CONSTRUCTED WETLAND ASSOCIATION

Annual Conference

TREATMENT WETLANDS: SOLUTIONS FOR WATER AND LANDSCAPE MANAGEMENT

Proudly sponsored by: Salix

12th and 13th May 2026

Glasgow Caledonian University

Final Programme

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CONSTRUCTED WETLAND ASSOCIATION

Day One

12th May

Time	Topic	Speaker
09:00	Registration and Coffee	~
09.30	Welcome	**Gaby Dotro** Chair of CWA
	MORNING SESSION	
09.45	**Keynote: "Global and Local Collaborations Delivering Multi-Benefit Place-Based Solutions for Water, Climate and Communities"**	**Rebecca Wade** Abertay University
10.30	Building Better Wetlands: The Power of Stakeholder Engagement	**Abi Cousins** Binnies
10.50	Bridging Policy Support and Practical Implementation of Constructed Wetlands in Latvia	**Linda Grinberga** Latvia University
11.10	**Break with Poster Exhibition**	
11.50	Stormwater Wetlands: Collaboration on the Realisation of Defra Policy	**Lisane Maus,** **David Naismith &** **Geoff Sweaney** Stantec, Mott MacDonald & Wetland Engineering
12.10	**New Wetland Professionals Session (1):** 1. Surface Flow Wetlands for Emerging Organic Micropollutants Removal **(Rubin Das)** 2. Enhancing Substrate Performance Using Biochar in Hybrid Constructed Wetlands for Dairy Soiled Water Treatment **(Prisca Nyamukondiwa)** 3. Optimising Surface Flow Constructed Wetlands for Manufacturing Waste Bioremediation **(Gabriel Mosso Zolezzi)**	
12.40	Reflections from Three Decades with Reedbeds & Technical Tour Briefing	**Stewart Moir** Moir Environmental
	AFTERNOON SESSION	
13.40	Travel to Hansel	Wetland site Lead: **Stewart Moir** Moir Environmental
14.30	**Site Visit: Tertiary Reedbed, Storm-only Reedbed, Flow Attenuation Pond and Wetland**	
16.00	Leave Hansel and return to Glasgow Caldeonian	
19.00	**Conference Dinner – Glasgow Caledonian University**	

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Day Two

13th May

Time	Topic	Speaker
09:00	Registrations and Coffee	~
09.25	Welcome to Day 2	**Gaby Dotro** Chair of CWA
	MORNING SESSION	
09.30	**Keynote: "In-Stream Treatment Wetlands for Mitigating Diffuse Pollution in Rural Landscapes in Estonia: Achievements, Challenges, and Lessons Learned"**	**Margit Kõiv-Vainik** University of Tartu
10.15	Treatment Wetlands for PFAS: From Sewage Works to Receiving Rivers	**Tao Lyu** Cranfield University
10:35	Long Term Performance Evaluation of Floating and Aerated Wetlands Treating Stormwater Runoff at Europe's Busiest Airport	**Andy Freeman** ARM
10:55	**Mentoring over Coffee: Constructed Wetland Professionals in Practice**	
11.55	**New Wetland Professionals Session (2):** 4. Long-Term Reliability of Nutrient Compliance in a Full-Scale Integrated Constructed Wetland **(Ayisha Affo Souleymane)** 5. Constructed Wetland as a Nature-based Solution for Treatment of Equine Farm Wastewater **(Nasrin Rastinifard)** 6. Hanningfield Sludge Treatment Reed Beds- 15 years' Experience with Full-scale Treatment of Waterworks Sludge **(Amy Harley)**	
12:35	Lessons from Long-term Performance of the UK's First Full-Scale Wetland for Zinc/Lead Metal Mine Water Treatment	**Adam Jarvis** Newcastle University
12:45	**Lunch & Poster Exhibition**	
	AFTERNOON SESSION	
13:45	**Special Session: Lessons Learnt from Wetlands Research And Practice** Jonny Tyler – Senior Process Engineer (Scottish Water) Victoria Wilson – Green First Strategy Lead (Dŵr Cymru Welsh Water) Fiona Sutton – Wastewater Expert Senior Process Scientist (Severn Trent)	
14:45	Workshop Session	
15:10	**Prizes and Conference Close**	**Gaby Dotro** CWA

Keynote Speakers

Global and Local Collaborations Delivering Multi-Benefit Place-Based Solutions for Water, Climate and Communities

