



# **Solutions for Stressed Out Waters: Enhancing Implementation of the WFD**

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**Centre for  
Ecology & Hydrology**  
NATURAL ENVIRONMENT RESEARCH COUNCIL

# Background & Acknowledgements

## 3 day e-Conference on future of WFD

- Monitoring and Assessment systems
- Programmes of Measures
- The Policy mix
- 21 invited expert speakers and panellists
- 249 people attended
- 27 European countries represented
- Post conference questionnaire survey





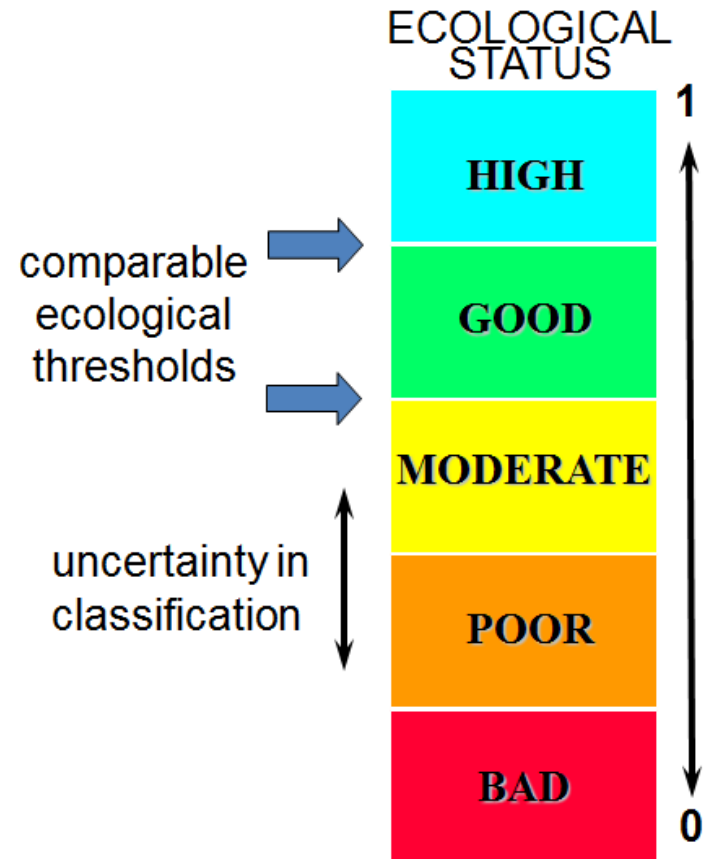
- Monitoring & Assessment
- River Basin Management Programmes of Measures
- Governance & Policy Integration

Focus on good examples of integrated RBM & lessons learned for fitness check



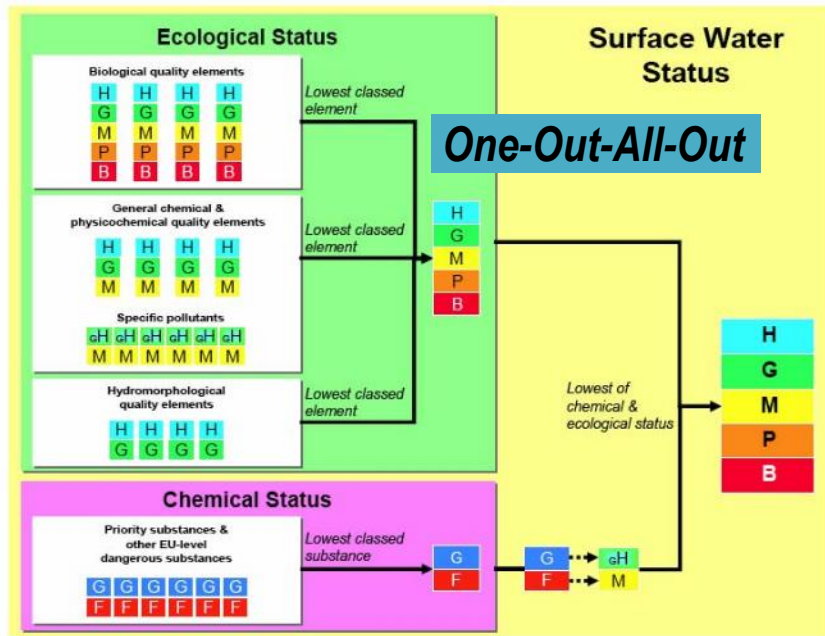
# Monitoring & Status Assessment

Delivering consistent Europe-wide data and innovative, robust and comparable ecological status assessment tools



