Economic Thinking in the WFD: Costs and Benefits

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Economic questions relevant to WFD

- Several interacting, but with different purposes:
  - Cost assessment of measures
  - Benefit assessment
  - Cost effectiveness
  - Cost recovery
  - Payment for ecosystem services
- Purposes:
  - Informing planning
  - Informing stakeholders
  - Delivering cost efficiency
  - Tools for sharing economic burden

Cost assessment of measures

- Surely a basic element of planning
- RBMPs do contain cost information – but sometimes limited to parts of operational or capital costs
- Only 1/3 MS reported all information requested and only 3 MS provided full information for all RBDs
- Analysis of alternative measures with alternative costs is much harder to find

- Why has this measure been chosen?
- Why have measures not been adopted?

A more basic problem!

- The fundamental approach of the WFD is:
  1. Determine gap to good status objective
  2. Identify pressures/sources that cause that gap
  3. Identify measures needed to tackle the pressure
  4. Apply, monitor, review, etc.

- Reviews of 2nd RBMPs show some have good analysis of 1 and 2, but others do not.
- Without knowing what is causing the problem, effective measures (and economic analysis concerning these) is mute!

Costs and benefits – a driver for action under the WFD?

- 2012 Water Blueprint – concluded that the WFD would deliver significant benefits, so comparing these to costs of measures should provide a justification for applying measures where these were lacking.
- Evidence from analysis of 2nd RBMPs suggests that there is still a lack of analysis of the costs of possible measures compared to the benefits they might bring.
- Where disproportionate cost arguments are made, this is usually about absolute cost rather than costs being significant higher than benefits, etc.
- So, DG ENV keen to promote greater assessment of benefits – Blue2 project.