Rebecca Wade
Abertay University, Scotland

Dr Rebecca Wade is a Senior Lecturer in Environmental Science at Abertay University. She works collaboratively across disciplines and sectors to address climate, nature and societal challenges. Rebecca's research and practice link urban water engineering, river restoration, and sustainable infrastructure to the delivery of multiple environmental and societal benefits. In 2003, Rebecca co-founded SUDSnet, an international community of practice for researchers and practitioners focused on sustainable urban water management. She holds director and trustee roles with science engagement and environmental organisations in Scotland, and has received a number of awards recognising her contributions to the field, including Top 50 Women in Engineering 2024 and the RRC UK Rivers Prize 2023.

Rebecca will draw on her experience spanning research, practice and international collaboration to explore how place-based approaches — rooted in local knowledge and delivered through cross-sector partnerships — can deliver multiple benefits for water quality, climate resilience and communities.

In-Stream Treatment Wetlands for Mitigating Diffuse Pollution in Rural Landscapes in Estonia: Achievements, Challenges, and Lessons Learned

Margit Kõiv-Vainik
University of Tartu, Estonia

Dr Margit Kõiv-Vainik is an Associate Professor in Environmental Technology at the Department of Geography, in the Institute of Ecology and Earth Sciences, University of Tartu, Estonia. Her interdisciplinary research focuses on process-based development and optimisation of nature-based water solutions — including constructed treatment wetlands and sustainable stormwater systems — to improve removal of highly problematic contaminants from polluted waters, spanning urban stormwater, agricultural diffuse runoff, landfill leachate, municipal and aquaculture wastewater, and greywater. Kõiv-Vainik's research integrates ecological processes, phytotechnology, and environmental engineering to improve the performance and resilience of nature-based solutions under multiple stressors.

Margit will present on decades of experience with treatment wetlands for diffuse pollution management in the landscape under cold weather conditions, drawing on collaborative work led by Prof. Kuno Kasak at the University of Tartu.

Panel: Lessons Learnt from Wetlands Practice and Implementation

Jonny Tyler
Senior Engineer (Process)
Technical Assurance Group
Scottish Water

Victoria Wilson
Environmental Programme Manager & NbS Lead
Dŵr Cymru Welsh Water

Fiona Sutton
Wastewater Expert
Senior Process Scientist
Severn Trent

David Naismith
Senior Associate
Wetlands
Mott MacDonald

Constructed wetlands have been delivering water treatment and environmental benefits for decades — yet the UK treatment wetlands community continues to grapple with the same recurring challenges around process selection, commissioning, and making the case for nature-based solutions.

This session brings together four practitioners with extensive experience across water utilities, consultancy, and environmental management to explore, honestly, what we get right and what we are still learning. Rather than a sequence of formal presentations, the session is designed as a conversation — drawing on real projects, live audience questions, and a short table exercise to capture collective thinking on the future of the field.

List of Posters

ID	Title	Author(s)
1*	Spatial and temporal dynamics of methane and carbon dioxide fluxes in a constructed wetland	Charlotte Harding, J Pearson, G Bending, S Abolfathi
2*	Hanningfield sludge treatment reed beds- 15 years' experience with full-scale treatment of water works sludge	Amy Harley, A. Freeman, S. Nielsen, C. Murphy, S. Harvey, D. Cooper
3*	Rodway Green outfall	Connie Hodge
4*	Enhancing substrate performance using biochar in a hybrid constructed wetlands for dairy soiled water treatment	Prisca Nyamukondiwa, A. Siggins, M. Healy, D. Casaban Padrino, R. Prendergast and P. Tuohy
5	The development of mycoremediation filters for water quality improvement	H.J. Walling, L.R.D. Mendes, L. Crockford, E. Morris, T. Parkes, P. Quinn, P. Schuler, M. Stutter, M.E. Wilkinson and S. Terreni-Brown
6*	Phosphorus removal in constructed treatment wetlands: A systematic review	Chris Webb
7	Lessons learnt from applying the IUCN Global Standard to DCWW's wetland schemes	Victoria Wilson, N. Wahlberg Macias, and G. Dotro

Abstracts

(by first author last name, in alphabetical order)

"Building Better Wetlands: The Power of Stakeholder Engagement"