Poikane et al., 2015. A hitchhiker's guide to European lake ecological assessment and intercalibration. *Ecological Indicators*, 52, 533-544

# Monitoring & Assessment: Issues for Fitness Check



## ***One-Out-All-Out***

Need to emphasise success in individual metrics and use “weight of evidence approach”

**Status assessment does not identify cause of degradation**

Multiple pressures impact status –  
Need to use monitoring data more holistically and effectively to improve water management decisions

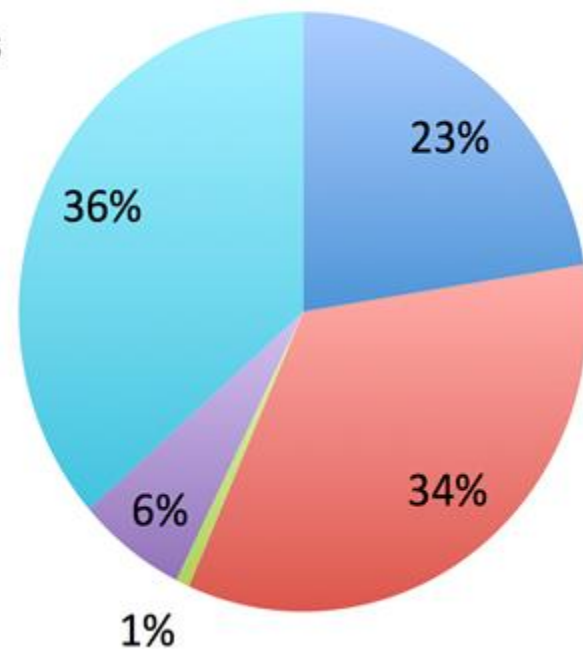


## Multiple Stressors

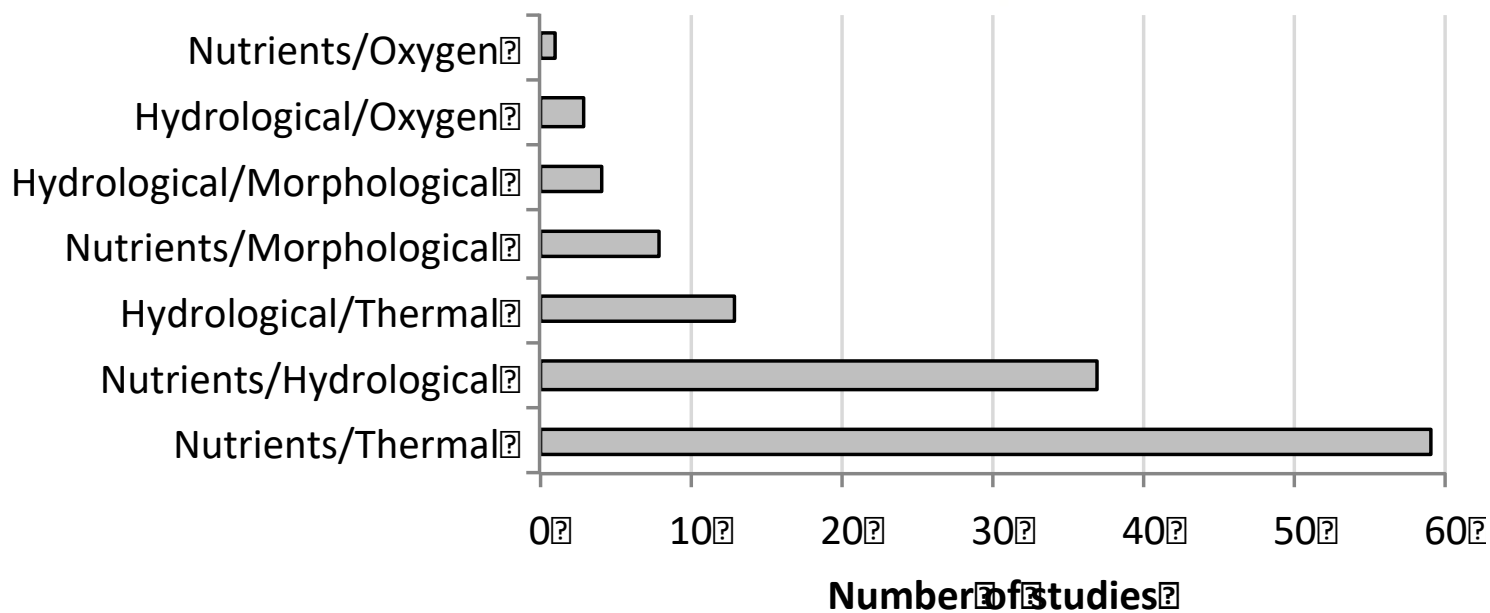
**134 case-studies  
across Europe**

## Response organism groups

- Benthic invertebrates
- Fishes
- Macrophytes
- Phytobenthos
- Phytoplankton

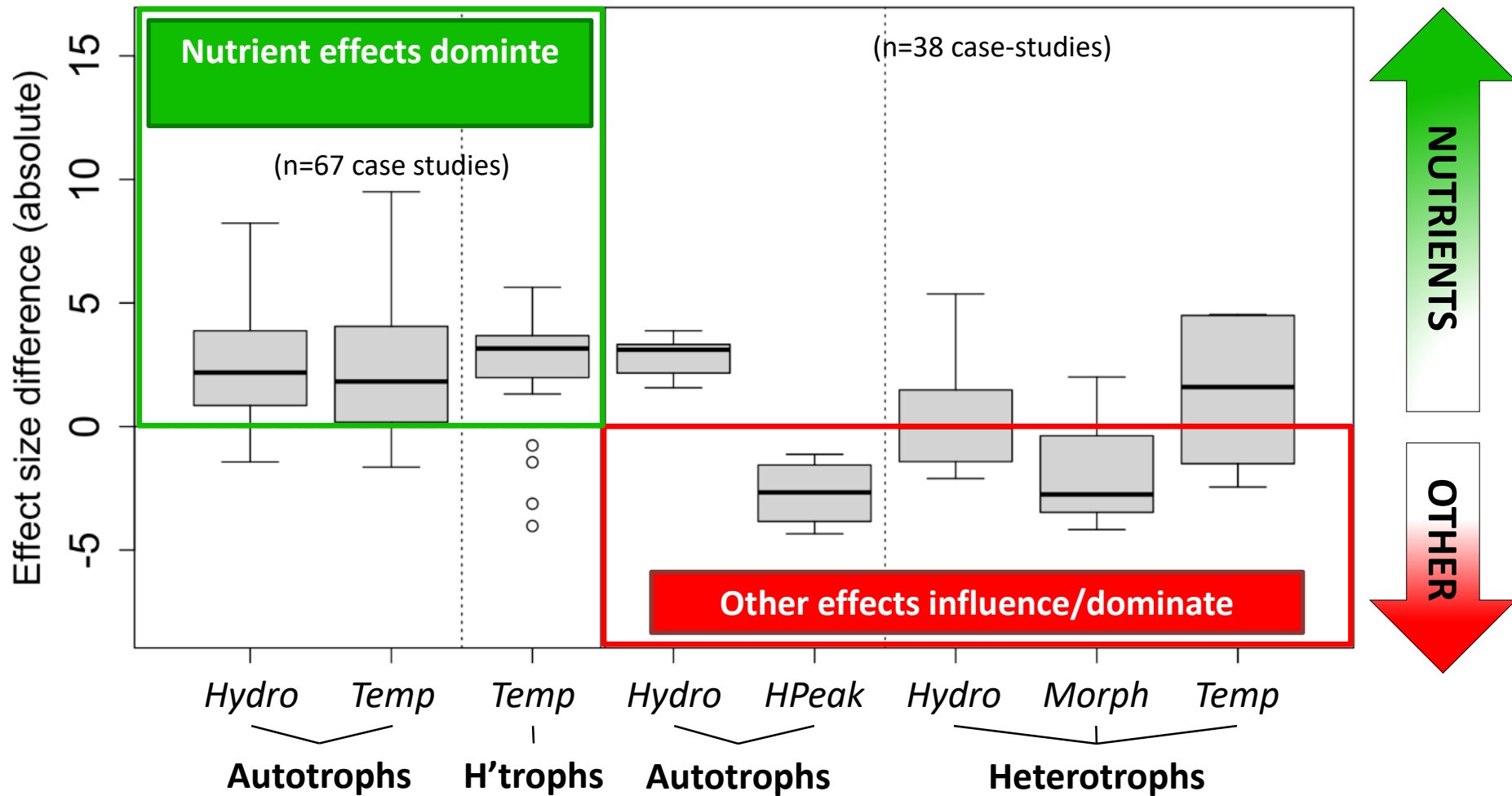


