



Wallonie
mobilité infrastructures
SPW

Visite guidée de sujets traités par les groupes de travail AIPCN

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Service public de Wallonie **mobilité infrastructures**

Sommaire

- Retour d'expérience en tant que membre INCOM (YP)
- WG 210 - **Smart shipping** on Inland Waterways
- WG 128 - Alternative Technical-Biological **Bank Protection** Methods for Inland Waterways
- WG 236 - Sustainable Management of the Navigability of **Free Flow Rivers**
- Conclusion

INCOM – Commission de la navigation intérieure

- Missions
 - Création de nouveaux groupes de travail (WG)
 - Définition des Terms of Reference (TOR)
 - Suivi de la constitution des groupes (appel à candidature via sections nationales de l'AIPCN)
 - Practice-oriented guidelines



PIANC INCOM WG ##

Title

Terms of Reference (XX Month 202X)

1. Background

This WG concerns / This WG is dedicated to the improvement of / The goal is.

2. Objectives

The objectives are:

- → to develop guidelines
- → to improve the understanding

The benefit of this WG is to

3. Earlier Reports and documentations

- → Existing PIANC WG reports from [InCom](#) and [EnviCom](#)

4. Scope

The scope of the investigation is to:

- → Improve the understanding;
- → Assess and;
- → Inventory and review current works including;
- → Inventory and review existing tools, methodologies, investigations, and other research to assess,
- → Case studies

Matters or terms to be investigated

Level of detail intended

5. Intended product

The intended product is a set of guidelines to improve

6. Recommended Members

The WG should ideally include managers of inland navigation systems, authorities, experts, engineers, ...

7. Relevance for Countries in Transition

This report

8. Climate Change, Working with Nature, Sustainable Goal (SDG)

INCOM – Commission de la navigation intérieure

- Missions
 - Création de nouveaux groupes de travail (WG, TG)
 - Définition des Terms of Reference (TOR)
 - Suivi de la constitution des groupes (appel à candidature via sections nationales de l'AIPCN)
 - Suivi de l'avancement des WG et révision des rapports
 - Personne de contact INCOM par WG
 - Groupe principal de relecteurs par WG
 - Promotion des WG
 - Rôle de facilitateur

INCOM – commission de la navigation intérieure

- Composition
 - +/- 35 membres internationaux
 - 20 pays représentés (Europe, Asie, Amériques)
 - Membres effectifs / YP
- Modalités
 - +/- 4 réunions / an



WG 210 - Smart Shipping on Inland Waterways

Chair: **Ann-Sofie Pauwelyn (BE); Lea Kuiters (NL)**

Status: **published report (March 2022)**

PIANC is aware that Smart developments in other transport modes have been reaching a mature status (as train and automobile). So, this WG refers to the methodologies implemented in these modes and focuses on **smart shipping** with a specific interest **on the waterborne infrastructure**.

Autonomous driving are expected to reduce the costs of road transport and to increase its flexibility, while new rail corridors and the next generation of freight trains are expected to lower the technical and organizational barriers for **rail freight**.

It is therefore of paramount importance that technologically innovative initiatives like smart shipping are in the focus of the IWT sector **to improve efficiency, safety and sustainability**.

SMART SHIPPING ON INLAND WATERWAYS



InCom Working Group Report N° 210 – 2022

WG 210 - Smart Shipping on Inland Waterways

Pauwelyn & Turf (Smart Rivers 2022)

Context of inland shipping

- Shortage of skippers, so smaller vessels disappear
- Has to be competitive with road transport to solve major mobility problems (e.g. road congestion)

⇒ **Part of the solution could be automation of vessels**

⇒ **Need to adapt physical & digital infrastructures and traffic management**

(infrastructure manager point of view to stimulate smart shipping)

Content

- Overview of current smart shipping developments
 - Information about legislation, security, cybersecurity, socio-economic factors
- What is lacking? Recommendations for the future
 - Need for new standards in **communication** (human and machine-optimized)
 - Need for safe **test areas**
 - To raise **awareness** about the positive change Smart Shipping can bring
 - To adapt **legal regimes** (distinct regulation framework in Europe, China and the U.S.)

