

## **Biodiversity and Water Directives integration in Italy**



Susanna D'Antoni, Laura Casella, Martina Bussettini

**ISPRA – Italian Institute for Environmental Protection and Research** Department for Monitoring and Protection of the Environment and for Biodiversity



## PROTECTION AND RESEARCH

ISPRA is a governmental research institute and a national EPA.

It is the central node of a regional EPA network.

It supports the MoE also for the implementation of environmental policies (e.g. WFD, FD, HBD, Biodiversity Strategy, protected areas)

- Methods to monitor and assess environmental matrices
- Reporting to EU
- Habitat mapping
- Guidance to integrated planning





## GUIDELINES TO INTEGRATE WFD AND HBD



- ✓ Indications for integration of RBMP with N2K/protected areas plans
- ✓ lists of water related species and habitats (Annex I, II HD & Annex I BD), selected by Wetland Horizontal Guidance – 2003, as a tool to identify protected areas /N2K sites to be included in the RBMP "registers" (WFD Annex VI) and identify where to implement the integrations
- Transcoding Aquatic Habitat description of different classification typology (*Nature* 2000 code, EUNIS, Corine Biotope) in order to facilitate links between the different cartography;
- ✓ indication of guide species, including the IBMR species (to link the monitoring data and activities)



Sinergie fra la Direttiva Quadro sulle Acque e le Direttive "Habitat" e "Uccelli" per la tutela degli ecosistemi acquatici con particolare riferimento alle Aree Protette, Siti Natura 2000 e Zone Ramsar. Aspetti relativi alla Pianificazione

Con liste di specie e schede degli habitat Natura 2000 legati agli ambienti acquatici



Technical Report n. 107/2010

## WETLANDS PROTECTION GUIDELINES



Tools and Indications for:

- Threats Analysis to water related species and habitat from basin to site scale, using also pressures analysis data from RBMP, in order to define <u>Threats prioritization</u> according to Salafsky et al., 2003 (IUCN) for the Mesures prioritization at appropriate scale
- Integration of conservation measures defined at site scale with RBMP protection measures (also for group/guild) of habitat & species, green infrastructures and ecosystem services conservation
- Integration of WFD-HBD-BD monitoring activities and data . on Habitat and macrophytes, Fish





APPORTI

Contributi per la tutela della biodiversità delle zone umide



Technical Report n. 153/2011



The Italian Ministry of Environment proposed to competent Authorities guidelines for the identification of additional objectives in the River Basin Management Plans in order to reach a Favorable Conservation Status for habitat and species that need more restrictive standards for ecological, chemical or hydromorfological elements to those of «Good» ecological status of river bodies (according to art. 4.1.c WFD).

#### Through:

- Identification of N2K/protected areas of the RBD where water related Species and Habitat are present (ISPRA reports 107/2010 and 153/2011)
- Assessment of Conservation STATUS of these species and habitats (ISPRA reports 194/2014 and 219/2015) with particular attention to priority habitat and species (\*)
- Assessment of the Ecological and Chemical status of water bodies in the sites N2K/AP
- Assessment of the Pressures and Impacts on Ecological Status of water bodies that can threat the Conservation Status of species and habitats (IUCN threat Analysis – cap. 6 ISPRA report 153/2011)
- Definition of Additional objectives for water bodies in order to reach the Favourable Conservation Status of water related species and habitats

https://www.minambiente.it/pagina/linee-guida-lindicazione-di-obiettivi-specifici-i-corpiidrici-ricadenti-nelle-aree-protette



Example of integration of conservation values of species and habitats and ecological status of water bodies in **the Basin District of the Eastern Alps** 

		Degree of Conservation status habitat or species				
		Favorable	unfavorable	Unknow		
Ecological status water body	High					
	Good					
	Less than good					
	unknow					

**blue** = unnecessary evaluation of stricter objectives, **green** = necessary evaluation of the **more restrictive** objectives, **violet** = suspended evaluation of the objectives



National handbook for habitat monitoring activities at site level (2015)

- ✓ On request of the Italian MoE
- $\checkmark$  with the support of national scientific societies and
- ✓ With the review of Regions

