

Hydromorphology of rivers and floodplains – What is at stake and how does REFORM contribute?



Tom Buijse
Deltares
Utrecht, the Netherlands
E: tom.buijse@deltares.nl



Hydromorphological pressures in European surface waters

- 127 000 surface water bodies
 - 82% rivers
 - 15% lakes
 - 3% coastal and transitional waters
- HYMO pressures affecting ..
 - 40% river and transitional waters
 - 30% lakes
- Causes
 - Hydropower
 - Navigation
 - Agriculture
 - Flood protection
 - Urban development

Source: EEA report 8/2012 European waters – assessment of status and pressures



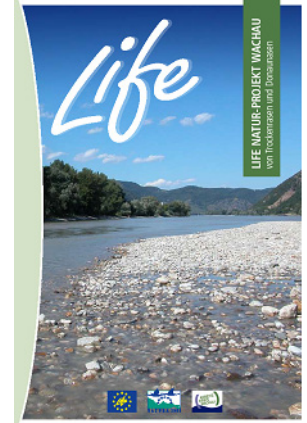
How do we share expertise on river restoration?

Examples of EU funded River River restoration projects



<http://wwwlife-donau-ybbsat/>

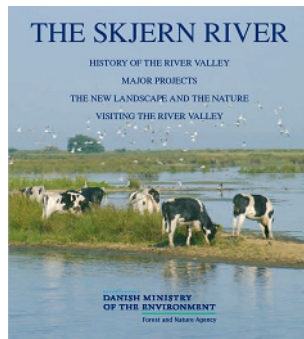
Count of ProjectName	Programme			
	Global objective	INTERREG	LIFE	Grand Total
Flood management		20	1	21
Integrated River Basin Management		26	1	27
River & floodplain restoration		17	114	131
Water quality improvement		4	1	5
Species conservation and management		14	55	69
Grand Total		81	172	253



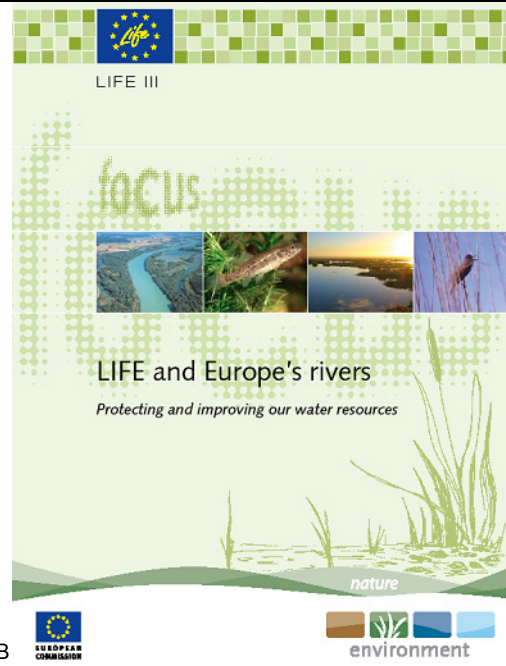
<http://wwwlife-wachau.at/>



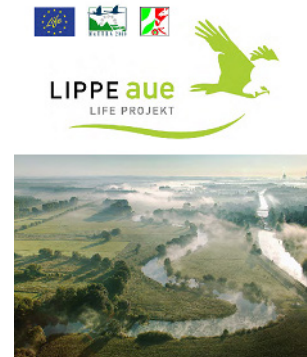
<http://webarchivenationalarchiv.esgovuk/20110303155229/http://wwwstreamlifeorguk/>



http://wwwnaturstyrelsendk/Naturoplevelser/Beskrivelser/Vestjylland/SkjernEnge/Skjern_River_Wetlandshtm



www.wwf.se/flodparlmussla



Hamn:

<http://wwwhamnde/lifelippaeuehtml> 3

REstoring rivers FOR effective catchment Management

November 2011 – October 2015

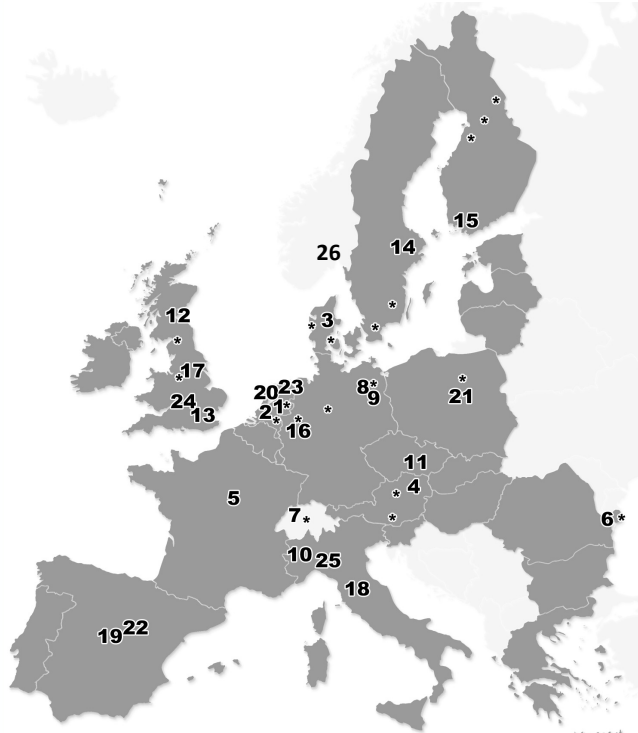
Tom Buijse NL
 Roy Brouwer NL
 Ian Cowx UK
 Harm Duel NL
 Nikolai Friberg DK/N
 Angela Gurnell UK
 Daniel Hering GE
 Eleftheria Kampa GE
 Erik Mosselman NL
 Susanne Muhar AU
 Matthew O'Hare UK
 Tomasz Okruszko PL
 Massimo Rinaldi IT
 Jan Vermaat NL
 Christian Wolter GE



4th All Partner Meeting – June 2014



Partners



26 partners from 15 European countries

No	Name	Short name	Country
1	Stichting Deltares	Deltares	Netherlands
2	Stichting Dienst Landbouwkundig Onderzoek	Alterra	Netherlands
3	Aarhus University	AU-NERI	Denmark
4	Universitaet fuer Bodenkultur Wien	BOKU	Austria
5	Institut National de Recherche en Sciences et des Technologies pour l'Environnement et l'Agriculture	IRSTEA	France
6	Institutul National de Cercetare-Dezvoltare Delta Dunarii	DDNI	Romania
7	Swiss Federal Institute of Aquatic Science and Technology	EAWAG	Switzerland
8	Ecologic Institut Gemeinnützige GmbH	Ecologic	Germany
9	Forschungsverbund Berlin E.V.	FVB.IGB	Germany
10	Joint Research Centre- European Commission	JRC	Belgium
11	Masaryk University	MU	Czech Republic
12	Natural Environment Research Council - Centre for Ecology and Hydrology	NERC	United Kingdom
13	Queen Mary University of London	QMUL	United Kingdom
14	Swedish University of Agricultural Sciences	SLU	Sweden
15	Finnish Environment Institute	SYKE	Finland
16	Universitaet Duisburg-Essen	UDE	Germany
17	University of Hull	UHULL	United Kingdom
18	Universita Degli Studi Di Firenze	UNIFI	Italy
19	Universidad Politecnica de Madrid	UPM	Spain
21	Warsaw University of Life Sciences	WULS	Poland
22	Centro de Estudios y Experimentacion de Obras Publicas	CEDEX	Spain
23	Dienst Landelijk Gebied	DLG	Netherlands
24	Environment Agency	EA	United Kingdom
25	Istituto Superiore per la Protezione e la Ricerca Ambientale	ISPRA	Italy
26	Norsk Institutt for Vannforskning	NIVA	Norway
27	Stichting VU-VUmc	VU-Vumc	Netherlands



Objectives of REFORM

APPLICATION

1. Select indicators for cost-effective monitoring
2. Improve tools and guidelines for restoration

RESEARCH

1. Review existing information on river degradation and restoration
2. Develop a process-based hydromorphological framework
3. Understand how multiple stress constrains restoration
4. Assess the importance of scaling on the effectiveness of restoration
5. Develop instruments for risk and benefit analysis to support successful restoration

DISSEMINATION

1. Enlarge appreciation for the benefits of restoration



WEBSITE: www.reformrivers.eu

The screenshot shows the REFORM website interface. The top navigation bar includes links for HOME, ABOUT, EVENTS, RESULTS, and INTERNAL. The 'RESULTS' section is active, displaying a list of deliverables under the heading 'Deliverables'. A red arrow points to the 'Deliverables' link. A green callout box on the right side of the screenshot contains the text: '18 deliverables' and '23 scientific publications'. The website also features a 'News' section on the left, a 'Search site' box on the right, and a 'Social Network' section at the bottom right. The browser's address bar shows 'www.reformrivers.eu' and the taskbar at the bottom displays various application icons and the system clock showing 16:42 on 08-Sep-15.

18 deliverables
23 scientific publications

HOME ABOUT EVENTS RESULTS INTERNAL

Deliverables

- Scientific Publications
- Meta-Analysis (WP1)
- Hydromorphological and ecological processes and interactions (WP2)
- Effects of hydromorphological changes on river and floodplain ecosystems (WP3)
- Effects of river restoration (WP4)
- Restoration potential and strategy (WP5)

News

REFORM final conference - a major success!