WG 210 - Smart Shipping on Inland Waterways

Pauwelyn & Turf (Smart Rivers 2022)

Examples

- Testing Seafar unmanned ships (river Yzer and Passendale-Nieuwpoort canal) with different stages of automation (2019-2022):
 - full crew on board
 - captain in remote control center, maintaining a crew on board
 - only a superintendent remained on board
 - nobody on board
- Autonomous vessel DEME Marine Litler Huntler at the Scheldt bridges Temse-Bornem (2020-2021)
- Autonomous Shipping Initiative for European waters (AUTOSHIP) – EU HORIZON 2020 program
 - Norway Short Sea shipping
 - Flanders inland waterways (Wintam lock to Willebroek and back via the Rupel)

WG 128 - Alternative Technical-Biological Bank Protection for Inland Waterways

Chair: **Bernhard Soehngen, BAW, Germany**

Status: **final stage**

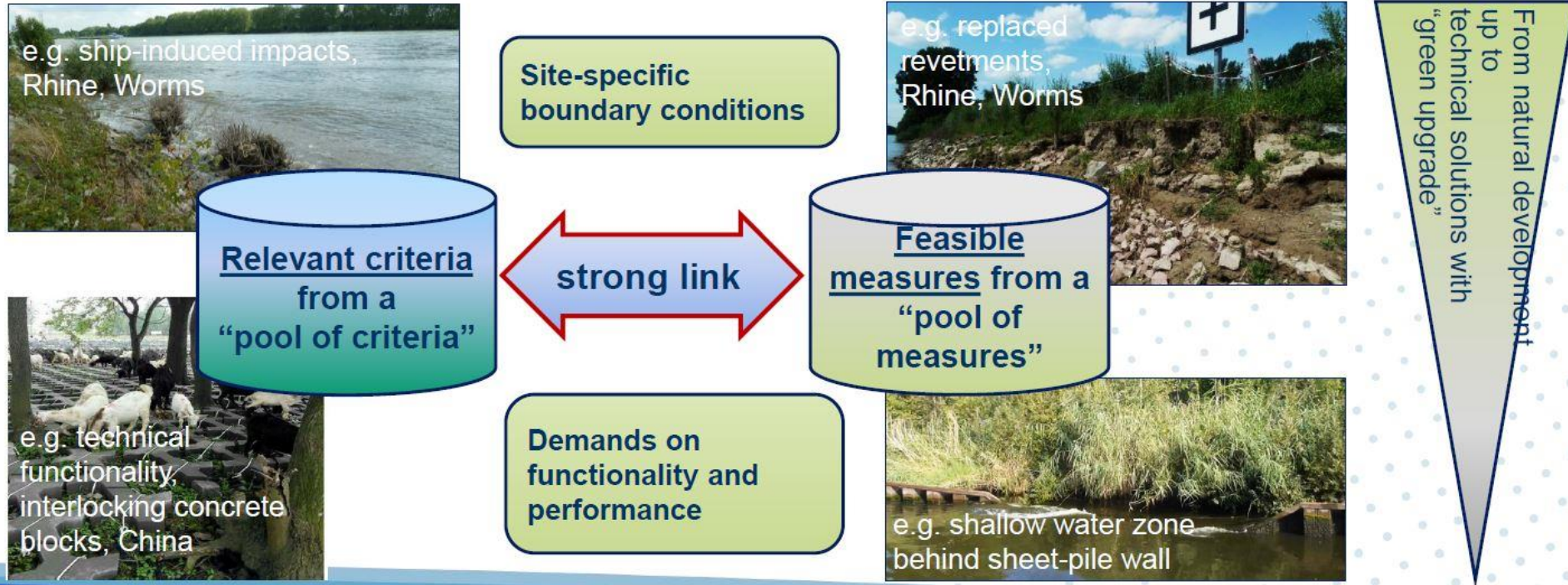
The objective of the InCom WG128 is to understand, evaluate and report on the effectiveness of **best practice** examples of **innovative** (alternative) **bank protection measures**, as related to different impact influences and boundary conditions,

- **to fulfil the technical purposes**
- **and additionally to improve the ecological conditions.**

WG 128 - Alternative Technical-Biological Bank Protection for Inland Waterways

Söhngen & Ma Dianguang (Smart Rivers 2022)

