Regione Emilia-Romagna

Assessorato Ambiente e Sviluppo Sostenibile

Strategic contents of policies in the Water Protection Plan of Emilia-Romagna Region

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INTRODUCTION

The Water Protection Plan (PTA in Italian) is the tool which has been designed in order to reach the objectives of environmental quality for internal and coastal waters in the Region, and to assure a sustainable water supply in the long run, in compliance with legislative decree (Dlgs) 152/99 and European Directive 2000/60/EC.

The Regional Council approved the PTA's preliminary Document with act n. 2239 of 10 November 2003, after a preparation work carried out together with the Provinces, basin Authorities and ARPA's technical and scientific support, as well as experts and specialists in several sectors (University), and the co-ordination by the Service for the Protection and Improvement of Water resources of the Department of Environment and Sustainable Development, with the participation of other Departments. Subsequently, in compliance with L.R. (Regional Law) 20/2000, Provinces have initiated the Planning Conferences, where territorial Authorities are called upon to participate, together with economic and social associations, in the exploration of the contextual framework, the preliminary assessment of outlined objectives and choices. The rounds of discussions at regional level, never used before for other water management and planning tools, and intended to activate processes and negotiations envisaged by the European Directive, have led to the drafting of a series of observations, partially adopted by the Council, which proposed to the Assembly a widely amended bill, enacted on December 22nd, 2004 with DCR (Regional Assembly Deliberation) n. 633.

After its enactment, the decree entered its presentation phase (art. 25, L.R. 20/2000) to Municipalities, Provinces and Mountain Communities, for sixty days from the date of approval, in order to collect further remarks coming from public authorities and bodies, economic and social associations, and individual citizens interested in the direct effects of the plan. At the same time, the adopted PTA was sent to the Basin Authorities for their binding opinion, as envisaged by art. 44 of Dlgs 152/99.

The PTA was finally enacted with deliberation n. 40 of legislative Assembly on December 21st, 2005 (BUR n. 14 of 1st February 2006 for the notice of enactment and BUR n. 20 of 13 February 2006 for the publication of Assembly deliberation with enclosed Regulations).

The PTA also envisages a knowledge-based phase with a relevant methodological effort and significant data and information collection. River basins and pressures (pollutant loads due to discharge, water drawing, etc.) on significant bodies of water with specific destination, by assessing their individual quality status (classification/conformity), have been analyzed on the basis of the 2001-2002 monitoring, in order to measure the real deviation of the environmental status from the expected objectives, to be reached statutorily by 2008 and 2016.
On the basis of statutory measures, according to the law and the European directive (compliance with the minimum vital outflow, conveyance and strengthening of water treatment, waste water sanitization in coastal areas, containment of animal manure in

soil, etc.) mathematic modeling has been performed on river, ground and coastal water, in order to assess attainable improvements.
As for quantitative aspects, the strategic approach of the plan has seen the presence of traditional infrastructural policies together with policies for resource conservation and demand management.

As for water courses which, according to 2008 and 2016 simulations, do not reach their objectives, the PTA prescribes that involved Provinces should take into consideration some identified “supplementary” measures (drops in nutrients counts in treatment plants’ outflow, setting up of additional first-rain tanks, plant-purification treatment, river bed re-naturalization and buffer zones, etc.) and choose the best combination with the support of a cost-effectiveness analysis.

The quality objectives for ground water are represented by the pursuance of a ‘good’ Environmental Status at 2016.
The assessment of the pursuance of the environmental quality objective on the individual measurement/gauge point, on which the classification has been performed, needs to be reviewed at local level, with thorough analyses carried out by Provinces during the drafting of their PTCP (provincial coordination territorial plan) or with a special PTCP abridgement plan for the water sector.

In brief, the PTA represents the knowledge-based framework, from which the definition of rules has been drawn *(ex ante)* for the application of flexible approaches, and at the same time an integrated assessment of actions and their effects on different ecosystems and production milieus (mitigation of conflicts for the use of water resources).
As the PTA is a dynamic tool, there is a need for a constant monitoring and assessment of effects and spin-offs of management policies and actions (review programme for PTA effectiveness), which could enable to adjust management modes of the water cycle and changing scenarios, in view of the attainment of targets or the identification of difficulties or critical issues.

1. ‘WATER POLICIES’: REFERENCE PRINCIPLES, OBJECTIVES AND TOOLS

Law. 36/94 (art.1) establishes the following:

1. *All surface water and ground water, although not abstracted, is a resources which is preserved and used with respect to solidarity criteria.*
2. *Any water use is intended, within the perspective of preserving expectations and rights of future generation to an undamaged environmental heritage.*
3. *Water use is intended within the perspective of resource saving and renewal, so as not to be detrimental to water resources, he livability of the environment, agriculture, water flora and fauna, geo-morphological processes and hydrological balances.*

The above-mentioned statements are part and parcel of a century-old (*public*) ‘water culture’, which has also permeated the legislative and regulatory tools on water resources, adopted in our country since the early 20th century (starting from the Royal Decree 523/1904), and introducing the notion of renewable environmental resources, which has been developed at international and EU level in the last decades.
Three main points are highlighted, which at the same time have the value of ‘statements of principle’ and ‘identification of objectives’: water is *public*; it is a *resource* to be used on the basis of solidarity criteria between communities and generations, and its protection means the permanence through time of environmental and anthropic processes (the latter statement in tune with Law 183/89 establishing among its aims in art.1, *soil defense, water improvement and remediation, use and management of water resources for a rational economic and social development, the protection of related environmental aspects*, by linking environmental protection to economic and social development).

In this wide-scoped framework, water management policies– a renewable resource only within specific utilization time and modes – should not cover only the regulations of a given body of water, in its stricter meaning, but should necessarily involve different actions having an effect on water resources. The sectors of land use and town planning, agricultural economy, industrial activity, public and private consumption, must organize their autonomous choices, by enclosing in their action lines the encompassing objective – for a synergic and common action – of the conservation of water resources: *Further integration of protection and sustainable management of water into other Community policy areas such as energy, transport, agriculture, fisheries, regional policy and tourism is necessary*. (Directive 2000/60/EC).

The measure of Dlgs 152/99 should be seen within this perspective (for the implementation of Directives 91/271/EEC and 91/671/EEC, also incorporating the action lines of Directive 2000/60/EC at the time in its drafting stage[1]), with a specific goal: reaching clear ‘quality objectives’ for water bodies in 2008 and 2016, to be pursued and maintained through a series of complementary actions and measures

[1] In a later date, after the passing of PTA, the Dlgs 152/99 was incorporated in Dlgs 152 of 3.4.2006 – *ENVIRONMENTAL REGULATIONS*

pertaining to diverse fields of action, and comprised within a specific plan, the Water Protection Plan (PTA), which falls within the area of competence of the Region, but is also an abridgement of the basin plan.
The objectives to be attained ('quality objectives') are the core of the measures; the rules to reach the required outcome (namely actions and provisions) are binding in so far as they are functional to goal fulfillment. For this reason PTA must comprise the *programme reviewing the effectiveness of envisaged actions*; the monitoring is necessary both as a tool upstream of the plan decisions, and as an ongoing review tool for the implementation process of the plan objectives (*for a timely detection of unexpected negative effects and the adoption of adequate…corrective measures* - Directive 2001/42/EC). If the monitoring (via suitable 'effect indicators'[2]) reports delays or inadequacies in the process of objective attainment, correctives or integrations should be envisaged (the plan should be reviewed), in order for the entirety of activated policies to assure the fulfillment of objectives. A plan of this kind is no longer (or no solely) a plan of regulations and procedures, but rather a plan of processes and results.

Actions and provisions envisaged by a plan of this kind, with the participation – both in its design phase and its implementation – of different activities sectors and several (public and private) stakeholders at social and economic levels, in order to be truly operative, should be defined and implemented, through a process of participation moving through different phases of sharing of information, networking of experiences and knowledge, choices, empowerment and accountability for behaviours and choices . The process is referred to by the Dlgs 152/99 (*Regions guarantee the wider information dissemination possible …. Regions should foster the active participation of all parties interested in the implementation of the present decree, in particular for the drafting, reviewing, and updating of the protection plans* – art.3), by Directive 2000/60/EC (*Member States shall encourage the active involvement of all interested parties in the implementation of this Directive, in particular in the production, review and updating of river basin management plans* – art.14), by Directive 2001/42/EC (*Authorities … and the public … should be provided in a timely fashion of an effective opportunity to express their opinion on a plan or programme proposal and on the environmental report accompanying them, before their adoption* … - art.6).
In Emilia-Romagna Region, the participation process has been institutionalized in the procedure for the designing and approval of regional plans (comprising also the PTA as sector plan), envisaged in art.25 of LR 20/2000: the regional Council drafts a preliminary projects which is sent to the regional Assembly, Provinces and Municipalities; the individual Provinces call for a planning conference, with the participation, alongside the Region, of Municipalities, Mountain Communities and other local authorities; at the closing of the planning conference, the Province expresses its remarks and proposals, and reports the observations coming from bodies participating in the conference and social and economic associations; the regional Assembly adopts a plan, proposed by the Council, which takes into consideration expressed remarks and proposals; then, follows the phase where public authorities and bodies, economic and social associations, and associations for the protection of general interests, individual citizens for whom the plans engenders direct effects, present their remarks, and finally the regional Assembly decide on the bases of these remarks and approves the plan. The same participation process should be repeated for every subsequent plan updating or variation, while dissemination of monitoring data at regular intervals should guarantee a constant information process.

[2] VALSAT: Chap. 4 – PTA control

In essence, therefore, water policies, as they are based on general principles (water, as a resource which all present and future communities are entitled to, should be preserved for the sake of the environment and human development), focus on strategies to be pursued in an integrated fashion in the different sectors of human activities, having an impact on water resources, in order for water bodies to be preserved or recover the environmental quality needed for their natural process, through a plan – the *Water Protection Plan* – linking strategies to the above-mentioned objective, and open to a progressive review and updating process, defined in its progression and implementation with the *active participation of all stakeholders.*

Within this reference outlook, the *Water Protection Plan* of Emilia-Romagna Region has been developed into a 'surveying' phase of the present status of regional water resources and related anthropic pressures, and in a 'project' phase, comprising the identification of *quality objectives* to be reached by 2008 and 2016 (according to measures of law and indication by Basin Authorities in their areas of competence) and the setting up of a *programme of measures* for the attainment of goals within the deadlines; the *programme of measures* is an action-planning tool for the attainment of target-objectives in 2016, within the framework of the more general strategy of the plan for water management, comprising the entirety of *qualitative and quantitative protection measures*.