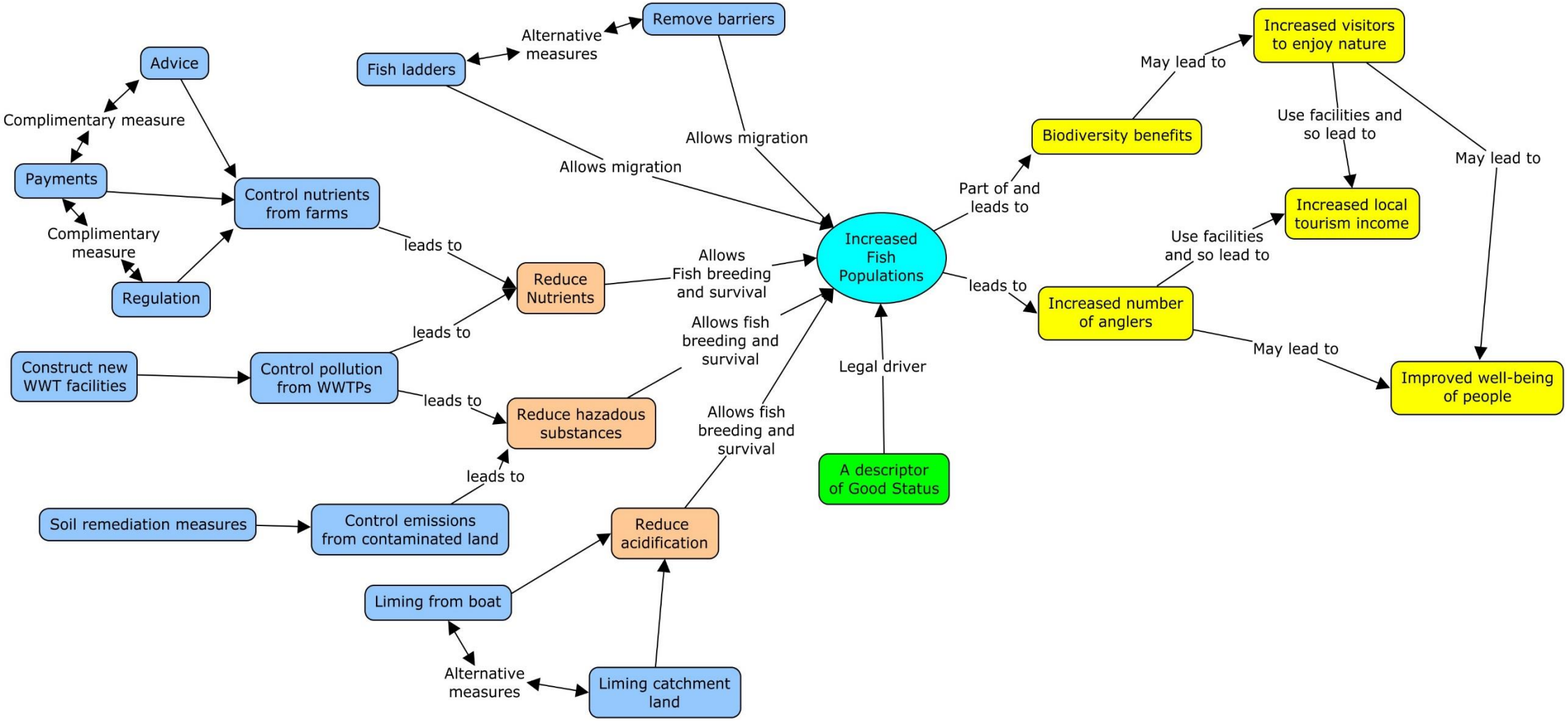
Linking costs and benefits of measures

- A key challenge in arguing for spending on measures to deliver benefits is how the law prescribes what exactly is to be delivered
- EU water law aims to deliver a range of benefits (health, biodiversity, economic, etc.)
- BUT few items of law have the benefits as the legal obligation. Instead they may set:
  - A technical obligation (e.g. levels of water treatment)