## Paired-stressors investigated



## LAKES

## RIVERS

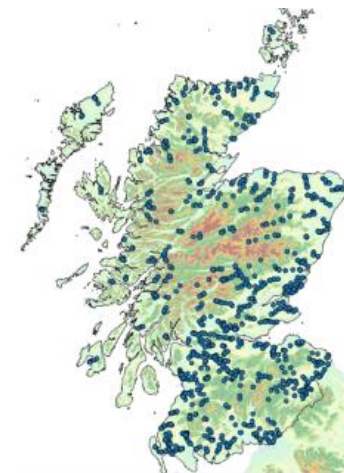


**Paired-stressor effects (Nutrients & *Other*) on lake and river BQEs**

N=105 paired-stressor – impact relationships

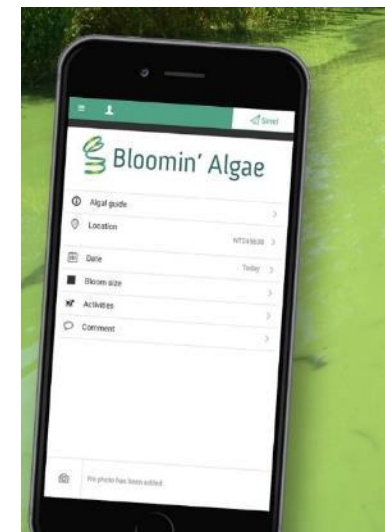
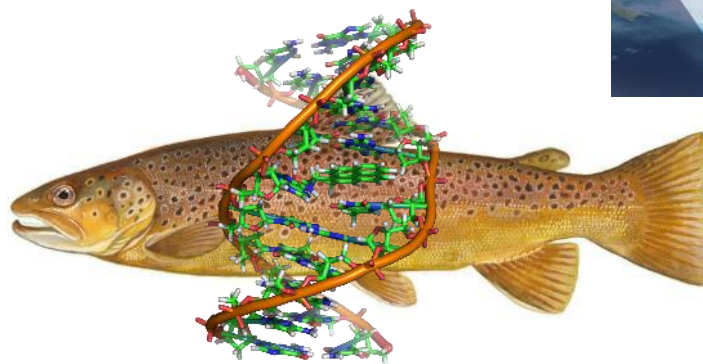
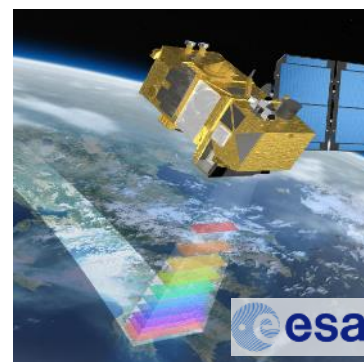
# Future Innovation in Monitoring & Assessment