2. THE PROCESS OF PTA DRAFTING AND IMPLEMENTATION IN THE REGIONAL CONTEXT

In the implementation of the procedures for the adoption of regional plans, as established by L.R. 20/2000, at first a *preliminary PTA document* has been drafted which, after the approval by the Council (10.11.2003), is conveyed to the regional Assembly, the Provinces and Municipalities. The Provinces have convened the planning conferences, through which the information and discussion were activated with local authorities, associations representing economic and social interests, and with environmentalist organizations, a process merging into an articulated framework of amending and integrative proposals, formally presented by individual Provinces. Planning conferences took place in a period of 4 months (December 2003 - March 2004) with a relevant number of meetings (6 for the Province of Piacenza, 8 for the Province of Parma, 4 for the Province of Reggio Emilia, 3 for the Province of Modena, 4 for the Province of Ferrara, 9 for the Province of Bologna, 5 for the Province of Ravenna, 5 for the Province of Forlì-Cesena, 3 for the Province of Rimini, 1 for the Provinces Ferrara, Ravenna, Forlì-Cesena, Rimini in a joint meeting to examine issues linked to the Adriatic sea).
The great majority of amendment and integration proposals for the preliminary project have merged into the final draft of the Water Protection Plan, adopted by the regional Assembly on 22.12.2004 (and registered as indicated).
In the publication phase, 25 remarks were presented, comprising the binding opinions of the 4 involved Basin Authorities (Basin Authority of Po River, Basin Authority of Reno River, Regional Basins Authority of Romagna, Basin Authority of Marecchia-Conca). Following the examination by the regional Council (deliberation n. 1878 of 21.11.2005) remarks and amendments following the partial reception of presented

proposals, the Protection Plan was approved by Assembly deliberation n. 40 of 21.12.2005.

The denomination of some identified areas, or even the protection measures in specific instances, must be reviewed on a regular basis, which entails a statutory process of reviews, changes or integrations; with the addition of amendments which will be needed, following investigations or the outcome of monitoring exercises for the assessment of plan effectiveness. The amendments will be approved by the Region with the same procedure followed for PTA design, in the case of significant modifications in the plan strategy, while they will be approved by provisions of the regional Assembly, in the case of amendments derived from investigations; amendments linked to investigations carried out by the Provinces will be approved by Provincial Assemblies with the procedure of art.27 of L.R. 20/2000 (planning conference with the participation of the Region, adjacent Provinces, Municipalities, mountain Communities and the managing bodies of natural reserves areas) and be incorporated into the modified PTA.

According to the legislative decree of 3 April 2006 n. 152 (art.121 – *water protection plan*, paragraph 5), the plan should be updated every 6 years (like to Directive 2000/60/EC envisaging that the 'managing plans for river basins' should be *reviewed* every 6 years). PTA updating should comprise all contents required for PTA design, and also: the summary of all partial reviews and additional measures which have been adopted; the results of implemented monitoring exercises, and assessments concerning missed targets, if any.

Once approved, the PTA entails the statutory adjustment of general and sector plans within 12 months, as indicated in the regional legislation.
In particular, for PTCP, the *adjustment* entails the indication – with respect to water for human consumption – of perimeter data and measures concerning the recharge areas of ground water in the foothill-plain, and protection areas of surface water. As clearly stated in the PTA, the PTCPs should identify in later phases the recharge areas of groundwater in the hill-mountain areas, the natural resurfacing of aquifers and reserve areas, according to the methodology indicated in PTA, as well as the areas of absolute protection and precautionary areas for abstraction points of water intended for human consumption, according to the methodology indicated in the specific regional directive. The identification of these areas is the *compliance* assigned to PTCP for the perfecting of PTA.

In the apportionment of competences and function, L.R. 3/99 (*reform of the regional and local system*) assigns to PTCP a significant role in the field of water protection, as it is comprised (art.113) with the 'planning tools for the protection and use of water resources', together with the basin plan and the regional plan for water protection, with the task of outlining the quality objectives of water bodies (*in compliance with the minimum objectives established by the State*) and identifying needed actions for the *attainment of objectives and provisions established by regional planning for the use and protection of water bodies* (art.115); also, the Province is competent for the *detection of qualitative and quantitative features of water bodies, via the regional*

Agency for prevention and the environment (ARPA) (art.111). Thus, the PTA, which has led to the classification of water bodies, the outlining of environmental quality objectives and the programme of measures for their implementation, envisages that the above measures are in force until the adoption by Provinces of a specific provision on the matter. Provinces should therefore proceed with the thorough analysis and updating of data and any amendment or integration of measure programme, through analysis methodologies used by the PTA and in compliance with quality goals and the water balance, established in the PTA. The PTCPs (or abridged elements of PTCP) thus laid out, will be approved via the procedure envisaged in art.27 of L.R. 20/2000, and will become the perfecting of PTA.

Therefore PTA drafting and perfecting would see the joint contribution by the Region and Provinces, in compliance with their respective competences, as established by L.R. 3/99.

3. CONTENTS OF THE PTA OF EMILIA-ROMAGNA REGION [3]: COGNITIVE FRAMEWORK, OBJECTIVES, MEASURES

3.1 COGNITIVE FRAMEWORK

The **cognitive framework** is the basic element and needed starting point for the definition of the plan choices, and it represents the status[4] of *regional surface and ground water bodies, defined as 'significant' or 'of interest'* or *for a specific function*, and pressures [5] they are subject to.

26 surface water bodies have been identified as 'significant', besides the Po river: 21 natural water courses (of which 10 are Po tributaries) and 5 canals; 5 reservoirs (fig.1); 8 areas with transitional water along the coastal zone in the provinces of Ferrara and Ravenna (fig.2); coastal sea water for the entire area between Goro and Cattolica, placed within the coast and 3 km at sea (fig.3).

[3] The PTA is composed of the following:
1. General Report comprising the cognitive framework
2. Assessment of Environmental and territorial sustainability (VALSAT)
3. Regulations
4. Table 1 – protection area of groundwater in the foothill-plain: recharge areas – scale: 1:250.000.

[4] General Report:
Chap. 1.1 General description of the features of river basins
Chap. 1.4 Map of monitoring networks of significant bodies of water and related classification
Chap. 1.5 Identification of water bodies with specific destination

[5] General Report:
Chap. 1.2 Summary of significant pressures and impacts on anthropic activity on the state of surface and ground water

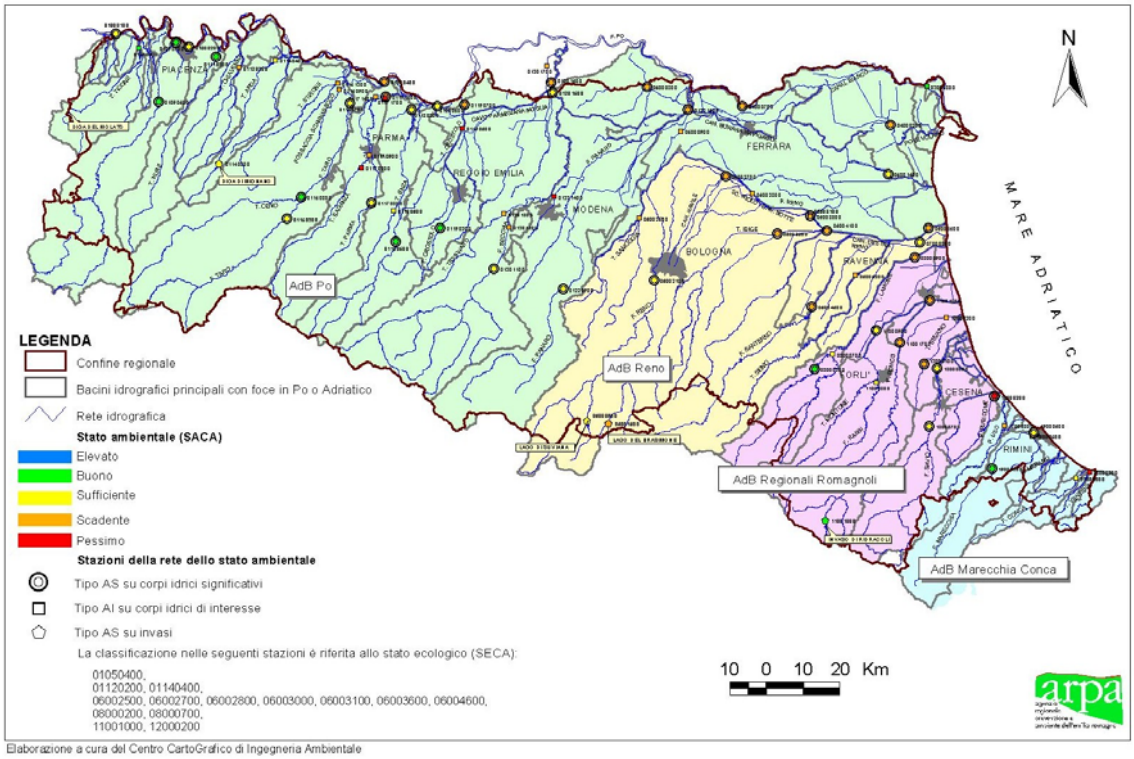

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Fig 1 – significant bodies of surface water

The grid of significant bodies of surface water (21 natural water courses, besides the Po river, and 5 artificial canals) is distributed in the fours basins covering the regional territory: Po river basin, Reno river basin, regional basins of Romagna, Marecchia-Conca basin.

There are 5 artificial reservoirs: the dam of Molato and the dam of Mignano (BA of Po River), lake of Suviana and lake of Brasimone (Reno BAI), reservoir of Ridracoli (BA regional Basins of Romagna).

The figure shows the *environmental status* of type-A stations (2001-2002).