II. What means Best Practice?

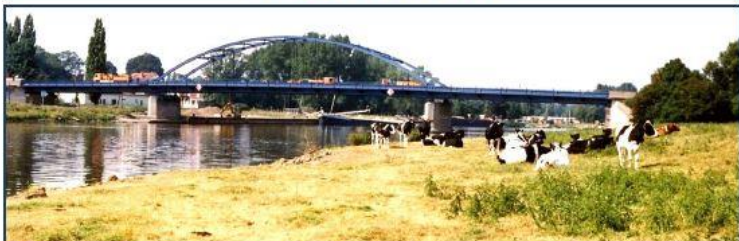


WG 128 - Alternative Technical-Biological Bank Protection for Inland Waterways

Söhngen & Ma Dianguang (Smart Rivers 2022)

II. What means Best Practice?

Design Case example: Weser at Stolzenau Town



DC: Impounded river, slope can be flattened because of existing hinterland, average terrain step height, average ship-induced impacts; main planners aim: ecological upgrade including support of shallow water zones, moderate necessary stability

Analysis Case example: Willow brush mattresses at Worms, Rhine



AC: Free flowing river with high water level changes, steep slope, no hinterland, high terrain step, high ship-induced impacts as low fairway-bank distance, main planners aim = ecological upgrade related to former riprap, high stability demands.

How to transfer experience from the AC (under AC-conditions & aims) to the DC (with its unique BCs and planners aims)?

WG 128 - Alternative Technical-Biological Bank Protection for Inland Waterways

Söhngen & Ma Dianguang (Smart Rivers 2022)

Focus

1. General and application limits
2. Relevant publications
3. Descriptions of typical measures
4. Content of Part 2 and SCREENING
5. Pre-Selection
6. Detailed study (process recommendations)
7. Application limits

Part 1: General design recommendations

Part 2: Library of Measures

Part 3: Step by Step-Application and examples (tutorial)

1. Introduction
2. Basic Types
3. Fact Files
 - I. Canals and still water
 - II. Impounded rivers
 - III. Free flowing rivers
4. Case studies
5. Overview on measures

Backbone

“7 Steps”: Planner’s aims; boundary conditions; **Pre-Selection (step by step)**; guided view into the measure collection; knockout criteria; specification of variants; final selection using AHP
Appendix A: Working sheets for AHP;



PIANC

InCom WG Report
n° 141 - 2019



DESIGN GUIDELINES FOR
INLAND WATERWAY DIMENSIONS

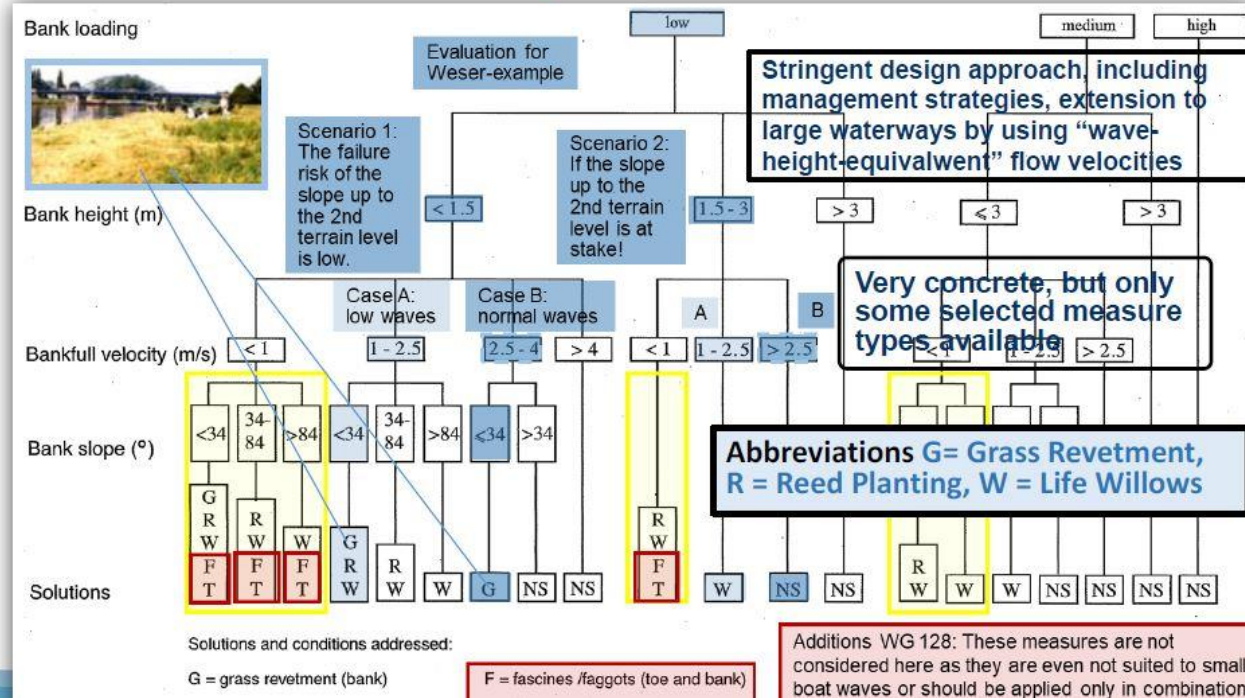
The World Association for Waterborne Transport Infrastructure