Abigail Cousins
Binnies

Stakeholder engagement plays a critical role in the success of constructed wetland projects, shaping not only the outcomes but also the long-term ecological and social value. It is often considered an obligatory step in the delivery of constructed wetlands, yet when used strategically, it becomes one of the strongest predictors of project success.
Drawing on case studies from recent wetland design and implementation projects, we highlight three core insights. First, framing engagement as a proactive project tool enables teams to anticipate challenges early, such as land access, operational expectations, regulatory uncertainty, or community concerns, and incorporate solutions into design from the outset. Second, early, transparent, and continuous communication builds shared ownership, reducing conflict and accelerating decision making at critical project milestones. Finally, authentic participation enhances ecological, social, and operational outcomes: wetlands designed with end users and communities deliver improved biodiversity value, more resilient system performance, and smoother long-term management.
Email: cousinsa@binnies.com

"Surface Flow Wetlands for Emerging Organic Micropollutants Removal"

Rubinmoy Das
Cranfield University

Surface flow wetlands, sometimes referred to as integrated constructed wetlands(ICWs), have been widely applied around the world in treating sewage and other sources of wastewater as well as delivering co-benefits as a nature-based solution. In response to increased awareness concerning emerging organic micropollutants, the role of ICWs is being extended to include the potential to help manage trace chemicals and other emerging pollutants such as pharmaceuticals, microplastics, and antimicrobial resistance (AMR) organisms and genes. This study conducted a literature review to summarise the evidence base for the use of ICWs in sewage treatment, with a focus on the removal of emerging micropollutants. Moreover, a tailored statistical framework was developed to group the targeted micropollutants with the aim of identifying representative compounds and minimising the number of compounds requiring costly monitoring by practitioners.
Email: Rubinmoy.Das.082@cranfield.ac.uk

Abstracts

"Long Term Performance Evaluation of Floating and Aerated Wetlands Treating Stormwater Runoff at Europe's Busiest Airport"

Andy Freeman
ARM Ltd

Constructed wetlands have been widely promoted to meet the objectives of the UK regulatory SORP. Recently however, the performance of such systems has been scrutinised which is potentially limiting the implementation of constructed wetlands. Consequently, water companies and industry are implementing conventional grey stormwater storage solutions which is a missed opportunity for increased NBS uptake and multiple co-benefit delivery. In this study we evaluate the long-term performance of floating and aerated wetlands operating under event-driven conditions over a 15-year operating period. The system has protected the environment by treating >2,000,000m3 of stormwater and removing >500t of de-icing chemical derived BOD5, whilst providing habitat in an urbanised environment. We will present the long-term performance results, degradation kinetics and comparison between actual and simulated performance. Our study demonstrates the positive long-term performance efficacy and capability of event driven treatment wetlands with lessons learned already being utilised within AMP8 to meet SORP objectives event driven treatment wetlands with lessons learned already being utilised within AMP8 to meet SORP objectives.event driven treatment wetlands with lessons learned already being utilised within AMP8 to meet SORP objectives.
Email: andy.freeman@armgroupltd.co.uk

"Bridging Policy Support and Practical Implementation of Constructed Wetlands in Latvia"

Linda Grinberga
Latvia University of Life Sciences and Technologies

Constructed wetlands are increasingly recognized as effective nature-based solutions for improving water quality in agricultural landscapes and decentralized wastewater systems. In Latvia, the development of constructed wetlands has evolved over the past two decades through practical implementation, monitoring, and gradually emerging policy support.

The first constructed wetlands for domestic wastewater treatment were built around 2005, and some systems are still in operation today, demonstrating the long-term viability of nature-based treatment solutions under local climatic conditions. Since 2014, two constructed wetlands for agricultural drainage water treatment have been established and monitored, providing data used to adapt design approaches for subsequent systems. By 2025, approximately 25 constructed wetlands have been built or are under construction in Latvia for treatment of agricultural runoff, domestic wastewater, industrial effluents, and stormwater. Both free water surface and subsurface flow systems are applied as primary treatment units or polishing stages. The Latvian experience illustrates how nature-based treatment solutions can develop through long-term practice, monitoring, and evolving policy support.
Email: linda.grinberga@lbtu.lv

Abstracts

"Spatial and Temporal Dynamics of Methane and Carbon Dioxide Fluxes in a Constructed Wetland"