124 monitoring forms: 21 Coastal Areas, <u>15</u>
<u>Freshwater</u>, 16 Scrub, 15 Grasslands and Pastures, 8 Mires, 10 Rocky habitats, 39 Forests

Critical issues examined:

- the selection of appropriate methods for the parameters to be used in the Report (Area & Structure and Function);
- the concept of " typical species";
- standard methodological and sampling procedures for each habitat type (vegetation, substrate and water quality, etc.).



http://www.isprambiente.gov.it/it/pubblicazioni/manuali-e-linee-guida/manuali-per-il-monitoraggio-dispecie-e-habitat-di-interesse-comunitario-direttiva-92-43-cee-in-italia-habitat



### Freshwater habitats of Italy - III Report

Code	Name
3110	Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)
3120	Oligotrophic waters containing very few minerals generally on sandy soils of the West Mediterranean with Isoetes spp.
3130	Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or IsoetoNanojuncetea
3140	Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.
3150	Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation
3160	Natural dystrophic lakes and ponds
3170	* Mediterranean temporary ponds
3220	Alpine rivers and the herbaceous vegetation along their banks
3230	Alpine rivers and their ligneous vegetation with Myricaria germanica
3240	Alpine rivers and their ligneous vegetation with Salix elaeagnos
3250	Constantly flowing Mediterranean rivers with Glaucium flavum
3260	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation
3270	Rivers with muddy banks with Chenopodion rubri p.p. and Bidention p.p. vegetation
3280	Constantly flowing Mediterranean rivers with PaspaloAgrostidion species and hanging curtains of Salix and Populus alba
3290	Intermittently flowing Mediterranean rivers of the Paspalo-Agrostidion



## HABITAT MONITORING ART 17 HABITATS DIRECTIVE

Habitat type	Vegetation analysis	Chemical- physical quality of water and sediments.	Hydro- morphological parameters.	Others parameters of biological water quality.
3140 Hard oligo- mesotrophic waters with benthic vegetation of Chara spp. CS III Report - Unfavourable inadequate ALP CON MED U1 (=) U1 (=) FV	Vegetation survey with percentage cover values in plot <b>of 4sqm</b> . To take into account the zonation <b>transects</b> are recommended in deep lakes, and single <b>plots</b> in lakes of low depth (depth average ≤ 15 m) and in other types of water bodies. The evaluation must be performed by analyzing the distance from the reference conditions (Azzella 2014)	It is recommended to Include the standardized indicators required by the legislation for water bodies monitoring under the WFD.	It is recommended to Include the standardized indicators required by the legislation for water bodies monitoring under the Water Framework Directive. (IARI; IQM for rivers;SA/LHMS for lakes )	It is recommended to include standardized biological quality indicators under WFD and the parameters that can be derived from the analysis of the species of Annex II and IV. (e.g. MacroIMMI; Lake Fish Index; Bolpagni, 2013)



## HABITAT MONITORING ART 17 HABITATS DIRECTIVE

Habitat type	Vegetation analysis		Chemical- physical quality of water and sediments.	mo pa	Hydro- orphological arameters.	Others parameters of biological water quality.	
Habitat type	Vegetation analysis		Water analysis	11.1.	Recon	nmendations	tors
3130 Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto- Nanojuncetea CS III Report- Unfavourable bad ALP CON MED U2 (x) U2 (-) XX	Vegetation survey with attribution of cover values (Braun-Blanquet scale or coverage percentage) in sampling areas of variable size, up to a maximum of <b>1sqm</b> (Bagella et al., 2010) identified with a <b>random stratified criterion</b> . In the case of small surfaces that cannot be mapped as polygons the occupied area is indicated as an attribute to the point in the table associated with the vector file.	St as sta bc or pr ar th th (R et m ph wa co ox pa pe	andards for WFD comp sessment of water bod atus in the case of sma ater and temporary wa odies are either not exi r not intercalibrated. The redictive ecological mo re in general different d the different trophic pote that characterizes them cossaro et al., 2006; Ser c al., 2015). It is advisab easure the main chemi hysical parameters of the ater (temperature, pH, onductivity, dissolved kygen) with a multi- arameter probe during the eriod of maximum flood	liant ly ll ter <b>stant</b> ne dels ue to ential rano le to cal- ne the ding.	Optimal sampli and spring-sum Minimum num variable in relat at least 5 samp water body (Ba Experienced sta per day / man, added work / p determination a the number of the accessibility distance. The ti sampling and th exceed 3 years, WFD frequencies macrophytes. T repeated within order to evalua modifications.	ng period: late winter imer (2 sampling). ber of sampling areas, tion to the dimensions: ling areas for each gella et al., 2009). aff sample up to 5 plots to which 1-2 days are erson for sample and data processing; days can vary based on y of the sites and their me interval between he other should not even according to the es for monitoring the surveys must be in the same areas in te the occurring	is II Fish