WG 128 - Alternative Technical-Biological Bank Protection for Inland Waterways

Söhngen & Ma Dianguang (Smart Rivers 2022)

Excerpts of the report – Appendix C

III. Structure and content of the report



WG 128 - Alternative Technical-Biological Bank Protection for Inland Waterways

Söhngen & Ma Dianguang (Smart Rivers 2022)

III. Structure and content of the report

Excerpts of the report – Part 2

G= Geotextile-Roll

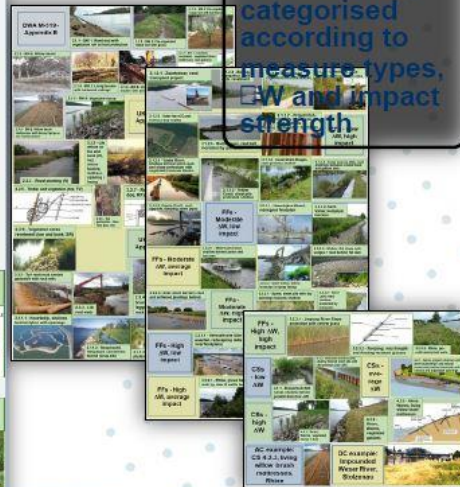
Example of
„Basic Types“

1. General and application hints
2. Relevant publications
3. Descriptions of typical measures
4. Content of Part 2 and SCREENING ...

Basic Types – British Waterway Management Guide (1999) – Chapter 2.2.6 and Appendix C

Chapter	Designation	
2.2.1	Grass revetment	
2.2.2	Reed planting	
2.2.3	Life willow on toe and bank	
2.2.4	Grass and geotextiles	
2.2.5	Timber and vegetation	
2.2.6	Toe geotextile - fibre rolls	
2.2.7	Rock and fibre roll	
2.2.8	Vegetated open cell Revetments	
2.2.9	Vegetated stone revetment	

63 measures,
categorised
according to
measure types,
W and impact
strength



WG 128 - Alternative Technical-Biological Bank Protection for Inland Waterways

Söhngen & Ma Dianguang (Smart Rivers 2022)

III. Structure and content of the report

Excerpts of the report – Part 2

2.2.6 Toe geotextile – fibre rolls (toe, TG)

Solution 5.4 – Toe geotextile, constr. no. 2 (page 159, other solutions pages 159 – 162) in the WMG (1999)

Classification: Biotechnical Engineering

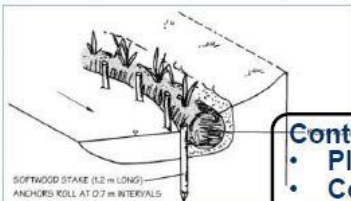
Objectives: The geotextile provides protection of the toe of the bank against undercutting, and thus stabilizes the bank without impeding drainage. The vegetation component contributes additional anchorage effects and increases the stability to absorb boat and wave wash.

Design: Sausage-shaped fibre rolls, made of coir fibre, are compressed into a roll and contained by an exterior netting of synthetic cord (or other more durable geotextiles up to steel wire braids, see photo below). The diameter of the roll is chosen to suit local conditions – slope of the bank, water depth etc. Rolls are anchored into place with 60 – 80 mm softwood stakes. The rolls may be fixed to the stakes by galvanised wire and staples. Emergent plants are planted along the length and rhizomes are able to penetrate through the coir into the substrate below. Reeds (as in the photos below) or other aquatic plants may be used.

Precautions: Ensure that dredging / fill for rolls is nutrient-rich to support emergent vegetation. Ensure a smooth profile to the embankment in order to encourage plant root development at a later stage. Any pre-planted or pre-seeded toe protection must be immediately planted in water on arrival at site. Thus, the measure is suited to very low water level changes only. Fencing or other measures to hinder access may be necessary in the early stage to protect young vegetation from grazing or trampling.