Charlotte Harding, J Pearson, G Bending, S Abolfathi
University of Warwick

Constructed wetlands (CWs) are increasingly adopted as a nature-based solution for wastewater treatment. However, given their affinity with natural wetlands and high degradation of organic pollutants, their classification as a sustainable 'green' technology is questioned due to potentially high greenhouse gas (GHG) emissions. To address this knowledge gap, CH_4 and CO_2 fluxes were measured from the Ingoldisthorpe integrated CW and an adjacent natural pond, located in the UK using the floating chamber method with gas chromatography, alongside climate and water quality monitoring. Mean seasonal CH_4 fluxes ranged from 0.13 ± 0.18 mg CH_4 m^{-2} h^{-1} (autumn) to 20.52 ± 45.01 mg CH_4 m^{-2} h^{-1} (spring), with ebullition contributing 25–93 % of total spring-summer CH_4 flux. When CH_4 was converted to CO_2 equivalents, the CH_4:CO_2 seasonal ratio revealed a greater contribution of CH_4 to the CW emission potential in spring-summer and CO_2 (mg CO_2 m^{-2} h^{-1}) in autumn-winter, resulting in a mean annual global warming potential (GWP) of 3.76 kg $CO_{2\text{-eq}}$ m^{-2} $year^{-1}$. Temporal temperature variability significantly influenced CH_4 ebullitive fluxes, while spatial variability of water depth and velocity were key drivers of CH_4 and CO_2 diffusive fluxes. The absence of ebullitive flux in the natural pond adjacent to the CWs was attributed to its lower eutrophic conditions than the CWs. However, no significant differences in overall GHG emissions were observed between the CWs and the natural pond. Overall, our findings capture the complex temporal and spatial variability of GHG fluxes in CWs, highlighting the importance of comprehensive sampling to inform more accurate GHG budgeting and support evidence-based design and management strategies for sustainable CW systems.

Email: charlotte.a.harding@aecom.com

"Hanningfield Sludge Treatment Reedbeds: 15 years Experience with Full-scale Treatment of Waterworks Sludge"

Amy Harley
ARM Ltd

Climate change and population growth could create a daily UK water shortfall of up to five billion litres by 2050, highlighting the need for expanded infrastructure. In response, the UK Government has committed to building nine new reservoirs by 2050—the first major programme of this kind in 30 years. However, potable water production generates substantial sludge, creating opportunities for low-carbon, Nature-based Solutions (NbS) such as Sludge Treatment Reed Beds (STRB), which offer an alternative to conventional, energy-intensive sludge management.

This study presents the award-winning STRB system, Hanningfield STRB, designed by ARM Group Ltd and WSP Denmark. Comprising of 16 basins totalling 4.2ha and has treated up to 1,275t/ds/yr, operating over 14 years. The system is in its emptying phase whereby accumulated sludge with nutrient loads of 311mg/t/ds Iron, 7.5 mg/t/ds Total Phosphorus and 7.6mg/t/ds Total Nitrogen are recycled to agricultural land under a regulatory land spreading deployment strategy.

Email: amy.harley@armgroupltd.co.uk

Abstracts

"Rodway Green Outfall"
Connie Hodge
Mott MacDonald

The Rodway water treatment works is being upgraded and expanded, requiring infrastructure to handle borehole washout and surface water drainage. The project was challenged with developing an alternative green solution to typical grey infrastructure options. A nature-based alternative has been developed, replacing underground tanks, pipes and headwall structures with a Green Outfall solution. The wetland can attenuate up to 0.7m depth of water before overflowing down a rock cascade into the River Strine. The wetland has been designed with small islets and deeper pool sections to promote greater diversity. The scheme incorporates additional ecological enhancements, including a dragonfly pool, basking mound, and a wildlife pond. By creating new wetland habitat and adding trees and shrubs across the site, the Green Outfall achieves the same functional performance as a conventional solution while providing BNG, landscape, and water-quality benefits. The project also offers community value via connections to existing public paths along the River Strine.
Email: Connie.Hodge@mottmac.com

"Lessons from Long-term Performance of the UK's First Full-scale Wetland for Zinc/Lead Metal Mine Water Treatment"
Adam Jarvis
Newcastle University

