

Managing Water

and its
environment



The Grein Barrier, Austria, courtesy of
IBS Engineered Products - see page 14

visionary responses to global water challenges



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Water Ambition and
Imagination



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Enhancing Society



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Flood barriers - worth having?



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Removing or replacing gauging weirs



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Long term funding for Flood and Coastal Erosion Risk

Defra has committed more than £2 billion for flood and coastal erosion risk management over the current four year spending period, which runs from April 2010 to March 2015.

The table below sets out the capital¹ and resource² budget for 2012/13, 2012/14 and 2014/15.

1	2	3	4	5
Resource or capital	Resource	Resource	Capital	Total
Risk management Authority	Defra	Environment Agency	Environment Agency, Defra, LA & IDB	
2012/2013	38.3*	255.6	266.0**	559.9
2013/2014	41.8*	238.9	293.8	574.5
2014/2015	42.5	226.4	343.8	612.7

The £120 million announced as part of the 2012 Autumn Statement will be spent over the next two years, with £35m allocated for 2013/14 and £85m for 2014/15.

The figures confirm the further reduction in the EA's revenue budget of approximately £30m for the period down to £226m for 2014/15. £50m less than the £275m budget for 2010/11.

Further infrastructure investment

As part of a £100bn package aimed at kick-starting economic growth the Government has promised to pour money into extra infrastructure spending by 2020.

Announced by Chief Secretary to the Treasury, Danny Alexander, following the budget cuts, the Government has set out its long term funding for flood defences.



Danny Alexander said that funding for flood defences would rise to £370 million in 2015-16, and would increase in real terms every year to 2020.

The total provision over this period will amount to £2.3bn and, according to the Government, represents a real annual increase of 18% and will protect over 300,000 households.

The Government also claims that by moving to a long term flood defence funding settlement, further efficiencies can be achieved by allowing the Environment Agency, its partners and the supply chain to plan more effectively and adopt new delivery methods. By adding longer term guaranteed funding, longer term projects can be entered into with more innovative contractual arrangements which will, in theory, create better value for money.

Summary of the Water Bill

The legislative changes with the new Water Bill are designed to reform the water industry to improve resilience, drive growth and give businesses more choice and flexibility - whilst protecting the environment.

The Bill will:

- Take action to tackle unsustainable abstraction by changing the way water company schemes to restore sustainable abstraction are funded.
- Streamline the environmental permitting framework by including three more licensing schemes - abstraction and impounding licensing, fish pass approvals, and flood defence consents - subject to public consultation.
- Encourage the use of Sustainable Drainage systems (SuDS) by clarifying that building and maintenance of SuDS can be a function of sewerage undertakers.
- Transfer responsibility for maintaining main river maps to the Environment Agency and the Natural Resources Body for Wales.
- Reduce bureaucracy relating to the governance of Internal Drainage Boards.

Reform of the water sector include:

- Increasing choice in retail market by allowing all business, charity and public sector customers to switch their water and sewerage supplier (and establishing a cross-border market with Scotland).
- Making it much easier for new businesses to enter the water market to provide new sources of water or sewerage treatment services, known as "upstream" services.
- Helping to better join up the national water supply network by making it easier for water companies to buy and sell water from each other.
- Encouraging development of small-scale water storage, by making it easier for owners of small-scale water storage to sell excess water into the supply stream.
- Providing powers for Ministers to set the level to which a water company needs to plan to cope with droughts.
- Making it easier for developers and inset appointees to connect new developments to the water mains and sewerage system.
- Improving the special merger regime for the water industry.
- Giving Ofwat a new over-arching duty to take greater account of long-term resilience.

Agreement reached on the future of flood insurance

Finally, after months of discussions, Flood Re has been confirmed as the Government's preferred option in safeguarding the future of flood insurance. The ABI and the Government have agreed a Memorandum of Understanding on how to develop the not-for-profit scheme ensuring that flood insurance remains widely affordable and available.

Flood Re is backed by an insurance industry levy, and will see flood insurance premiums capped, linking them to council tax bands allowing property owners to know the maximum that they will have to pay.

All UK household insurers will have to pay an annual levy into a pool amounting to £10.50 per household, creating a fund that provides cover for properties in high-risk areas. Flood Re will provide full cover for losses generated by, up to, 1:200 year events and for events that exceed that level, the Government will take responsibility, working with the industry and Flood Re to make resources available.

On 27th June, the Water Bill gave legal backing to the scheme which will provide a long term solution for at least the next 20 years.

It will take a while for the Water Bill to be passed, and the aim is to have Flood Re is up and running by Summer 2015, so in the meantime, the insurance industry will continue to honour the current Statement of Principals.

Defra has committed to provide capital investment over a 6 year period starting with a £370m investment in 2015/16 and rising with inflation up to 2020/2. New measures will also be added to the Water Bill to give the government legal powers, if required, to regulate the insurance industry and ensure that flood insurance remains affordable.



Owen Paterson
Environment Secretary

"Flooding is terrible for anyone affected by it. We have worked extremely hard with the industry to reach an agreement on the future of flood insurance. There are still areas to work through but this announcement means that people no longer need to live in fear of being uninsurable and that those at most risk can get protection, now and in the future."



Otto Thoresen
Director General,
Association of
British Insurers

"Insurers' priority has always been to ensure that flood insurance remains affordable and available for everyone who needs it. Today's announcement is the start of a process that aims to deliver affordable flood insurance to high flood risk households."

"Getting to this stage has required compromise by both sides and there remain issues that need to be overcome. For Flood Re to be established successfully there needs to be an unprecedented level of partnership between the Government and the industry. But insurers and the Government are now working towards a shared vision, with Flood Re as the Government's preferred choice."

"Flood Re would be a major undertaking for UK insurers and the work insurers have undertaken to get here reflects the industry's desire to cover flood risk at an affordable price in the face of the increasing flood threat in the UK. The hard work now begins for both sides if we are to make this vision a reality"



Environment Agency and Natural England to stay as separate bodies

Environment secretary Owen Paterson has announced that the Environment Agency and Natural England will **not** be merged into a single agency.

On 12 December 2012, Secretary of State for the Environment Owen Paterson announced the start of a joint Triennial Review of the Environment Agency and Natural England.

The purpose being to examine what functions the Environment Agency and Natural England carry out and how they do it. The overall aim was to ensure that the delivery bodies meet the Government's environmental ambitions and are sufficiently strong and resilient.

The EA welcomed the review findings saying that they should retain their current role and responsibilities, while continuing to reform to ensure effective and efficient delivery of frontline services, including flood protection.

The EA, Natural England and the Government will continue working closely together to achieve closer integration and better outcomes for communities and the environment.

Owen Paterson said:

"I have concluded that the EA and Natural England should be retained as separate public bodies with separate purposes and functions, but that both bodies should continue to reform how they deliver their services to their customers and drive further efficiencies."



FADS and Managing Water Magazine become media partners for the

Green Apple Awards

The awards, given for Environmental Best Practice, were launched in 1994 by The Green Organisation and are well established as one of the major environmental recognition schemes, both in the UK and internationally.

The Green Organisation is an independent, non-political, non-activist, non-profit environment group dedicated to recognising, rewarding and promoting environmental best practice around the world.

The awards are presented at a ceremony, held every November, in the House of Commons and although initially aimed only at local authorities the success of the campaign resulted in a similar scheme being organised for commerce and industry including Utilities and water companies.

The Green Apple Awards campaign was one of the first to be invited to become an automatic accredited feeder scheme into the European Business Awards for the Environment and is still one of only a few schemes that meet the exacting criteria of the Brussels-led EBAs. This has given several Green Apple Award winners the opportunity to go on to win European recognition.

Previous Green Apple Award winners have gone on to benefit from media exposure with nearly three quarters saying that they had won business as a direct result of the award.



'Environmental Best Practice'

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31st July 2013

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Flood Risk





House of Commons
Environment, Food and Rural
Affairs Committee

Managing Flood Risk

Government actions on flooding to spur economic growth are welcome but funding increases do not meet rising flood risk



Anne McIntosh
Committee
Chair

"Record rainfall in the past two years has led to extensive flooding, cost the economy millions and caused disruption and distress to householders and communities across the UK.

Additional capital funding for flood defences is welcome since every £1 spent on flood defences to protect communities spurs growth and delivers economic benefits worth £8.

But spending on flood defences has not kept pace with rising risks from more frequent severe weather. The Chancellor must ensure that investment increases by £20 million year on year. We need that money over the next 25 years to protect homes and businesses better. Maintenance of these defences and effective dredging of watercourses must be a priority.

Delay by the Government and the insurance industry in agreeing provision of affordable flood insurance has caused a lot of householders unnecessary uncertainty. The opaque cross-subsidy provided in the current Statement of Principles must be translated into a more transparent scheme with clear and robust governance arrangements."

In its report, EFRA, welcomed the Government's recognition that effective flood protection is essential for economic growth and for the regeneration of key parts of the country. However it criticises the Government for failing to secure significant private sector funding for new flood defences and for the delay in the implementation of SuDS. It warns that current funding allocations fail to protect agricultural land adequately which poses a risk to the security of UK food production. It also says that Local Authorities should have central government funding for repairing flood damaged roads and other infrastructure.

Additional Funding

Additional capital funding until the end of the decade announced by the Chancellor in the 2013 spending round is essential for securing flood defences to protect homes and businesses. However, funding has not kept pace in recent years with an increased risk of flooding from more frequent severe weather events and the relatively modest additional sums to be provided up to 2020 will not be sufficient to plug the funding gap. The original provision of a total of £2.17 billion for the current spending review for flood and coastal defence works represents a 6% fall in central government funding compared to the previous spending period.

In the 2012 Autumn Statement the Chancellor of the Exchequer announced additional funding, raising spend to a level close to that of the previous spending period. Some £120 million of funding would be made available for flood defence work, to be spent in 2013-14 and 2014-15. (See table on adjacent page)



Full report here

Defra must set out detailed evidence to demonstrate that capital funding will rise year on year by £20m over the next 25 years to keep pace with the increasing flood threat.

