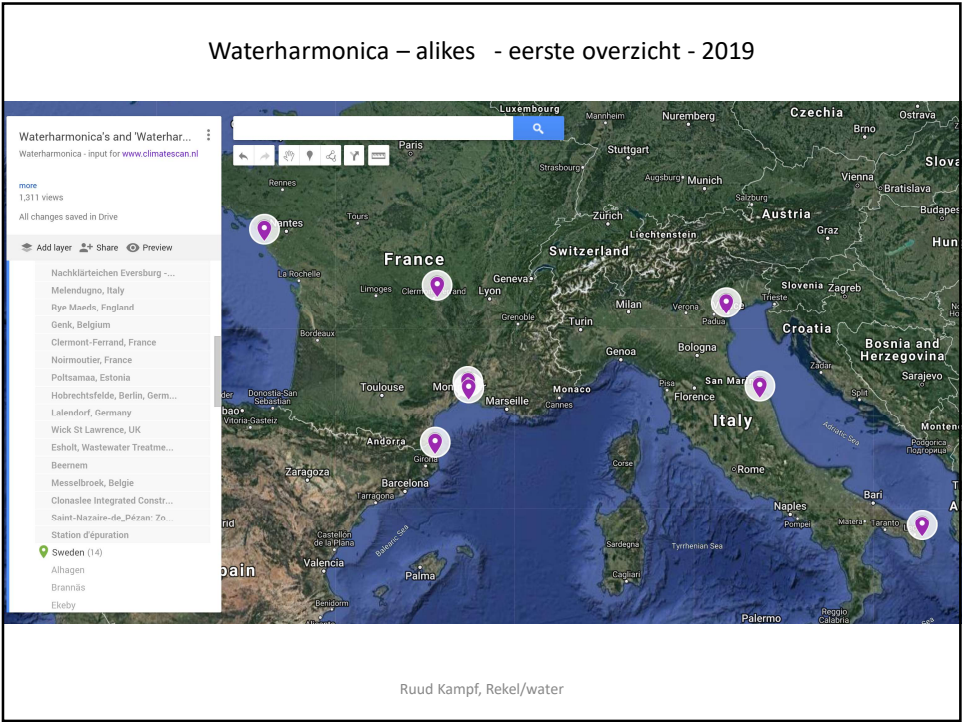
37



38



39



40

Waterharmonica – alike - eerste overzicht - 2019

Add layer

Share

Download

Trossa Vårmark

Vårmarksvårmark, Trossa

North America (12)

Tres Rios Project Improves ...

Arcata

City of Davis

Incline Village wetlands enh...

West Jackson County, MS co...

Wakodahatchee wetlands

West Regional Wastewater T...

Breaux Bridge Assimilation ...

St. Martinville assimilation w...

Luling assimilation wetlands

Hammond city

Mandeville-Tchefuncta assi...

Africa (10)

Cape Town, flat

Cape Town

Kleinmond

Kommetjie

The Wakodahatchee Wetlands
Palm Beach Florida

Ruud Kampf, Rekel/water

41

Doorlinken kan verdere info geven

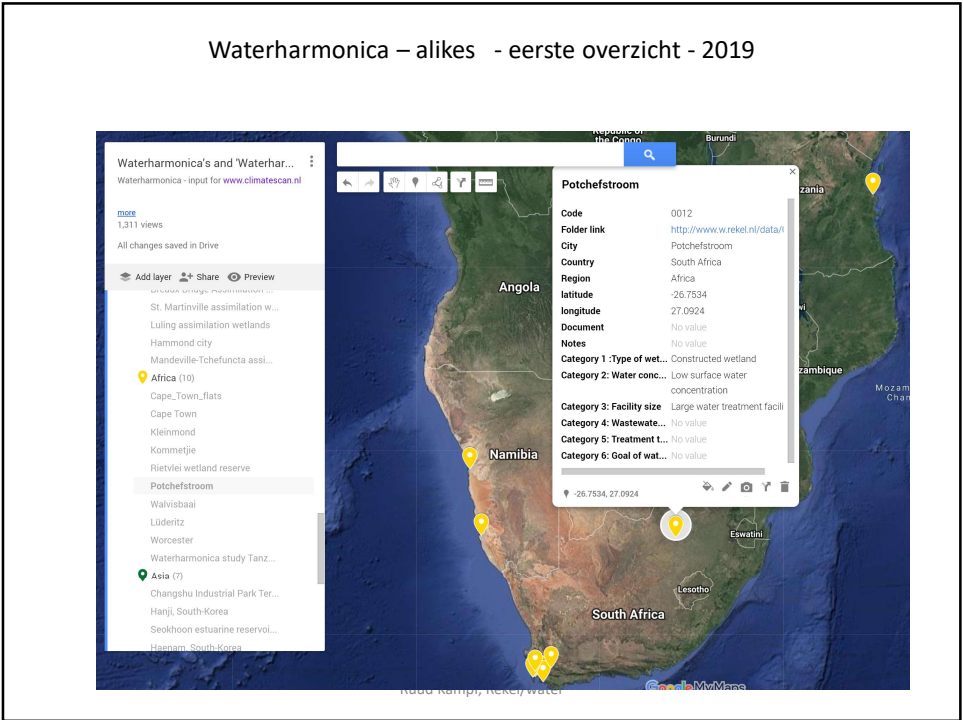
Wakodahatchee Wetlands
Palm Beach Florida