  - An environmental quality objective (chemical standard, Good Ecological Status, etc.)
- Meeting the legal obligation requires measures, but the link (or perceived link) to the benefits may not be clear
- Indeed – most RBMPs do not describe benefits from achieving good status
- Hence the justifying costs of measures is not always easy

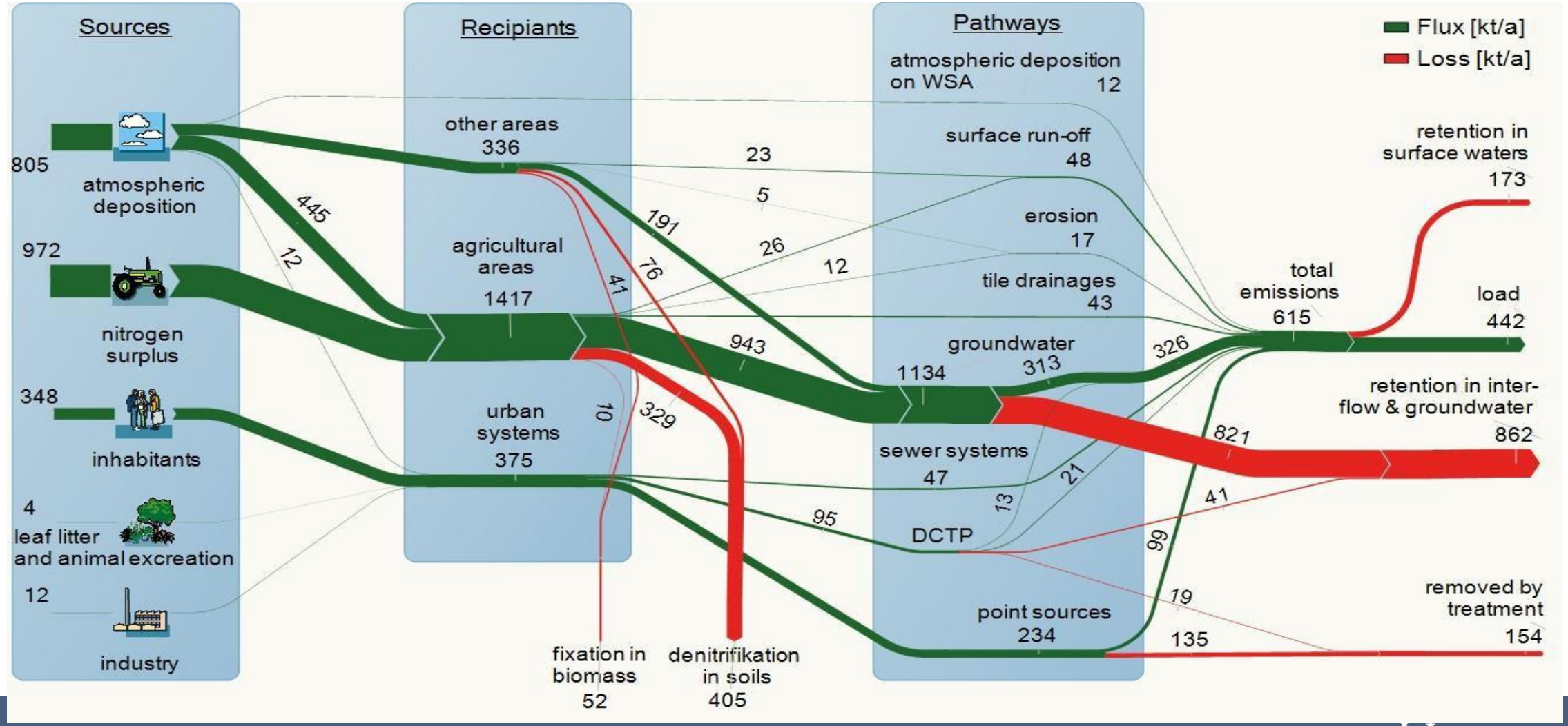
Costs and benefits – a complex interaction

