

## EDITORIAL

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Every year at 22 March the United Nations celebrate the World Water Day. The theme for this year is „Nature for Water“. The significance of intact ecosystems for the entire water cycle has been published in the UN World Water Development Report, entitled “Nature-based Solutions for Water“. The report also reveals the great potential of Green Infrastructures as a reasonable supplement to technical systems.

In various projects, we are working on approaches to designing water management systems in urban areas in a natural way. A good example of such „ecological services“ is the bank filtration practiced in Berlin. For more than 100 years, this natural process has reliably delivered drinking water from surface water. However, this system only works as long as nature and resources are handled carefully. Risks associated with the warming of surface waters in the context of climate change are currently being investigated in the recently started project Hydra.

In the fields of water supply and wastewater treatment, the combination of natural and technical systems will play an increasingly important role in the future, precisely because positive effects on the process quality are expected. The actual potential of these combinations are currently being investigated at several European sewage treatment plants and water treatment systems together with various international partners in the EU-funded project AquaNES.

I hope that you will find our current newsletter interesting and informative.

Edith Roßbach  
CEO Kompetenzzentrum Wasser Berlin

## LATEST NEWS

### BLUE PLANET Berlin Water Dialogues

*On behalf of the Federal Government and the Land of Berlin German Water Partnership (GWP) and Kompetenzzentrum Wasser Berlin (KWB) will continue the successful series of conferences.*

The BLUE PLANET Berlin Water Dialogues were initiated in 2011 and are being sponsored by the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety and the Berlin Senate Department for Economics, Energy and Public Enterprises. The aim of the event series is to promote extensive international networking and to intensify the dialogue between representatives from various fields of policy and business with decision-makers and international water management professionals. This event format will be further consolidated as a permanent platform for the exchange of knowledge, ideas, concepts and experience between politicians, the private sector, science and non-governmental organisations.

The next two events will take place on 22 October 2018 and during the trade fair WASSER BERLIN INTERNATIONAL to be held in spring 2019. The upcoming conferences will address the dynamic transformation processes in cities and, in particular, reveal the opportunities in achieving the Sustainable Development Goals (SDGs) set by the UN 2030 Agenda for Sustainable Development. In this context, ideas will be developed in open dialogues between international professionals and the auditorium on how the transformative power of cities can be used to improve the quality of life and the security of public services such as water supply, wastewater treatment and stormwater management.

[blueplanetberlin.de](http://blueplanetberlin.de)



## Tertiary Treatment in waste water management – KWB launched a new cooperation with a Danish Water Utility

*In 2017 a new cooperation was launched between Kalundborg Utility A/S and KWB.*

Kalundborg Utility A/S is the municipal utility of the city of Kalundborg located in the western part of Zealand (Denmark) and operates the local services such as district heating, fresh water supply, sewage and wastewater treatment in an efficient, reliable and sustainable way.

The core activities of this new cooperation is the development of new concepts for the future operation of the wastewater treat-

ment plant in Kalundborg. The first goal is the optimised operation of the existing ozonation unit which was built in 2002 for additional reduction of non-degradable organic compounds. As the local wastewater treatment plant receives approx. 50 % of pre-treated industrial wastewater, the content of non-degradable organic compounds is high compared to municipal wastewater.



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## "NATURE FOR WATER" – THE SIGNIFICANCE OF NATURAL SYSTEMS FOR WATER TREATMENT

INTERVIEW WITH DR. DANIEL WICKE WHO HAS BEEN WORKING AS ENVIRONMENTAL ENGINEER AT KOMPETENZZENTRUM WASSER BERLIN SINCE 2012

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Daniel Wicke finished his PhD in 2008 at the TU Berlin, Department of Water Quality Engineering (Prof. Jekel). Afterwards he did a postdoctoral fellowship at the University of Canterbury in Christchurch, New Zealand for 3.5 years. He has specific expertise in issues relating to the occurrence of trace organic compounds in the environment and is currently coordinating KWB's activities within the EU-funded AquaNES project and UBA-project BaSaR.