- Optimising network design (status assessment)
- **Sentinel sites** (measure trends & emerging threats)
- **Landscape “experiments”** to assess effectiveness of measures (control vs intervention)



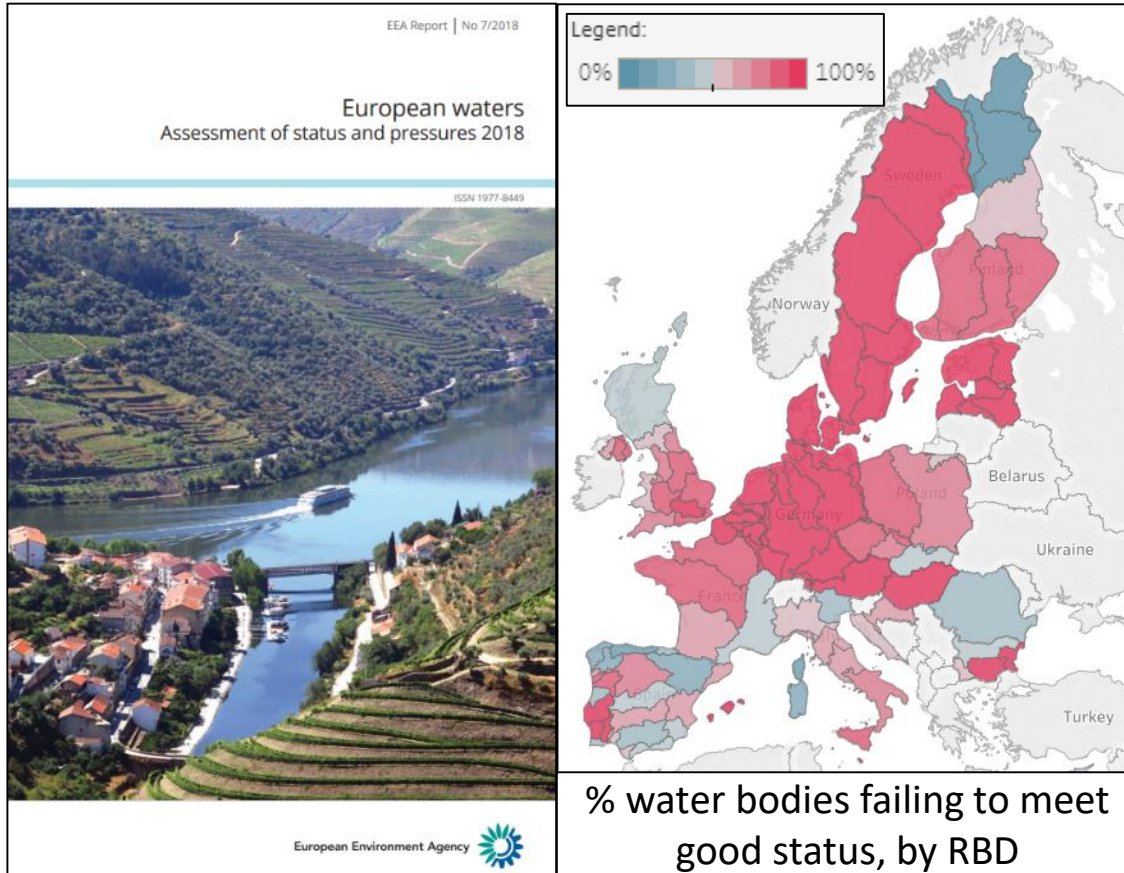
Source: SEPA

- Earth Observation & Remote Sensing
- **Citizen science**
- eDNA



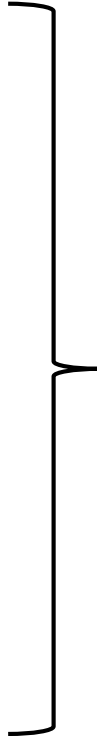


# Knowledge of Pressures and Status but limited Impact



- Only 40% of surface waters in good ecological status or better
- Limited change in status between 1st and 2nd River Basin Management Plans