Maintenance of flood defences and watercourses

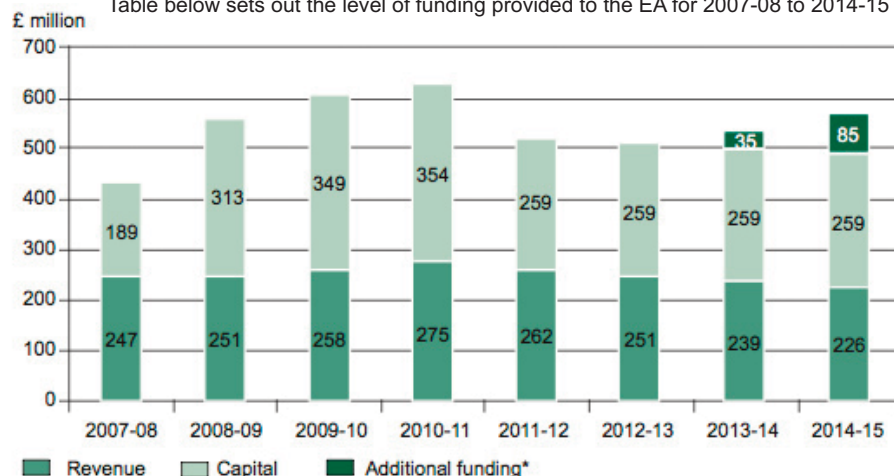
The Secretary of State acknowledged that some rural waterways had been allowed to get blocked up, flooding agricultural land and eroding bridges and other assets. This needed to be resolved. However, as noted above, only £20m a year is spent on channel maintenance, including dredging.

On 27 June, the Secretary of State informed us that an additional £5m would be provided for EA maintenance work. However, this represents only a fraction of the increase necessary to counter-balance budget reductions of recent years. The EA's revenue funding for 2014-15 is at the lowest level since 2007 and is some £50 million below 2010-11 levels.

EFRA were deeply concerned at the decision to reduce funding for maintenance of flood defences and watercourses which could leave communities exposed to the threat of flooding despite having benefited from considerable capital investment in flood defences. It is essential that adequate revenue funding is provided to enable the Environment Agency to conduct the necessary dredging and maintenance of watercourses so as to minimise flood risk to local communities.

With IDB's already undertaking maintenance works within their

Table below sets out the level of funding provided to the EA for 2007-08 to 2014-15



catchments it was recommended that IDBs which wish to undertake maintenance of local watercourses be supported in doing so, including by enabling them to retain the funding they currently provide to the Environment Agency for these services. It is also recommended that the Environment Agency continues to provide Internal Drainage Boards and local authorities with schedules of maintenance work to enable effective co-ordination of such work.

Sustainable Drainage Systems (SUDs)

Councils are already working with developers to introduce Sustainable Drainage Systems (SUDs) to reduce flood risk and more than 40% of newly built properties have connections to SUDs. However, key provisions of the Flood and Water Management Act which require new developments of two or more properties to adopt SUDs are yet to be commenced. These measures would make the right to connect surface water to the public sewer conditional on the drainage system being approved by a SUDs Approving Body. Sewerage undertakers, the EA, IDBs, British Waterways and Highway Authorities are to be statutory consultees to the Approving Body.

The committee were disappointed that three years after enactment of the Flood and Water Management Act 2010, its provisions on sustainable drainage have yet to be implemented. We have previously criticised the Government for failure to reach agreement with key parties,

such as local authorities, on how implementation is to be funded and managed, yet Defra is unable to commit to commencement before April 2014.

Sustainable drainage is a key aspect of managing flood risk and it is vital that the measures are implemented without further delay.

Flood Insurance

We welcome the Government's increased funding for flood defences which has enabled the insurance industry to undertake to continue to provide affordable flood insurance under the Statement of Principles regime until new arrangements can be put in place. The Government and insurance industry have had a number of years to consider future arrangements and we regret the delay in announcing a solution. This uncertainty has exacerbated the concerns of householders facing potentially significant rises in insurance premiums. The Government must conclude negotiations urgently on the details of the measures it proposes so as to spell out clearly the arrangements which will apply in the future and end the current uncertainty. We were not persuaded that the open market would be able at present to offer affordable insurance to all households. We welcome the Government's recognition that, whilst premiums should in time reflect a property's risk of flooding, this transition should only take place over a long timescale. A solution must be found to ensure that insurance is available for those homes built in areas at high risk of flood which

would be unable to obtain insurance. We endorse in principle the agreement between the Government and the insurance industry to introduce a levy-funded insurance pool for households at high risk of flooding which will keep premiums affordable for all. Flood Re will make transparent the current implicit cross-subsidy under the Statement of Principles so that householders are fully aware of the contribution they are making. This approach will provide stability for communities and certainty for householders in future. However, the Government's announcement raises many questions about the operation of Flood Re, in particular how the scheme will be accountable to Ministers and Parliament, and how taxpayers' interests will be protected in the event of an extreme flood event requiring funding beyond the capacity of the scheme. It is unclear who will bear the costs from such a 1 in 200 year flood event.

We are also concerned that the approach does not achieve the value for money normally required of Government policies. Furthermore, it is not clear how assurances will be enforced to limit the amount of levy to be paid by all householders and maintain premiums at affordable levels for those in the scheme. The regulatory regime must be fully transparent and open to Parliamentary scrutiny. Ministers conceded that they must publish further details on these issues. These must be provided urgently so that Parliament can scrutinise fully both the Flood Re scheme proposals and the measures in the Water Bill.

Planning

EFRA were disappointed that the commitment to end unnecessary building in flood plains has not yet been translated into effective action.

The Government should review how effective the National Planning Policy Framework has been in preventing new development from increasing flood risk. If necessary, guidance must be amended to enable local authorities to reject applications where flood risk will be increased.

WEM framework

The Water & Environment Management Framework

The Environment Agency has announced the successful suppliers for the WEM framework.

The contracts have been awarded over a four year period with the option to extend by a further 2 years.

Over the next 4 years the Environment Agency plans to invest more than £1 billion to further reduce the risk from flooding and to meet environmental improvement targets. With 75% of its capital programme spending via Asset Delivery,

In awarding the contracts, the Environment Agency, have based the awards equally on price and quality in order to meet their objective of delivering the best value to the taxpayer.

The WEM framework will become operational on the 2nd July 2013 and covers a wide range of environmental and flood management services. These include modelling, mapping, environmental work, feasibility studies, emergency planning, detailed design and construction.

Image courtesy of Royal HaskoningDHV. The urgent defence scheme at Bawdsey in Suffolk was part of a NEECA framework project for the Environment Agency.

Modelling Mapping & Data (Lot 1)

Capita Symonds Ltd
Halcrow Group Ltd
JacksonHyder
Jacobs UK Ltd
Jeremy Benn Associates Ltd
Mott MacDonald Ltd

Engineering & Related Services (Lot 3)

Capita Symonds Ltd
Halcrow Group Ltd
JacksonHyder
Jacobs UK Ltd
Mott MacDonald Ltd

Joint Ventures

There are several joint ventures which have been awarded contracts, including:

JBA Bentley

Jeremy Benn Associates and J N Bentley Ltd.

AKT

AECOM and Kier Ltd.

GBV, GallifordTry and Black & Veatch.

VBA consortium

VolkerStevin, Boskalis Westminster and Atkins.

JacksonHyder

Jackson Civil Engineering and Hyder Consulting.

BMM

BAM Nuttall and Mott MacDonald

Team Van Oord

Van Oord, May Gurney, Mackley and Royal HaskoningDHV.

Environmental Services (Lot 2)

AKT
Capita Symonds Ltd
Halcrow Group Ltd

Asset Delivery (Lot 4)

BMM
GBV joint venture
JacksonHyder
JBA Bentley
Team Van Oord
VBA consortium



Steven Magenis, director of strategic development at Royal HaskoningDHV said:

"The addition of Royal HaskoningDHV to the existing Team Van Oord partnership will enable the joint venture to deliver the full range of Flood and Coastal Risk Management projects, from feasibility and environmental assessment through design and on to construction, operation and maintenance. This will enable the Environment Agency to continue to make efficiency savings and to maximise the outcomes from its investment in Flood and Coastal Risk Management work"



Royal HaskoningDHV proud to be part of Team Van Oord

Nyree Ambarchian

Royal HaskoningDHV is delighted to have been appointed to the Environment Agency's new Water and Environment Management (WEM) framework as part of the revitalised Team Van Oord joint venture with partners Van Oord, May Gurney and Mackley.

The four year framework runs from 2013 to 2017 and is valued at an estimated £1bn, the asset delivery partners will work in joint ventures to primarily serve the agency's flood and coastal erosion risk management function. They will also be available to risk management authorities, Defra delivery bodies, local authorities, internal drainage boards, the Scottish Environment Protection Agency and the Welsh Government. The framework replaces SFRM, NEECA and NCF as the Environment Agency's procurement vehicle for its Flood and Coastal Risk Management activities

Team Van Oord Ltd formally brings together Van Oord UK, May Gurney, JT Mackley and Royal HaskoningDHV. The four partners already have a well-established track record of delivering to the Environment Agency for many years and are now able to successfully implement any project that becomes available on the market with in-house resource from start to finish – including feasibility studies, environmental assessments, design, construct, maintenance and operational aspects.

For the new framework Royal HaskoningDHV has joined as the fourth member of Team Van Oord. Royal HaskoningDHV's core values of delivering innovative solutions and engineering excellence rounds out Team Van Oord's capabilities. Royal HaskoningDHV brings in world-wide experience in a broad range of consultancy disciplines including flood and coastal risk management, environmental assessments, maritime and port developments.

This new partnership will build on Royal HaskoningDHV's work under the previous National Engineering and Environmental Consultancy Agreement (NEECA) and Strategic Flood Risk Management (SFRM) consultancy frameworks and Team Van Oord's work on the National Contractors Framework (NCF).

The WEM framework consists of four lots: engineering and related services, modelling mapping and data, environmental services, and asset delivery.

It is expected that around 75 per cent of its capital programme spending will be via Lot 4, which encompasses consulting, design and construction services undertaken either separately or as design-and-build projects.

Keith Howells, chairman of Mott MacDonald, said:

"Mott MacDonald has worked with the Environment Agency since its inception and with its predecessor organisations before that, providing technical assistance in strategic flood risk assessment, engineering of flood alleviation schemes and environment services. We're delighted to continue our work for the agency and look forward playing a crucial role in delivering flood and coastal risk management and environmental enhancements."

JBA Consulting Managing Director Marc Pinnell said,

"After fourteen years working with the Environment Agency on previous frameworks, we are very pleased to be continuing our work on the new WEM Framework. The appointment is an affirmation of the hard and excellent work produced by JBA staff."

"We are especially pleased about our new Joint Venture company with J N Bentley. The partnership between JBA and J N Bentley adds breadth and depth to our offering while ensuring work of the highest quality. The next four years promise to be rewarding and exciting for everyone involved in JBA Bentley Limited."