Additional measures: Fibre rolls can be laid with plant pallets to give extra coverage and protection on the bank. The fibre rolls should be laid at the toe and secured. The space between the roll should be filled and levelled so that the plant pallets may be laid over the top.

Technical aspects: The construction suits optimal to toward with soft



The construction is fitted to shallow water depths close to the bank. If the water depth close to the bank is higher, it should be combined with conventional protections below the MW level. According to the design features provided in the Waterway Management Guide and in this report in Appendix C.1, the applicability of the measure is restricted to very low flow velocities ($< 1 \text{ m/s}$) and thus almost negligible wave heights. The measure was considered here nevertheless, as it seems to be able to withstand even higher velocities (up to 2.5 m/s) and waves up to 0.1 m height, if durable materials will be used and if the water level changes are very low. The erosion resistance may be increased by filling the rolls additionally with stones to increase its weight as experience show that reed is able to root through gabions.

Site requirements: The construction requires generally land access as it is suited to shallow water areas in front of the bank.

Construction: The area between land and water should be prepared to ensure a close contact between the rolls and the ground. This includes clearing stones, root stumps and branches. The area above the water level should be well prepared prior to laying the rolls. Three or four fibre rolls should be linked together by a steel wire or a synthetic cord. Then the fibre roll (100 – 150 mm) above the water level should be anchored to the stakes. The rolls should be driven between the netting and the ground.

Timing: Avoid periods with high flows. The construction should be installed in the early stages of the planning process. Plants should be planted or damaged plants should be removed before cutting or planting. Note that coir rolls filled with large stones (according to gabions) are penetrated by reeds (see Fact File in Chapter 3.2.3.1).

Advantages: The construction is flexible so that they may accommodate minor changes in channel geometry.

Safety features: Depending on the species of plants, stage of development and the type of the geotextile, they may weigh over 12 kg . Thus, care should be exercised when lifting.

Ecological implications: Once vegetation is established it screens the fabric bags, giving the appearance of a natural ridge.

Aesthetic value: Once the vegetation is established, it screens the fabric.

Sustainability: The vegetation component has the potential to self-sustaining and, once properly established, may provide permanent bank stabilization.

Practical design lifetime: In time the geotextile will degrade, depending on the type of material.

Maintenance: In the early stages watering should continue above the water line until the root structure has taken hold. Access to the bank may be restricted in the early stages, e.g. by fencing. Inspection will be required to ensure that the geotextile remains firmly in place and is not undermined. When the vegetation has established occasional trimming or controlled grazing may be necessary to prevent encroachment into the channel where necessary.



Content is a
Planner's objectives
Combinations
Selection and design hints
But above all concrete
layout recommendations
(part of the planning process
after selection)

WG 236 – Sustainable Management of the Navigability of Free Flow rivers

Chair: Calvin Creech, USACE, NL

Status: first stage

This WG focuses on free-flowing currents or rivers in their natural state, entirety or partially, in which the flow is not constrained by any hydraulic infrastructure. We refer to these as "**natural rivers**."

This WG is dedicated to the improvement of navigability natural rivers that are not intended to be regulated. The goal is finding ways to **guaranty/improve navigability without conventional training structures**, concrete, rock etc. inside the natural rivers.

WG 236 – Sustainable Management of the Navigability of Free Flow rivers

		Existing System Conditions	
River State		Regulated or constrained by Hydraulic Infrastructure	Natural or Quasi-Natural
Proposed System Conditions	Regulated or constrained by Hydraulic Infrastructure	<i><u>Resulting Guidance:</u> Management and maintenance of existing systems that are controlled by hydraulic infrastructure.</i>	<i><u>Resulting Guidance:</u> Traditional methods of river engineering.</i>
	Natural or Quasi-Natural	<i><u>Resulting Guidance:</u> River restoration of systems that have been trained or significantly regulated. Recommended for a future PIANC Working Group</i>	<i><u>Resulting Guidance:</u> Innovative navigability improvements that maintain natural river system behavior. Focus of WG 236.</i>

Table 1-1: Resulting Guidance based on Existing System Conditions and Future End State

