



Hydromorphology: ***What does it mean for the WFD?***

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for birds • for people • for ever

We know we've heard it all before but.....

The Purpose of the WFD

Article 1

- Prevent further deterioration, protect and enhance aquatic ecosystems and, with regard to their water needs, terrestrial ecosystems and wetlands
- Promote sustainable water use based on a long-term protection of water resources
- Contribute to the mitigation of the effects of floods & droughts.



WFD Article 4 – Environmental Objectives

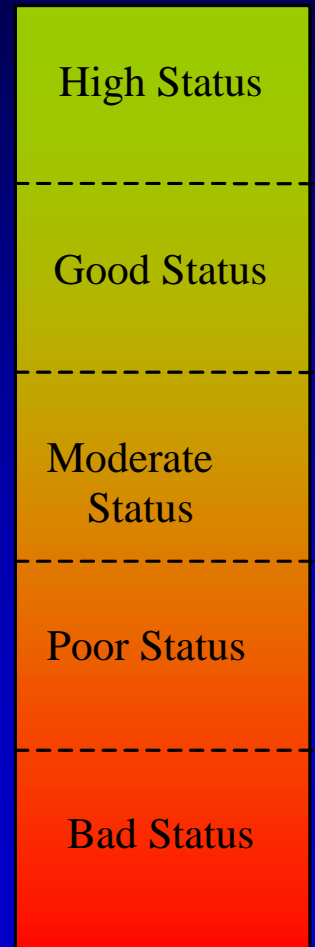
Member States shall:

“Implement the necessary measures to prevent deterioration of the status of all bodies of surface waters and protect, enhance and restore all bodies of surface water with the aim of achieving good surface water status”



Surface Water Status

- Defined as 1 of 5 categories from High to Bad
- Defined by poorer of chemical and ecological status.
- Ecological Status includes the elements of:
 - *hydromorphology,*
 - *biology.*
- Status is measured relative to undisturbed reference conditions.
 - *Defined by monitoring of pristine sites, modelling or expert judgement.*



Reference Conditions?



*Insh Marshes: RSPB
Reserve - Scotland*



*Tagliamento river (North-East
Italy), Natura 2000 site*

What is Good Status?

- **Good Ecological Status:**

"...the values of the biological quality elements for the surface water body type show low levels of distortion resulting from human activity, but deviate only slightly from those normally associated with the water body type under undisturbed conditions."

- **While morphological quality elements must be**

"consistent with the achievement of the values specified above for the biological quality elements."



Biological Quality Elements

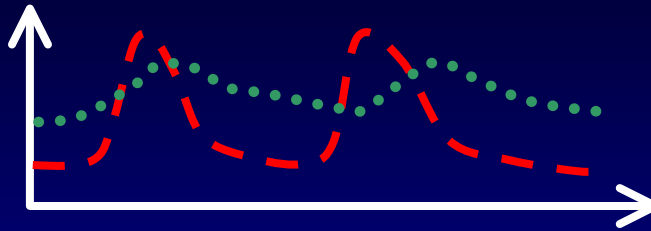
Coastal Waters	Transitional Waters	Rivers
Phytoplankton	Phytoplankton	Macrophytes
Macro-algae	Macro-algae	Phytobenthos
Angiosperms	Angiosperms	Phytoplankton
Benthic invertebrates	Benthic invertebrates	Macro invertebrates
	Fish	Fish