The Force Crag mine water treatment system, Cumbria, was commissioned in 2014, and monitoring data has been collected ever since. Parallel vertical flow wetlands, containing an organic substrate, remove divalent metals (mainly Zn, but also Pb and Cd) via bacterial sulphate reduction, immobilising metals as their sulphides. The entirely nature-based system is highly effective, removing a mean >95% Zn (n = 201). A variety of monitoring data indicates that the primary sink for divalent metal contaminants is solid metal sulphides. Key lessons have been learned about: (1) differences in performance with scaling from lab- to full-scale of this type of novel treatment wetland technology (now being replicated at other sites), (2) substrate permeability as a key driver of operational performance, and how lab testing of key substrate hydraulic properties benefits new system operation, and (3) the long-term viability of the now metal-laden substrate, and possible options for reuse or disposal.
Email: adam.jarvis@newcastle.ac.uk

Abstracts

"Treatment Wetlands for PFAS: From Sewage Works to Receiving Rivers"

Tau Lyu
Cranfield University

Per- and polyfluoroalkyl substances (PFAS), commonly known as 'forever chemicals', have recently been detected across a wide range of environmental matrices and pose significant ecological and human health risks. Due to their extremely stable chemical structures, current PFAS removal strategies largely rely on advanced adsorption materials and energy-intensive treatment processes. Emerging research suggests that certain microbial communities, including strains derived from wetland environments, have the potential to transform and degrade PFAS compounds. Our recent research in UK treatment wetlands has demonstrated promising PFAS mitigation performance for wastewater effluents, reducing the PFAS load discharged from sewage treatment works into receiving rivers. Different diffuse sources at the catchment scale continue to contribute to PFAS contamination in river systems. This highlights the need for broader catchment-based management strategies to address the PFAS challenges. management.

Email: T.Lyu@cranfield.ac.uk

"Stormwater Wetlands – Collaboration on the Realisation of Defra Policy"

Lisane Maus, David Naismith and Geoff Sweaney
Stantec, Mott MacDonald and Wetland Engineering

YTL Construction UK and consultants working on behalf of Wessex Water Services Ltd are constructing a large programme of nature-based solutions to reduce the impact of groundwater-driven storm overflows, as outlined in Defra trial guidance. Throughout AMP8, they will be delivering solutions on 30 sites. Stantec, Mott MacDonald and Sweco have been employed to design wetland solutions for 24 of these sites, eight per consultant.

Through early design the whole team, consultants, YTL Construction UK and Wessex Water Services Ltd have worked together to devise a standardised approach to wetland sizing as well as presenting key deliverables. As there are no UK standards for groundwater event driven wetland design and operation, open knowledge sharing workshops have been used to develop a consistent wetland design standard.
We will be presenting the types of wetlands applied, the basis of deriving flows and loads with limited data and the wetland sizing criteria.

Email: Lisane.Maus@stantec.com

Abstracts

"Enhancing Substrate Performance using Biochar in Hybrid Constructed Wetlands for Dairy Soiled Water Treatment"

Prisca Nyamukondiwa, A. Siggins, M. Healy, D. Casaban Padrino, R. Prendergast and P. Tuohy
University of Galway

Large quantities of dairy soiled water (DSW) produced on Irish dairy farms create management challenges. Current handling involves land spreading, however, excessive application can result in soil and water pollution through nutrient runoff and leaching. There is also growing concern regarding the presence of emerging contaminants (ECs) like herbicides and antibiotics, and their potential presence in DSW. Hybridised constructed wetlands (CWs) are an environmentally friendly and cost-effective treatment option for DSW. By employing solid separation as a pretreatment and integrating novel substrate materials, CWs have the potential to further enhance nutrient removal and mitigate EC losses. Biochar has shown promising ability as a substrate to remove contaminants due to the high surface area, porous structure and carbon sequestration ability. This study will be conducted over a milking period at Teagasc Moorepark to evaluate performance of replicated hybridised CWs amended with different proportions of biochar for nutrients and EC retention.
Email: Prisca.Nyamukondiwa@teagasc.ie

"Constructed Wetlands as Nature-based Solutions for Treatment of Equine Farm Wastewater"