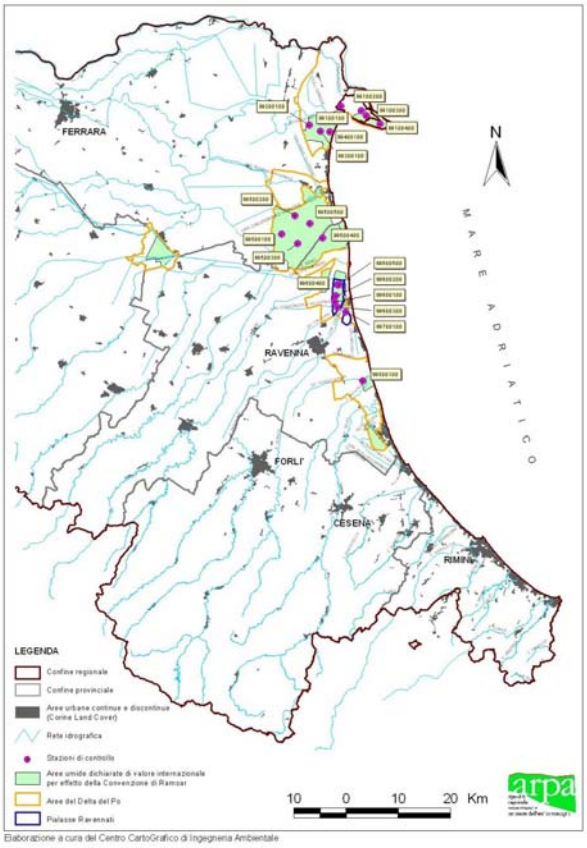
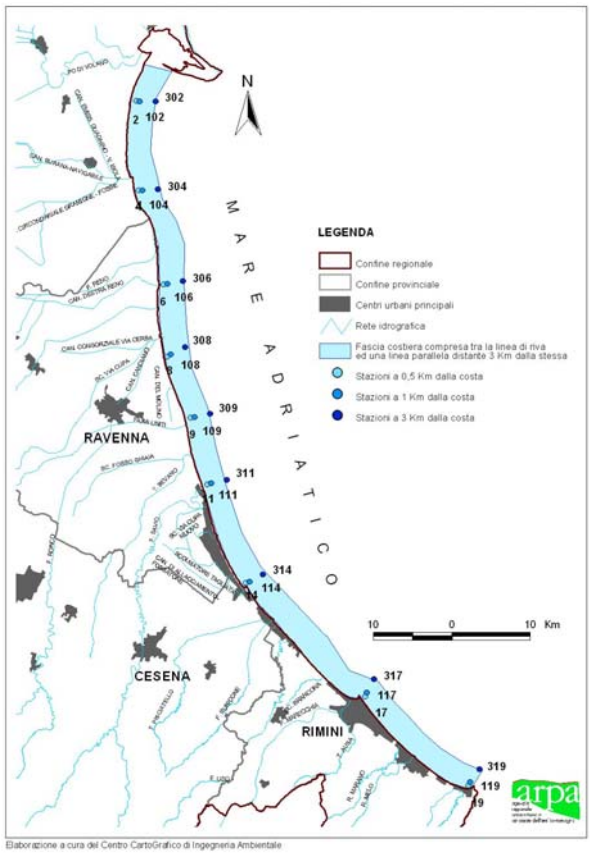


Fig 2 – transitional waters
The areas with transitional water are composed of: *wet lands of international value in compliance with the Ramsar* Convention (green background), *areas of the Po delta* (yellow perimeter), *Pialasse Ravennati* (blu perimeter).
The figure shows the map of control stations (red dots with related code).

Fig 3 – coastal sea waters
Coastal sea waters are comprised within the coastal zone (between Goro and Cattolica) laying between the shoreline and the parallel line at 3 km from the shore.
The figure shows the map of the control stations, placed at 0.5 – 1 – 3 km from the coast (numbered dots).



The environmental status (SACA)[6] of natural and artificial water courses (fig.1) is generally 'good' in the Apennine areas, while in the stretches laying at the north of via Emilia it is usually 'poor' or even 'very bad' (due to the entity of abstractions, number of point discharges, and the presence of diffuse discharges of agricultural and husbandry origin).
The water quality of the 5 artificial reservoirs shows a 'moderate' environmental status for the Dam of Mignano and the lake of Suviana, 'poor' for lake Brasimone, while a classification has not been possible for the Dam of Molato (due to the outflowing) and for the reservoir of Ridracoli as additional parameters were not indicated.

The condition of transitional waters[7] both in the provinces of Ferrara and Ravenna may be deemed 'good'.

The entire costal zone, which is influenced for ca 90% by Po input, and is classified according to the TRIX index[8], is comprised in a 'moderate' status, where water is characterized by poor transparency, hypoxias, anomalous colouring and occasional anoxia in benthonic waters, impairment at the level of benthonic ecosystem.

Some surface water bodies have been chosen and monitored for the specific functional destination attributed to them: surface fresh waters for the production of drinking water; water for bathing, fresh waters requiring protection and improvement to support fish life (fig.4), water for shellfish life (fig.5).

[6] The classification methodology, and the classification, of surface water bodies are described at point 1.4.1.2 of the general Report
[7] Results and remarks concerning transitional waters are indicated in point 1.4.2.1 of general Report
[8] Remarks concerning the classification of coastal sea waters are indicated in point 1.4.3 of general Report

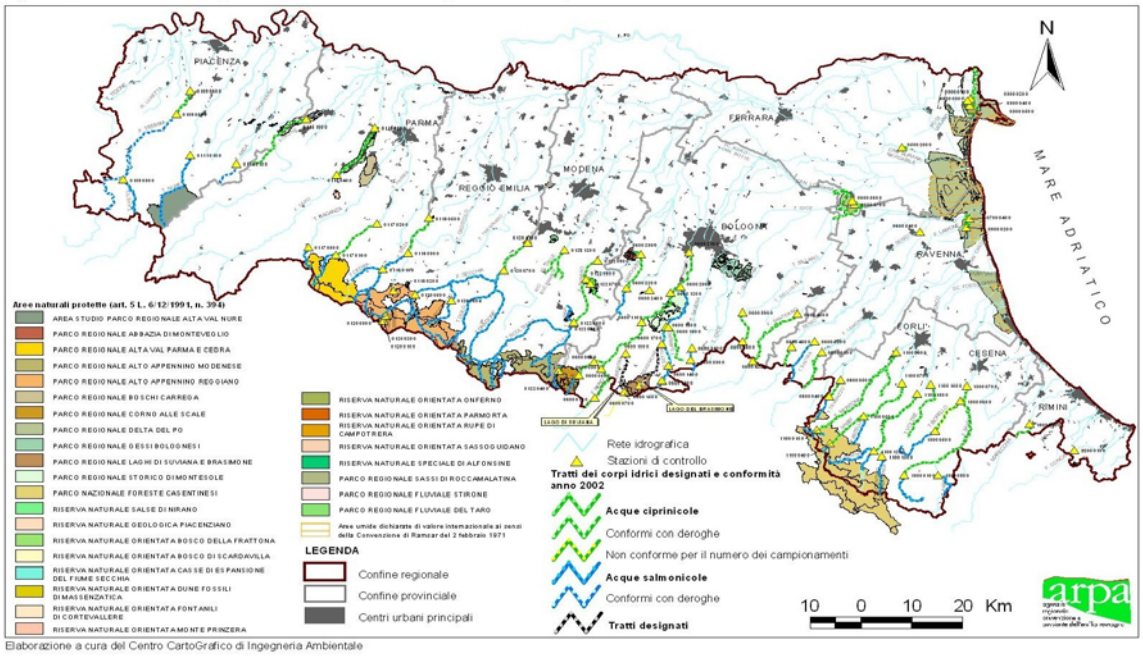


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Fig.4 – surface fresh waters suitable for fish life – protected natural areas
The system is composed of water bodies considered suitable for the life of salmonoids (blue lines; the dotted lines are the ones considered *compliant with derogation* at 2002) and cyprinoids (green lines; the dotted lines are the ones found *compliant with derogation, or non compliant for the number of samples* at 2002). The figure also shows natural protected areas (natural reserves, parks, sites of Community importance SCI, zones of special protection ZSP), for which the system of surface fresh waters suitable for fish life is shown to be relevant.

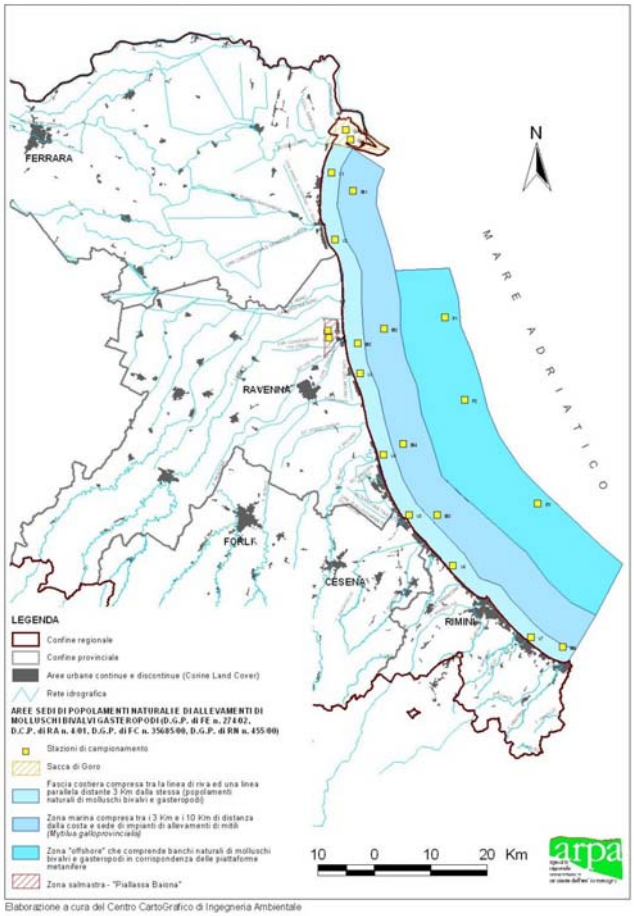

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Fig.5 – water for shellfish life
The following have been identified as waters suitable for shellfish life (sites for natural stock and breeding beds of bivalve and gastropod mollusks): Sacca di Goro (yellow dotted line); the coastal zone comprise between the shoreline and the parallel line at 3 km (natural stock of bivalve and gastropod mollusks); the marine area comprise between 3 km and 10 km of distance from the coast, with breeding beds for mussels; the "offshore" zone with natural beds of bivalve and gastropod mollusks, at the level of natural gas platforms; the brackish water zone "Piallassa baiona" (red dotted line).
The figure shows the sampling stations (yellow squares).

Ground water bodies[9] which are defined as 'significant', although with diverse hierarchical importance, have been subdivided into: Apennine alluvial fans (major, intermediate, minors, foothill) falling within the foothill zone crossing the entire region in the east-west direction; the Apennine alluvial plain, alluvial and Po delta (fig.6). Their environmental status has been defined on the basis of quantitative (indicating the impact of groundwater abstractions) and qualitative data (showing the impact of agricultural practices requiring the spreading of animal manure and nitrogen-based fertilizers, and percolations of domestic waste water) resulting 'moderate' or 'poor' in many areas of the foothill zone for anthropic impacts, and 'particular natural' (poor for natural causes) for large part of the Apennine and Po alluvial plain (fig.6).