The Wakodahatchee Wetlands
Palm Beach Florida

The Wakodahatchee Wetlands
Palm Beach Florida

Ruud Kampf, Rekel/water

42



43

In The Netherlands we do have something called Waterharmonica



www.stowa.nl

www.waterharmonica.nl

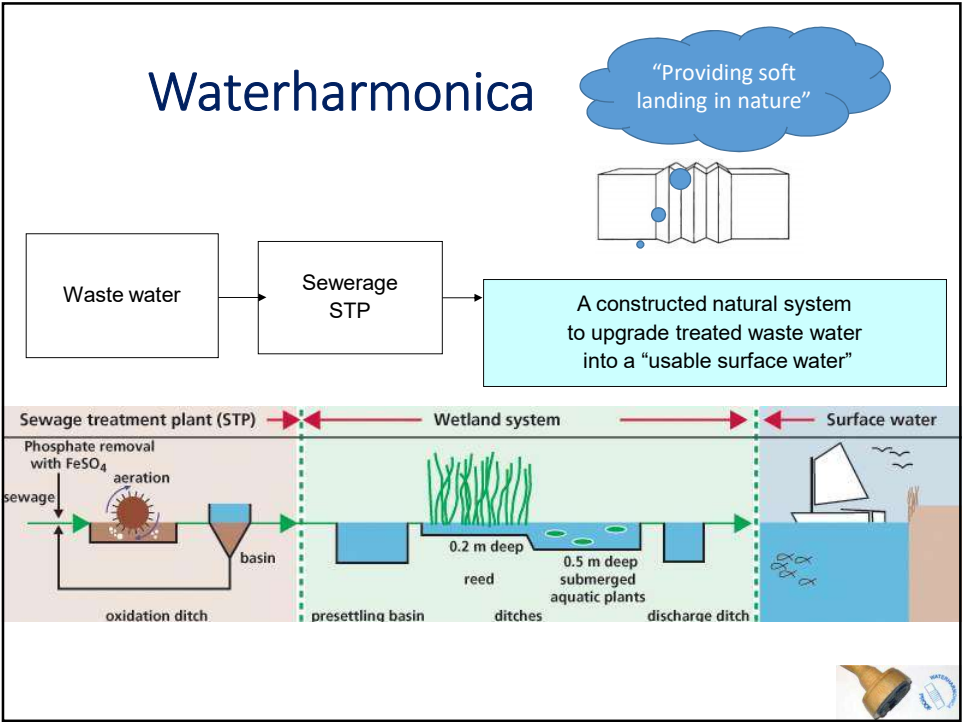