Ivor Catto, Chief Executive, Hyder said:

"We are delighted to be awarded a position on this important framework. We have a long-established and growing presence in river and coastal engineering and look forward to employing this expertise on behalf of the Environment Agency and its stakeholders."

Richard Neall, chief executive of Jackson Civil Engineering, said:

"We're over the moon with this result. I am so pleased for the team who will now have the opportunity to deliver something new and exciting. We believe that a truly integrated approach is the only way to achieve the next level of efficiencies in the UK and we aim to make that happen by working with the Environment Agency throughout the entire project cycle, as an integrated designer-contractor team. How could you not be excited about that?"



CAPITA SYMONDS



Halcrow

AECOM

Bentley



Aquobex appointed as global distributor for J & J Carter's flexible and reusable Eco-Dam

Aquobex, a leader in the design and provision of flood management solutions, announced today that it is been appointed as the global distributor for J & J Carter's Eco-Dam. This brand new patented product is a temporary, removable, re-usable and recyclable product that can protect a group of properties from impending flood risk. Eco-Dam can also be used as a temporary cofferdam* on construction sites and rivers.

"We are delighted that J & J Carter have appointed us to distribute this innovative new product," said John Alexander, director at Aquobex. "Its versatility and flexibility make it the ideal solution for not only for certain flood protection sites but also in a range of specialist engineering scenarios."

The Eco-Dam is manufactured from high tensile PVC coated polyester and incorporates a specially patented design which prevents rolling. The overlapping modular format provides extended protection in linear form but it can also be arranged to form shaped enclosures i.e 90 degree turns and complete enclosure. This affords protection to an entire enclosed area of land or building(s).

The Eco-Dam is not only suitable for water authorities and councils to store in readiness to deploy in the case of impending floods, but also for civil engineering contractors to use as cofferdams in the re-construction and maintenance of water ways and rivers.

Robert Carter, director at J & J Carter, said;

"Aquobex is rapidly establishing itself as the point of contact for anyone requiring quality independent advice on products and solutions for the management and mitigation of flooding and flood risk. It makes sound commercial sense for them to act as our distributors and we look forward to a beneficial partnership over the coming years."

The Eco-Dam is easy to use and can be deployed rapidly. When not in use it can be deflated and rolled up for ease of storage and removal and should damage occur it can be easily repaired in the field.



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Concrete Canvas

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Rapidam Handling Unit (RMU)



Pneumatically



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Environment Minister visits the Morpeth flood scheme

On the 5th and 6th of September 2008 Morpeth found itself at the centre of the most intensive rainfall in living memory. There was extensive flooding throughout the town centre, where over 950 properties, including dozens of businesses, were directly affected. It is estimated that a further 90 properties throughout the borough were seriously affected.



Environment Minister Richard Benyon

"It's good to see the progress that has been made with this new scheme which will better protect more than a thousand homes and businesses in Morpeth from flooding.

"The scheme, which has been made possible by our successful Partnership Funding, is a fantastic example of the way Government and local communities are working together to protect communities and businesses from the devastation of flooding."

Environment Minister Richard Benyon visited Morpeth earlier this month to see first-hand how construction is progressing on the Morpeth flood alleviation scheme. Mr Benyon joined Environment Agency Chairman Lord Chris Smith, Civil Head of Council Kath Nisbet, MP Ian Lavery and others to find out how the scheme will protect properties and to view the construction at High Stanners in the town.

Work on the £21 million flood scheme for Morpeth, which will protect 1,000 homes and businesses from flooding, began in February this year and is expected to be complete in Autumn 2014, depending on weather conditions. The solution for reducing the risk of flooding is a combination of water storage upstream of Morpeth, building flood defences in the town where none currently exist and improving existing flood defences where this is needed.

The Environment Agency and Northumberland County Council are working in partnership to fund and deliver the scheme, which is one of the best examples in the country of the government's Partnership Funding approach. Partnership funding from local councils, businesses and private investors has enabled more schemes to go ahead. So far £148 million of contributions have come forward over the four years to 2015.

Floods in Europe

In June parts of Europe, in particular Germany, Czech Republic and Austria were hit by some of the worst flooding on record.

Thousands of people living alongside the Elbe River in Germany were evacuated as the water levels rose 7m higher than normal. The same for the Danube, Inn and Ilz rivers which caused extensive flooding in southern and eastern German cities.

In Passau, Germany the water levels reached a 50 year high beating the highest previous level recorded in 1501.

In the Czech Republic, the rising Vltava River caused the evacuation of more than 7000 people and the streets of Prague, the famous historical city and capital of the Czech Republic, were flooded.

However many towns including Grein, a small city built along the River Danube in Upper Austria, demonstrated the importance of strategically used flood protection measures and provided the world with some rather dramatic images that perfectly demonstrate the effectiveness of a demountable barrier system (the 3.65m high barrier at Grein was designed and supplied by IBS, along with many others used 'in anger' across Europe during this terrible flooding event).



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***“Open and shut case -
demountable flood barriers please!”***

Grein, Austria



IBS barrier protecting Freudenberg, Germany



IBS barrier protecting Wurzburg, Germany



Stormwater & SuDS





Alex Stephenson,

Alex has over 37 years experience in stormwater drainage design and related issues.

As well as being the UK Stormwater Director with Hydro International he is also Chairman of the British Water SuDS focus group. He is ideally situated to keep you up to date with the industry changes and legislation.

Talking SuDS

SuDS, WSUD and Blue/Green Infrastructure – What's the difference?

Across the globe approaches to sustainable water management are getting more sophisticated as we recognise just how closely intertwined our lives are with the water cycle.

Historically, we separated out the way we think about water: waste water; drinking water; stormwater; rivers and coastal waters - we have compartmentalised, industrialised and managed each separately.

Now, climate change and more responsible environmental stewardship are driving us to realise that our approaches to water should be much more interconnected – and that integrated urban water management can have highly positive social consequences.

It's an evolution that's happening the world over, although countries are developing their legislative frameworks to water management in different ways, depending on the priorities of climate, water scarcity, flooding and population growth.

As the world becomes smaller, our ability to share and adopt best practice is rapidly accelerating. New water management approaches evolve in different places then 'cross-fertilise' by recognising similarities and sharing new ideas. You only have to look at the Australian winning garden at this year's Chelsea Flower Show to see it in a nutshell: the refreshing message was for UK householders to disconnect their downpipes and build billabongs in their back yards!

So, when Paul Shaffer tweeted the question: what exactly are the differences between SuDS, WSUD and green/blue infrastructure – and what is just smoke and mirrors? – I stopped to think.

Terminology

My problem is that I strongly believe terminology can – and in some cases has - become the enemy of really good water management. Such terms are open to interpretation – or misinterpretation - and to being adopted for differing agendas.

Of course, we need to have terms to 'hang our hats' on. So I will attempt my own interpretation of each: I fully expect that some of you reading this may disagree!

Sustainable Drainage Systems (SuDS): A principle for surface water management only really used in the UK and Ireland, based on managing surface water as close as possible to where it falls by mimicking natural paths and processes. SuDS fulfil the joint objectives of quality, quantity and amenity using a wide toolbox of techniques (manufactured or 'natural') to deliver attenuation, infiltration, flow control and water treatment.

Water Sensitive Urban Design (WSUD) is a much more global term used to describe an approach to planning and

designing towns and cities through integrated and sustainable approaches to water management. It looks at the water cycle as a whole and how urban environments can best be developed to bring about healthy ecosystems by integrating the whole water cycle.

*I believe **Green Infrastructure (GI)** began life in the US alongside terms like Low Impact Development (LID). For me GI is simply a way of describing surface engineering techniques that favour 'natural' or 'green' features. It can also be expanded to describe a way of linking green 'corridors' or spaces through urban and rural environments to build a countrywide green network to connect ecosystems and encourage biodiversity.*

*Introducing the term **Blue Infrastructure** links the concept of water to GI. Essentially blue corridors, or a network of water bodies, are intimately connected with green corridors. The 'blue' environment can encompass natural watercourses, lakes and ponds as well as man-made water bodies and manufactured drainage features.*

It's easy to recognise the vision that connects these concepts and gets people passionate. Using the opportunities that water presents to 'green' more of our public spaces can help our urban environments to breathe again. Reconnecting the need to conserve water with a need to recycle rainwater is a 'no brainer'; we simply must stop wastefully sending useable surface water to sewers.

But with all of this well-intentioned passion come challenges of practicality and step-by-step progress: At the beginning of this blog I said we needed to go 'back to basics' by reconnecting the water cycle. But that does not necessarily mean back to nature all by itself.

My concern is that a passion for 'green' has become the sub-text for some of these terms and a platform to evangelise 'natural' as the default solution. After all, mankind has spent hundreds of years improving on nature and all infrastructure is engineered in some way. Are we at risk of developing a kind of pre-industrial preference for 'green' that excludes well-proven technologies that can help deliver sustainable – and practical – answers to urban problems?

Our construction industry is bearing the brunt of a stagnant economy and for many developers and contractors futuristic concepts of water-sensitive cities are little more than pipe dreams, compared to a day-to-day battle to stay profitable. No doubt, the debate about terminology will continue. You could say, at the end of the day, the language is not that important. What is important is that an idealistic interpretation of SuDS doesn't discourage shovel-ready projects and slow down the introduction of more sustainable water management practices that are still a huge improvement on the status quo.

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Telephone: 01275 878371



Exploring the Full **SuDS** 'Toolbox' for Surface Water Treatment

MANAGING surface water runoff has long been tackled as a vital strategy to reduce the risk of flooding. Generally, the focus has been on controlling the volume and flow of water to protect receiving watercourses. By comparison, the need to treat pollutants in surface water has been given a lesser priority.

Now, driven by legislation and a growing public desire to improve the health and ecology of the neighbouring environment, new measures are being taken across the UK to ensure damaging pollutants are removed from runoff before they are discharged into our rivers and streams.

Sustainable Drainage Systems (SuDS) are widely accepted as the most environmentally-responsible way of managing surface water and industry understanding of best practice is developing to appreciate a full toolbox of SuDS techniques for surface water treatment. SuDS are engineered drainage systems, either constructed as pseudo-natural features or using manufactured devices. Often associated with a desire for Green Infrastructure, they are based on the principle of mimicking natural paths and processes and deal with rainwater as close as possible to the point where it falls.

Choosing from the whole SuDS toolbox of techniques using natural and proprietary features is the best way to deliver the optimum outcome for pollutant removal, depending on the site conditions. Manufactured devices can be used to enable, enhance or protect "natural" features, or used by themselves to meet water quality objectives.