#### **POINTS OF STRENGTHS:**

- Better knowledge about functionality and trend of aquatic ecosystems
- Better identification of **right scale to define conservation measures** for water related habitat and species
- Reduction of monitoring and management costs
- Implementation of adaptative management (sensu CBD) of protected areas (as recommended by IUCN)

#### **POINTS OF WEAKNESS:**

- Lack of knowledge and awareness on the importance of ecosystem based management and planning
- **poor cooperation between public bodies and sectors** that deal with the conservation of biodiversity and water
- **Higher short term costs** (that decline to medium-long term also due to maintenance of ecosystem services )
- **Poor knowledge on ecological requirements of water related habitat & species** in terms of **parameters of the WFD Indicators/Index** of chemical, hydromorphological and ecological **Quality Element**
- different reference scale for assessing the ecological status of water bodies and the conservation status of species and habitats



The actual challenge in RBM lies in the integration of conflicting objectives in an anthropized context: e.g. quality (WFD), habitat/biodiversity conservation (HBD) safety (FD), energy production (RES)



Reduction of spatio/temporal availability of habitat

To evaluate and prioritize optimal measures, we need methods and tools able to understand how a river system works, how it reacts to pressures at the different spatial and temporal scales : *hydromorphological process based method*.





Morphological Dynamics (MDI, EDC) River morphodynamic corridors (MC, EMC)

It is a comprehensive methodological framework (IDRAIM) to support integrated management of rivers, to achieve WFD, FD and other objectives

It includes a set of tools for characterization, monitoring and assessment of river conditions.



MQI: WFD Hydromorphological quality assessment



#### Geomorphic units Survey



Habitat integrity: mesohabitat modeling also for e-flows specification



- Hydromorphological quality of rivers affects the distribution of widely ranging species (e.g. otters)
- The presence of such species can be predicted by the river hymo quality and its adjustments over the last decades.

MQI used to characterize <u>otter</u> habitat in terms of river dynamics, mechanisms, and physical structures



Significant relationship between MQI and the probability of the presence of otters



(Scorpio et al., RRA 2014),



- ✓ WFD river status bioindicators are not particularly sensitive to hymo degradation (e.g. Friberg, 2014) and are usually applied only to flowing channels (not to the river corridor).
- ✓ Odonates are optimal bioindicators for the ecological integrity of the river corridor, since this taxon provides information on the conditions of their aquatic breeding sites, as well as on the surrounding terrestrial areas, due to its amphibiotic life cycle. → Odonate River Index (Golfieri et al, 2016)



Significant relationship between MQI and ORI

Evident better performance of ORI compared to WFD indeces in detecting hymo pressures (Golfieri et al, 2018) Physical habitats conditions directly influenced by reach and catchment controls: survey procedures to be cross-scalar and geomorphologically meaningful. → Geomorphic Unit Survey (Belletti et al; 2015; 2017)

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Developing a suite of tools to map river habitat and assess river hymo features. The approach integrates low-cost drone acquisitions and satellite data from the EU Copernicus programme (i.e. *Sentinel* 1,2).



Optimization of costs by integration of RS based and traditional monitoring (e.g. WFD, HBD)







# Thanks for your attention!

susanna.dantoni@isprambiente.it laura.casella@isprambiente.it martina.bussettini@isprambiente.it

ISPRA Technical Reports and Guidelines <u>http://www.isprambiente.gov.it/en/publications</u>

ISPRA Hydromorphological tools <u>http://www.isprambiente.gov.it/pre\_meteo/idro/idro.html</u>