NB Fish are not included as coastal quality element for coastal waters

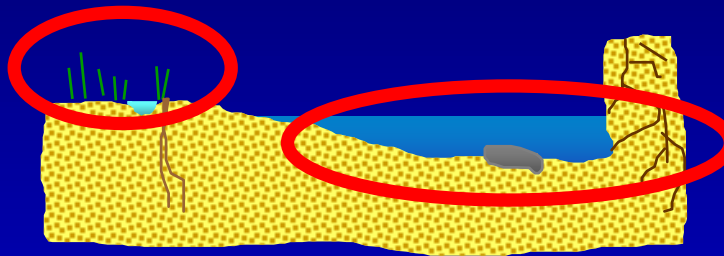


Hydromorphological elements: *Rivers*

Flow patterns

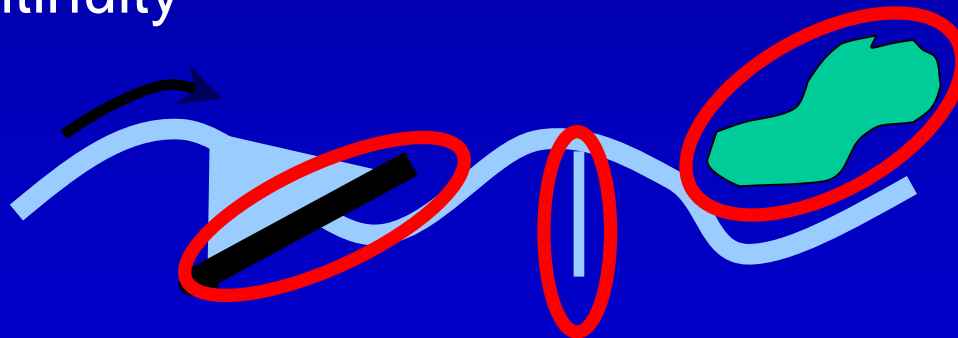


Structural complexity of riparian zone



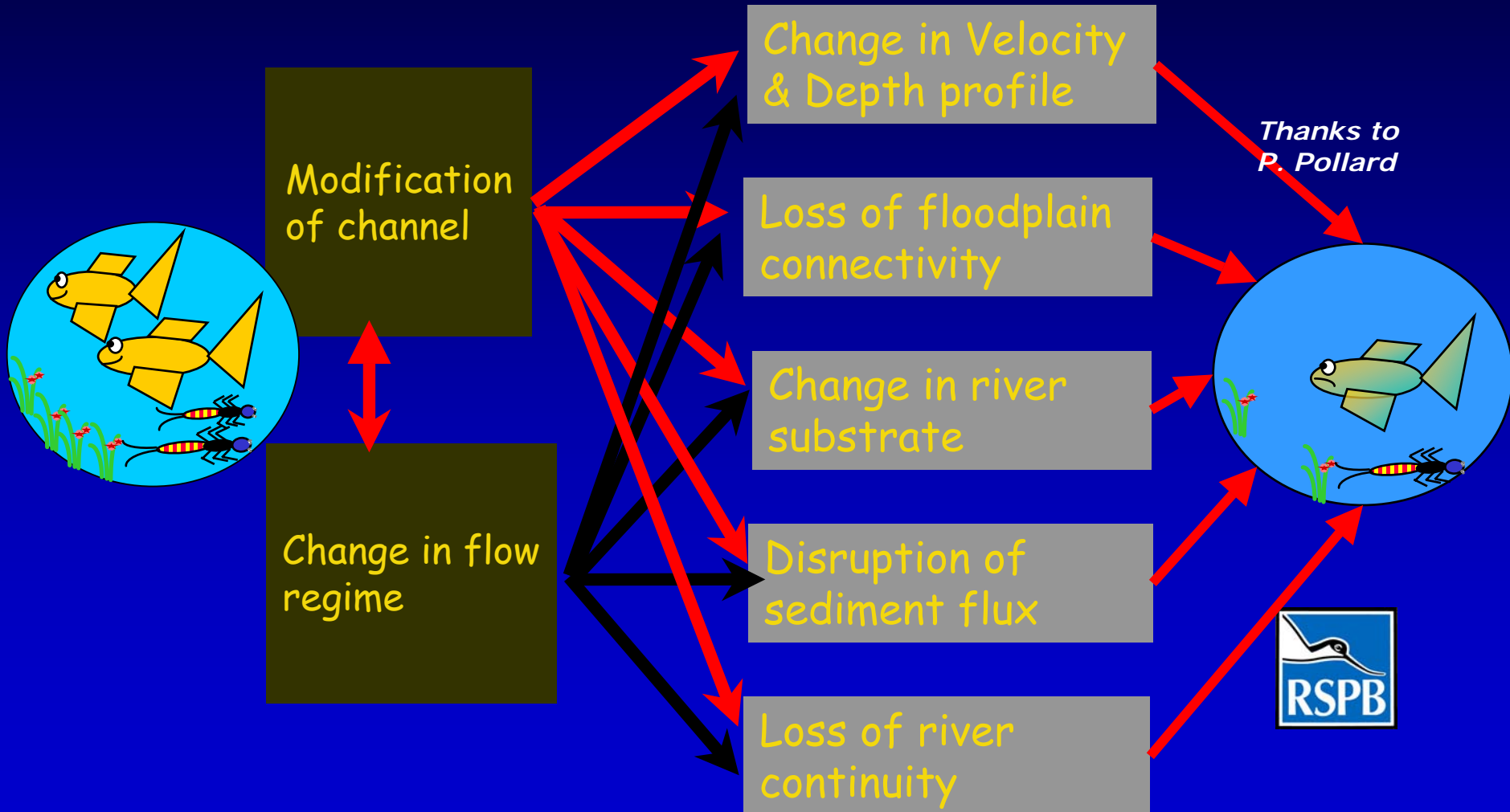
Channel morphology

River continuity



Ecologically significant features e.g. WETLANDS!