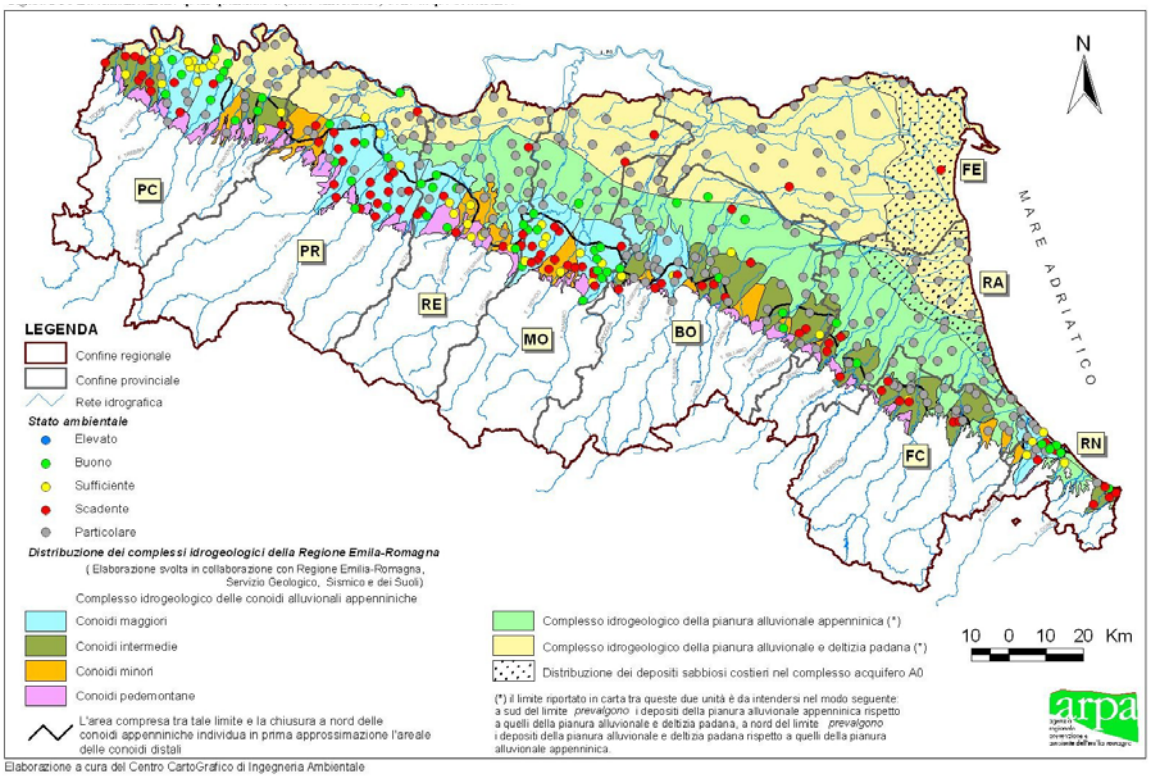


Fig. 6 – ground water bodies
The hydro-geological systems of Emilia-Romagna Region comprise:

- the hydro-geological system of Apennine alluvial fans: major (light blue), intermediate (dark green), minor (orange), foothill (pink) fans;
- the hydro-geological system of Apennine alluvial plain (light green);
- the hydro-geological system of the alluvial and Po delta plain (yellow).

The figure shows the map display of the quali-quantitative classification (environmental status) performed on abstraction points (2002).

Pressures over water bodies are due to pollutant inflows, having an impact on the quality of water resources, and abstractions having an impact on the quantity. As regards *pollutants*[10], analyses have reported that every year the following are discharged from point sources (treatment plants, untreated sewerages, flood overflow, industrial emissions) into the different basins of the region: 28.264 t of BOD_5, 12.824 t

[9] The classification methodology, and classification, of round waters are indicated in 1.4.4 of general Report
[10] General Report: point 1.2.2.3 (tables summarising, for each main basin, data relating to discharges on a surface water body from the different analysed types of discharge, either point and diffuse)

of Nitrogen and 2.490 t of Phosphorous, while from diffuse sources (mainly of agricultural and husbandry origin) 18.620 t of BOD_5, 18.222 t of Nitrogen and 1.721 t of Phosphorous are discharged.

Water abstractions[11] amount to 2.131 Mm^3 per year (of which 1.427 to users: 26% household use, 58% for irrigation, 16% industrial use), composed of ground water drawing (681 Mm^3 entailing 24,4 Mm^3 of annual deficit of ground water, with a relevant impact on the subsidence phenomenon in the Po valley), and also of abstraction of surface waters (1.450 Mm^3); of the latter, Po abstractions, supplying a large irrigation area (fig.7) do not present criticalities, while abstractions from Apennine waters report periodical criticalities linked to irrigation; on Apennine water courses the quantity of abstractions has an impact on their functionality and on the quality of involved ecosystems.

A relevant indicator to assess the availability of renewable water resource, with respect to abstractions – the *water exploitation index* (percentage ratio between water drawing and renewable water resources) – highlights the significant contribution of Po river: Emilia-Romagna region does not report an overall water stress (measured according to the parameters of the European Environmental Agency) only if Po river's inflows are considered; the historical value of the index is in fact equal to 23% (*exploited countries*) without the contribution of Po, while with the Po is equal to 5,1% (*non exploited countries*) [12].

[11] General Report: point 1.2.3.2 (tables summarising, for each province, data relating to abstractions of ground waters and quantitative criticalities, and data relating to drawing of surface waters and criticalities of Apennine water courses)
[12] VALSAT: Chap. 1.1.3 "Water exploitation index"

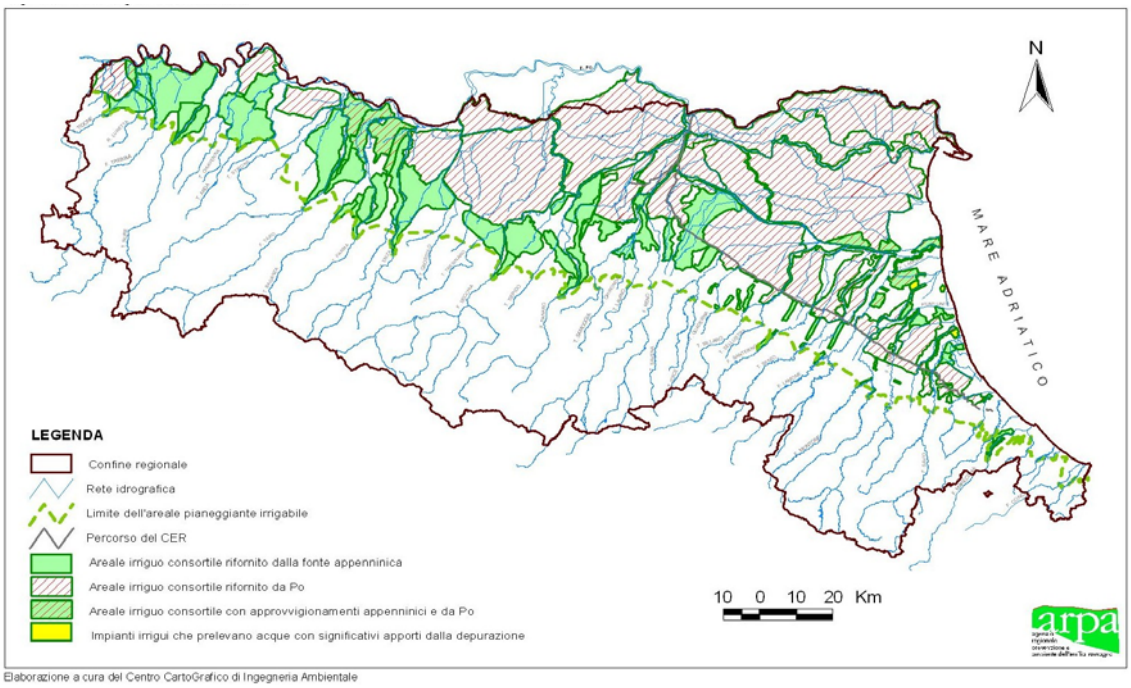


Fig 7 – present irrigation areas
The present irrigated areas are for the majority supplied by the Po river (red line) and to a minor extent by the Apennine tributaries (green) or jointly by the Po river and Apennine tributaries. There are also irrigation facilities no (yellow areas, near the coastal zone) which draw water with relevant supply from treatment.

Pressures have an impact on the environmental status of the water bodies with respect to the 'weight' of the pressures and the features of territories where actions having an impact on water bodies take place. Some areas of the territory, in view of their specific physical features or as 'containers' of water resources with definite functional destinations, should undergo specific protection from pollutants and/or abstractions . For this reason, beside surface water bodies with specific destination (fresh water for drinking water production, water for bathing, water suitable for shellfish life, fresh water suitable for fish life), the following have been identified: the SCI and ZSP *natural habitats* (Sites of Community Importance and Zones of Special Protection) (fig.4)[13], the parts of the territories defined as *sensitive areas* (sensitivity for nutrients) (fig.8), the *nitrate vulnerable zones from agriculture* (fig.9), areas for the *protection of waters for human consumption*, the latter being differentiated according to whether the 'protection' is performed on ground waters in the foothill-plain (fig.10 indicates 'recharge areas), or on surface water (fig.11), or ground water in the hill-mountain (fig.12) indicates the main aquifers in the mountains where the protection areas should be outlined)[14].

[13] VALSAT: Chap. 1.3 – assessment of the present state of natural sites of Community importance (SCI and ZSP) and Annex 1 – 6.1: list of SCI, ZSP and related habitats
[14] General Report: Chap. 1.3 List and map display of the areas indicated in Title III, Heading I, Dlgs. 152/99 (sensitive areas; nitrate vulnerable zones from agriculture; areas vulnerable to plant-treatment products and other vulnerable areas; protection areas of surface and ground waters for human consumption)

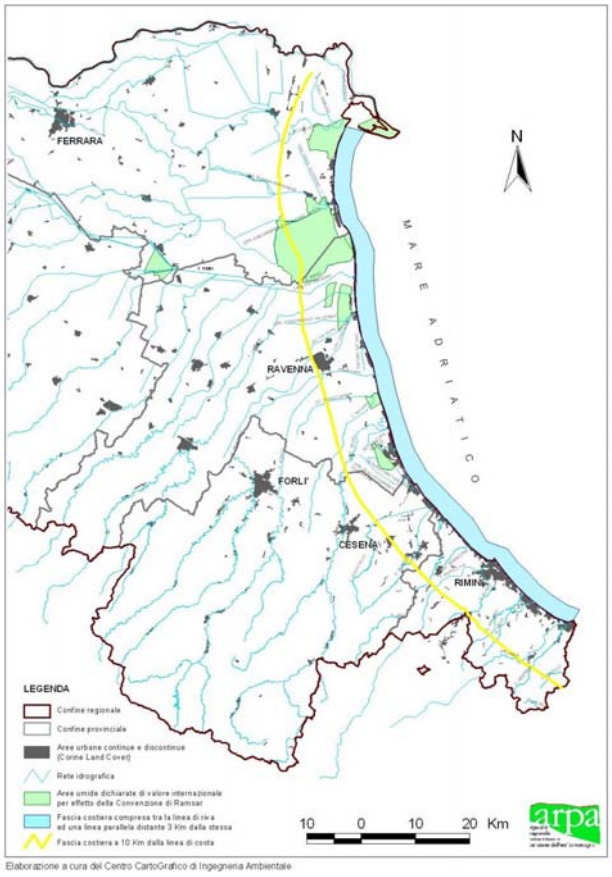


Fig.8 – sensitive areas
Sensitive areas are: wetlands of international value in compliance with the Ramsar Convention (green), the coastal zone within the shoreline and the parallel line at a distance of 3 km (light blue), water courses pertaining to the coastal areas for a strip of 10 km from the coastline (yellow perimeter).