Why Treat Surface Water Runoff?

As rain falls on impermeable surfaces it also washes off pollution which is transported with silt and sediment carried in the flow. High quantities of waste materials, sediments and pollution can often be present particularly during the earlier stages of a rain storm event.

If the run-off is left untreated, the receiving waters can suffer extensive and damaging pollution which affects the entire ecosystem.

Pollutants that need to be removed from runoff include floating matter like litter, sediments and silts, heavy metals, hydrocarbons and organics, faecal matter and dissolved chemicals such as fertilisers and nutrients.

Most pollution in runoff is attached to sediment particles, so removing the sediment results in significant pollutant removal. Sediment can contain high concentrations of hydrocarbons, and heavy metals such as lead, copper and cadmium. It can also build up in rivers and drainage systems and increase flood risk.



Legislation

The SuDS triangle of Quality, Quantity and Amenity is well-established as one way of defining what SuDS are – but, in reality, quality has been treated as the ‘poor relation’ of the three.

However, that’s all about to change. The EU’s Water Framework Directive (WFD) is underpinning improvements in the water environment across the whole of Europe and each member legislative body including England, Wales, Scotland and Northern Ireland must implement enabling legislation to meet the WFD’s target of achieving ‘good’ or ‘excellent’ ecological and chemical status for its water courses by 2015.

Scotland is recognised as being several years ahead of the rest of the UK with regards to widespread implementation of SuDS, which have been compulsory for all developments except single dwellings since 2003 through the Water Environment and Water Services (Scotland) Act (WEWS) 2003.

The Scottish Environment Protection Agency (SEPA) is the lead authority responsible for delivery of the WFD and Regulatory Method 8 sets out SEPA’s guidance on SuDS. The guidance covers the planning consultation procedure for new developments and the regulation of surface water discharges from built developments including construction sites, buildings, roads and yards.

In England and Wales, the Flood and Water Management Act 2010 has set out a framework for making SuDS compulsory for new developments of more than one property, according to proposed new National SuDS Standards. SuDS schemes will be approved by new local authority SuDS Approving Bodies which are expected to begin work in April 2014.

Following a public consultation ending in April 2012, details of the National Standards and accompanying guidance are still to be finalised. In the meantime some local authorities and water companies have developed their own guidelines and expectations for the use of SuDS including surface water treatment.

The legislation focuses on new developments. However, the Environment Agency (EA) is the lead authority for delivery of the WFD in England and Wales and is already responsible for setting discharge limits for flow and volume for highways and construction sites and for monitoring pollutants in receiving waters.

Best Practice

Industry is gaining a greater understanding of how to apply and combine the best techniques from the SuDS toolbox successfully. Whilst the techniques for volume control to meet discharge consents are well known, some engineers and contractors may require guidance to understand the options and best practice approaches for treatment.



FILTERRA combines street scene good looks with SuDS

Key considerations that influence the optimum choice of SuDS features depend on factors such as the site and ground conditions, available land, construction costs and future maintenance and adoption.

The Treatment Train

Delivering effective SuDS solutions to meet site requirements will often require multiple stages of techniques used in sequence to achieve a so-called ‘Treatment Train’. This approach is already established as the preferred method in Scotland and the proposed National Standards for England and Wales are expected to follow a similar pattern.

The basic principle is that a number stages or ‘levels of treatment’ will be required depending on the ground conditions, the sensitivity of receiving waters and potential for the land to be contaminated through infiltration.

As techniques and best-practice knowledge for surface water treatment are still developing, a level of treatment is still not completely defined and is open to interpretation. However, best available guidance suggests that SuDS features can be used to deliver one or more levels of treatment to achieve required discharges into a water course.





Choosing the right SuDS Features

“Natural” SuDS features include dry ponds, basins and vegetated slopes (filter strips) that hold back runoff to allow time for evaporation and infiltration; wet ponds, wetlands and bioretention systems that enable some biological treatment; and swales and infiltration trenches for silt trapping and treatment.

Manufactured systems include pervious paving as well as purpose-designed technology that can meet comprehensive surface water treatment objectives. Manufactured surface water treatment devices provide removal of pollutants, oils, silts and sediments from surface water runoff and can be specified to target site-specific discharge requirements.

In response to the developing regulatory framework in the UK, Hydro has launched The StormTrain™ Series of surface water treatment devices. Four products, First Defense®, Downstream Defender®, Up-Flo™ Filter and Hydro Filterra™, are specialist surface water treatment devices that can be used independently or in combination to deliver a SuDS treatment train that meets the water quality stipulations of a site. They can also be used to protect, enhance or enable “natural” SuDS features.



Alex Stephenson is Director of Hydro International's UK Stormwater Division and Chair of the British Water Sustainable Water Management (SuWM) Focus Group

Ten Considerations for Surface Water Treatment

- 1. Site Layout:** Ground conditions and topography are an important starting-point for choosing SuDS features, especially if the land is steep or very flat.
- 2. Pollutant Removal Effectiveness:** Some SuDS features are better suited than others to removing targeted pollutants effectively, especially in ‘hot spots’ such as busy highways.
- 3. Landscaping and Amenity:** Ponds and detention basins can create attractive landscaping features or public amenity areas.
- 4. Ecology and Habitats:** Where sufficient land is available, using SuDS features to create wildlife habitats can be very desirable.
- 5. Land-take:** Ponds or wetlands may not be suitable for projects in high-density urban environments or retrofit applications.
- 6. Measurable Performance:** Where accurate measurement of pollutant removal is required, this may be achieved by careful targeting of pollutants with manufactured treatment devices.
- 7. Predictability:** Consistency and predictability of performance over the development design life (50 years or more) must be considered carefully.
- 8. Buildability:** Some natural SuDS features can require more onerous construction, whilst installing a proprietary device can be as easy as fitting any manhole on site. Natural features may require interim protection during construction while vegetation is established.
- 9. Adoption and Maintenance:** Predicting the ongoing maintenance of SuDS and deciding who will be responsible for it can be challenging to resolve.
- 10. Construction and Whole-life Costs:** Depending on the site conditions, and pollutant removal requirements the choices and combinations of SuDS features can greatly influence the capital and whole-life costs.

Barry Gets 'Quality' Treatment with Pioneering Hydro Filtterra™ Bioretention System

One of the first UK installations of the innovative new Hydro Filtterra™ bioretention and bio filtration system has brought attractive landscaping and stringent stormwater quality control to a sensitive location in Barry, South Wales.

Vale of Glamorgan council decided to install three Hydro Filtterra™ units from Hydro International at the Business Service Centre (BSC) car park to meet Sustainable Drainage Systems (SuDS) standards and provide urban planting and landscaping within construction of a new car park.

"Features like swales and reedbeds were not feasible to introducing more biodiversity, as there was not enough room in this typical urban location which is surrounded by buildings and infrastructure," points out Vale of Glamorgan Drainage Engineer Keith Sulsh.

"The three Hydro Filtterra™ units enabled us to meet Environment Agency requirements for removing pollutants from stormwater runoff before discharge via the storm sewer into the adjacent docks. Hydro Filtterra™ combined several different SuDS features within one system, which was not met by any other solution the council looked at."

The pioneering Hydro Filtterra™ system looks like a normal tree box from the surface with suitable shrubs or a tree protruding through a decorative grating in a typical concrete slab at pavement level. Underneath, a concrete container with a mulch layer, and unique soil filter medium provide for effective and consistent stormwater treatment and attenuation. Hydro Filtterra™ is connected to a surface water drain, infiltration or soakaway system via an underdrain system.

The Hydro Filtterra™ bioretention system is a self-contained unit with high retention rate for solids, heavy metals and oils and grease, thanks to the vegetation and special growing medium. Its footprint is typically up to 50 times smaller than other standard bioretention systems, and requires little maintenance.

"The three Hydro Filtterra™ units enabled us to meet Environment Agency requirements for removing pollutants from stormwater runoff"

"Hydro Filtterra™ combined several different SuDS features within one system, which was not met by any other solution"

The council decided to review surface water drainage at the BSC Car Park when a previous design using porous paving was proving unsatisfactory. The Hydro Filtterra™ units provided an attractive solution that was sympathetic to the need to improve the landscaping and amenity of the area.

As the overall parking is for 63 cars, Environment Agency requirements on pollution are strict, so water quality treatment must be very effective. The BSC car park is divided into three connected areas, which added complexity to the falls required for drainage.

Final discharge from the car park is via the surface water drainage system into Barry Dock. Requirements from the Association of British Ports, who are responsible for the marine environment of the docks, were that no additional pollution should be allowed to jeopardise the marine ecosystems.

"We had several different elements to take into the equation including the cost," continues Keith. *"Within this type of project, landscaping should not be treated as a separate budget. With Hydro Filtterra™ units, tree containment is integral. With a traditional landscape design cast iron grilles and the plastic root barriers for root growth containment to prevent future damage to surrounding construction would have added to the costs of the whole installation."*

"However, when we factored in these elements, even with additional hydrocarbon interceptors for 'belt and braces' pollution control for water discharged into the harbour, the difference in costs between a standard storage attenuation unit with high performance silt and hydrocarbon interceptors and the three Hydro Filtterra™ units was negligible."

"What really swung the deal was the committed approach of the Hydro design team. They sized the Hydro Filtterra™ units to ensure that the drainage and treatment requirements were met at each point; it was effectively a bespoke installation."





Filtterra Bioretention systems at Barry South Wales

“Surface drainage had to be more efficient than it was previously, so we had to adjust the falls a little. The lowest Hydro Filtterra™ unit was specially adapted so that it performed as an attenuation storage unit as well, by repositioning the outlet to slow down discharge. The modular units were quite simple to install and, although it was not the best season for starting tree growth, after a year they are fine.”

The Business Service Centre was completed in the early 2000s, as part of a redevelopment and regeneration initiative for the whole Barry Waterfront Development and harbour areas after the demise of local industry.

Currently the Barry Waterfront Development drainage is being assessed by Welsh Water with a view to adoption. Hydro Filtterra™ units are being considered for other locations in Barry. The Vale of Glamorgan Council is committed to explore SuDS solutions wherever drainage projects occur. Each location is assessed on its merits and requirements to enable the most effective options to be chosen from a range of SuDS techniques, against available budgets.

For more information about the Hydro Filtterra™ Bioretention surface water treatment and landscaping system and other Stormwater management products please call 01275 337977, email enquiries@hydro-int.com or visit www.hydro-int.com.