- A major challenge to understanding how measures affect pressures, change status and deliver benefits is the complexity of their interactions
- Sometimes there are a limited number of interactions
- Often it is very complex:
  - Multiple pressures affecting status
  - Several measures affecting a pressure
  - One benefit leading to another
- Some analysis can highlight the easier aspects to analyse/present, but the danger is to miss key benefits
- Useful to have a transparent way to present as many interactions as can be reasonably described

Costs and benefits: fish populations

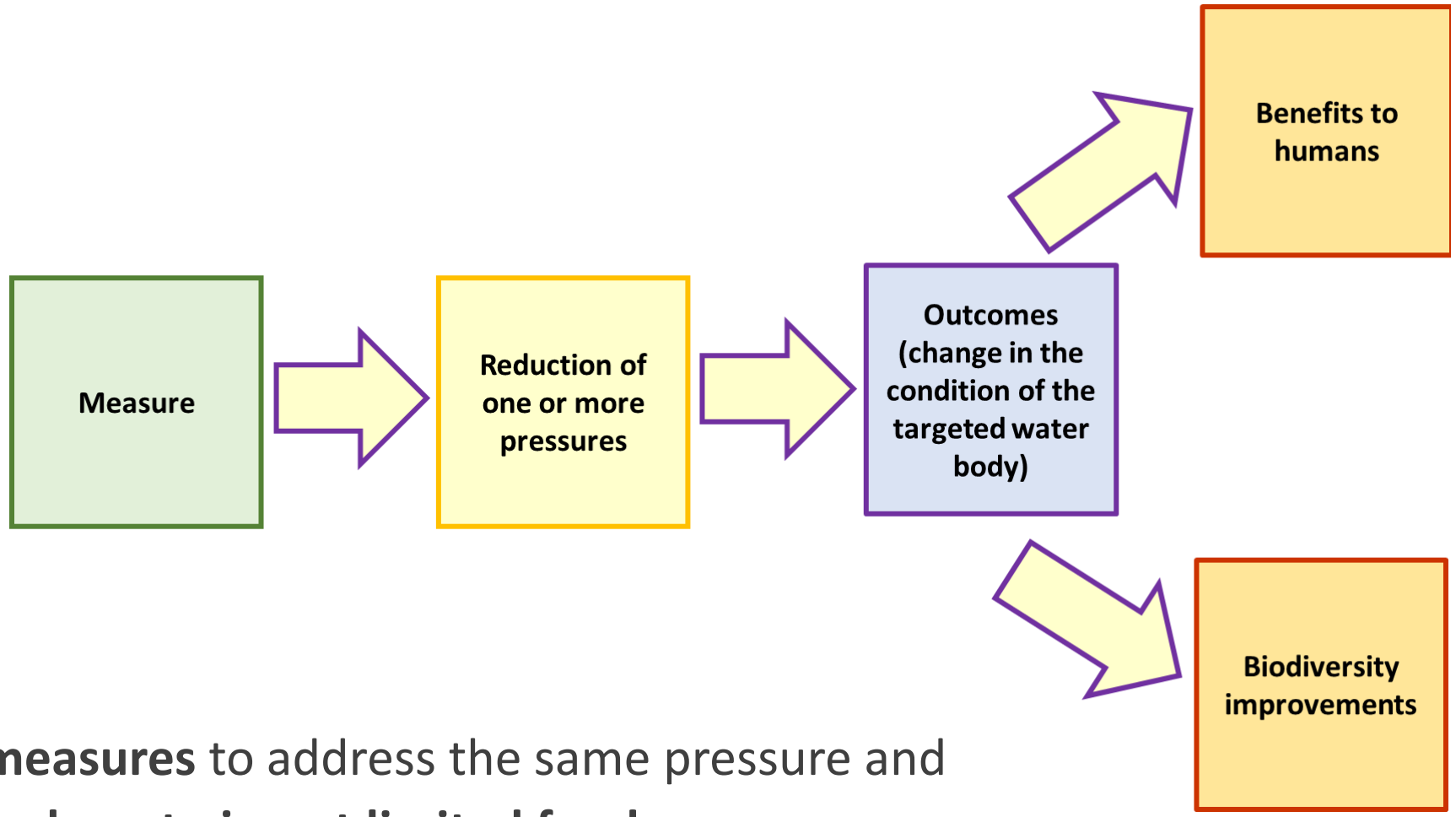


Moneris model nitrogen fluxes in Danube



The Blue 2 approach

Objective: To develop a methodology to analyse the links between **measures**, the **modification of the status** of WBs and the **cost** and **benefits** generated



There may be **alternative measures** to address the same pressure and decisions to be made as to **where to invest limited funds**

→ **comparison of the costs and benefits of alternative measures is important**

Multi-Criteria approach

- Benefits assessed using **monetary, quantitative** and **qualitative** indicators
- Indicators are **not aggregated** in order to avoid weighting, information loss and related assumptions
- Objective: to **summarise all available information** in an **impact matrix** – not a single figure