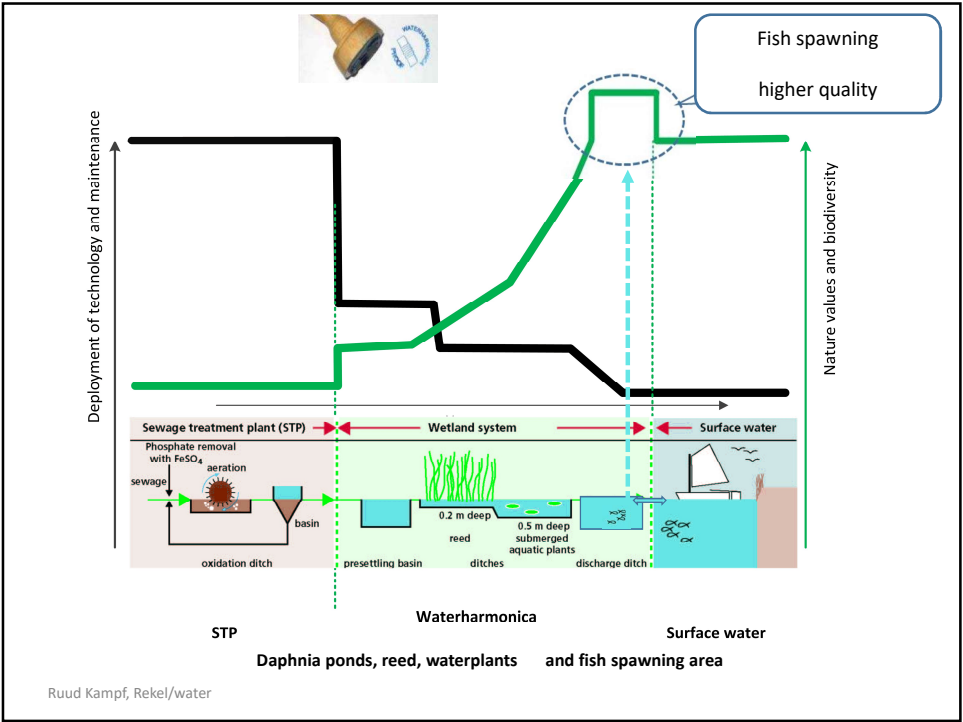
Rekel/water

Ruud Kampf, Rekel/water

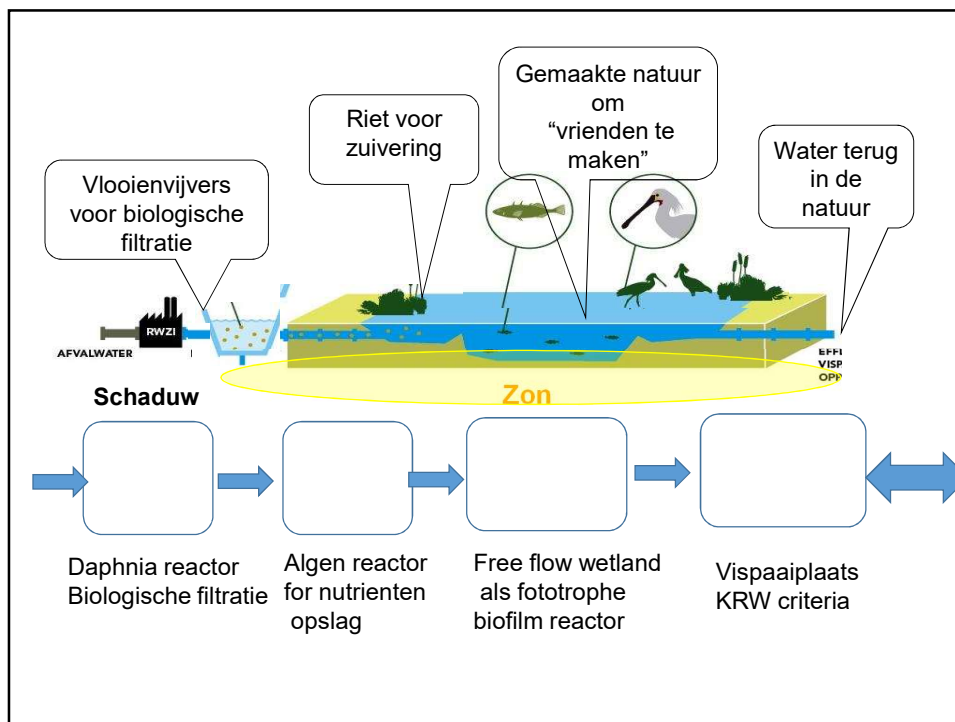
44



45



46



47

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 katalytic) biofilms, diffusion, growth, decay, etc.