*The theme for World Water Day 2018 is "Nature for Water", which underlines the significance of nature-based and ecological solutions for the protection of our water resources. This theme belongs also to your area of expertise, doesn't it?*

Yes, that's correct. Just when I started to work at KWB, I was involved in the Aquisafe project which was about the improvement of water quality by using natural systems. One main topic was the release of nitrate from agricultural land use, which resulted i.e. in Brittany in problems for drinking water production at the nearby river. We experienced that by means of constructed wetlands and modification of drainage trenches at field edges nitrate loads can be reduced.

Natural systems like constructed wetlands can also be used for post-treatment of wastewater treatment plant effluents, also in terms of further reduction of trace organic compounds (project EcoTreat). However, the realisation of such solutions requires sufficient area, which on the other side may also serve as habitats or recreational areas due to their natural character.

*You are currently in charge of the EU-funded AquaNES project which combines natural and engineered processes. What is KWB's responsibility in this context? Are there first results?*

Two of altogether 13 AquaNES demonstration plants are located in Berlin and are operated by KWB and BWB. At WWTP Schönerlinde, a pilot-scale combination of ozonation with constructed wetlands was realised to reduce trace organic compounds and pathogens in wastewater effluent and improve the surface water quality. The second Berlin site features the combination of bank filtration and nanofiltration for the

removal of sulphate and trace organic compounds during drinking water production at Tiefwerder waterworks. First results of both sites indicate that these process combinations work quite well.

Besides our activities here in Berlin, KWB also coordinates a work package which comprises several demonstration plants in Germany, the United Kingdom and Greece, where various types of constructed wetlands are applied. In addition, the development of software tools to cope with the huge amount of online data and for microbial risk assessment belongs to KWB's project tasks.

*Rainwater is considered a natural resource. The occurrence of trace organic compounds in stormwater runoff has recently been reported. Is that true?*

Yes, indeed. In urban areas, rain gets in contact with various surfaces and materials - e.g. traffic areas and building materials. In façade coatings for instance, biocides are used to eliminate undesired algae growth and fungal infestation, which is particularly relevant for well-insulated façades. On the one hand, this extends the façade's life span, on the other hand the biocides also get into the rainwater runoff. The "OgRe" project has demonstrated that in Berlin these biocides and numerous other trace organic compounds (e.g. phthalates from plasticisers, vulcanisation accelerators from tyre wear) reach the storm sewers. In the ongoing UBA project "BaSaR" we further investigate the interaction between building materials and stormwater, including a monitoring program at recently finished development areas.

*Are there any solutions in sight? It cannot be that we pay for high energy standards in buildings by a deterioration of our surface waters.*

I totally agree with you – however, there are also approaches to mitigate the problem. At the source, one example is the chemical encapsulation of the biocides in paint or render to reduce leaching. There are also end-of-pipe approaches, such as



AquaNES working group meeting at WWTP Schönerlinde

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the development of advanced filter substrates in stormwater treatment systems for removal of organic micropollutants. The best method of course is to avoid the use of critical substances. Recommendations for action, as issued by the Senate of Berlin in relation to the application of root-resistant bituminous sheetings, are a step in the right direction. Measures to reduce the discharge of micropollutants from urban stormwater runoff are also the topic of a project application we have recently submitted.

Bodo Weigert asked the questions



The AquaNES project demonstrates the benefits of combined natural and engineered processes for water treatment systems at 13 test sites (two of them situated in Berlin). Bank filtration, managed aquifer recharge (MAR) and constructed wetlands are natural systems which are combined with various technical pre- or post-treatment methods. The project consortium involves 30 partners from Europe, Israel and India. In Berlin, Berliner Wasserbetriebe, AKUT Umweltschutz Ingenieure Burkard und Partner as well as KWB participate in the project.