Nasrin Rastinifard and Kiran Tota-Maharaj
Royal Agriculture University

Constructed wetlands are sustainable nature-based systems for wastewater treatment; however, their performance is often limited by low oxygen availability and reduced biodegradation under cold conditions. This study evaluates a hybrid system integrating vertical-flow constructed wetlands with solar-powered aeration for treating equine farm wastewater. Six parallel units were operated over 120 days to investigate the effects of plant species (Vetiver *Chrysopogon zizanioides*and Cattail *Typha latifolia*) and perlite substrate on treatment efficiency.The influent exhibited moderate pollution levels (COD: 235 mg L^{-1}; TOC: 34 mg L^{-1}). Vegetated systems significantly outperformed non-vegetated units. The Vetiver–perlite configuration achieved the highest removal efficiency, reducing COD to 71 mg L^{-1} (~70%) and TOC to 12 mg L^{-1} (~65%). Dissolved oxygen increased from 1.3 to 2.2 mg L^{-1}, while oxidation–reduction potential improved from −16 to +32 mV, indicating enhanced aerobic conditions. Total dissolved solids and electrical conductivity also decreased notably. Statistical analysis confirmed that both plant species and substrate type significantly influenced treatment performance ($p < 0.05$). The integration of vegetation, porous media, and aeration enhanced microbial activity and overall system efficiency. These findings demonstrate that hybrid constructed wetlands with solar aeration offer an effective and sustainable solution for treating equine farm wastewater, particularly under oxygen-limited conditions.
Email: nasrin.rastini95@gmail.com

Abstracts

"Long-term Reliability of Nutrient Compliance in a Full-scale Integrated Constructed Wetland"

Ayisha Affo Souleymane
Cranfield University

Integrated Constructed Wetlands (ICWs) are widely implemented as nature-based systems for decentralised wastewater treatment, yet long-term performance is typically assessed using mean effluent concentrations, which may obscure changes in compliance stability. This study analyses fourteen years (2010–2024) of monitoring data from a full-scale ICW using survival-based reliability modelling of inter-exceedance intervals. Ammonium (NH_4–N; 1 mg L^{-1}) and orthophosphate (0.5 mg L^{-1}) thresholds were evaluated using a two-parameter Weibull distribution across three operational periods. Mean effluent concentrations remained stable throughout the monitoring record. However, reliability analysis revealed contrasting hazard dynamics. NH_4–N displayed near-constant hazard behaviour ($\beta \approx 1$), with median compliant durations increasing from 49 to 71 days. In contrast, orthophosphate showed a transition from decreasing to time-dependent hazard ($\beta \approx 1.4$), indicating increasing exceedance risk over time. Sediment fractionation showed phosphorus predominantly stored in Fe/Al-bound (20 - 60%) and organic pools (30 - 45%), suggesting reactive but non-inert storage. These findings demonstrate that stable mean effluent concentrations may conceal evolving compliance risks in long-operating ICWs.

Email: a.affosouleymane@cranfield.ac.uk

"The Development of Mycoremediation Filters for Water Quality Improvement"

H. Walling[1,2,3], L. Mendes[1,4], L. Crockford[2], E. Morris[5], T. Parkes[1], P. Quinn[4], P. Schuler[1], M. Stutter[3,4], M Wilkinson[4] and S. Terreni-Brown[1]
[1]Rhizocore Technologies Ltd., [2]Harper Adams University, [3]Lancaster University, [4]The James Hutton Institute, [5]Cheshire Wildlife Trust.

Agricultural runoff introduces excess nitrates and phosphates into freshwater systems, driving eutrophication and water-quality decline. This project aims to develop mycoremediation filter systems, using locally sourced saprotrophic fungi in combination with organic substrates, that can be deployed close to source in field ditches, drains and small streams to uptake nutrients, e.g. nitrates and phosphates to improve water quality. The filters are created using metal cages and deployed in a variety of designs such as cross channel and alternatively along the stream channel. Results so far have been focused on the filters' ability to withstand winter storms with some improvement in water quality evident by growth of sapotrophic fungi. Engagement with stakeholders has also elucidated considerations required in design and deployment.