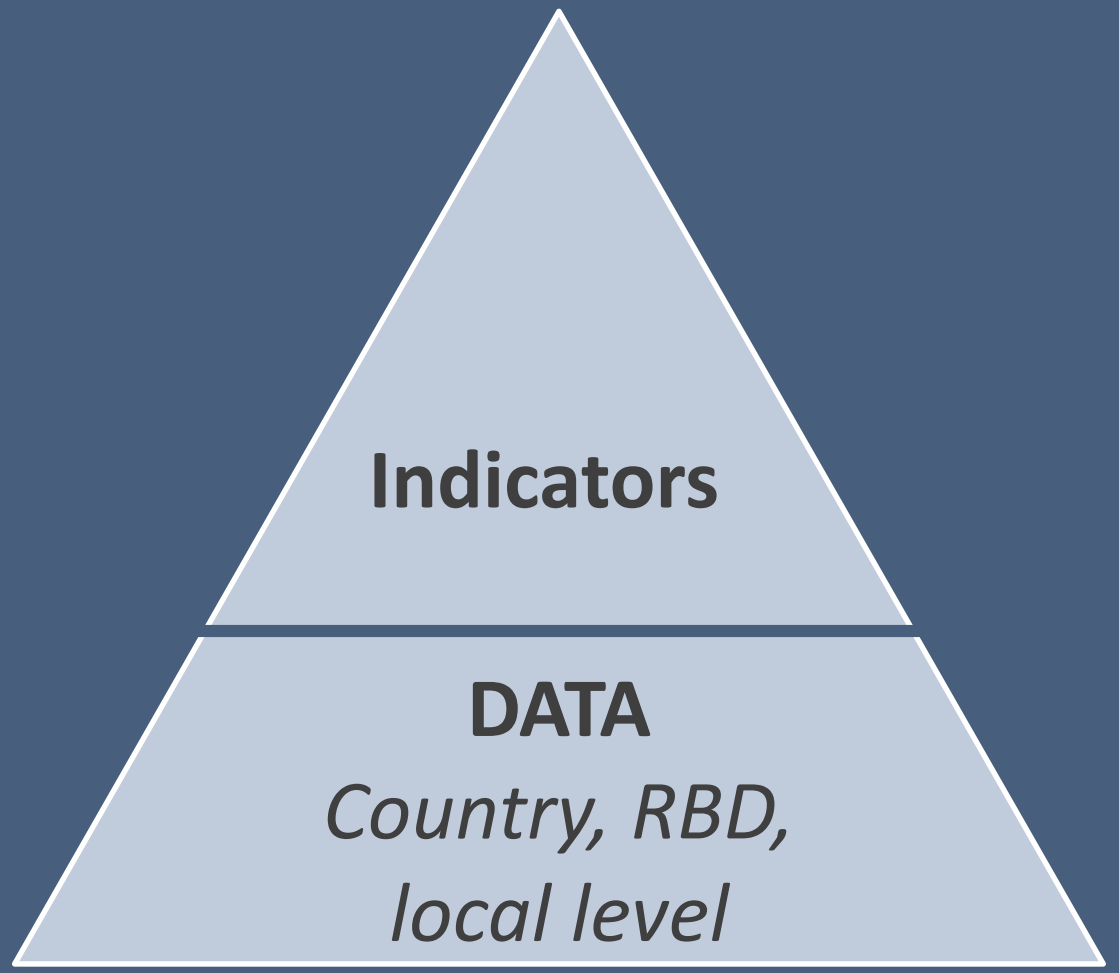
Indicators	Unit of measurement	BaU level	HI Level
Indicator 1			
Indicator 2			
…			
Indicator N			

Support to the analysis of costs and benefits of water policies, trade-offs and synergies

→ useful basis for the **involvement of key stakeholder** and **participation**

Bottom up-approach

- Possibility to obtain **more detailed, locally-specific information**
- Facilitates a **direct engagement** with decision makers, experts and other relevant stakeholders → **buy-in**
- **More time and information-intensive** (→risk of problems with data gaps) than top-down approaches