# River Basin Management Measures: strengths and weaknesses

- WFD DPSIR framework is an integrative, participatory management framework at RB-scale
  - Active participation limited (no ownership of problem by society and industry)
  - Integration limited. Insufficient mechanisms or funding for societal/sector buy-in to implement measures at scale needed e.g. NFM
  - Basic & supplementary measures insufficient to deliver success with diffuse sources. Further enhancements needed for WWT – resilience to storm events
- 
- Reasons for  
limited Impact of  
RBMPs

# Solutions delivering Success (Impact)

## Finnish Watercourse Restoration Network

European Centre for River Restoration and RESTORE Life+ Project



- Provide up-to-date knowledge of restoration practices
- Support citizens, communities and enterprises in management of their waterbodies
- Platform for co-operation between authorities, practitioners and citizens
- Demonstration case-studies and best practice



Photo: Esa Lehtinen

# Solutions delivering Success (Impact)



## Lake Vesijärvi Foundation Innovative financial initiative

- Foundation established by local municipalities and enterprises
- Public and private resources combine to secure funding for research, maintenance, and management of Lake Vesijärvi and its catchment
- Foundation also promotes the public's awareness of lake condition and the efforts to improve its status

PÄIJÄT-HÄMEEN  
VESIJÄRVISÄÄTIÖ



Source: SYKE

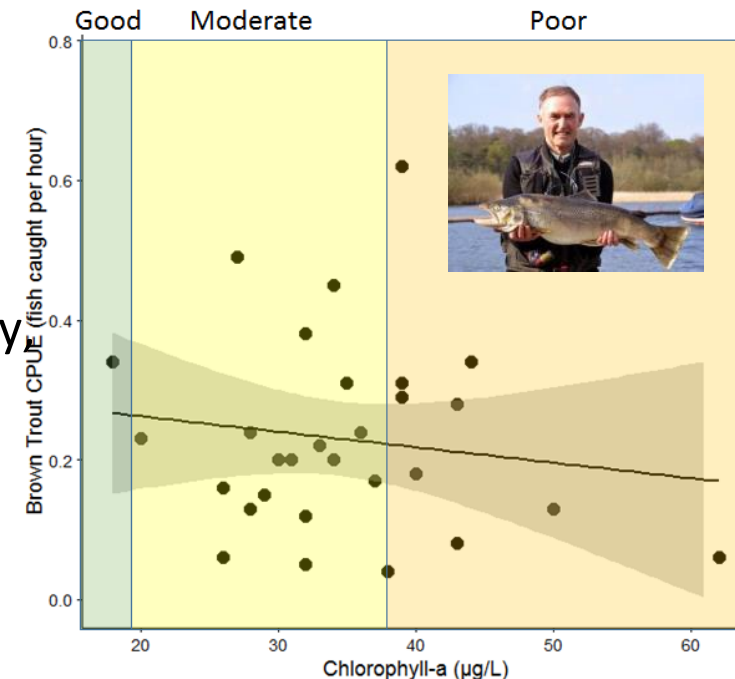
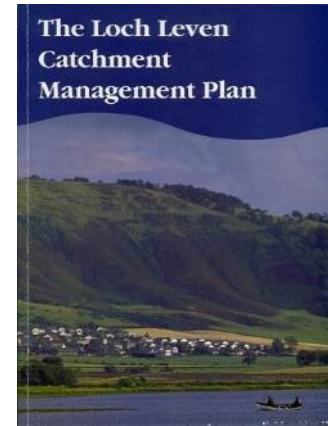


# Solutions delivering Success (Impact)

## Loch Leven Catchment Management Group

### Long-term (pre-WFD) stakeholder engagement and ownership

- Robust evidence that poor status damaged conservation status, fishery and local economy, offered limited community benefits
- Buy in from all sectors (industry, fishery, farmers, regional authority) of need to invest to reduce pollution across whole catchment
- €5 million investment in STWs and industry
- Innovation in planning regulations to deliver sustainable urban growth (125% rule)
- ES Benefits: ecological recovery, fishery recovery >200,000 visitors per year and new SMEs based around eco-tourism