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

→ ecological engineering: www.IEES.CH

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

48

“Kwekelbaarsjes”

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



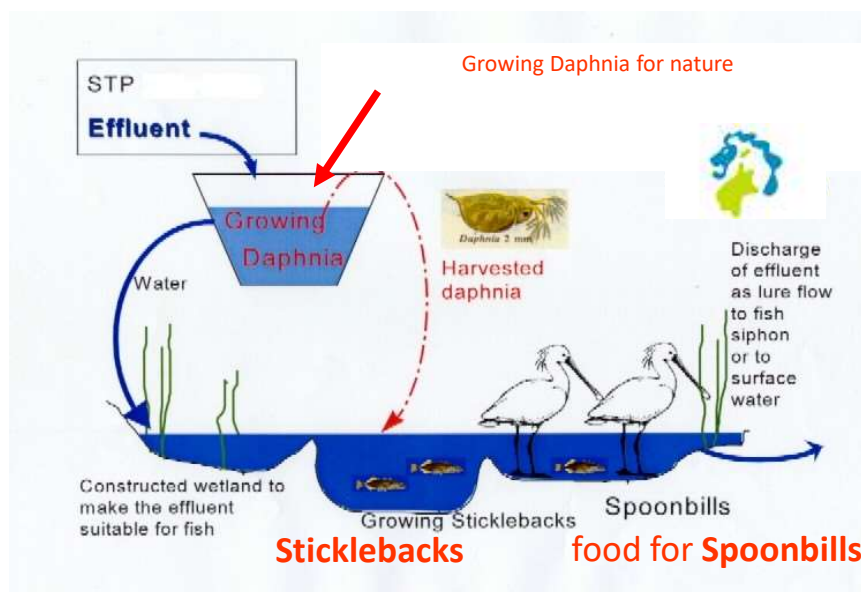
to grow **Sticklebacks**

as food for **Spoonbills**



49

“Kwekelbaarsjes system”



50

Groot verschil

Inrichting

Technisch vs natuurlijk

Zachte landing in de natuur

Verdere uitwerking:

Windesheim Creative Waterharmonica Team:

Ruud Kampf, Rekel/water

51



52

Inhoud

- Ruud zag veel van de Waterharmonica's en Waterhar...
 - 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
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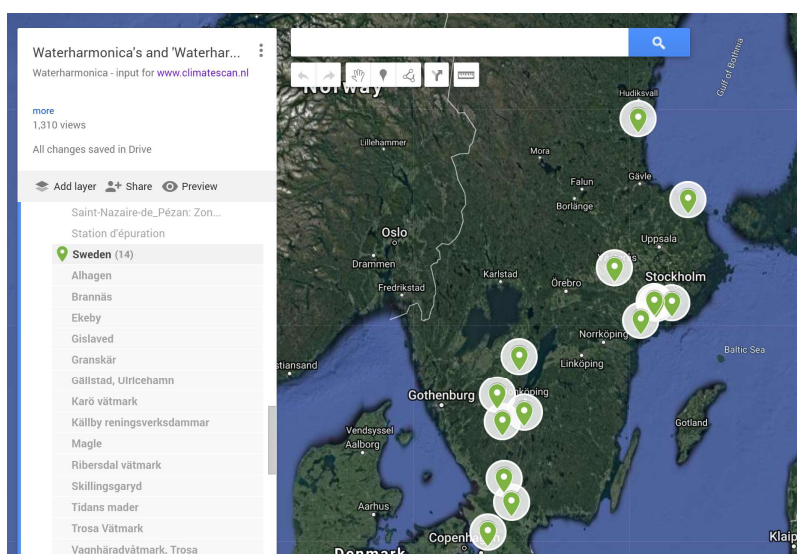
Ruud Kampf, Rekel/water

53

Waterharmonica – alikes - eerste overzicht - 2019

En er zijn 14 Waterharmonica's in Zweden

[link](#)