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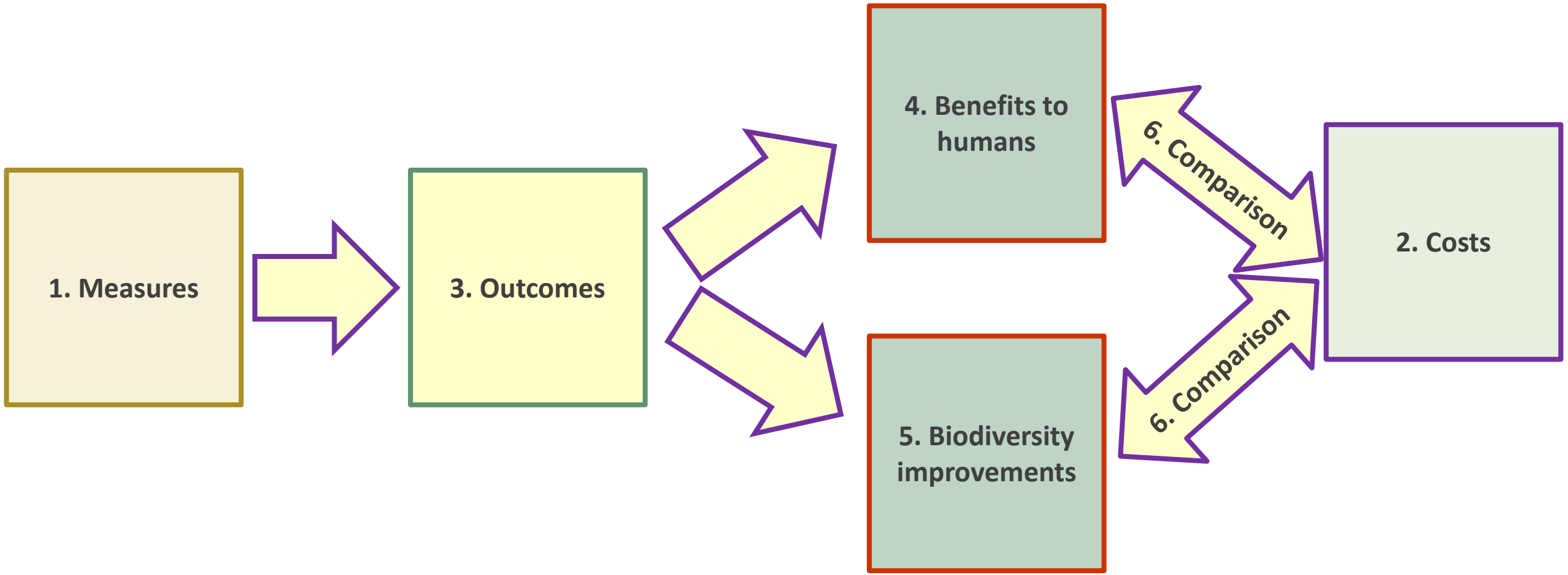
Six steps


1. Measures
3. Outcomes
4. Benefits to humans
5. Biodiversity improvements
6. Comparison
6. Comparison
2. Costs

1. Choice of measures

- Measures targeting WB in **poor/bad status**
- Which deliver outcomes that address the **most important pressures**, based on the key pressures identified in RBMPs
- **Most expensive**
- For which more **information** is available

- Measures classified according to **Key Types of Measures** (**KTMs**), as defined in the WFD Reporting Guidance

- This facilitates the collection of data: information is collected by KTM in the RBMPs

2. Costs

- **Capital Costs (CCs) + Operation and Management Costs (OMCs)**
- All measures are assumed to be implemented in year 0
- **Opportunity costs and costs incurred in the past not included**
- If possible, **costs are categorised depending on their sources** (public, private, other)
- The **expected lifetime of the measures is set at max. 40 years** (Water Appraisal Guidance by UK Environment Agency)

Discount rate: **3.5%** for years 1-30 and **3%** after that (Green Book on Appraisal and Evaluation in Central Government, UK)

3. Outcomes
(changes in the state of WBs)

Collected information for each outcome:

- Whether the related pressure is key in the RBD
- Related measures
- Actual situation (baseline)
- The outcome to be expected that results from the measures assessed