REFORM Summer School - Lectures available online

Building partnerships and the way forward to gear up hydromorphological improvements: An interview with Peter

Search site

Search... Go

REFORM Wiki

You are also welcome to discover more about river restoration case studies through the [REFORM Wiki](#).

Social Network

Recommend Tweet

www.reformrivers.eu/results/deliverables

16:42 08-Sep-15



Summer school "Restoring Regulated Streams linking Theory and Practice"

The screenshot shows a YouTube browser window with the following details:

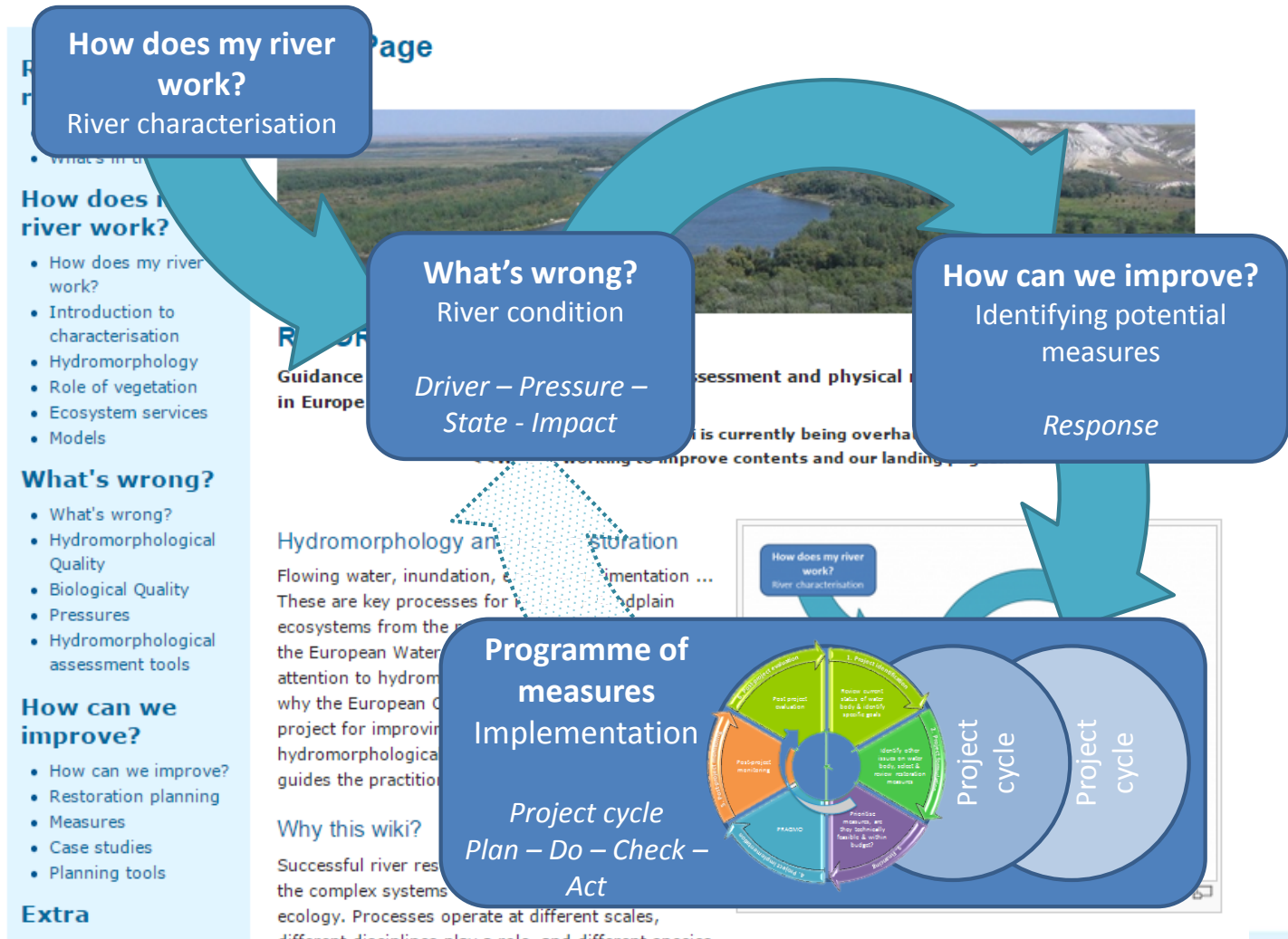
- Browser address bar: https://www.youtube.com/playlist?list=PLKAZHri1nLrYituXeVn4KR_5p3_y6J0vF
- Page title: Summer Course | REFORM Rivers | 2015
- Channel: van STOWA • 12 video's • 200 weergaven • Laatst geüpdatet op 28 jun. 2015
- Description: REFORM - REstoring rivers FOR effective catchment Management - Summer School 2015 - Restoring Regulated Streams linking Theory and Practice - Sunday June 28 - 2015 Lectures.
- Video list:
 - 150628 STOWA REFORM | Tom Buijs door STOWA
 - 150628P01 STOWA REFORM | Ian C door STOWA
 - 150628P01a STOWA REFORM | Ian C door STOWA
 - 150628P02 STOWA REFORM | Angel door STOWA
 - 150628P02a STOWA REFORM | Ange