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River restoration & management



The Catchment Based Approach

A policy framework to encourage the wider adoption of an integrated Catchment Based Approach to improving the quality of our water environment



The Catchment Based Approach is a new scheme, launched by the Government, to encourage local communities and environmental groups to take on more responsibility for improving the health of their local rivers, as well as the surrounding natural environment and wildlife.

It follows on from the success of a series of nationwide pilot schemes in areas including the Norfolk Coast, Bristol Avon and Poole. In Bristol, local authorities worked together to introduce new measures to reduce the need for dredging the River Avon and save taxpayers' money.

There will be just over 80 of these Catchments across England, supported by local, voluntary Partnerships.

The scheme has been designed with flexibility for local communities in mind. It will ensure that local projects are targeted to address the specific water and natural environment needs in each catchment. The creation of these catchment groups will be helped by the initial funding.

The scheme was launched at Singlers Marsh, where work has been undertaken to improve the flow of the River Mimram, as well as removing accumulated silt from the river bed so that fish and invertebrates can access the river bed. This is exactly the type of approach the government would like to see.

The Love Your River initiative, supported by Richard Benyon and rower James Cracknell is not just about educating people about the difficulties that many rivers face. It is also recognises the great work local groups already do to look after their rivers - honouring the community spirit and the inspirational individuals who give up their time and energy to improve their local environment. The Environment Agency will work with local groups to ensure the lead for each Catchment Partnership is agreed collaboratively and more details can be found on the Agency's website.

Click [HERE](#) to view the framework



Richard Benyon,
Environment Minister

"Rivers are the lifeblood of our country. They give us the water we need for our daily lives, and sustain our wildlife. That is why this new scheme is so incredibly important.

Our pilot programme achieved great results and this new funding will help more people take action to improve the health of their local rivers.

Ensuring we have enough water, not just for us, but for future generations is an issue of huge importance. Everyone has a part to play and can make a real difference."

"We are delighted to be part of this joined-up approach to restore our rivers. Some excellent work has been carried out on the Mimram and the Beane already, and we would like to thank all partners, organisations and volunteers involved for the great work that has been done so far.

It is a great thing to be in the position to say that our rivers are the healthiest they have been for two decades, but we are doing even more to further improve water quality and local biodiversity. Schemes like this, as well as the Love Your River initiative, are vital to help tackle low flows and pollution on our rivers but everyone has a part to play in this. Local people can help their rivers by being careful about their water usage and by installing water meters, then we can continue to work with water companies and communities to reduce the impact of abstraction on our chalk streams. Farmers, businesses and water companies can also still do more to reduce pollution to our rivers."

Debbie Jones, Environment Manager, Environment Agency

"Yorkshire Water is proud to have had the opportunity to pilot the government's new Catchment Based Approach as part of our ambition to achieve excellent catchments, rivers and coasts. Through the Don Network initiative we have built lasting partnerships with a range of stakeholders across South Yorkshire, and as a result we are already starting to see new projects to improve water quality come to life."

Miles Foulger,
Environment Strategy Manager, Yorkshire Water

Removing or replacing gauging weirs to improve ecology and hydromorphology

Dr Di Hammond, Senior Projects Adviser, the River Restoration Centre

Can we remove or replace gauging weirs but still maintain the integrity of long-term hydrological records?

The River Restoration Centre (RRC) in association with one of its external advisers (Karen Fisher of KR Fisher Consulting Ltd) have recently carried out a piece of work

for the Environment Agency (EA) and Natural England (NE) to put together a guidance document ***How to approach the issue of whether a gauging station is***

affecting fisheries, hydromorphology and ecology. Potential alternatives that could minimise the impact of the gauging structure are also explored.

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The most accurate way to measure flow is by installing a weir structure. Flow and water level data measured in this way is used widely both within the EA for water resource management, flood warning and flood risk management, and for long term trend analysis. The Centre for Ecology and Hydrology (CEH) maintain a National Water Archive and external bodies such as water companies and climate change scientists also utilise this valuable data. However, the presence of any significant structure in the channel is likely to cause issues with respect to the free movement of fish up and down the river. Additionally such barriers adversely affect aquatic habitats

and morphological processes. Hence the removal of in-channel structures, whilst potentially good for the aquatic environment, can be problematic where the structure is being used to measure the quantity of water flowing in a river.

To kick start the debate, a wide range of specialists including hydrometrists, hydrologists, fisheries experts, geomorphologists, biologists and ecologists from diverse organisations such as the EA, NE, CEH and consultants, were invited to a workshop to voice their concerns. The outputs from the discussion - along with a précis a previous R & D work entitled **Weir removal, lowering and modification: A review of best practice** (due to be released by the EA imminently) which relates to the ecological benefits of weir removal - was then used to develop a gauging station assessment framework. This guidance document took the form of a set of ten initial assessments followed by pre-technical and technical assessment, options appraisal and case studies. It is aimed at guiding the discussion of removal/replacement between fisheries and biodiversity teams and the hydrometric teams within the EA. The overview of the whole process is illustrated in a flow diagram (Figure 1).

Barrier removal is very much a 'hot topic' for the EA and all organisations looking to improve the aquatic environment. The RRC is currently collating information on weir removal through a questionnaire.

If you are interested in taking part click [here](#). If sufficient interest is generated the RRC will run a workshop to pool the current thinking on weir removal and produce a risk based guidance document on everything you need to know about weir removal, but were afraid to ask!

The gauging weir guidance document is available on the RRC website click [here](#).

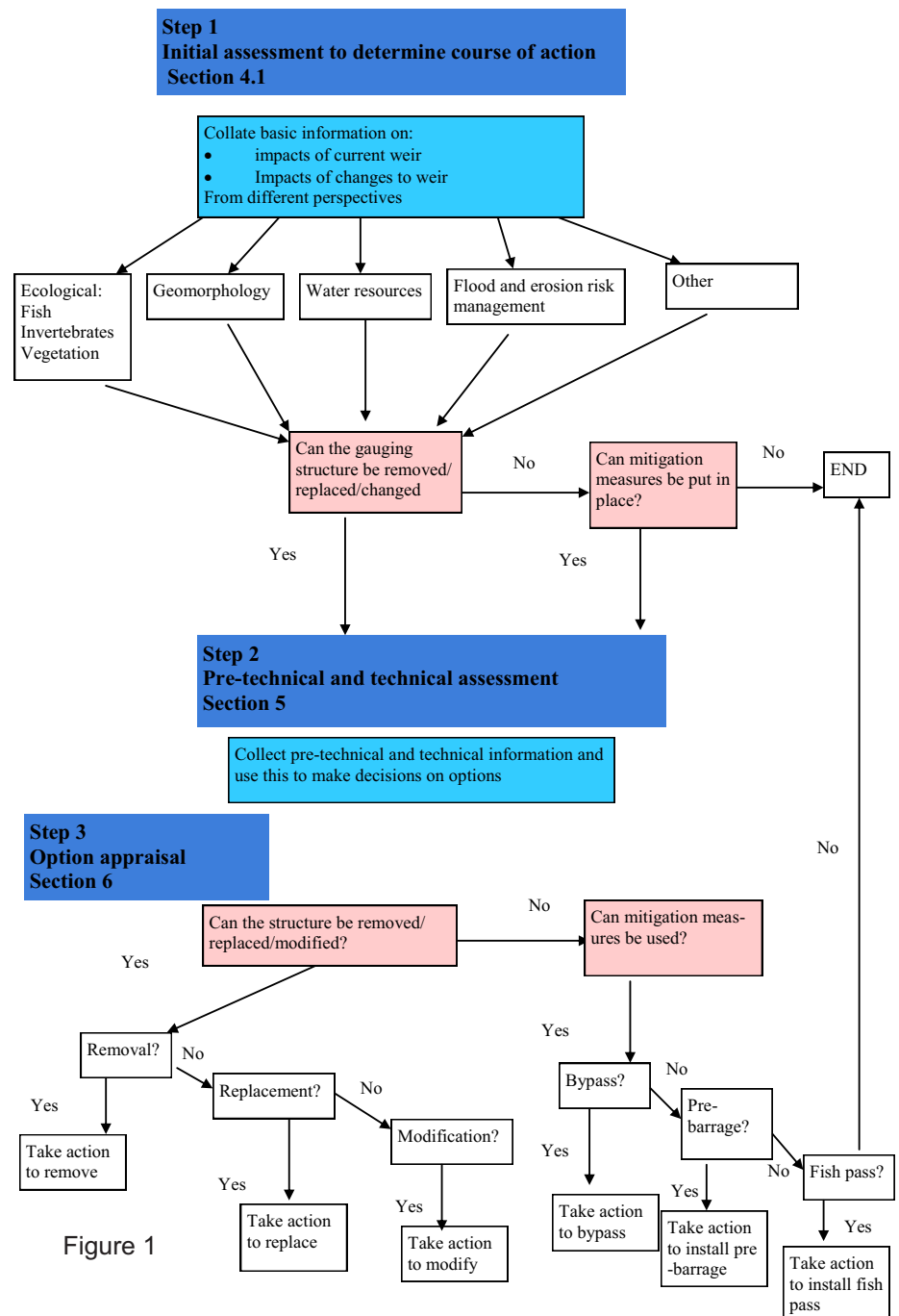


Figure 1

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Reedbeds

A natural boost for biodiversity and water quality



Independent research calls for extensive reedbed creation to reduce water pollution, boost biodiversity and increase London green space.

only 8% of the river currently benefits from reedbeds

A new independent report commissioned by Thames21 reveals huge potential for reedbeds to boost biodiversity, reduce the effects of pollution and improve the social and amenity value of the lower Lee Catchment. Reedbeds are regarded as one of the most important ecosystems on earth and are sometimes referred to as 'the kidney of the landscape' for their important role in filtering pollutants and maintaining fresh water health. The research report 'Project Reedbed' was supported by the Environment Agency and carried out as part of the charity's Love the Lea campaign.

Existing reedbeds with potential for expansion and improvement, and sites suitable for new plantings on the Lee Navigation within the M25 were identified with the help of volunteer surveyor teams in the second half of 2012.

It was found that only 8% of the river currently benefits from reedbeds, which are recognised as a UK Biodiversity Action Plan to be preserved and promoted wherever possible. The report identifies 60 new sites on the Lea suitable for reedbed creation, with multiple environmental and social benefits for relatively low cost and effort.



Theo Thomas

Thames21
Programmes
Manager

"This research sets out very clearly how important reedbeds are for our river systems and wider environment. This solution is within our grasp and will help make the Lee healthier. It also provides specific guidance on where and how they can be implemented for far-reaching benefits to water health, biodiversity and social and amenity value."