[www.aquan-es-h2o2o.eu](http://www.aquan-es-h2o2o.eu)

Financial support



## WATER RESEARCH IN BERLIN AND BRANDENBURG



### CLOOP – Surface water protection due to efficient use of fertilisers

*The international joint project CLOOP is to demonstrate that in practice, mineral nutrient recyclates may have higher use efficiencies than conventional fertilisers.*

The international joint project CLOOP is to demonstrate that in practice, mineral nutrient recyclates may have higher use efficiencies than conventional fertilisers.

Nutrients in conventional fertilisers are present in a highly water-soluble form. This ensures that the nutrients are available to the plants guaranteeing high agricultural yields. However, the use efficiency, i.e. the quantity of nutrients in fertilisers that plants actually absorb, for conventional phosphate fertilisers is only about 15-40 %. The international joint project CLOOP was designed to demonstrate that in practice mineral nutrient recyclates obtained from wastewater may have higher use efficiencies than conventional fertilisers. This is crucial to ensure the protection of surface waters and the efficient use of resources. The project focuses on testing a new generation of secondary fertilisers (NextGen fertilisers) that feature high plant availability and low water solubility at the same time.

The project partners are Outotec GmbH & Co KG (coordination), Bundesanstalt für Materialforschung und -prüfung (BAM), Kompetenzzentrum Wasser Berlin, Universität Bonn, The University of Queensland (Australia) and Universidade de Sao Paulo (Brazil). The project was started end of 2017 and will be funded for three years by the German Federal Ministry of Education and Research (BMBF). ●

Further information on  
[KWB-Website](#)

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### HYDRA – Investigation of possible impacts of climate change on groundwater augmentation

*The climate change scenarios for the Berlin-Brandenburg region suggest an increase in hot, dry summers and heavy rainfall events.*

One possible consequence could be that at times of low groundwater levels the withdrawal rates for artificial groundwater recharge, which is essential for backing Berlin's drinking water supply, would have to be reduced. The HYDRA project, which started in January 2018, is to clarify in detail whether fluctuations in surface water runoff could actually lead to restrictions in the operation of artificial groundwater recharge in the future. In this context, the influence of increasing temperatures on the hydraulic properties during infiltration and subsurface passage until abstraction will also be examined. For this purpose, simple and cost-effective measuring methods for monitoring the hydraulic boundary conditions will be used.

The associated and cooperation partners Berliner Wasserbetriebe and the Berlin Senate Department for the Environment, Transport and Climate Protection will arrange for the integration of the project results into Berlin's Concept for Adaptation to the Impacts of Climate Change. This will facilitate the continuation of the dialogue between the enforcement authority on the one hand and municipal utility on the other hand. ●

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### Data-driven Models – Prediction of Future Condition of Sewer Pipes

*Recent studies about the wastewater infrastructure in Germany show that current investments for sewer rehabilitation are not sufficient to tackle the ageing and deterioration of the networks. So far, the extent of the damages has been determined by regular CCTV inspections.*

In the scope of the 13-months project SEMA-Berlin water professionals of KWB and Berliner Wasserbetriebe have investigated whether statistical models and machine learning are suitable methods to predict the future condition of sewer pipes. All models have considered the individual pipe properties and data made available by the Land Berlin providing information on the external load of sewer constructions. The analyses have demonstrated that in addition to age and material of the sewer pipes also the profile and surrounding trees impact the condition development. By means of a statistical model, it was possible to simulate the distribution of the damages within the entire sewer network with an accuracy of 99%. In addition, it was shown that machine learning models can identify pipes in bad condition with 85% of the inspection accuracy. The model results can be used for the short-term determination of sewer inspections and rehabilitation measures as well as for long-term investment planning. The project was financed by Berliner Wasserbetriebe.

An [animated video](#) on the KWB website illustrates the challenges of sewer ageing. ●

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>> continuation of page 1 (Kalundborg)

The work of KWB includes the development of a new operational control strategy e.g. based on UVA245nm closed loop control, which KWB currently is working on in the projects MeReZon and CWPharma. Beyond the optimisation of the existing system, the cooperation partner aims for contributing

to circular economy concepts by promoting municipal and industrial water reuse and energy recovery.