Generic impacts of Hydro-morphological change



Hydromorphological elements: *Coastal & Transitional Waters*

- Tidal Regime
- Depth Variation
- Substrate Composition
- Structure and Complexity

BUT

- WFD also creates direct link between status and inter-tidal habitat thorough use of angiosperm (flowering plant) community as a quality element.



Hydromorphological elements: *Coastal & Transitional Waters*

- Land claim for agriculture, development etc, directly linked to loss of angiosperm abundance and diversity.
- Sea level rise will cause deterioration in angiosperm community in front of sea defences even where no new development occurs.
- Damage of inter-tidal zone is linked to other elements defining status e.g. fish and water quality.



Hydromorphology & Good Status

“In reality, good ecological status is unlikely to be achieved where there are substantial changes to the flow and velocity of a river, the depth and residence time of a lake, or the tidal patterns of an estuary;”.

Wetland CIS Guidance



Article 4 Exemptions

- **Directive gives flexibility to change objectives, relax timescales of delivery**
 - 4.3 Artificial and heavily modified water bodies
 - 4.4 Time Extension
 - 4.5 Relaxation of objectives
 - 4.6 Unforeseen disasters
 - 4.7 Sustainable development and overriding public interest



4.3 Heavily Modified Water Bodies

Designation can be applied when Good Status would have adverse effects on range of activities:

- (i) Impacts on the wider environment*
- (ii) Navigation, including port facilities, or recreation;*
- (iii) Activities for the purposes of which water is stored;*
- (iv) Water regulation, flood protection, land drainage;*
- (v) Other equally important sustainable human development activities;*



4.3 Heavily Modified Water Bodies

- No a priori assumption that modification should remain.
- HMWB designation can only be applied where:

*“the **beneficial objectives** served by the artificial or modified water body cannot, for reasons of technical feasibility, or **disproportionate costs**, reasonably be achieved by other means, which are a **significantly better environmental option**”*



4.3 Heavily Modified Water Bodies

- **Beneficial objective:**
 - What about uneconomic defences?
 - Historic/abandoned structures with no cultural significance?
- **Disproportionate Cost:**
 - Not just when costs exceed benefits
 - Including assessment of qualitative benefits/costs
- **Significantly better environmental option**
 - Not “Good Status” just significantly better!



4.3 Heavily Modified Water Bodies

- **GEP becomes surrogate target for HMWBs**
- **Ecological potential judgement is made with reference to closest natural water body type**
- **Variation from natural status must be a function of the purpose of modification NOT poor management.**



4.5 Relaxation of Objectives

- To be used for existing modifications
- May be used where natural condition or human activity make reaching good status technically infeasible or disproportionately costly
- Must demonstrate environmental or socio-economic needs cannot be met by significantly better environmental option not entailing disproportionate costs



4.7 Sustainable Development & overriding public interest

- **Essentially exempting new development where:**

The reasons for modifications or alterations are of overriding interest and/or the benefits to environment and to society of achieving the environmental objectives are outweighed by the benefits of the new modification, maintenance of human safety or sustainable development.

- **Again test of disproportionate costs & feasibility**



Delivering change: The programme of measures

- POM's must include:

“...measures to ensure that the hydro-morphological conditions of the bodies of water are consistent with the achievement of the required ecological status”

- **Designed with reference to economic analysis to provide cost effective solutions.**
- **Must be in place by 2009, operational by 2012 and deliver outcomes by 2015!**



PoM's in England

- Environment Agency is competent authority AND has powers to regulate and carry out FD works
- Current flood defence powers & land drainage regulatory regime will not deliver.
- English Nature's powers with regard to SSSI's and Natura 2000 sites are too restricted in scope.
- IDBs, LA's & riparian landowners have, or share, responsibility for some water bodies.



Implications

- WFD will act as a constraint on new works in rivers, estuaries and on the coasts, defining acceptable range of morphological modification.
- It requires ecological appraisal of existing modifications and maintenance techniques.
- Presumption for restoration to Good Status
- Exemptions must pass strict tests, placing onus on planners/ developers to justify their actions.
- Alternative approaches must be explored.



Challenges

- **Develop**