54

55



• Swedish-Dutch cooperation

Zweedse Waterharmonica connectie



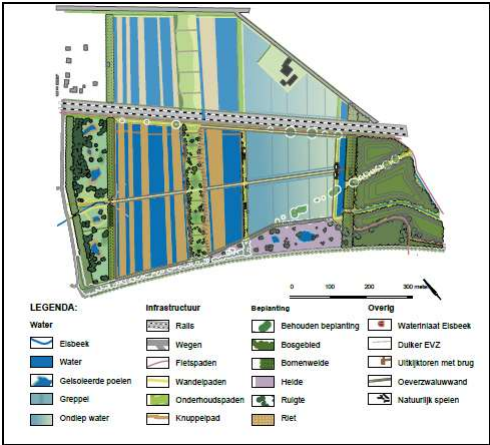
Introduction

- 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

57




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

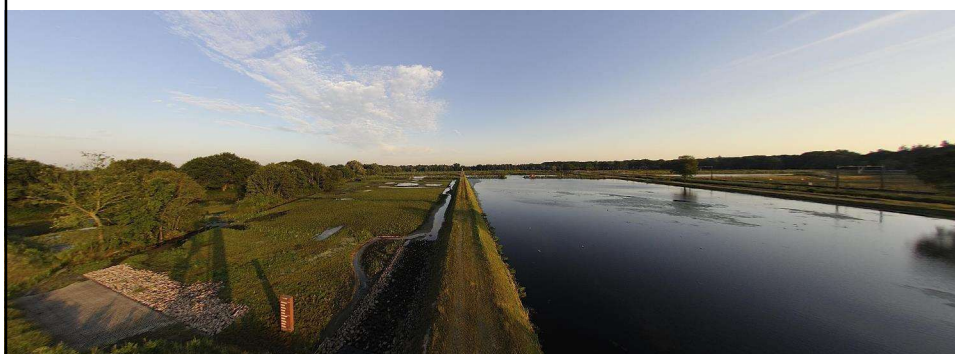
1. Water buffer: 187.000 m³
2. Ecological zone between cities of Enschede and Hengelo
3. Convert effluent into an “ecological sound water”
4. Spacial planning
5. Recreation and nature close to the two cities

bronnen:
Senter-Novem KRW-innovatie programma
<http://www.berflotribune.nl/images/stories/kristalbad-flyer.pdf>