John Bryden,

Biodiversity
Officer for the
Lee Catchment
at the
Environment
Agency

"We're delighted to fund and help Thames21 develop this report which outlines how the River Lee Navigation can improve, for people and wildlife throughout the area."

"Over the next five years we hope to see a number of the recommendations of the report implemented, leading to a substantial change in the look and amenity value of the River Lee Navigation. This will allow for more wildlife to inhabit the river and will hopefully allow for more people to enjoy themselves in and around the area."

River restoration & management



Salmons Brook pollution



The unhealthy colour of Pymmes Park lake

The Lower Lee catchment is known to suffer from 'severe problems with water quality'; hard engineered modifications to the river and on-going water pollution, drastically inhibit wildlife and impairs peoples' enjoyment of the river. The Lee contains high levels of phosphates and nitrates due to under-capacity sewage treatment works, household misconnections and road run-off. The effects of this pollution in the River Lee Navigation could be significantly reduced through the natural and low cost implementation of reedbeds, which can remove dangerous chemicals from the water in a function, which if directed artificially is highly expensive and energy intensive. Reedbeds can store nutrients such as phosphates and nitrates, which are damaging at high levels, preventing them from moving downstream. This function is particularly significant as phosphate and nitrate over-loading is a direct

contributor to the Lee's failing health status under the European Water Framework Directive.

This report paves the way for practical solutions to improve the health of the river for environmental and social benefit, which would also help the UK to meet its targets under the WFD. It is hoped the practical plan set out by the independent research will be used to inform partnership solutions to improve this badly neglected river

Reedbed creation is just one part of the solution to a river beset by complex problems in a highly urbanised environment. Thames21 will work with volunteers, community groups and local authorities to monitor the health of the river before, during and after reed planting to build on the growing body knowledge of these solutions.

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Sewage pollution, Haringey

River user groups, residents, local authorities and business that live and work near to the Lea are encouraged to consider their role in helping to restore the reedbed habitat for East London's river. Thames21 will work directly with interested parties to plant and maintain these hugely important habitats, which not only have special functions that can enable them to remove and store significant quantities of aquatic pollutants, but could also help boost numbers of several rare and endangered species and improve biodiversity.



Blue-green algae at Grovelands Park

In the UK, reedbeds are important habitats for native mammal species, including: harvest mice; water shrews; otters; and water voles, endangered water birds such as the bittern and reed warbler and amphibians and fish, including the endangered European Eel.

For more information contact Theo Thomas:
theo.thomas@thames21.org.uk
Tel: 07968 012 757



Cody Dock reedbed

When we first visited the Cody Dock Reedbed, close to the mouth of the River Lea, in late 2010, it was instantly clear what a wonderful place it was and how damaged it had become. In amongst the reeds it was beautiful and peaceful, but we stood calf-deep in rubbish and Japanese Knotweed had grown across the reedbed, eating out its heart. It became a Thames21 priority to save Newham's largest reed bed, and two years later we had. While we were happy to have preserved a reedbed that cleans the sick River Lea and offers a home to wildlife, we knew that many others would be at risk. That's why we commissioned the report. Some new reedbeds have been created in recent years, and what the report clearly shows is that there is great potential for many more to flourish along the Lea, cleansing the water, providing sanctuary to wildlife and vital oxygen to breathe life back into this great river.



About Thames21



Thames21 is London's leading waterways charity. We work with thousands of Londoners each year to improve their rivers, canals, lakes and ponds for people and wildlife through: litter clean-ups, non-native invasive species removal, habitat improvement, education and campaigning, river restoration, water quality monitoring and through a training programme for individuals and groups wanting to take ownership of their local stretch. We are committed to open and accessible volunteering, and aim to provide free, engaging activities on our waterways for all abilities.

Every year we mobilise thousands of volunteers to clean and green the capital's wide network of waterways. Looking to transform neglected and littered waterways into areas that everyone can use and enjoy with innovative and tailored community approaches.

For more information visit: www.thames21.org.uk

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Embankments being lowered



Natural wood replaces the boulders



Allt Lorgy Restoration



Development of pools, riffles and meanders

A first of its kind in the River Spey Catchment

The Allt Lorgy which joins the River Dulnain, a tributary of the Spey, had been straightened in the past, mainly for agricultural purposes. However, this resulted in a degraded salmon spawning habitat and affected the way the water flows downstream, especially at times of high flow.

With funding from the Cairngorms National Park Authority (CNPA), the Scottish Government, Scottish Environment Protection Agency (SEPA), Woodlands Trust Scotland and the Spey Fishery Board, work has been undertaken to restore the river to a more natural state.

This restoration project is the first of its kind in the River Spey Catchment. It aimed to restore the morphology and habitats of a section of the Allt Lorgy (a moderately high energy river) and its floodplain by removing significant artificial constraints that have, over the years, canalised the watercourse from a multi braided to a single channel.

Kick starting a natural process

Similar projects to restore watercourses to their natural state have previously involved heavily engineered solutions, but the Allt Lorgy project is unique in that the ground works have simply kick started a process whereby the river will now do its own work to re-establish its natural equilibrium. In time this should improve both the in water and surrounding habitat and create a more diverse ecological environment.

Following a scoping study commissioned by the Spey catchment Initiative and undertaken by Dr H Moir of CBec Eco-Engineering Ltd the ground works began in September 2012.

Over the course of a week, 5 artificial embankments were lowered by removing over 900m³ of material. In stream boulders were removed and replaced with large wood structures. Additional wood structures were introduced in key locations and some of the extracted gravel was graded and stockpiled

ready to be used for sediment reintroduction. Three culvert pipes were removed from the floodplain and one large drainage ditch was in filled.

The turf on the embankments was removed by the digger and then reinstated once the embankment had been lowered.

Existing plants on the embankments such as juniper trees were relocated within the site and care was taken to ensure that disturbance, both in and out of the water, was kept to a minimum. The site has been planted with a range of native species by local schoolchildren that will supplement the natural regeneration that is expected to take place.

The Allt Lorgy site presented a unique opportunity to develop a river restoration option without existing infrastructure constraints placed upon it.

The site will be monitored both in the immediate and longer term to quantify and qualify the projects success and to assist with future river restoration projects. It is intended that a diverse programme of data gathering and monitoring will be instigated which will include topological resurveys, electrofishing, habitat surveys and point photography.



Flood plain before - with ditch



Flood plain after - ditch filled

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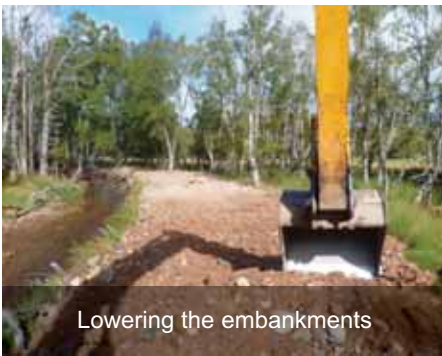
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Lowering the embankments



Trees planted



the first flood event



Paul Wheelhouse, Minister
for the Environment and
Climate Change

The project was visited by Minister for the Environment and Climate Change, Paul Wheelhouse, who said:

"This project at Allt Lorgy will allow the river to restore natural habitats, creating a diverse environment and benefitting a range of species. It will also reduce flooding – a problem which has wiped out salmon spawning habitat over the years – helping the angling industry around the Park. Scotland's National Parks are not only vital to the protection of our habits, but also to the rural economy."



Gravel deposition after the first flood

Funding

The £13,000 scoping study for the Allt Lorgy project was jointly funded by the CNPA and the SEPA Restoration Fund. The ground works were supported by £21,475 from the Scottish Government's 'shovel ready' funds; SEPA's Water Environment Fund provided £10,000; £5,000 from Woodland Trust Scotland and £8,025 from the Spey Fishery Board.

The Spey Catchment Initiative

The Spey Catchment Initiative is a partnership project supported by the CNPA, SNH, SEPA, FCS, Spey Fishery Board and the local councils. Its remit is to undertake activities that protect and enhance the water quality and natural heritage within the River Spey catchment and raise awareness of associated issues such as the benefits of riparian woodland and natural flood management techniques.

More information on this and other projects instigated by the Spey Catchment Initiative can be obtained by contacting the Project Officer, Liz Henderson at

l.henderson@speyfisheryboard.com

or by visiting

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Erosion Control on the River Wye

Bank failures on the River Wye, High Wycombe were the cause of several flooding events within the Rye parkland which prompted Wycombe District Council to take action.

It was established that four sections of embankment would require restoration works. and the works would primarily involve the installation of coir, post and faggot and Nicospan revetments.

The contract for the work was awarded to Land and Water who developed the designs further as well as assisting with the flood defence consents required.



Although a relatively straight forward project, complications arose quite early on, when during the construction phase, previously unspecified sewers were discovered. Un-phased, Land and Water came up with a instant solution to the problem and introduced the use of granite filled Gabion baskets which provided the durability required and kept with the overall aesthetics of the project.

The project cost was £90 thousand and the work completed in May 2013.



Building with Nature



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Rock Mattresses

The effective solution

Hugh Ellis, Salix River and Wetland Services

Rock Roll Mattresses are a robust and permanent revetment for use around reservoirs, shorelines, lake edges, streams and river banks. They are cost-effective revetments that are suitable alternatives to rock rip rap and gabions in many scour applications.

Rock roll mattress are formed from rock rolls joined together to create a 1m x 2m unit capable of resisting high velocities and shear stress up to 1200 k/N in high energy river situations. They also accrete silt due to small stone size and can be fully vegetated. This is not possible with rock armour and large rip rap.

River Ouse, Lewes

When bank instability started to cause problems alongside the River Ouse, flowing through Lewes, the Environment turned to Salix River & Wetland Services for a solution to the problem.

The integrity of the existing blockwork facing was deteriorating due to a combination of factors. The Ouse is a tidal river and the action of tidal inundation and draw-down cycles combined with areas of groundwater seepage emanating from the slope profile was gradually causing slumping and bulging along the bank.

The first stage was the removal of the old block facing, which was then reused as rip-rap at the toe of the slope. The bank was then regraded and dressed with a heavy duty needle-punched separation fabric.



*Before Work Commenced: March 2013
The blockwork lines show the slumping, bulging and lost integrity.*



Heavy duty needle-punched separation fabric



The prefilled Salix Rock Mattresses were then lifted into place, using the inbuilt straps, before being butted and mechanically stitched together with “hog rings” so as to form one continuous flexible revetment.