Lecture Notes

1. Ian Cowx (UK) **Planning stream and river restoration and cost- benefit analysis**
2. Angela Gurnell (UK) **The REFORM hydromorphology framework: working with river processes**
3. Massimo Rinaldi (Italy) **Hydromorphological assessment**
4. Christian Wolter (Germany) **Biological assessment**
5. Nikolai Friberg (Norway) **Coupling hydromorphology to biotic responses: challenges in assessing river restoration outcomes**
6. Jochem Kail (Germany) **Selection of restoration measures: general principles and approaches, potential restoration measures and effects on river morphology and biota**
7. Gertjan Geerling (The Netherlands) **Recap of the key reform steps for effective river restoration**



Guidance and tools – REFORM WIKI





Cooperation with ...

WISER



Lourdes Alvarelllos, Gary Brierley,
Johan Kling, Margaret Palmer,
Hervé Piégay, Peter Pollard, Ursula
Schmedtje, Bas van der Wal

MARS PROJECT

Managing Aquatic
ecosystems and
water Resources
under multiple Stress

make use of earlier research projects
(e.g. REBECCA, WISER,
FORECASTER)

RESTORE (LIFE+ Information &
Communication)

European Centre for River Restoration
(ECRR)

WFD Implementation: common
implementation strategy (CIS)

Advisory Board of REFORM

Connecting to new research projects
(e.g. MARS)



EVENTS

- European stakeholder workshop – Brussels February 2013
- National stakeholder workshops
 - Zutphen, the Netherlands November 2013
 - York, UK May 2014
 - Seville, Spain June 2014
 - Rome, Italy September 2015
- Thematic workshops
 - Role of groundwater for river ecosystems – Biebrza, Poland September 2014
 - Linking E-flows to sediment dynamics – Rome, Italy September 2015
 - ECOSTAT Hydromorphology – Oslo, Norway October 2015
- Summer school – Wageningen, Netherlands June 2015
- Scientific conference – Wageningen, Netherlands June 2015

REFORM Stakeholder Workshop (Brussels, February 2013)



BREAKOUT SESSIONS

- Lowland rivers
- Highland/midland rivers
- Mediterranean rivers
- Unraveling the impact of hydromorphological pressures in multiple-pressure settings
- Designing programmes of measures
- Heavily modified water bodies

IMPORTANT TOPICS

- Cause-effect between HyMo and biota
- Ecological indicators of HyMo impacts
- **SEDIMENT ASSESSMENT METHODS & SEDIMENT CONTINUITY ISSUES**
- Disentangling effects of HyMo pressures
- Use HyMo to define GEP of heavily modified water bodies
- **GUIDANCE ON ENVIRONMENTAL FLOWS**
- Robust ways to confidently demonstrate success of RR
- Cost-effective methods for RR monitoring
- Process-led RR & account for cumulative impacts within a catchment scale approach
- Decision support tools to emphasise benefits of RR
- General framework for ecosystem services



**Confronting prioritised requests from participants with
foreseen output of REFORM**



Acknowledgements

REFORM receives funding from the European Union's Seventh Programme for research, technological development and demonstration under Grant Agreement No. 282656

Thank you for your attention



COLLABORATIVE PROJECT
LARGE SCALE INTEGRATING PROJECT

ENV.2011.2.1.2-1
HYDROMORPHOLOGY AND ECOLOGICAL OBJECTIVES OF WFD

GRANT NO. 282656

News

REFORM final conference - a major success!

REFORM Summer School - Lectures available online

Building partnerships and the way forward to gear up hydromorphological improvements: An interview with Peter Pollard, Scottish Environment Protection Agency

Second REFORM Policy Brief now online

REFORM in a nutshell

Rutor River - Italy



A proglacial confined reach of the Rutor river (Valle D'Aosta, Italy) exhibiting a pronounced braided pattern. Such aquatic environments are

Search site

Search...

REFORM Wiki

You are also welcome to discover more about river restoration case studies through the [REFORM Wiki](#).

Social Network

Contact

Project coordinator
Dr. Tom Buijse
Delft

Our project website is our display window

www.reformrivers.eu