Ruud Kampf, Rekel/water

58

Kristalbad



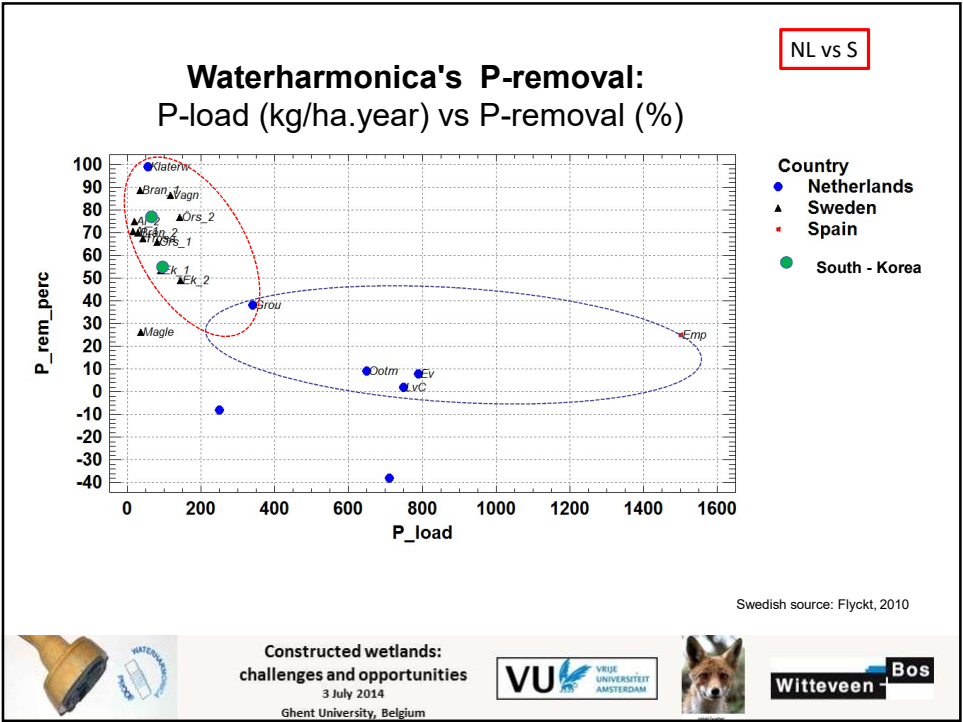
Ruud Kampf, Rekel/water

59

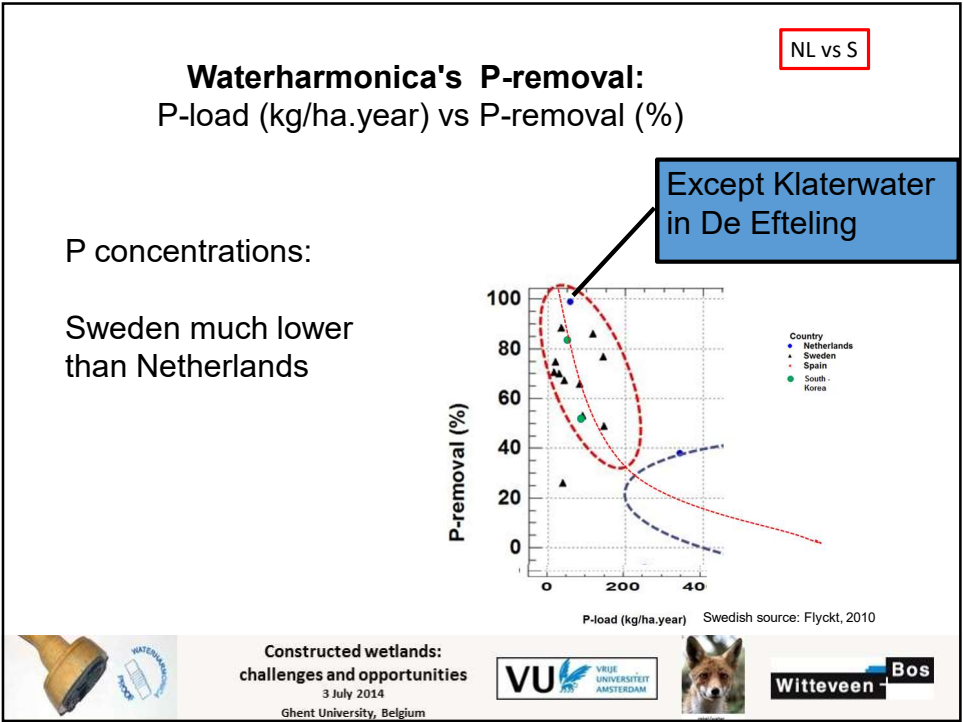


Ruud Kampf, Rekel/water

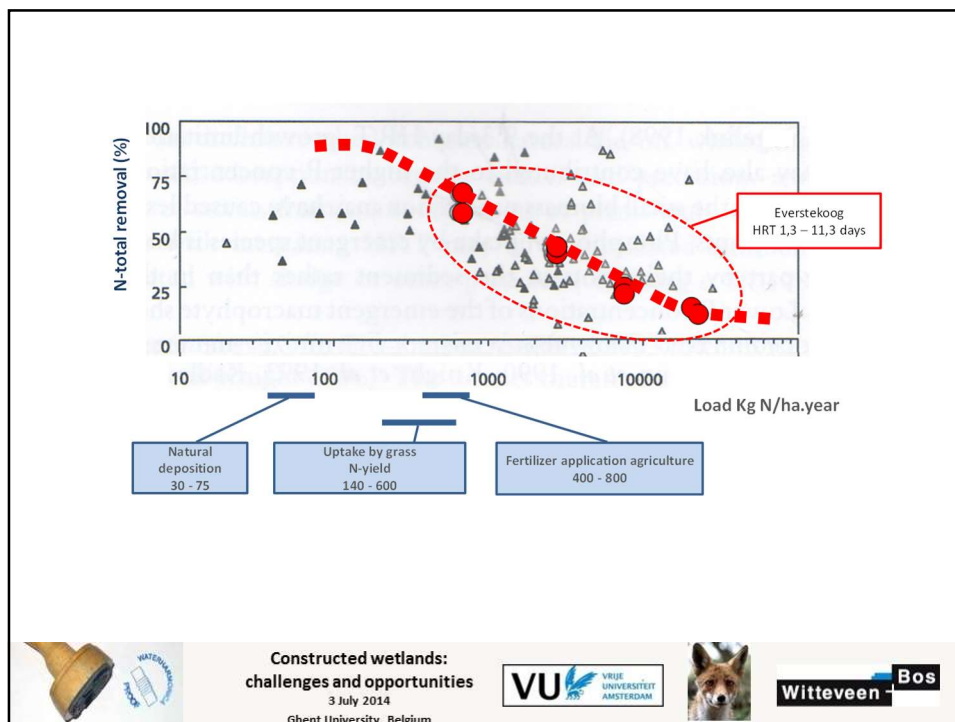
60



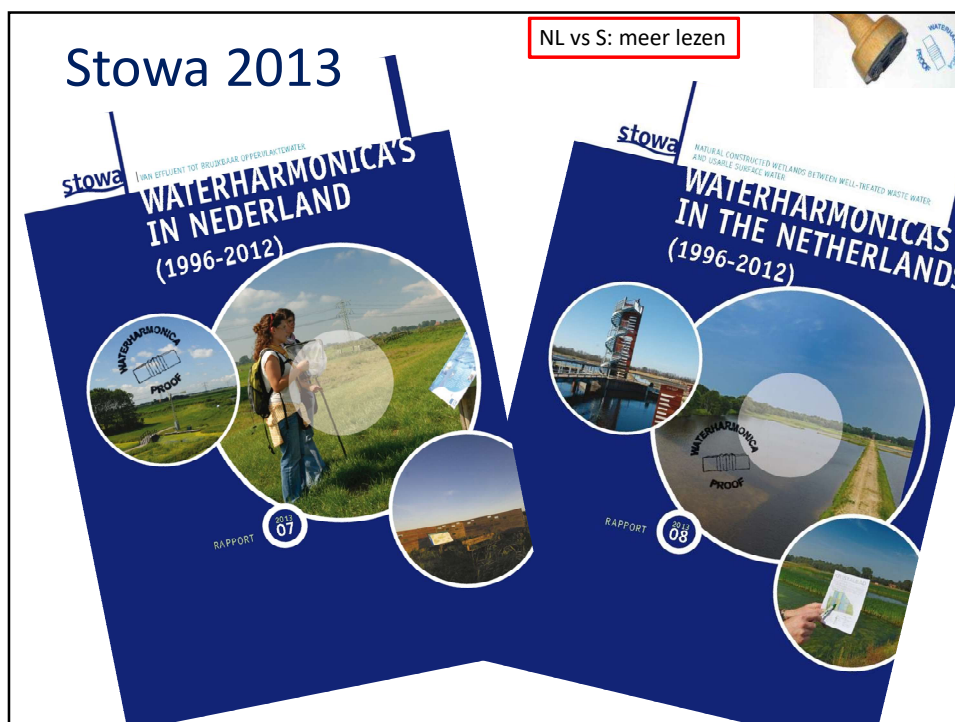
61



62



63



64

våtmarksguiden START SKÖTSEL GODA EXEMPEL LÄNKAR OM GUIDEN

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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- › Webpage: www.waterharmonica.nl

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

65

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

66

67

A world map showing the distribution of COVID-19 cases by country. The map uses colored circles with numbers to represent the total cases in each country. The colors range from blue (low case counts) to red (high case counts). The numbers are placed inside the circles. The map includes labels for major countries and oceans.

Country	Number of Cases
Greenland	0
Iceland	0
Finland	0
Sweden	63
United Kingdom	25
Poland	491
France	2198
Germany	158
Italy	44
Spain	36
Ukraine	0
Kazakhstan	0
Mongolia	0
China	13
Japan	0
South Korea	0
Taiwan	0
China	36
India	21
Indonesia	68
Philippines	69
Papua New Guinea	0
Australia	3
New Zealand	510
Canada	2
United States	37
Mexico	3
Venezuela	5
Brazil	7
Chile	9
Argentina	0
Algeria	0
Libya	0
Mali	5
Niger	0
Chad	0
Nigeria	3
Sudan	0
Ethiopia	0
DRC	7
Tanzania	0
Angola	0
Norway	2
Poland	19
Switzerland	55
Madagascar	0

68



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 Waternet, 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/waterharmonica-netherlands-1996-2012
YIXING BRAINwave Source of Life and Water concepts: makan.nl/en/landschap/yixing-brainwave-waterharmonica-china/

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



Ruud Kampf, Rekel/water