“The mattresses were very competitively priced and easy to work with, allowing us to complete the project on time and within budget. From start to finish the job took just 4-5 weeks.”

Environment Agency, SSD - Ouse Field Team



Work In Progress: April 2013

The rock mattresses allow the pore-water pressure from the profile to be released through the fabric and the porous rock sheet. As the tides rise over the surface and retreat, over time sediment will be deposited in the gaps providing a less ‘engineered’ appearance.

The finished result is a rock mattress that sits neatly between the upper and lower existing structures. The sediment infill will also encourage plant colonisation adding biodiversity and a more natural looking reinforced bank.

www.salixrw.com



Completion: April 2013

The Salix Rock Mattresses sit neatly between the upper and lower existing structures.

Inset - evidence of early plant establishment



Bray Wick Fish Pass & Habitat Enhancement

Jayne Hornsby, Land and Water

The Cut at Bray Wick is so named because it is an artificial river diversion around nearby Maidenhead. Bray Wick Fish Pass and Habitat Enhancement downstream works included the demolition of a weir and wingwalls down to apron level and the construction of a rock ramp fish pass. Upstream works comprised the creation of a multi-stage rock ramp fish pass in order to facilitate fish passage over a further upstream weir which was required to remain in order to reduce velocities on the approach to a tight bend in the watercourse.

Channel habitat enhancements in between the rock ramps included the introduction of gravel bars, local bank re-profiling, earth and brushwood berm installation using post and faggot systems and woody debris.

Cofferdams were required in order to cast the concrete within the fish rock ramps and to enable boulders to be placed by hand to meet the tight tolerances specified, both laterally

and linearly. The need to manage flows around these temporary cofferdams during the winter period was became an integral part of the project.

Piled bypass channels and piped culverts were utilised to enable works to continue, during record breaking flows.

Reinstatement works included subsoiling, topsoiling, seeding and erection of a post & rail fence.

The works were completed in a period of record rainfall, with the river



flows increasing 10 fold in a matter of hours following significant weather events. The completed works successfully allow uninhibited fish passage and improved habitat along the reach.





Specialist Dredgers, Land and Water Services, at the London Gateway

Contracted for their specialist skills, James Maclean, Director, at Land and Water Services explains how they have been helping to deliver major improvements to London Gateway Port.

London Gateway

Set to open in Q4 of 2013 London Gateway Port will have the best tidal window access for deep-drafted vessels (Ultra Large Container Ships) in the UK. As the UK's first major port development in 25 years and with Europe's largest dedicated logistics park, London Gateway represents the ultimate in PortCentrics. Its location, operational systems and the opportunities it will provide for businesses to reduce supply chain costs, time and CO2, make it a world class asset for the UK.

Selecting Land and Water Services for the Project

Land and Water Services were contracted by Dredging International (part of the LORDI joint venture for the port construction) to complete two phases of the project over an 13 month period that began in December 2011 and was completed in January 2013.

Land and Water Services were chosen for a number of critical reasons. Most importantly we have a proven track record of performing this sort of work.

Consideration of Impact on the Environment

The inter-tidal habitat, approximately 500m upstream of Land and Waters' work, is classed as an environmentally sensitive area. It was therefore important for Land and Water Services to consider the wildlife and water.

Phase One

The first phase was the recovery of 52,500m³ of temporary rock revetment in order to allow the removal of a temporary sand berm – made to facilitate the quay wall construction – before dredging in front of the quay wall to expose the new quayside. Once recovered the rocks were stockpiled for later re-use on the project's permanent revetment, a measure designed by Dredging



International to minimise waste and allow re-use of the rocks.

Phase Two

The second phase, made possible by the first, was for the removal of the sand berm, which was made up of in excess of 530.000m³ of sand and gravel. This was achieved using the largest long-reach excavator available in the UK, configured for a maximum reach of 17m (although the machinery is capable in a different configuration of reaching up to 27.5m). In order to recover the material the operation had to be performed at low-tide which required work to begin as early as 3am. The work was completely based upon the tides and was a highly complex logistical exercise.

Once recovered, the sand and gravel was then transported in articulated dump trucks, supplying raw materials for other contractors to carry out their own phases of work such as the reclamation of the low lying land areas to create development platforms. This meant that the work being undertaken by Land and Water Services was of importance to the success of the project as it helped keep the programme running to schedule.

Logistical Planning & Risk Management

The two phases of work involved a great deal of logistics, and planning for the removal of sand, rock armour and gravel. There were a number of sensitive aspects and strict controls that have to be adhered to. Firstly because the lower Thames Estuary has strong tidal currents, and because the work can only be performed at certain times,



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River restoration & management

the logistics of the project becomes, in itself, a major task – making sure that machinery and people work on time in order to maintain constant production.

Secondly, when working between tidal zones, with machines that weigh between 80 and 115 tonnes (ZX670, ZX850 respectively) extreme care is required as is regular maintenance of equipment. It was of paramount importance that the machinery provided by Land and Water Services was in perfect working order. The operators had to be able to depend fully on the machinery that they were using to be as close to 100% reliable as possible. Land & Water Services made a significant investment into the machinery. The ZX670 and ZX850 on site were collectively worth in excess of £1m. Losing any of this machinery to flooding would be financially disastrous, yet worse still would be the environmental impact of any oil or fuel spillage.

Well Maintained Machinery

It was of utmost importance that Land and Water Services were able



to maintain the machinery. All planned maintenance took place, outside of working hours, based around the tidal patterns in order to keep the machines in working order and running to a tight program.

Specialised global positioning system software was retro-fitted to the Hitachi ZX850 and ZX670 long reach excavators to enable extremely accurate digging to a high tolerance, in order to ensure that all rock boulders greater than 250mm diameter were recovered from the foreshore.

Tim Jessop,
Project
Manager for
Land and
Water
services

"The ZX670 and ZX850 supplied for this project were incredibly productive machines. They were strong and reliable. Land and Water Service provided invaluable maintenance skills. The best way to make sure machinery is reliable is to maintain it correctly and service it regularly. Land and Water Services worked at all hours of the day and night to ensure uninterrupted production."



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Wetland Creation at the Olympic Park

by Mike Cooper, AGA Group

London 2012, one of our biggest sporting events offered many opportunities in innovative landscaping design. One such project called for the creation of wetland areas within the Olympic Park venue including long term habitat for amphibians.

Construction of Frog Ponds

The A.G.A. Group working for the Soft Landscape Contractors were instrumental in the construction of the frog ponds, one of the many habitats created to encourage a wide range of wildlife. These shallow ponds, hydrologically separate from the River Lea, which runs through the site, were the prime habitat for breeding amphibians.



'Frog Log' structures were specifically designed to provide facilities that would maximise creature habitat and protect the wetland population.



Long untreated chestnut poles were driven to refusal into the earth and each exposed section of the post were drilled and fitted with eye bolts for secure anchor points. The 'Frog Log' walls were erected using untreated wood of various diameters laid according to a specified pattern designed by the architect's ecologists that ensured creating the maximum potential habitat. The higher drier sides of the ponds, were covered with A.G.A. nursery grown vegetated TRM (turf reinforcement mat), to provide complementary terrestrial habitat for amphibians. The gently sloping sides of the ponds were planted with our native emergent and floating aquatic vegetation.





Outdoor cultivation

AGA TRM350 was laid above a plastic barrier sheet; this was seeded and blinded with tightly specified clean top soil. Polyethylene germination sheet was used to cover the crop creating a micro climate. An irrigation system was installed to insure optimum growing conditions. Within 20 days initial plant development was binding together the soil, TRM and root system to a cohesive state. This provided a very robust structural matric that was entirely fit for purpose and to survive and flourish following the rigours of harvest, transport and installation.



Covered Cultivation

To conform to the call off pattern during construction, much of the growing was carried out under multi-spans polytunnels. During the cooler conditions growing under poly tunnels aided early germination and establishment. The variation in maturity made it possible for us to carry out delivery and installation as access to various areas of the Olympic site became accessible. The flexibility of AGM TRM350 allowed for the roots of the vegetated TRM to be laid in close contact on the graded and pre-soiled slopes, held in situ using degradable Enviro pegs while root structure bonded with the sub-soil.



The habitat creating swards on the slopes of the Frog Ponds might consist of over 20 different grass and/or wild plant species, which proved to establish very successfully well before the opening ceremony.

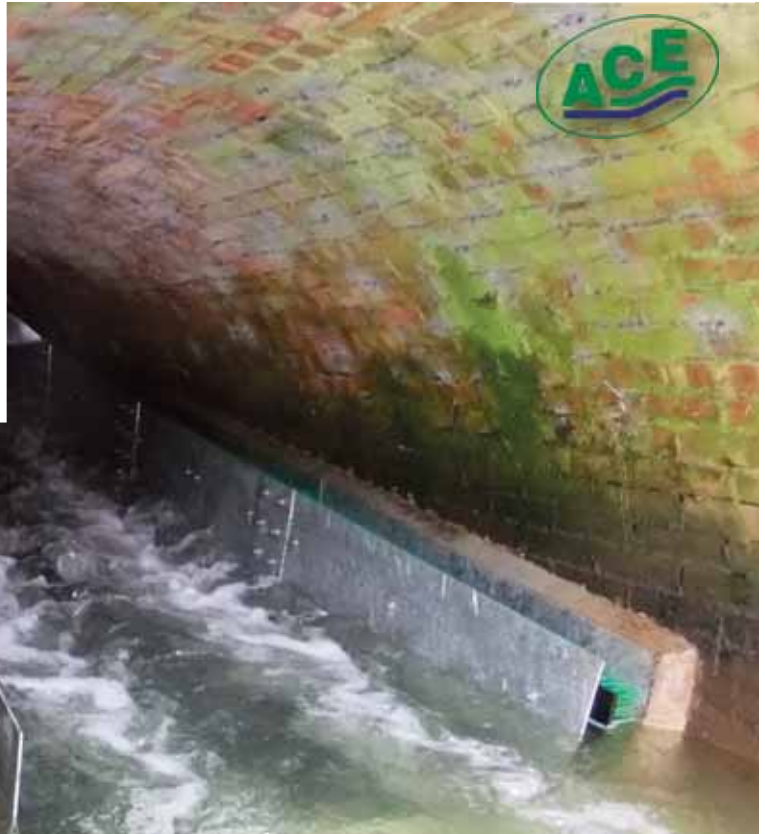
Growing the Grass And Wildflower Turf

Creating a wildflower sward of reinforced turf requires the correct balance of seed mixture sowing date and husbandry, since wildflowers and grass can take varying amounts of time to establish depending on species. Over 10,000 m² of grass and wild flowers TRM (turf reinforcement mat) were grown at A.G.A. Group Merton nursery from July 2010 and had to be ready for transportation to comply with a strict installation schedule to meet the demands of the Olympic Delivery Authority.