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## EVENTS

Meet us at the following events:

11 April 2018

**Phosphorus recovery from wastewater with a focus on the potential of thermo-chemical sludge treatment**

Venue: Quality Hotel View, Hyllie, Malmö, Sweden

Organiser: IWA Sweden

[Information](#)

12 April 2018

**Konferenz Urbaner Umweltschutz - Weichenstellung für eine umweltorientierte Stadtentwicklung**

Venue: Tagungswerk Berlin, Germany

Organiser: German Federal Environment Agency (UBA)

[Information](#)

26 April 2018

**8. Kommunalen Erfahrungsaustausch: Regenwassermanagement in der Praxis**

Venue: Gelsenkirchen, Germany

Organiser: AGG/GELSENKANAL, GELSENWASSER, WSW Energie & Wasser AG, Dr. Pecher AG

[Information](#)

7–9 May 2018

**Berliner Energietage**

Venue: Ludwig Erhard Haus, IHK zu Berlin, Germany

Organiser: Berliner ENERGIETAGE c/o EUMB Pöschk GmbH & Co. KG

[Information](#)

8–9 May 2018

**Regional Water Resources-Management for Sustainable Protection of Waters in Germany (ReWaM); Final Conference of the BMBF Funding Measure**

Venue: Berlin, Germany

Organiser: ReWaMnet, The German Federal Institute of Hydrology (BfG)

[Information](#)

16–17 May 2018

**Wastewater Treatment Plants as Resource Recovery Factories – Final Conference POWERSTEP Project at IFAT 2018**

Venue: Munich, Germany

[Information](#)

23 May 2018

**Berliner Wasserwerkstatt: statistische und deterministische Modelle zur Bewirtschaftung von Badegewässern**

Venue: Berlin, Head Office Berliner Wasserbetriebe

Organiser: Kompetenzzentrum Wasser Berlin

[Information](#)

9 June 2018

**Berlin's Long Night of the Sciences – All about Rain**

Venue: Berlin, Campus Wissenschaftsstadt Adlershof, Institut für Physik

[Information](#)

11–12 June 2018

**5th EURO-SAM Workshop**

Venue: Innsbruck, Austria

Organiser: University Innsbruck

[Information](#)

11–13 June

**European Sustainable Phosphorus Conference 3 (ESPC3)**

Venue: Finlandia Hall, Helsinki, Finland

Organiser: European Sustainable Phosphorus Plattform (ESPP), Baltic Sea Action Group (BSAG)

[Information](#)

1–6 July 2018

**HIC 2018 – 13th International Hydroinformatics Conference**

Venue: Palermo, Italy

Organiser: University of Palermo/University of Enna "Kore"

[Information](#)

22 October 2018

**BLUE PLANET Berlin Water Dialogues**

Venue: Berlin, Germany

Organiser: German Water Partnership (GWP) and Kompetenzzentrum Wasser Berlin

[Information](#)

## KEY READS



**Wasserwirtschaft in Deutschland – Grundlagen, Belastungen, Maßnahmen**

Publisher: Umweltbundesamt, October 2017  
Language: German; Number of pages: 234

→ [Further information on UBA website \(in german only\)](#)

The brochure „Water Management in Germany“, which was reissued in 2017, gives a comprehensive overview of the basic conditions, loads and measures of the German water management and summarises all important facts and current data relating to the condition of waters, water protection and water supply and disposal in Germany. Thanks to its extensive illustration with graphics, data tables and photos the brochure provides interested laymen but in particular also water professionals with an excellent summary of information on the current situation, but also on the upcoming challenges for the German water management. Unfortunately, the booklet is currently available in German only. ●

## about us

Through network activities, the KWB strengthens Berlin's position as an international centre in the field of water economy and technology. Its associates are the Technologiestiftung Berlin, the Berliner Wasserbetriebe and the Berlinwasser Holding. Partners and actors are scientific facilities, public institutions, companies as well as multipliers from public and private sectors.

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