- Loch Leven highlights need to communicate progress in OOA world
- Enhanced connectivity not always a benefit – whole catchment ecosystem service analysis important





# Solutions delivering Success (Impact)

## H2020: NAture Insurance value: Assessment and Demonstration (NAIAD)



- Develop concrete Nature Based Solutions (NBS) approach for managing flood and drought risks
- Real-world demonstrations of NBS implementation and mainstreaming
- Co-develop financial instruments and novel business models to support NBS implementation



# Solutions delivering Success (Impact)

## Restoration of River Hydro-morphology

- Demonstration sites network of restoration case-studies
  - Re-establishing river continuum (dam removal or fish pass) across whole catchment
  - Re-meandering
  - Adding sediments
- BACI design to robustly assess effectiveness
- Commitment to long-term monitoring by FAB, Irstea and French agencies
- Early results highlight return of spawning of river lamprey and salmonids



Marlène Rolan-Meynard, Anne Vivier & Sophie Tuaux



# River Basin Management Measures: Lessons learned for Fitness Check

## **Much greater implementation of measures needed, plus:**

- Robust data to support decision making
- Demonstrations of cost-effective measures and management best practice
- Incorporate Ecosystem Approach and NBS to highlight multiple benefits and strengthen societal support
- Community ownership and financial incentives needed to improve cooperation between stakeholders, upstream and downstream (polluters & beneficiaries)



# Governance and Policy Integration: strengths and weaknesses

- Integrating previous water policies
- Water-Biodiversity Policy
- Poor integration of water quantity vs quality policies (Floods Directive)
- Conflicting objectives between sector policies e.g. CAP vs WFD



# Better Governance Delivering Impact

## European Structural and Investment Funds: Baltic Deal

### Traditional approaches for a more water-friendly agriculture

- Use legal instruments e.g. manure regulations
- Provide economic support (agri-environment)
- Support knowledge transfer & advisory services

### Enhanced Solutions

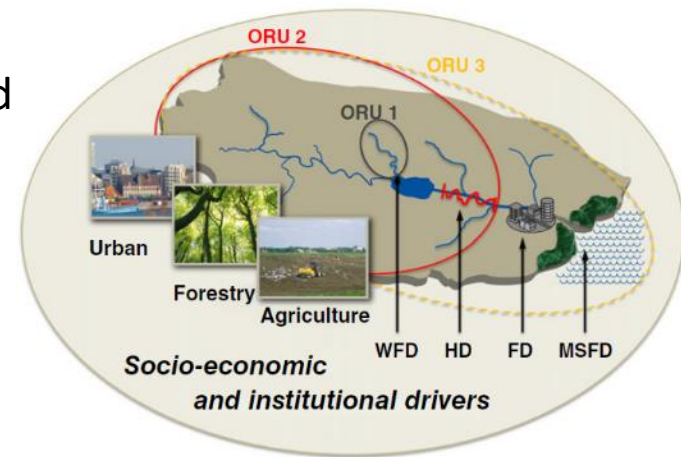
- Creation of strong cooperative platform between farmers and agencies, incorporating 2 500 farmers from 7 countries
- 117 farms demonstrating cost effective measures visited by 2500 people
- Strengthened advisory service
- Rapid and increased uptake of innovation



**Baltic Deal**  
- PUTTING BEST AGRICULTURAL PRACTICES INTO WORK  
Through transnational co-operation and farmers' engagement

# Solutions for Stressed Out Waters: delivering a systemic approach

1. Create manageable catchment units for restoration that incorporate temporal and spatial scales of ecosystems, legislative units, and policy agendas
2. Provide credible demonstrations of social, economic and biodiversity co-benefits of WFD measures
3. Enhance active participation of communities, business enterprises, land owners (especially farmers):
  - Citizen science
  - Co-operative platforms
  - Ownership of problem
  - Responsibility (and finances) for implementing measures



