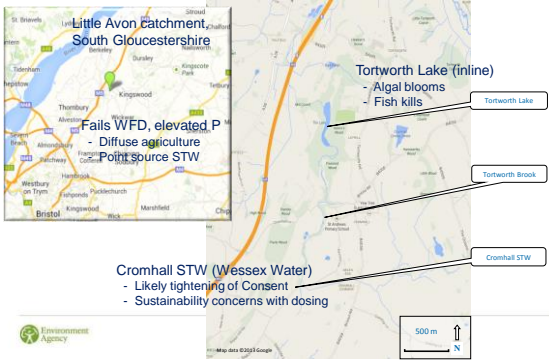


The Tortworth Brook Project: Defra PES Pilots programme, phase 2

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Friday 29th November 2013

Ecosystems Knowledge Network, Manchester

The Tortworth Brook and its issues



Little Avon catchment, South Gloucestershire
Fails WFD, elevated P
 - Diffuse agriculture
 - Point source STW

Tortworth Lake (inline)
 - Algal blooms
 - Fish kills

Cromhall STW (Wessex Water)
 - Likely tightening of Consent
 - Sustainability concerns with dosing

Options considered

- ⇒ Traditional electro-mechanical methods
- ⇒ Relocation of the discharge
- ⇒ Constructed slag media/reedbed cells
- ⇒ Wetland-based solutions with Tortworth Estate



The PES opportunity

- ⇒ Widest practicable ecosystem service gains
- ⇒ Key market / beneficiaries





- ⇒ Other potential benefits and beneficiaries?



Integrated constructed wetlands (ICWs)


- ⇒ 'Systemic solutions'
 - ⇒ "... low-input technologies using natural processes to optimise benefits across the spectrum of ecosystem services and their beneficiaries" (Everard and McInnes, 2013)
- ⇒ Treatment of wastewater
 - ⇒ P (including farm slurries, sewage and run-off)
- ⇒ Habitat, wildlife, landscape
- ⇒ Recreation
 - ⇒ Fishing, swimming
 - ⇒ horse riding, etc.
- ⇒ And more services...






Following the PES Best Practice Guide

- ⇒ Change between November 2012 working draft guide and the final (22nd May 2013) version
- ⇒ All part of the learning approach





Dramatis personae

- Principal seller: Tortworth Estate
 - Provider of the land for development of ICW system
- Principal buyer: Wessex Water
 - WFD compliance, sustainability policy, innovation
- Intermediary: Bristol Avon Rivers Trust (BART)
- Knowledge Providers (KPs)
 - RM Wetlands & Environment Ltd
 - Engain Ltd
 - Bath Spa University, Science Department
 - BART
 - Environment Agency



Project objectives

- Provide Buyer and Seller with information on ICW potential
- Identify the legal, regulatory, contractual and financial issues
- Address feasibility of preferred approach, inc. monitoring
- Develop win-win solution that demonstrates additionality
- Summarise information for formalisation of scheme
- Evaluate transferability
- Report the findings to DEFRA

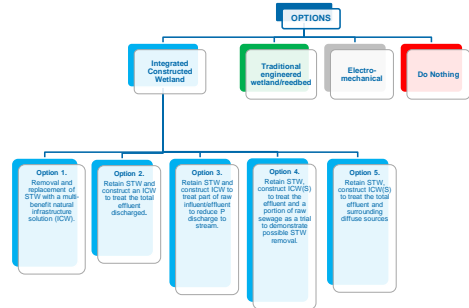


A highly iterative PES Pilot process

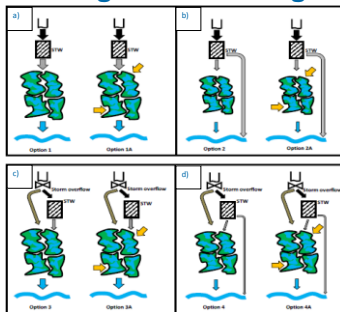
- Methodology and objectives evolving with understanding
 - A structured approach
 - Formal MCDA avoids 'the loudest voice'
 - Ongoing risk register to ensure concerns not lost
- A changing regulatory framework
 - Surrounding farmland designated as Nitrate Vulnerable Zone (NVZ)
 - Wider role for ICW approach in nutrient management
- Project stages
 - Site visits
 - Desk-based exploration
 - Workshop 1 to agree aims and objectives
 - Workshop 2 to develop options and evaluation



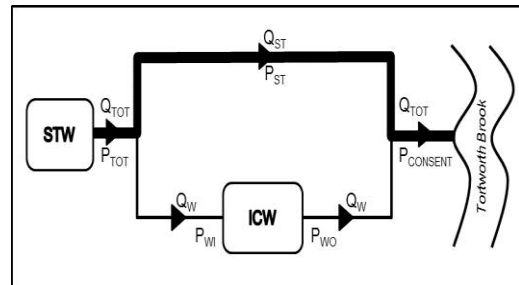
Options considered in Workshop 2



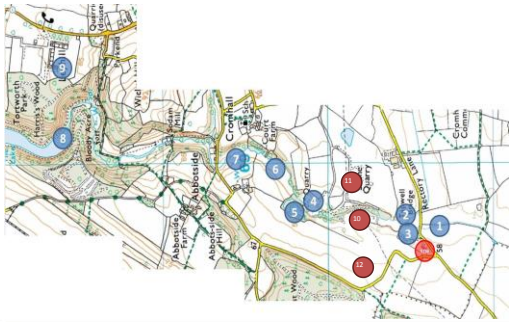
Consider a range of ICW designs



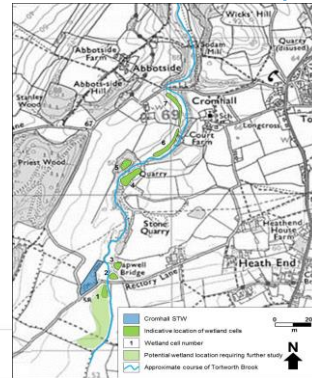
Final iteration of ICW design



Potential ICW locations (walkover + desk study)