	Indicator	Unit of measurement
O1	Reduction of BOD	mg/L
O2	Reduction of nitrogen	mg/L
O3	Reduction of phosphorus	mg/L
O4	Decrease in the urban areas with sewage overflows	ha
O5	Reduced concentration of pesticides in water	mg/L
O6	Reduced concentration of priority substances (PS) or river basin specific pollutants (RBSP) (of most problematic substances)	mg/L
O7	Reduced contaminated sites or abandoned industrial sites affecting the achievement of objectives	number
O8	Reduced number of dams, barriers and locks for hydropower purposes, flood protection, drinking water, irrigation, recreation, industry, navigation and other purposes not compatible with achievement of GES or GEP	Number
O9	Reduced water bodies affected by alterations for flood protection, agriculture, navigation and other purposes	Number
O10	Reduced water abstraction or flow diversion for agriculture, public water supply, industry, cooling water, hydropower, fish farms or others	m^3
O11	Reduced hydropeaking	Number of occurrences per year
O12	Increase in the number of rivers meeting environmental flows	% of total river length
O13	Improved groundwater levels	% of the number of GW water bodies where abstraction does not exceed recharge
O14	Reduced concentrations of substances controlled by GWD	mg/L
O15	Reduction of sediments	kg/m^3
O16	Reduced water bodies where the exploitation/removal of plants/animals is preventing the achievement of GES and GEP	Number
O17	Reduced microbial contamination of surface and GWs	mg/L
O18	Reduced acidity of surface waters (pH)	pH
O19	Reduced area subject to flooding	ha

4. Benefits

Collected information for each benefit:

- The methodology used to assess it and the unit of measurement
- The actual situation (baseline)
- The benefits to be expected that results from the measures assessed
- The possible beneficiaries (e.g. recreational users, residents, farm operators, reservoir operators, broad public, land owners)
- Expected duration
- The outcomes contributing to it

- **Monetary indicators (**calculated using costs, **not preferences**) :
  - **added value/turnover** for benefits related to the recreational and navigation sector
  - **changes in property values** for benefits related to flood protection
  - **avoided costs** due to reduced need for water treatment, avoided damages from floods, reduced need for dredging and maintenance work to improve bank stability
  - **reduced expenditures** related to decreased water use (improved water efficiency and less irrigation) and reduced use of fertilisers/pesticides
- **Quantitative (non-monetary) indicators**:
  - **reduced health risks** from exposure to contaminants (number of people that may experience health problems);
  - **Increase in generated electricity** due to measures improving flow regimes and reducing sediment (MWh);
  - **improved water availability** (m^3);
  - **increased yields** due to improved agricultural practices and reduced soil erosion (%).
- **Qualitative indicators (scale: 0 - 5)**: **improvements in the recreational experience** of fishers and non-fishers

Conclusions on Blue 2

- The aim was for a transparent presentation of costs and benefits – this was well received
- The focus on bottom-up, WB level analysis welcome, rather than broad EU level analysis
- Not relying on monetisation also welcomed.
- Big problem, even at small scale, of multiple interactions
- Bigger problem with data gaps!

- Do know the work is being applied

Cost-effectiveness

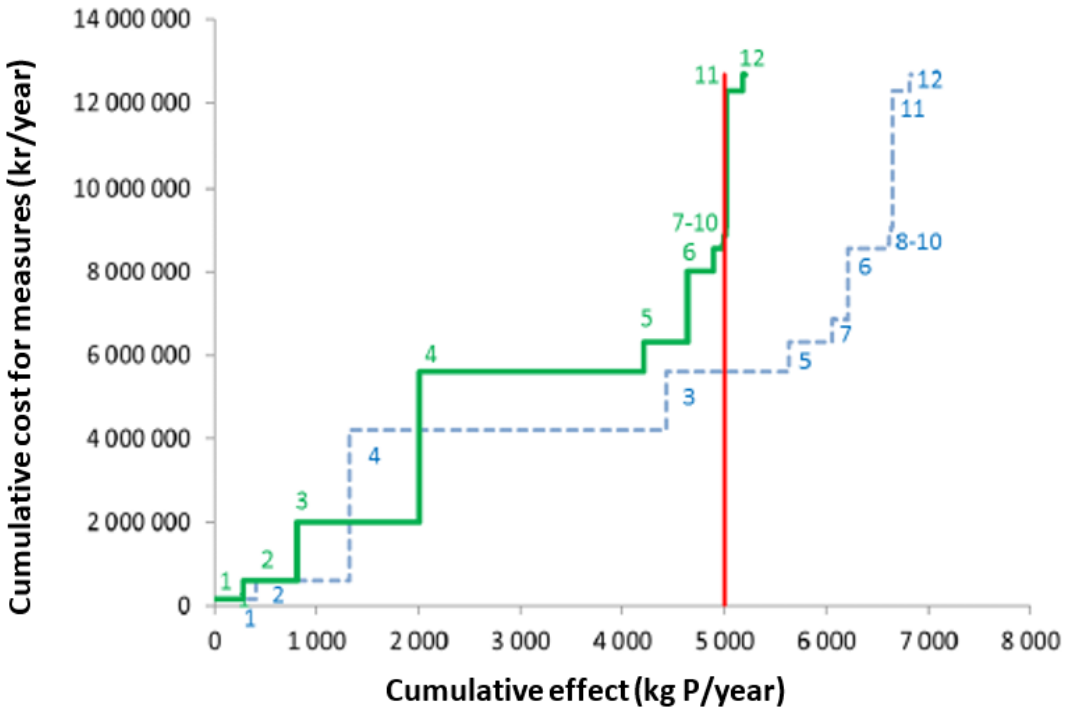
- The assessment of relative costs of alternative approaches (what, when, where, etc) is basic.
- Also the assessment of whether a measure will deliver objectives is basic
- Not much information is made available on this (probably more behind the scenes)
- Heavy reliance on measures under other EU law avoids the problem – having to build a WWTP under the UWWTD (why worry about effectiveness!)