## Operational restoration unit

Friberg, N, T. Buijse, C. Carter, D. Hering, B. Spears, P. Verdonchot and T. Fosholt Moe (2017) Effective restoration of aquatic ecosystems: scaling the barriers. WIREs Water, 4, e1190

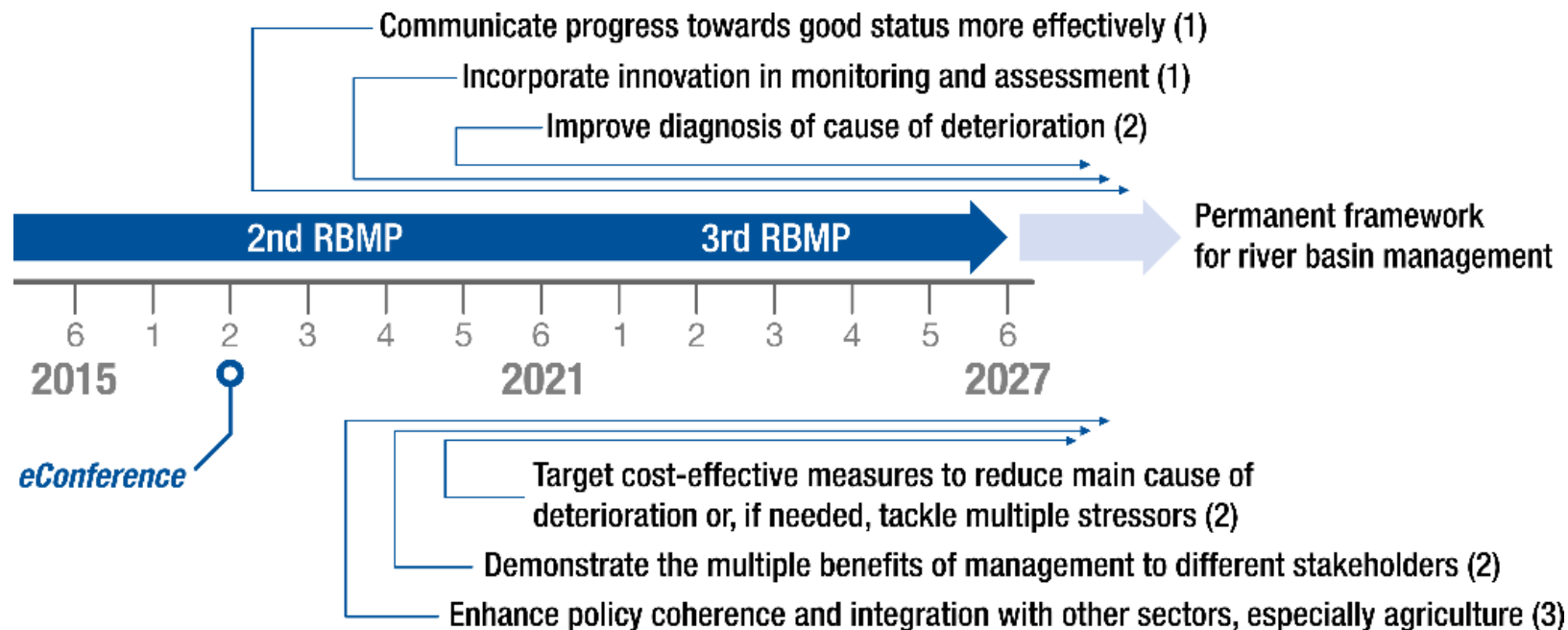




WFD has delivered a great increase in knowledge of the pressures and state of European waters.

Challenge now is to use that knowledge more effectively to drive solutions for River Basin Management

Effective solutions need a *systemic approach* - greater community and cross-sector participation and ownership underpinned by robust science



Science of the Total Environment (2019) 658: 1228–1238

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MARS: Managing Aquatic ecosystems and  
water resources under multiple stress  
Funded by the EU FP7, contract no. 603378