ICW locations refined after Workshop 2



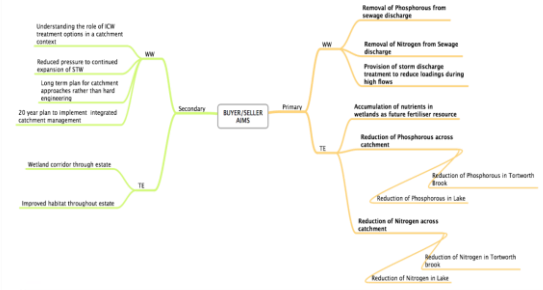
Ranking importance of ecosystem services by MCDA

- ➔ Buyer + Seller rank services
 - ➔ Core PES services of reducing P + N
 - ➔ Other services
 - ➔ Order of importance to businesses
 - ➔ Total allocation of 100 points
- ➔ Buyer
 - ➔ Pollution control of prime importance
 - ➔ Nutrient recycling of 2ndry importance
- ➔ Seller interested in wider range

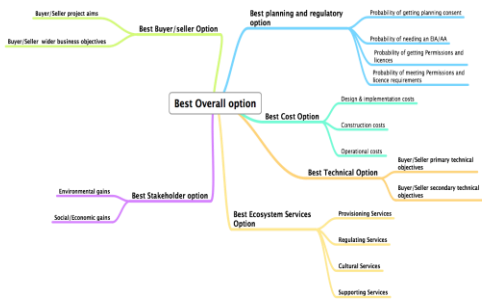
Ecosystem Service	Buyer (WW)	Seller (TE)
Biochemical Products	10.0	17.5
Biochemistry	10.0	17.5
Blocks	10.0	17.5
Biological control of pests and disease	10.0	17.5
Climate regulation	10.0	0.0
Erosion Protection	10.0	0.0
Food for humans	10.0	0.0
Freshwater	10.0	0.0
Genetic materials	10.0	0.0
Hazard reduction (flooding)	10.0	0.0
Maintenance of hydrological regimes	10.0	0.0
Nature viewing	10.0	0.0
Pollination	10.0	0.0
Recreation and tourism	10.0	17.5
Scientific and educational	10.0	17.5
Socioeconomics	10.0	0.0
Spiritual and inspirational	10.0	0.0



Capturing preferred outcomes for scheme optimisation

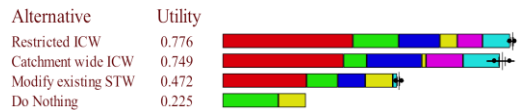


Criteria considered important for scheme optimisation



Assessing options by MCDA rankings

Ranking for Best Scheme Goal

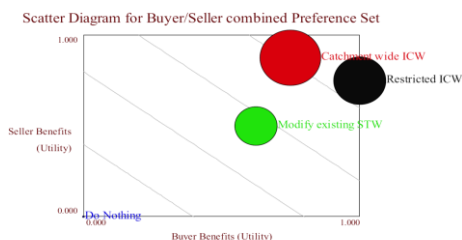


- Buyer/Seller Benefits
- Project Costs
- Ecosystems Benefits
- Regulatory Risks
- Stakeholder Benefits
- Technical Effectiveness

Preference Set = Buyer/Seller combined



Mapping utility to buyer and seller



Outcomes

- ⇒ ICW efficacy well proven in the literature
- ⇒ Sufficient land area identified at Tortworth
- ⇒ ICW costs low relative to conventional P stripping
 - ⇒ Construction costs ≈ 50%, Operational costs ≈ 95%
- ⇒ Theoretical PES viability for 'anchor service'
- ⇒ Key risks are failure of planning and Consenting
- ⇒ Multiple co-benefits are possible with low inputs
- ⇒ Can inform more sustainable water industry practice
- ⇒ Catchment-wide ICW approach to land/water management?



General conclusions

- ⇒ ICWs offer a cheaper solution
 - ⇒ Multi-service outcomes, less inputs, consistent with *The Natural Choice*
- ⇒ The scheme is attractive to both parties
 - ⇒ A learning approach was essential
 - ⇒ But it does need more start-up funds to make it feasible
- ⇒ Safeguards needed to maintain systemic outcomes
 - ⇒ To stop PES-traded services overlooking the bigger system
 - ⇒ Bring Phase 5 of the Defra guide up front as default position?
- ⇒ An ICW approach that can boost catchment resilience
- ⇒ The principal obstacles appear to be regulatory
 - ⇒ Sewage regulation, agricultural slurry regulation, development planning
 - ⇒ How do we differentiate 'systemic solutions' from



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