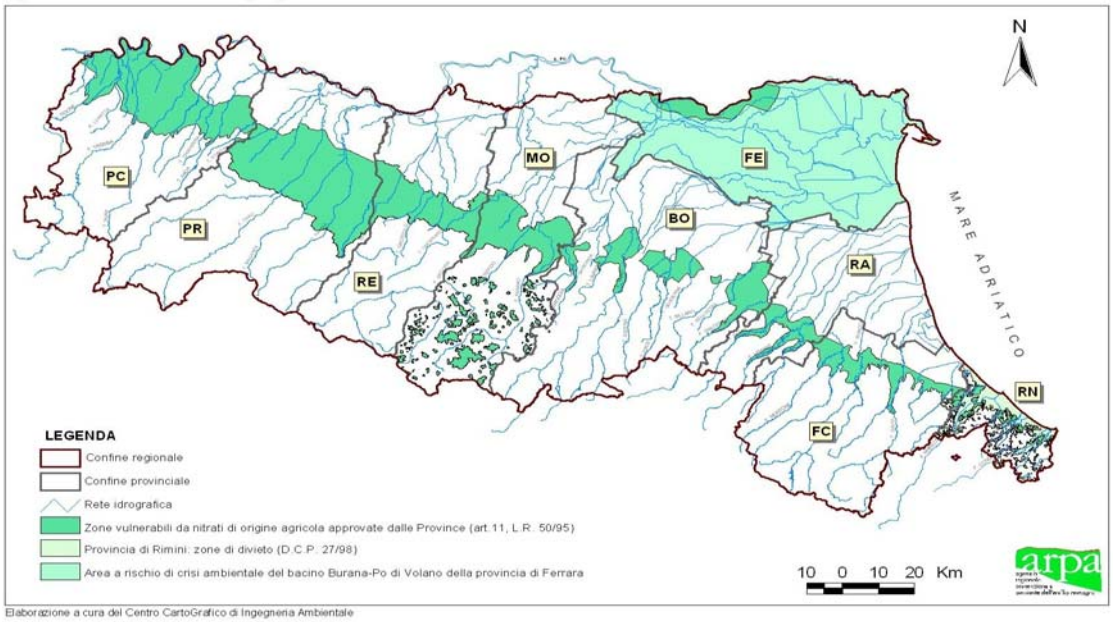


Fig 9 – nitrate vulnerable zones from agriculture
The areas identified by Emilia-Romagna Region as vulnerable to nitrates from agricultural origins, with DCR n.570/97 and incorporated by the Provinces, and the areas at risk for environmental crisis of the Burana-Po of Volano, coinciding with the administrative borders of the Province of Ferrara.

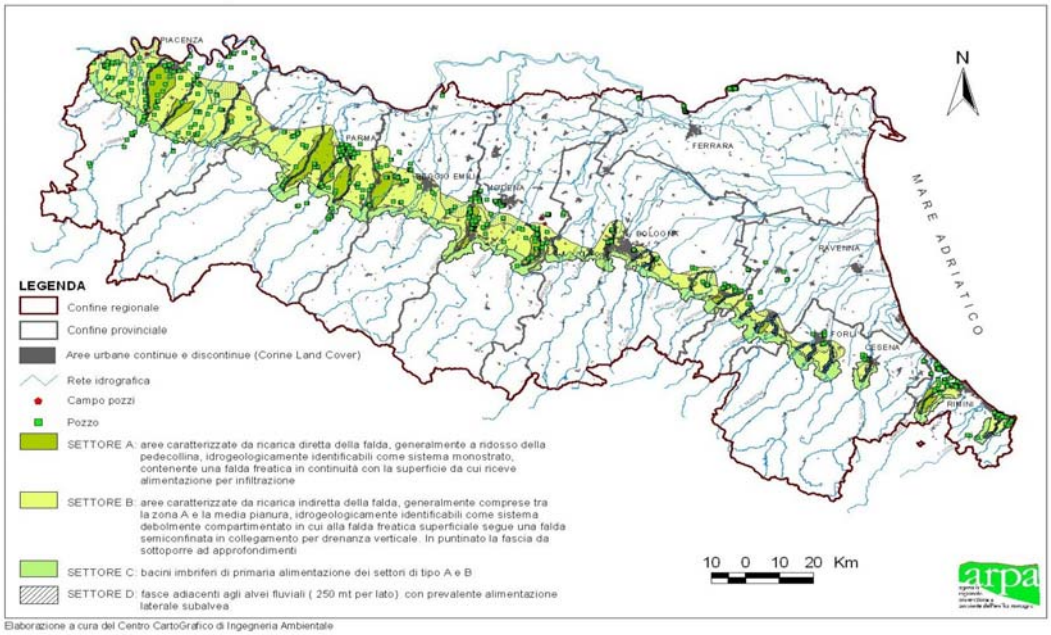


Fig 10 – protection areas of ground waters in foothill-plain – recharge areas

Recharge areas for ground waters in foothill-plain (interested by the diffuse presence of wells for water drawing for human consumption) are subdivided into 4 sectors:

- A: characterized by direct recharge from ground water, usually close to the foothills;
- B: characterized by indirect recharge from ground water, usually between sector A and the mid-plain;
- C: catchment basins of primary supply of sectors of A and B;
- D: stretches adjacent to river beds with prevailing lateral supply beneath the river bed.

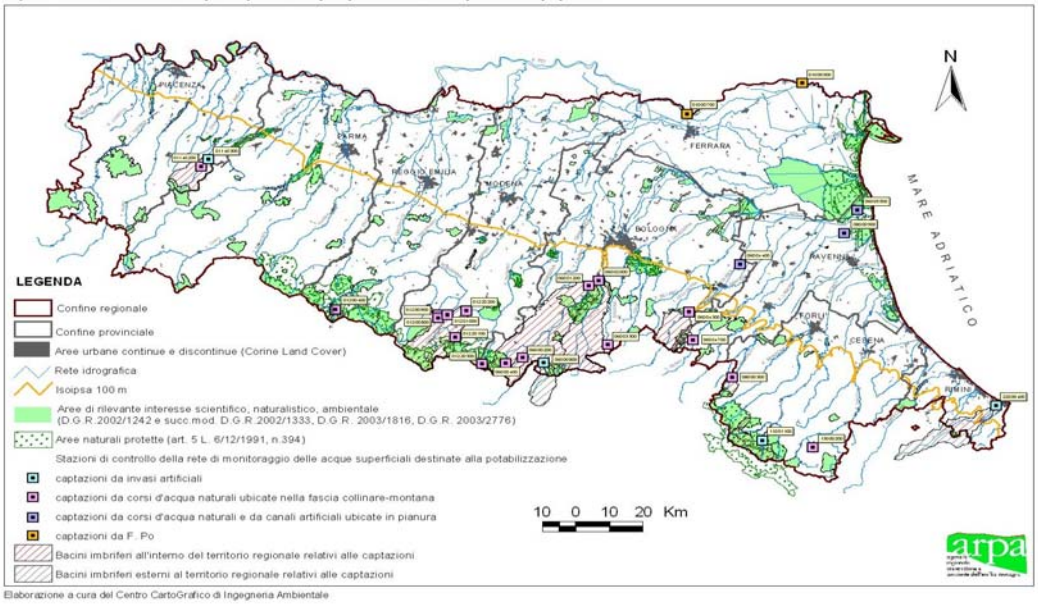
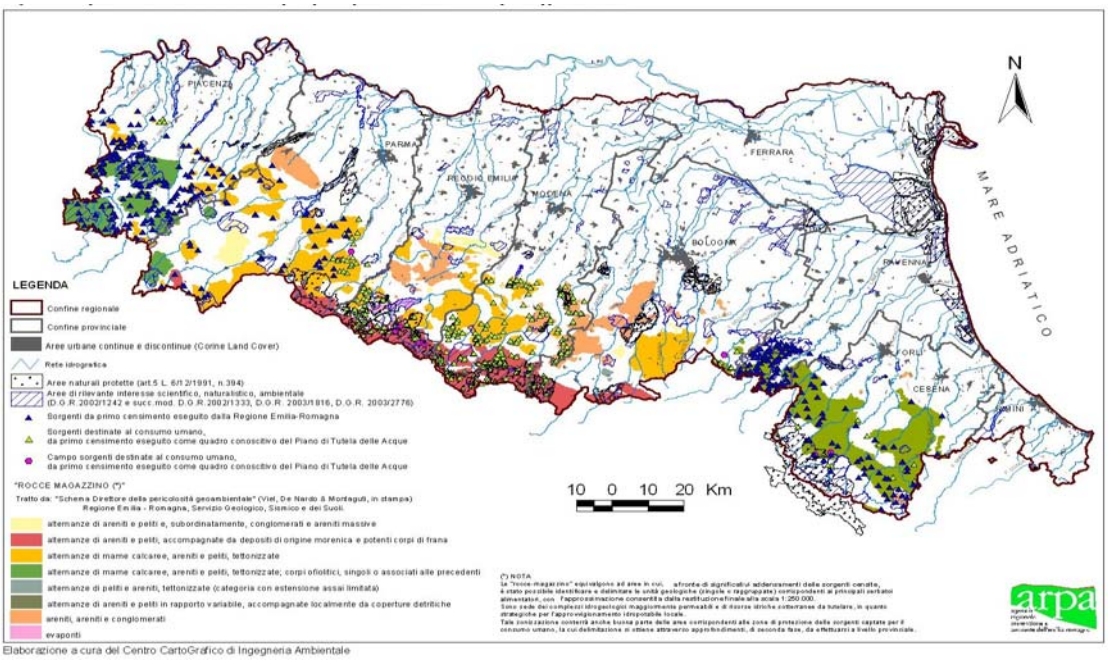


Fig.11 – protection areas for surface water

Surface area protection areas for abstraction of water for human consumption are composed of catchment basins relative to the abstraction points. The figure shows abstractions from artificial reservoirs (light blue), natural water courses in the foothills-mountain stretches (pink), natural and artificial water courses in the plain (purple), the Po river (orange), and related catchment basins (pink line), partially outside the regional territory (grey line).