Email: lcrockford@harper-adams.ac.uk

Abstracts

"Phosphorus Removal in Constructed Treatment Wetlands: A Systematic Review"

Christopher Webb
Wildfowl and Wetlands Trust

This study synthesises evidence on phosphorus removal in free water surface constructed wetlands. It is based on our recently published global systematic review, which includes the analysis of 71 studies which met stringent criteria checks. Most wetlands (90%) achieved net phosphorus retention, however, outcomes were highly variable. Key design and loading parameters governing retention are examined. These focused on wetland area, hydraulic loading rate, hydraulic retention time and phosphorus loading rate. Key learning points include: 1) larger wetlands and those with low hydraulic loadings tend to deliver more consistent and higher efficiencies. 2) higher phosphorus loads and short retention times generally reduced efficiency. 3). There is a trade-off between having a stable, high removal efficiency and high mass removal, therefore an optimal design depends on whether reliability or mass removal is prioritised. 4) Based on the literature, we provide recommendations for standardised monitoring that could underpin effective adaptive management.
Email: chris.webb@wwt.org.uk

"Ensuring Treatment Wetlands are Nature-based Solutions: Lessons Learnt from Applying the IUCN Global Standard to DCWW's schemes"

Victoria Wilson[1], Natascha Wahlberg Macias[2], Gabriela Dotro[3]
[1]Dŵr Cymru Welsh Water (DCWW), [2]Social Climate, [3]NbS Future

This paper reports the application of the IUCN Nature-based Solutions (NbS) Global Standard to two treatment wetland schemes delivered by Dŵr Cymru Welsh Water (DCWW) as part of their NbS investment programme: an urban combined sewer overflow (CSO) wetland, and a rural phosphorus-capture wetland supporting nutrient neutrality. The schemes were assessed against the Standard's 28 indicators to identify alignment strengths, residual risks, and common barriers to NbS integrity in a UK water utility context. Systems thinking, cultural shift, ecosystems thinking, and policy & regulation emerged as four recurring weaknesses across both schemes, providing a basis to flag potential greenwashing early in utility investment planning and to prioritise green/NbS alternatives.
Email: gaby@nbsfuture.com

Abstracts

“Optimising Surface Flow Constructed Wetlands for Manufacturing Waste Bioremediation”

Gabriel Mosso Zolezzi
Bangor University

Treatment of manufacturing waste (MW) is expensive and can generate high carbon emissions. Surface flow constructed wetlands (SFCWs) may be a potential low-cost and low-carbon solution. 16 laboratory-scale SFCWs were tested by 4 MW dilution levels (DLs), including 50% distilled water, 50% river water, 80% distilled water, and 80% river water over 2, 4, 6, 8, and 10-day hydraulic retention times (HRTs). The MW in this study was predominantly phosphate (1,185 mg/L), chloride (2,417 mg/L), and sodium (3,136 mg/L). Phosphate removal peaked during the 10-day HRT within the 80% distilled water DL (75% removal efficiency). Chloride removal peaked during the 10-day HRT within both 80% DLs (31-33% removal efficiency). Sodium removal peaked during the 10-day HRT within both 50% DLs (88-90% removal efficiency). This demonstrates that SFCWs can achieve substantial removal rates of pollutants in MW from a high initial concentration.
Email: gabrielmossozolezzi@gmail.com

Field Trip Info

Thank you to our site visit hosts:
Hansel & Moir Environmental

We'll be visiting **Hansel**, a social care facility in Ayrshire with over two decades of real-world, nature-based water management.

The site features two horizontal flow constructed wetlands for sewage treatment - one handling standard flows (tertiary reedbed) and one dedicated to storm flows (storm reedbed). In addition, the site has a retention pond and a surface flow wetland to buffer surface water runoff and reduce flood risk when surrounding soils are saturated.

CWA Committee

Chair
Dr Gabriela (Gaby) Dotro
NbS Future

Treasurer
Dr Andy Freeman
Research and
Development Manager
ARM Group Ltd

Committee Member
Dan Roberts
Project Manager (NbS)
Wildfowl and Wetlands Trust

Secretary
Dr Lucy Crockford
Senior Lecturer in Soil and
Water Management
Harper Adams University

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Isobel (Izzy) Love
NbS lead
Afonydd Cymru

Committee Member
Matthew Simpson
Director
35 Percent

Committee Member
Liam Hall
River and Wetland Lead
Binnies

CWA Contact Details

General Enquires:	info@constructedwetland.co.uk
Membership Enquiries:	admin@constructedwetland.co.uk
Training and Conference Enquiries:	events@constructedwetland.co.uk
Social Media:	https://www.linkedin.com/company/constructed-wetland-association/ https://www.facebook.com/Constructed.Wetland.Association

Administrator
Jessica Hulican-Lynskey
Student
Harper Adams University
admin@constructedwetland.co.uk