The mixture (in this case grown in AGA TRM350 reinforced matting), included plants that would establish to protect the exposed bare ground from air and soil borne weed invasion and erosion, but also not be so vigorous as to hinder the future establishment of the wildflowers. Such a mixture is called a "nurse crop" and usually takes the form of an open growing non-competitive grass seed mixture. Given the correct future maintenance, this 'nurse crop' will gradually form a smaller and smaller contingent of the sward, thus being replaced by the wildflowers as they establish and mature and an equilibrium across the species is naturally arrived at. It was essential that once installed on site the sward would take hold and be in peak flower for the opening day of the games (July 27th) and must remain in full flower throughout the games and Paralympics.



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New fish and eel pass forms part of a major river restoration project

Marcus Widdison, Aquatic Control Engineering

Aquatic Control Engineering (ACE) Ltd. is extremely proud to have completed the successful installation of the larinier fish pass and Eel pass at the Glandford watermill in Norfolk. ACE have worked hard with their client, Tim Jacklin at the Wild trout trust to design, develop and install the best solution for a major river restoration scheme at Glandford mill on the River Glaven in North Norfolk.

The works formed the final phase of the Project at glandford mill, installing the fish and eel pass at the mill sluice. The first phase involved creating a new meandering river channel through the bed of a former mill pond. The completion of the project will re-enable trout, sea trout and eels to access the newly-created habitat upstream of the Mill and beyond.

It doesn't stop there, ACE have kindly loaned out their CCTV monitoring equipment, the Wild trout trust have willing volunteers and with assistance from the Mill owners the new larinier pass will be monitored.

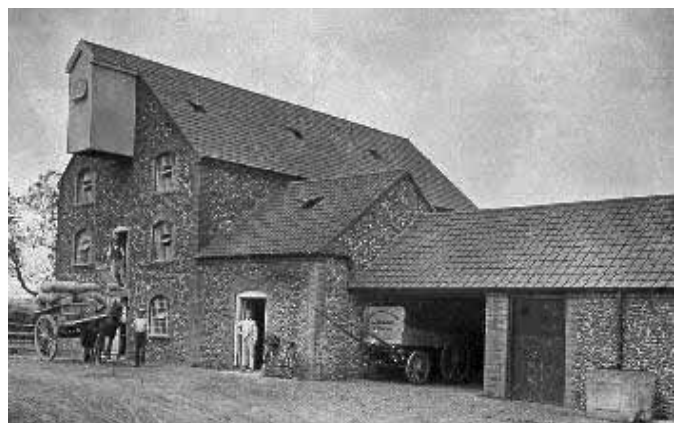
Glandford mill along with the Wissington fish pass siphon, were used as project references for ACE's UVDB Verify. On all aspects of the audit ACE are proud to have achieved above 92.5% - a fantastic result. For certificates go to www.aquaticcontrol.co.uk/downloads and follow the corporate information links.

This work was funded by the Environment Agency as part of the East Anglian Sea Trout Project.

We would like to thank Tim Jacklin of the Wild trout trust, Mike and Matt Beech, Rossi Long Consultants, the Mill owners Mr and Mrs Brownlow, West Dereham Plant and USL Divers for all the great Team work on this successful project.

For more information on the project, contact Marcus on marcus@aquaticcontrol.co.uk

Glandford mill on the River Glaven in North Norfolk



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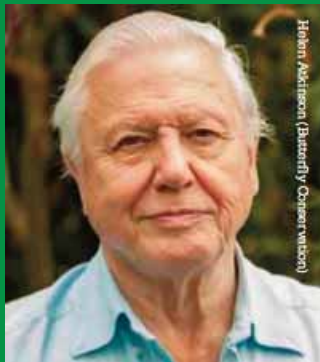


State of Nature Report



The State of Nature report was launched by Sir David Attenborough and UK conservation charities at the Natural History Museum on Wednesday, May 22, while simultaneous events were held in Edinburgh, Cardiff and Belfast.

View the Full Report [HERE](#)



"This groundbreaking report is a stark warning – but it is also a sign of hope."

"This report shows that our species are in trouble, with many declining at a worrying rate. However, we have in this country a network of passionate conservation groups supported by millions of people who love wildlife. The experts have come together today to highlight the amazing nature we have around us and to ensure that it remains here for generations to come."

60% of the species studied have declined

Scientists working side-by-side from 25 wildlife organisations have compiled the 'State of Nature' report. The report is the first of its kind in the UK and takes stock of our native species.

The report reveals that 60% of the species studied have declined over recent decades and more than 10% of all the species assessed are under threat of disappearing from our shores altogether. A number of reasons for the decline in species have been given including rising temperatures and habitat degradation affecting species that require specific habitats and are less adaptable.

Freshwater and wetland habitats

On freshwater and wetland habitats, which includes ponds, lakes, rivers, streams, ditches, canals, reservoirs, reed-beds, fens and marshes, the report says that although more protection is now afforded to these areas, many are still in a poor condition. These wetland areas cover just 3% of the UK's land surface, but support around 10% of its species.

Major factors blamed for the significant threat to wildlife and plant species are listed as water abstraction (15% of channels believed to be over abstracted), pollution (farmland and urban run-off) channel straightening (loss of natural meanders and natural banks) and the draining of ancient wetlands including the loss of 227,000 ponds on farm land between 1945 and 1998.

Freshwaters are the most intensively monitored parts of the UK's natural environment, although monitoring focuses mainly on water quality and flow at a network of river sites and a few large lakes. However monitoring of smaller water bodies is less common despite forming most of the water network and providing homes for the majority of species.

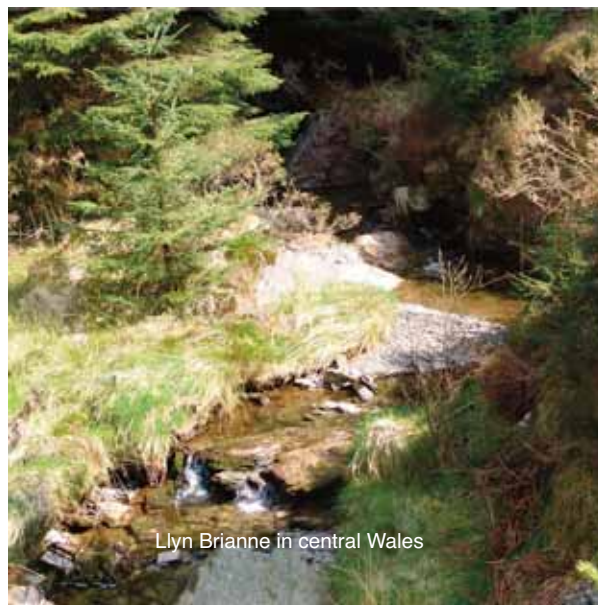


Climate & the Environment

The report says that in the UK we lack reliable trends for most conservation priority species in freshwater, such as the great crested newt, although efforts are now underway to rectify this problem.

Freshwaters are affected by more threats than any other part of the natural environment and whilst substantial efforts to control adverse impacts have been in progress for around 100 years, mitigation has often proved difficult.

On the positive side, the report says that freshwater habitats receive some of the most intensive and expensive conservation measures to control pollution, manage habitats and respond to threats. There are many well-documented examples of badly damaged rivers being improved as a result of sewage treatment, and restoration works although many river systems remain damaged.



Llyn Brianne in central Wales

Natural Resources Wales

'State of Nature' report prompts wildlife summit

In response to the report, the Minister for Natural Resources Wales, Alun Davies has invited wildlife organisations, farmers and fisherman to take collective action to help halt the decline of wildlife in Wales.

Speaking in the National Assembly, Alun Davies commended the work of the organisations in producing the comprehensive report and highlighted the need for action.

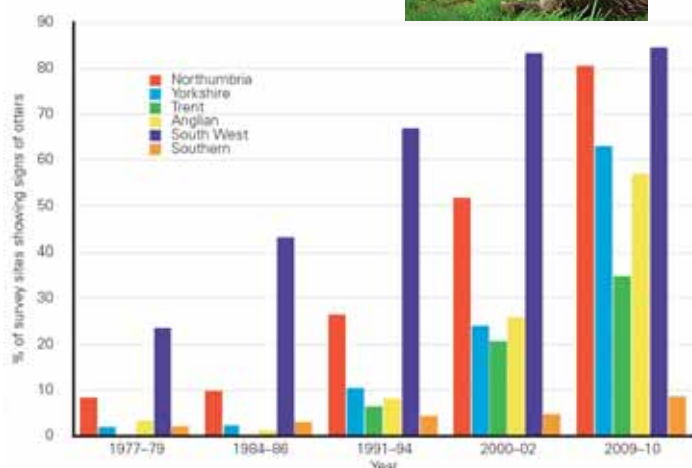
"Although the 'State of Nature report' presents some notable conservation success stories such as horseshoe bat, red kite and otter, the report clearly highlights dramatic declines in a range of species."

"We cannot continue as we are. As I announced at the launch of the State of Nature report I will host a summit at the Royal Welsh Show to agree our ambition to protect wildlife in Wales, the imperative for change and the action needed to enable us to take forward this work together."

The Minister also talked about the need for more robust information around biodiversity in Wales and committed the Welsh Government to producing an audit of the data available in Wales and to start benchmarking progress in protecting Wales' biodiversity in time for the July summit.

The Biodiversity Strategy Board has already started engaging with all key players to capture suggestions for protecting Wales' biodiversity ahead of the Royal Welsh summit.

Otters have increased substantially over the last 30 years - one of the few examples of freshwater or wetland species to reclaim its range. Data courtesy of EA



Dr Mark Eaton, a lead author on the report, said:

"This report reveals that the UK's nature is in trouble - overall we are losing wildlife at an alarming rate."

"These declines are happening across all countries and UK Overseas Territories, habitats and species groups, although it is probably greatest amongst insects, such as our moths, butterflies and beetles. Other once common species like the lesser spotted woodpecker, barbastelle bat and hedgehog are vanishing before our eyes."

"Reliable data on these species goes back just fifty years, at most, but we know that there has been a historical pattern of loss in the UK going back even further. Threats including sweeping habitat loss, changes to the way we manage our countryside, and the more recent impact of climate change, have had a major impact on our wildlife, and they are not going away."



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