Elaborazione a cura del Centro CartoGrafico di Ingegneria Ambientale

Fig.12 – main aquifer in the mountains
Inside the main aquifers defined as "reservoir rock", as characterized by concentrations of springs, the protection areas of ground waters should be identified (and in particular the supply and recharge areas of springs). The figure identifies the "reservoir rocks", differentiated according to geological formations and springs.

3.2 OBJECTIVES OF ENVIRONMENTAL QUALITY AND FOR SPECIFIC DESTINATION

In this extremely articulated context of anthropic uses, interacting with water resources in diverse territories, and in order to reach the water protection general objective of *maintaining the natural self-purification capacity of water bodies, and the capacity to support wide and diversified animal and plant communities* by pursuing *sustainable and lasting uses of water resources*, and reaching a gradual *remediation and improvement* of water (art.1 of Dlgs 152/99), the PTA identifies strategies for reaching – by December 31st 2016 - the **objectives of environmental quality** (for significant bodies of water) and **quality objectives for specific destination** (for water bodies having a specific function) as established by the above Dlgs (art.4), and namely:

- that for significant bodies of surface and ground water the objective of environmental quality corresponding to the 'good' status should be maintained or reached, with the exception of some motivated derogations (at the intermediate deadline of 31st December 2008, every classified surface water body should acquire at least the requisites of the 'moderate' status);
- that the environmental quality status of 'high' should be maintained, whenever already present;
- that for water bodies with specific destination the quality objectives for specific destination should be maintained or reached (if a water body has been assigned

objectives of environmental and special destination quality, the stricter parameters should be complied with).

In order to reach these objectives, the basin Authorities in the regional territory (Basin Authority of Po, Reno, Marecchia-Conca, Regional Basins Authority of Romagna), having hear competent Provinces and Authorities, have outlined the **objectives at basin level**[15] (*which the water protection plans should comply with*) and the action priorities for the river basin of competence, developed according to the features of the basins, highlighted criticalities and acquired knowledge level.
Thus, both the *qualitative* parameters of significant bodies of surface and ground water, and *quantitative* parameters have been defined as objectives in the PTA (elimination of the water deficit in ground water and maintenance of the minimum vital outflow in surface water courses); for coastal sea waters, the objective indicated by the Po basin Authority has been taken, with respect to the maximum admissible concentration of total phosphorous, for the closure section of the basin at Pontelagoscuro as an indicator of the basin outflow to the sea[16].

In the phase of objective definition, the co-ordination takes place between the PTA as *abridged sector plan of the basin Plan* (the Authority defines objectives at the level of river basin, unit-based hydraulic and physical system, and at the conclusion of the plan, assesses its compliance to the objectives and issues a binding opinion) and the PTA as *regional sector plan* (the Region drafts a plan, as it is the competent authority for land use and co-ordination of multiple sector functions impacting on it, by implementing defined objectives).

3.3 STRATEGY AND PROGRAMME OF MEASURES

In order to reached by the established deadlines the above-mentioned quality objectives, the PTA has defined a **programme of protection and improvement** for water bodies for specific destination[17], and a **programme of measures**[18] for the fulfillment of environmental quality objectives in significant bodies of surface and ground water, which entail:

- the compliance with the *Minimum Vital Outflow* for off-takes from surface water;
- saving and streamlining actions of surface and ground water abstractions;
- progressive application within specific deadlines of waste water and discharge treatment plants according to the following: secondary or equivalent treatment for discharges pertaining to conglomerations with 2,000 -15,000 (10.000 if in sensitive areas) EI (*Equivalent Inhabitants*), and suitable treatment for discharges pertaining to conglomerations with less than 2,000 EI; harsher secondary treatment for phosphorous abatement in discharges from conglomerations with more than 10,000 EI comprised within drainage basins of sensitive areas; harsher secondary treatment for nitrogen abatement in discharges from conglomerations with more than 20,000 EI comprised within sensitive areas and in their pertaining drainage basins; sanitization and de-nitrification in the treatment plants with more than

[15] General Report: Chap. 2.1 – Objectives defined by the Basin Authorities in compliance with art.44 of Dlgs 152/99
[16] General Report: Chap. 2.2 – Definition of plan objectives
[17] General Report: Chap. 3.2; Regulations: Title II, Chap.2
[18] General Report: Chap. 3.1; Regulations: Title II, Chap.1

10,000 EI having an impact on water bodies with drinking water abstractions; summer sanitization for treatment plants exceeding 20.000 EI in the 10 km stretch from the coast; first rainwater management for built-up areas with more than 10,000 residents, in order to reduce the load input in water bodies;

- application of the *agricultural good practice Code* and, in areas which are nitrate vulnerable from agriculture, of regional provisions now in force;
- re-use for irrigation purposes of treated waste water from designated treatment plants, for at least 50% of potential;
- decrease in emissions by industrial plants subject to Dlgs 372/99;
- specific action for the re-naturalization of river stretches.

The programme of measures could also be integrated by additional measures established by the Provinces, in the framework of PTA 'perfecting'.

The adopted strategy for the attainment of required quality objectives is therefore developed according to the following, in order of importance:

- for the *conservation* of water resources (*quantity* conservation through diversified policies envisaging the regulation of abstractions, the setting up by ATOs of action programmes for leakage reduction and "*Plan for resource conservation*", as a reference for utilities, for saving initiatives the drafting of "*Conservation Plans for water saving in agriculture*" by Drainage Consortia envisaging the collection of water resources upstream from drawing abstractions from Apennine tributaries, the drafting of corresponding conservation plans by public or private entities for the setting up of low-environmental impact reservoirs and micro-basins systems for the collection of meteoric water; *quality* conservation through the regulation of agricultural and husbandry practices, and discharge regulations);
- for *efficiency* recovery in diverse water use forms (through incentives for the adoption by users of devices reducing consumption of sanitation water, and water saving behaviours; selection of irrigation techniques entailing increased saving with respect to crop needs; progressive improvement of water main network for irrigation);
- for the *re-use* of water resources via the re-use of treated waste water;
- for the setting up of needed *infrastructures* for the implementation of conservation, efficiency and re-use policies (reservoirs with low environmental impact, water main networks, distribution networks for treated water, etc.).

The modeling exercises which have been carried out in order to see beforehand the level of effectiveness of the applied strategy, have computed the pressures on water bodies at the deadlines of 2008 and 2016, deriving from the supposed changes in demographic and production (industrial and agriculture-husbandry) situations and the joint effect of planned measures[19]. The modeling has shown that the quality objective for 'significant' and 'of-interest' water courses could be reached by the set deadlines, through established measures, for the great part of river stems; water stretches or courses have been identified for which additional local actions would be necessary in order to reach the established objectives.

[19] General Report: Chap. 5 – Modelling supporting the reconstruction of present situations and simulations of action scenarios;
VALSAT: Chap.3 – PTA Assessment

Also for ground water bodies the outcome of envisaged actions has been positive (in terms of nitrate reduction), which however should be reviewed for individual measure points by specific analyses of the Provinces. As regards quantitative objectives: the maintenance in the river bed of the *Minimum Vital Outflow* is added with the application of the specifically-envisaged regulation; the elimination of the groundwater deficit seems attainable by 2016 with the activation of all expected policies.

3.4 QUALITATIVE AND QUANTITATIVE PROTECTION MEASURES

The programme of measures for quality objectives to be attained by 2016 falls within the general framework of **qualitative and quantitative protection measures**[20] comprising the PTA strategy for quality water remediation or improvement and the long-term management of the basins falling within the regional territory with approaches entailing the *sustainable water management* in policies having an impact on the territory.
Protection measures comprise actions (linked to timeframe and financial resources planning), norms and regulations (partially interacting with urban town planning), behavioural regulations; encompassing several sectors and different competences; they are also subject to a constant process of reviews and adjustments.[21]

Measures for "***qualitative protection***" focus mainly on the control of (point and diffuse) discharges, management modes of areas pertaining to surface waters and protection of water for human consumption.

The control of **point discharges** is carried out through the regulation governing domestic waste water discharge comprised in the Directive approved with regional council deliberation (DGR) n.1053/2003 and via the action programme for the streamlining of sewerage and treatment systems (indicated in the *programme of measures*). The action programme has been defined for the attainment of quality objectives also referring to *sensitive areas* and *drainage basins pertaining to sensitive areas* (hydrographic basins of surface water bodies inputting in the Po river or in the Adriatic sea, where the basin Authority of Po river requires the abatement of at least 75% of the total nitrogen and total phosphorous load).
The Directive of DGR n.1053/2003 referring to the regulation governing domestic waste water discharge is accompanied by the Directive of DGR n.286/2005 regulating the management of first rainwater and the washing of external areas, which envisages the planning of needed actions via a 'Policy Plan' drafted by the Province together with ATO; the 'Policy Plan' is the tool by which actions for the curtailment of pollutant load conveyed by first rainwater are planned and selected, in compliance with quantities established for 2016 by the *programme of measures*.

[20] General Report: Chapters 3.3, 3.4, 3.5, 3.6;
Regulations: Titolo III – Measures for qualitative protection of water resources; Title V – Measures for quantitative protection of water resources
[21] General Report: Chap. 6 – Programme of effectiveness review of envisaged measures;
VALSAT : Chap. 4.1 – Guidelines for territorial-environmental control

The control of ***diffuse discharges*** of husbandry origin is carried out via the application of regulatory tools (in particular LR 50/95 and regional Deliberation CR n.570/97) which since 1995 have been issued by the Region for the enactment of Directive 91/676/EC relating to the water protection from pollution by nitrates from agricultural sources. The regional legislation has defined zone and periods for which the spreading of animal manure is forbidden; 'vulnerable zones' and 'non vulnerable zones' have been identified with the attribution for each of them of maximum amounts of nitrogen to be spread annually in an hectare of land; also the features of storage facilities for animal breeding runoffs have been outlined; the procedure for spreading permission has been introduced. The areas identified by the Provinces as *nitrate vulnerable zones* on the basis of the 'Vulnerability Map' annexed to DCR 570/97 have been classified, and also the basin Burana Po di Volano' (fig.9) has been declared at risk of environmental crisis'. The definition will subject to review (by the Region, after having hear the basin Authorities) every four 4 years *in order to take into account unexpected changes and factors*; the measures will be updated in the action programmes issued by the Region.