WG 236 – Sustainable Management of the Navigability of Free Flow rivers

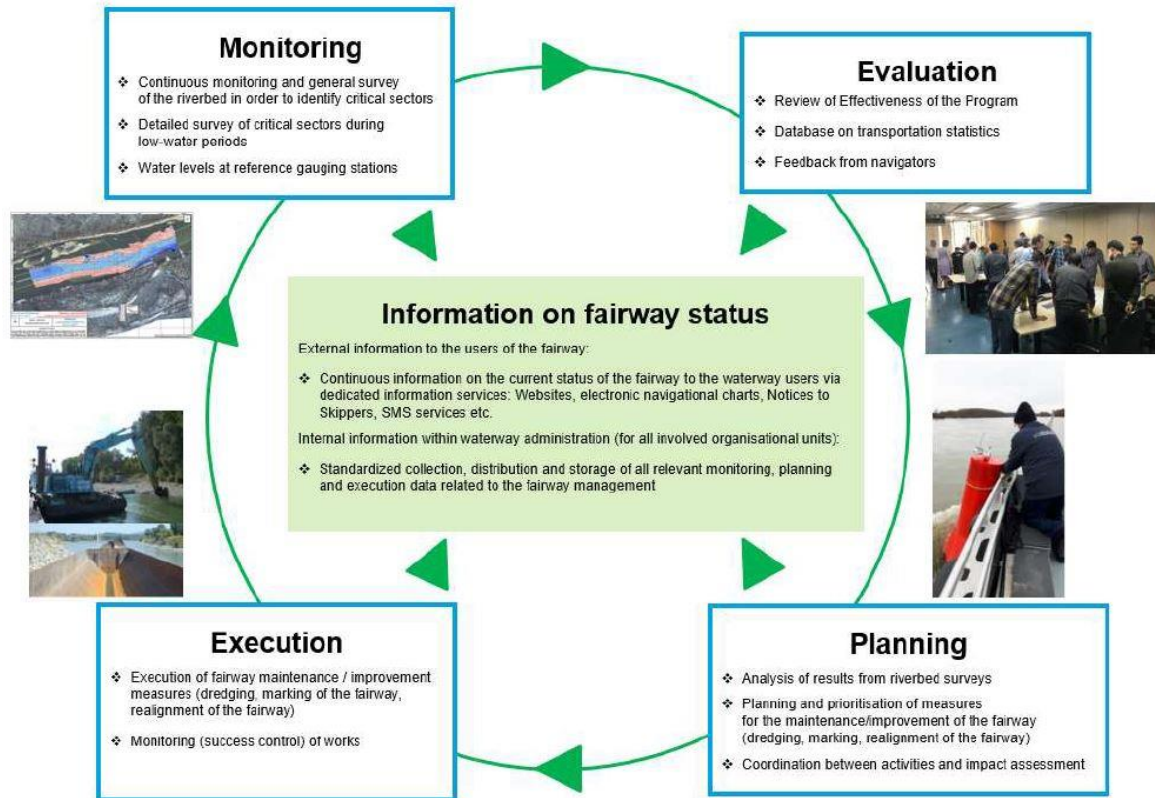


Figure 1-1: Cyclical Nature of Navigability Improvement Measures

WG 236 – Sustainable Management of the Navigability of Free Flow rivers

This report includes 7 main sections and two Appendices:

Chapter 1: Introduction

Chapter 2: Background

Chapter 3: Planning and Design Strategies to Improve Navigability in Natural Rivers

Chapter 4: Interventions and Measures to Improve Navigability in Natural Rivers

Chapter 5: Impacts and Mitigation of Navigation Interventions

Chapter 6: Monitoring, Management and Operations Tools

Chapter 7: Recommendations

Bibliography and References

Appendix A: Terms of Reference

Appendix B: Case Studies

The case studies include:

Madeira River (Appendix B1)

Magdalena River (Appendix B2)

Niger Delta (Appendix B3)

Yangtze River (Appendix B4)

Brahmaputra-Jamuna (Appendix B5)

Congo River (Appendix B6)

Red River, Vietnam (Appendix B7)

Conclusion

- Liste des WG
 - <http://incomnews.org/wg>
- Possibilité de proposer des sujets à traiter dans le cadre de futurs groupes de travail (WG)
 - Contacts:
 - catherine.swartenbroekx@spw.wallonie.be
 - ph.rigo@uliege.be
- Participation bienvenue, y compris des Young Professionals (YP), dans les différents groupes de travail