- But the much stronger focus on WFD delivery for 2027 should challenge RB managers in determining if measures will deliver – will they be effective? Cost questions are then readily linked.

- But good cost-effectiveness analysis is a good communication tool and can be powerful if alternative measures affect different sectors

Cost-effectiveness: Sweden

- For SWB failing due to nutrients:
  - 15 measures identified and assessed
  - Selection of cost-effective measures considering downstream effects of each measure



1. Adapted bufferstrips
2. Phosphorus pond
3. Structural liming
4. Wetlands
5. Adapted spreading of manour
6. Limed ditches
7. Segmented ditches
8. Bufferstrips (0-2m)
9. Increased P-retention in UWWTPs
10. Bufferstrips (2-6m)
11. Small sewages, adjusted to normal protection level
12. Small sewages, adjusted from normal to high protection level

Figure 5. Cumulative costs and reduction potential for 12 measures aimed at nutrient emission reduction in an example river basin. The 12 measures are applied in order of cost efficiency, starting with the lowest cost measure. The non-solid line indicates cumulative potential from all identified measures in the basin without correction for upstream effects (marginal affect). The solid line represents the reduction potential adjusted for marginal effects. The vertical red line indicates the reduction needed to achieve the environmental goals in all the waterbodies.

Payments for Ecosystem Services

- Unlike traditional subsidies, financed by taxpayers, PES are (in theory) financed **directly** and **voluntarily** by the **beneficiaries of the ecosystem services** PES help maintain.
- *Note that PES, under this definition, is arguably not a subsidy - as it is voluntary payment for a service.*
- *Where it becomes a public programme, then the question of (acceptable) subsidy depends on the level of the PES and the relationship to foregone income / service provided & level of environmental benefit (proportionality).*

PES 2021-27

- Challenges in implementation:
  - Defining the service to the beneficiary
  - Relating protection of the service to Good Status
  - Getting beneficiaries to pay for what they might expect to be free
  - Private PES arrangements link to specific service, rather than WFD outcome

- Opportunities:
  - Pressure to apply measures in 3rd RB planning period
  - Particular reluctance to oblige farmers – paying them is well established
  - How do stakeholders react to PPP? (is payment to stop something or to do something?)

Conclusions

- The economic analysis in implementing the WFD must be strengthened
- With stronger pressure to implement for 2027 several economic questions become more urgent
- As pressure mounts on measures, cost analysis will improve, so good analysis and presentation of benefit information is essential
- Who pays will also become more important – with questions on full cost recovery, PES, etc.
- Review of WATECO guidance is overdue! But any lengthy process to revise it will miss the 3rd RB planning preparation.

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