The protection of *surface water quality* has been assigned, besides to the drop in pollutant inputs, via the control of discharges and first rainwater, also to the self-purification power of water courses, which could be strengthened by a river bed morphology fostering water flow, as well as by plant coverage of ***peri-riparian areas***, for their *filtering functions of suspended solids and diffused-origin pollutants, stabilization of river banks and biodiversity conservation* (art.41 Dlgs 152/99) performed by natural vegetated areas of land. The identification of areas to be involved in re-naturalization actions in order to outline buffer zones capable of reducing nitrate and phosphate runoffs from arable land (as an integration to measures regulating spreading and the concomitant role of ecological corridors), has been assigned to Provinces (in agreement with basin Authorities), on the basis of specifically detected criticalities and with reference to explorative contributions from pilot and research projects carried out by the Provinces, the Region, basin Authorities, or drainage Consortia.

The protection of ***water for human consumption*** is carried out either through the conservation of abstraction points of surface or ground water conveyed to third parties via public-interest drinking water main system, or through the protection of water resources.
For the conservation of *abstraction points* (wells for the drawing of ground waters, off-takes of surface water, headwater abstractions) measures will be outlines in the regional Directive soon to be issued (although in the meantime measures comprised in art.21 of Dlgs 152/99 are in force).

Water resources for human consumption comprise ground water from foothill/plain zone, surface waters involved in abstractions for drinking water main systems (artificial reservoirs for drinking water supply; natural water courses involved in off-takes), ground waters in hill-mountain zones.
The protection zones for *water resources* comprise recharge areas, natural surfacing of aquifers, reserve areas, but the most relevant territorial aspect for resource 'protection' is represented by the recharge and input areas, for which cautionary measures have been established for the recomposing of resources and maintenance of its qualitative features.

The identification and regulation of these zones would see the participation not only of the Region, but also of the Provinces: with the PTA, the Region has identified the recharge areas of foothill-plain ground waters (subdivided in 4 sector) (fig.10), catchment basins upstream the abstraction points of surface waters (becoming their protection zone) (fig.11), the 'reservoir rocks' (fig.12) in hill-mountain areas, where headwaters' supply zones are located. Provinces are called upon, through the PTCP, to identify recharge/input areas within the 'reservoir rocks', to identify the surfacing of aquifers, to identify reserve zones, proposed by ATO's.
Specific regulations for the different recharge/supply zones are defined by the PTA in a detailed manner as regards risk and hazard centres, mining activities, landfills and modes of implementation of technological and road infrastructures; in their turn, Provinces, according to their thorough understanding of the territory, are called upon to decide, through PTCP, whether to allow or stop new urban sprawls in recharge/supply zones, thus further perfecting regulations outlined by the PTA, and impacting on town planning and zoning of involved municipalities.

Measures for "***quantitative protection***" comprise a set of provisions for the promotion of utilization modes of surface and ground waters, which would be sustainable, which means that surface water bodies should maintain in their bed the *minimum vital outflow* (the flow assuring the *conservation of physical features of the water body, chemical-physical features of water, as well as the maintenance typical biocenoses of local natural status*), and for groundwater bodies, the progressive elimination of over-abstractions, as shown by the time evolution of monitored piezometries. Conservation measures focus therefore on the regulations governing discharges and saving policies, also comprising the re-use of treated waste waters.

The ***quantitative protection of natural surface water bodies*** is pursued by regulations governing concessions for public water deviations from water courses, as the granting of concessions for deviations depends on the fact that the minimum flow to be left in the water course bed downstream the abstraction, should be the *Minimum Vital Outflow (*DMV in Italian*)*. The PTA has defined the computing modes for *DMV* and has differentiated, in computing criteria, the water bodies with catchment basin lower than 50 sq km from the ones with a larger surface; for the latter, the *DMV* makes a distinction between the hydrological component (defined according to the features of the water regime) and a morphological-environmental component, composed of parameters which will be added to the hydrological component as amendment factors for the definition a the complete *DMV*.
The mandatory issue of *DMV* will be introduced gradually (and with different criteria for the concessions of new off-takes), but all off-takes at 2016, should release in the river bed the entire *DMV* (in the interim date of 2008 off-takes in water bodies with a catchment basin over 50 sq km should release in the river bed the hydrological component of *DMV*). Derogations have been envisages (for precise and limited time periods) for specific situations.

For the ***quantitative protection of ground water bodies*** (which could be improved by the increased recharge from *DMV* compliance) a drop in abstraction is necessary which would eliminate the annual aquifer deficit; this decrease would derive from PTA's provisions forbidding the drilling of new industrial wells in areas covered by industrial waterworks systems, and the drilling of new irrigation wells in the areas with suitable

supply of water from consortia, and in areas with criticalities deriving from aquifer over-drawing (subsidence, sea encroachment).

In the presence of quantitative protection measures reducing water supply and with progressively increasing water demands for domestic, industrial, and irrigation use, measures for water resource saving and rational utilization become necessary in order to pursue *water balance assuring the equilibrium between available resources and demands* (art.3, paragraph 1, L. 36/94).

Water saving in the domestic and production sectors is partially attained through the dissemination of techniques (in the domestic, household sector: 'water saving behaviours and dissemination of technological devices reducing water consumption in sanitation water; in the production sector: implementation of systems of environmental management), with incentives produced by specific awareness-raising campaigns and economic benefits by the Region, Province and Municipalities, besides regulatory measures and town planning provisions, by which Municipal Administrations promote the use of technologies for the reduction of water consumption, and the setting up of dual network systems for the utilization of lower quality waters, in particular for new sprawls. On the other hand, together with this complex system of 'guiding policies' intended for users, the PTA prescribes the drafting (by 31.12.2006) - within the specific sector Plans defined by ATO - of *resource conservation Plans* as reference tools for saving-oriented actions. The specific sector Plans – through actions for leakage reduction and infrastructures – should reach by 2016 a yield, at regional level, equal to 82%, and make a contribution towards an average regional domestic consumption of 160 l/inhabitant/day in 2008 and 150 l/inhabitant/day in 2016.

In the agricultural sector, where water demand for irrigation is very high and the impact of DMV application quite relevant, differentiated strategies have been established for water saving: the progressive selection of irrigation techniques which entail more saving, and concomitant services (monitoring of weather and soil conditions) offered to farmers for the streamlined planning of irrigation; the drafting of *conservation plans for water saving in agriculture* by drainage and irrigation Consortia, envisaging actions for efficiency improvement of water main and distribution networks, in particular in the area of Emilia (in Romagna actions are now taking place for the irrigation use of CER - Emilia-Romagna canal - waters coming from the Po river), and the setting up of reservoirs for water storage upstream off-takes or along canals, for abstractions from Apennine tributaries, preferably in quarry reservoirs, and, whenever suitable, in synergy with flood lamination zones, envisaged by basin Authorities. With similar *conservation plans for water saving in agriculture*, drafted by public or private bodies, reservoirs built by individual companies or groups of companies at low environmental impact can be envisaged, as well as micro-basin systems for the collection of meteoric waters. Treated waste water can also conveyed to irrigation, coming from water treatment plants assuring the compliance with threshold values defined by PTA (and DM - ministerial decree- n.185/2003).

Treated waste waters can be used, besides agriculture, also for irrigation of parks and green areas, for non industrial (road washing, sewage cleaning, supply of dual

networks) or industrial (production cycles, for fires, etc.) use or for ecological purposes. Re-use of waste water should be implemented through specific *re-use plans*, drafted by ATO in agreement with competent basin Authorities, local authorities and public bodies, and with the representative of categories interested in re-use. The above plans should entail the system composed of the treatment plant with related lagooning and/or plant-purification treatments and the distribution network, thus making available known and constant quantity of treated water. The 'programme of measures' for the implementation of PTA objectives has envisaged, by 2016 (at least for 50% of potential), the re-use for irrigation purposes of waste water from 24 'priority' treatment plants in order to make this action feasible.

3.5 PREVENTIVE EVALUATION OF ENVIRONMENTAL AND TERRITORIAL SUSTAINABILITY

The effects on the environment of measures established by the plan have undergone a process of preventive evaluation accompanying PTA drafting in a sort of interaction.
This process of preventive evaluation aiming at reviewing environmental sustainability responds to LR 20/2000 (art.5 - *1. The Region, Provinces and Municipalities carry out, within the process of plan drafting and approval, the* ***preventive evaluation of environmental and territorial sustainability*** [VALSAT] *of effects deriving from plan implementation, also in view of national and EU regulations*), as well as to directive 2001/42/EC (which in the *strategic environmental assessment* [VAS], to be performed '*during the plan preparation phase'*, covers two aspects of the '*report of environmental impact*' and the '*performing consultations*).

The assessment of environmental and territorial sustainability (VALSAT) of the PTA has been carried out through a methodology (fig. 13) subdivided into 4 phases:

- *assessment of present status*: acquisition of information relating to environmental aspects involved in the plan and pressures exercised on them by anthropic activities;
- *assessment of objectives*: review of the consistency of plan objectives with the goals of environmental and territorial sustainability, landscape qualification and environmental protection, established by legal provisions and planning;
- *assessment of plan effects*: assessment of plan effects via simulation models of reference scenarios of future layout of the territory. These reviews have identifies measures for the mitigation or prevention of negative impacts of made choices. The VALSAT outlines the outcome of evaluations concerning the sustainability of plan measures, by indicating possible conditions for the implementation of individual forecasts;
- *control of the plan and effect monitoring*: definition of functional indicators for a monitoring system enabling the review of plan effects with respect to established objectives.

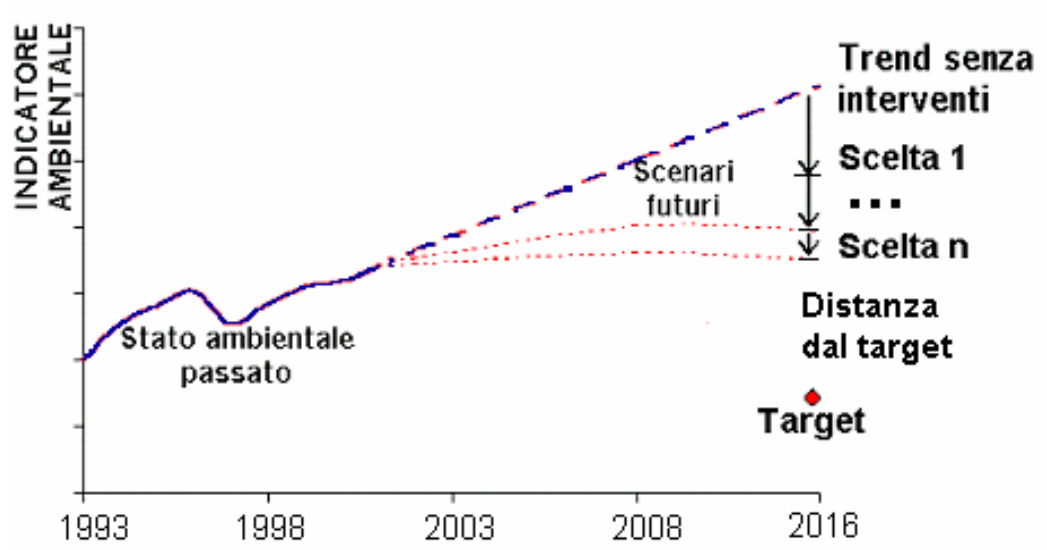


Fig.13 – VALSAT – adopted methodological layout
The first phase of VALSAT assesses the environmental status– past and present – (continuous line); the second phase assesses the consistency of PTA objectives (*target*) with the general ones of sustainable development identified by Community policies, national action strategies, Emilia-Romagna policies; the third phase assesses the effects of PTA (dotted lines and arrows) with respect to established goals (the fourth phase, not shown in the chart, displays the guidelines for the future control of PTA effects).

