



#### CircuLar Economy Approach to River pollution by Agricultural Nutrients with use of Carbon-storing Ecosystems



University of Warsaw, Poland Warsaw University of Life Sciences, Poland Aarhus University, Denmark University of Greifswald, Germany Greifswald Mire Centre, Germany Radboud University, the Netherlands Leibniz-Institute of Freshwater Ecology and Inland Fisheries, Germany Green Management Group, Poland

Water JPI; WaterWorks2015 Cofunded Call, 6 April 2017, Stockholm

## MOTIVATION

- Improved water management on the agricultural land = circular economy
- Wetland buffer zones (WBZ) =
  - nutrient retention = capturing nutrient-rich runoff water <u>from arable land</u> to reduce nutrient loads in surface waters
  - paludiculture = "wet" land use, reduction of GHG emissions through rewetting drained peatlands
  - WBZ biomass = source of fertilizers <u>to arable land</u> & energy
  - water retention = retaining water in the landscape (also for agriculture)

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## **OBJECTIVES**

- Aim: to develop an integrated landscape-ecological, socio-economic and policy framework for using WBZ in circular economies of water purification and nutrient reuse in agriculturally used catchments; to be achived by:
  - assessing synergies and constraints between nutrient removal in WBZ and biomass utilisation;
  - analysing market and non-market values of rivers and river ecosystem services (as co-benefits of WBZ),
  - quantificating costs and benefits of WBZ at catchment scale,

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- policy and social network analysis,
- market assessment of WBZ-related ecosystem services, including nutrients removal and biomass production.



### **CONSORTIUM DESCRIPTION**

#### UW - University of Warsaw, Poland

SGGW - Warsaw University of Life Sciences, Poland

- AARHUS UNIVERSITY
- ERNST MORITZ ARNDT
  - r greifswald

NIWERSYTET

UG - University of Greifswald, Germany

AU - Aarhus University, Denmark



Greifswald Mire Centre, Germany



UN - Radboud University Nijmegen, the Netherlands



IGB - Leibniz-Institute of Freshwater Ecology & Inland Fisheries, Germany



GMG - Green Management Group, Poland





#### WPI. Upland sources recharging WBZ

- Objective: To build a tool and framework for identification of spatially explicit nutrient input hotspots toward existing and projected WBZ.
- Participants:
  IGB Dominik Zak
  (with involvement of SGGW, UW and UN)







#### WP2. Wetlands as buffers

- Objective: To establish methods of quantifying nutrient capture in WBZ and apply them to case catchments.
- Participants:
  AU Carlos C. Hoffmann
  (with SGGW)







WP3. Closing the loop: biomass use, nutrient removal & commodification of nutrient recycling

- Objective: To analyse options of combining nutrient removal including nutrient recycling (ashes, substrates) potential and biomass utilisation.
- Participants:
  UG Wendelin Wichtmann
  (in collaboration with
  GMG and UN)



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#### WP4. Water cycles and hydrological boundary conditions

- Objective: To localize & delimit WBZ & quantify available water in case catchments; assess hydrological co-benefits?
- Participants: SGGW
  Mateusz Grygoruk
  (with contribution of AU)







evaluation of ecosystem services

WP5. Co-benefits:

- Objective: To estimate cultural services and pure non-use values related to different WBZ scenarios
- Participants:
- UW / WOEE
  Marek Giergiczny (with UG; including subcontracts)







WP6. Policy and civil society: barriers and opportunities

 Objective: To identify policy and social constraits and opportunities of implementing WBZ.

Participants:
 UG –
 Rafael Ziegler









#### WP7. Integration & upscaling

- Objective: To integrate information on different ecosystem services and benefits from WBZ and synthesise in form of costs and benefits analysis on the catchment scale.
- Participants:
  UW Wiktor Kotowski
  (contribution all partners)





#### **Expected Impact of the Project**

- better use and protection of European natural resources
- implementation of existing and breakthrough scientific knowledge in agricultural practices (paludiculture), while in addition contributing to biodiversity conservation, GHG emissions reduction and flood mitigation
- quantification, monetarisation and commodification of nutrient retention (through WBZ) is an innovative exemplary approach to valuation of ES
- integration of different (country-specific) approaches will provide synergies for implementation from research into practice

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# How will your project target to following aims of the call:

- to promote multi-disciplinary work
- to encourage proposals with fundamental and/or applied approaches
- to stimulate mobility of researchers within the Consortium
- to enhance collaborative research and innovation during the project life and beyond