4. APPORTIONMENT OF REGULATORY PROVISIONS

The system of PTA provisions encompasses differentiated sectors, by identifying for each of them, regulations and actions for the protection of water resources. This protection strategy covering several sectors and regulations is assigned to a regulatory framework composed of laws and norms in force, and already activated by the Region with specific objectives of water improvement, or control of water resources, either through specific PTA provisions, or directives to be issued, which should explore aspects which have not yet been defined, or update legislation following changes situations.

The former group comprise the system of regional measures relating to regulations governing agricultural spreading, Directives 1053/2003 and 286/2005 referring to regulations governing urban waste water discharge and the management of first rainwater, respectively, regulation n.41/2001 concerning procedures for public water concession. The latter group comprise the Directive of activation of Action Programme 2004-2008 for nitrate vulnerable zones, which should update existing measures, the policy Directive relating to measures for peri-riparian areas, the Directive for protection and conservation zones concerning water abstraction intended for human consumption, the Directive relating to features of gauge devices for flow rates flowing through water bodies and sampled flow rates, in correspondence with off-takes, the Directive relating to technical and regulatory aspects for reuse of waste water.

With the PTA, a time-based process is thus set and managed for the progressive definition and updating of a regulatory-legal system, governing the management of river basins enclosed in the regional territory, by integrating its diverse aspects.

5. PTA IMPLEMENTATION

The implementation of PTA action lines takes place through the application of *regulatory provisions* comprised in the plan and through the implementation of *works and actions* derived from strategies defined by the plan.

The system composed of the cognitive framework, the identification of quality objectives to be attained by 2008 and 2016, and by the programme of measures designed to reach these objectives, formulated by PTA and immediately effective, represents the knowledge-based and operative 'corpus' of a programme of behaviours and actions, which individual provinces incorporate (via the PTCP or specific PTCP abridgements) with the concurrent perfecting linked to data and information updating, and detailed adjustments of envisaged measures.

Provisions (statutory or policy-driven), which are part of protection legislation, which do not need urban layout specifications to be applied, will be effective starting from the date of PTA approval (in some cases, they were already in force due to previous laws or regulations). Provisions having effects on urban layout regulations (namely provisions relating to the protection of waters intended for human consumption) become effective after their incorporation in PTCP (which establish also terms and modes for the adjustment of urban planning tools of Municipalities).

Envisaged *works and actions* are implemented with a planning taking into account priorities and available financial sources, after being enclosed in the *regional Three-year Programme for environmental protection (PTRTA)* or in other operative tools for specific actions, co-ordinated at regional level and supported by a specific programme and financial framework[22].
The identification of needed works and actions should be defined in some sectors by explicit PTA's request, through more detailed sector plans or programmes (even the PTA is actuated through it): the *Policy Plan* which the Provinces must draft for the localization and sizing of first rain tanks of the main urban conglomerations; the *resource conservation Plans* which the ATO must draft and which the utilities should take as reference for actions intended for water resource saving; the *Conservation plans for water saving in agriculture* drafted by the Drainage Consortia for a streamlined use of water resources coming from Apennine tributaries through storage reservoirs upstream off-takes or along main waterworks canals (envisaged, whenever possible, in synergy with action for flood lamination, envisaged by basin Authorities) and improvement actions for waterworks networks; the *conservation Plans for water saving in agriculture* drafted by authorities of private entities for the setting up of single or multiple company reservoirs or micro-basin systems, for the collection of rainwater to be used for irrigation; the *Reuse Plans for waste water* drafted by ATO for the reuse of

[22] For the 2000 - 2006 the general Report: point 3.5.4.4 – Summary of planned actions

waste waters coming from treatment plants for irrigation or other use (domestic, industrial and environmental uses).

6. APPORTIONMENT OF COMPETENCES

The definition, via specific plan of action lines for the management and protection of water resources, derives from the process leading to the evolution of a Community water policy formalized via specific 'Directives' for the incorporation of these directives in the State's body of laws for their integration into already-existing regulations.
The PTA, which the State has assigned to the Regions in compliance with measures established in Dlgs 152/99, outlines the overall system of action lines for the implementation of policies in the regional territory, by involving a plurality of competences which therefore become responsible in varying ways and aspects for water management and protection.

The **Region**, which has acted on the drafting (and approval) of the plan even before the assignment of competences, has taken its responsibility in terms of methodologies for cognitive frameworks leading to the identification of criticalities and territories to be protected, on the identification of objectives to be pursued, on the entire system of protection provisions. The Region will be competent (art. 99 and 100 of LR 3/99) for the drafting of the regional three-year plan for environmental protection, for the setting up of actions for environmental protection (including water management actions) to be pursued through the use of Community, national, regional and local resources; on the basis of this programme, the framework relating to action and work planning will be defined. The Region is competent for the co-ordination of surveying activities for qualitative and quantitative features of water bodies, and the effectiveness review of envisaged actions; the Region is also competent for the issuing of directives enabling the thorough analysis of provisions not fully explored and the co-ordinated management of function attributed to Provinces. The Region should also promote information and awareness-raising campaigns for water saving.

LR 3/99 has attributed to **Provinces** relevant competences in water policies both concerning knowledge-based aspects (monitoring of qualitative and quantitative features of water courses via ARPA), the co-responsibility in the choices made through the PTA for tool definition (planning conferences), and the attribution of autonomous planning choices (in particular with reference to urban plans in recharge or supply zone of water sources) via the PTCP or specific abridgements, in perfecting or changing and integrating PTA's choices.
In the PTA implementation phase, Provinces will have specific competences in the definition of sector plans (drafting, together with ATO, of *Policy Plans* for the planning of containment actions for pollutant loads conveyed by first rainwater; approval of *reuse Plans for treated waste water*), in the planning of actions and works enclosed in the regional three-year plans for environmental protection (PTRTA) or other operative tools for specific actions, coordinated at regional level and fully comprised in the PTCP, in control and authorization procedures (in particular for animal manure spreading activities on farm lands).

Municipalities, besides specific competences of transposition of measures impacting on urban planning into territorial planning tools, are attributed decision-making tasks (together with other bodies) in some sector plans (like the reuse plans for waste water or water resource conservation plans, through micro-basin systems for irrigation) and autonomous choices, established via regulatory acts or town planning tools, to promote water saving policies.

Basin Authorities, which are competent for the drafting of basin plans, play a central role in PTA drafting (abridged sector plan of the basin plan) both in the initial phase (as they define the *objective at basin level,… as well as the priorities of actions*) and in the final phase (*they review the plan compliance with objectives and priorities … by expressing their binding opinion*).
Following PTA approval, basin Authorities present their summary framework for planned development dynamics referring to their basin of competence, by drafting *integrated and co-ordinated qualitative and quantitative protection measures* envisaged by the PTA (comprising additional measures established by the Provinces) together with other measures in the *abridged plans* of the basin plan. Then the summary framework could be developed for the diverse sub-basins comprising the hydrographic basin.
The PTA envisages the participation of basin Authorities in variations and improvements impacting substantially on significant aspects of plan regulations, and in the drafting of sector plans having an influence on basin functions.

In the regional context, the role of **drainage Consortia** is particularly relevant as *they participate in the implementation of actions for environmental protection and water improvement, also for their use in irrigation, re-naturalization of water courses and plant purification*. PTA assigns them the responsibility for the drafting of pilot projects and actions for the rational use of water resources and the drafting of *Conservation Plans for water saving in agriculture*, contributing to the streamlining and saving in water use, as well as to the satisfaction of irrigation needs, via the planning of reservoirs for water collection, coming from Apennine tributaries (whenever suitable, through the use of flood lamination tanks, or quarry reservoirs) and actions for the improvement of water main networks for a relevant yield increase.

The Agencies of **Optimal Territorial Ambit (ATO)**, each composed of the Municipalities from every Province, (performing *all the functions pertaining to Municipalities concerning the organization and implementation of public service management, including relations with service utilities*) are assigned the drafting, within the Ambit Plan, of the *resource conservation Plan* which will be the reference or utilities for water saving initiatives. Also the Ambit Agencies are attributed the drafting of the *reuse Plan for waste water*. Their competences therefore comprise actions specifically impacting on water saving and reuse.
The *Ambit Plans* for the management of the integrated water service as per LR 25/99 should also enclose (for the provisions of art.18 of PTA), *with reference to the quantification of economic resources needed for their implementation and related financial coverage,* the adjustment actions relating to regulations of urban waste water discharges, the application of stronger secondary treatments for phosphorous

abatement, the application of stronger secondary treatments for nitrogen abatement: actions of particular relevance for the attainment by 2016 of environmental quality objectives, and for this enclosed in the PTA *Programme of measures*, attributing to ATO a specific responsibility for environmental quality of water bodies. Finally, the Ambit Plan, in compliance with paragraph 2, art.12 of LR 25/99, must be drafted and updated with respect to the PTA.

The main activity of knowledge-based support (monitoring activities of different environmental components, additional analyses of environmental aspects and criticalities, information drafting and dissemination, implementation and management of regional information System on the environment) for environmental policies is carried out by the regional Agency for prevention and the environment (**ARPA**), operating in Emilia-Romagna since 1996 according to the law LR 44/95. This specific competence (monitoring) represents an essential reference elements for the control of dynamics activated by PTA and their effectiveness, as the activation of thorough studies relating to themes linked to water resources will be a needed tool for PTA development, in matching operative programmes and knowledge-based pathways.

The articulation of different competences, as well as the time process of progressive updating of the plan and the diversification of protection regulations, all outline the PTA function as a ‘strategy’ involving diverse sectors and diverse ‘stakeholders’ in the shared goal of managing land use policies via sustainable development processes of water resources.

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