



WATER QUALITY



The new concepts introduced by the Water Directive (2000/60/EC): Ecological status and management of the entire watershed.

Legislative Decree 152/06 defines objectives of environmental quality and of quality for specific uses.

Reach, by 2015, the objective of “good” ecological and chemical status for surface and underground water bodies.

Introduction of the principle of “non deterioration”.

Introduction

The Water Directive (2000/60 EC), which provides a strategic framework for Community action on the subject, constitutes a major advance in European environmental policy, given that it regulates the concepts of “ecological status”, regarding water-body quality in terms of local responsibilities and of the “planning, management and governance of water on the watershed level”.

Ecological status must be based on an assessment of the biological communities, of the habitats and of the hydrological and morphological characteristics of water bodies, as well as the traditional physical and chemical determinants. In addition, for the first time, a directive calls for measures to be issued to maintain sustainable hydrological levels and systems and to defend and restore coastal habitats.

Legislative Decree 152 (environmental measures), approved in Italy in April 2006, transposes the European directive into Italian Law, though only in part, and sets the following objectives for:

- *environmental quality*, based on the capacity of water bodies to maintain natural processes of self-purification and to support extensive and highly diversified animal and vegetable communities;
- *quality for specific use*, which identifies the status of water bodies suitable for a certain use by man (production of drinking water, water suitable for swimming) or for the lives of fishes and molluscs.

The objectives of quality (Appendix 1, part three, of Legislative Decree 152/06) to be achieved by 2015 are the maintenance or attainment, for major bodies of surface or underground water, of “good” status or, if that status has already been reached, maintenance of a “high” environmental quality rating.

The Directive, which introduces the principle of the “non deterioration” of water bodies, in addition to adopting the further principles of precaution, prevention and “if you pollute, you pay”, obliges the Member Countries to protect their transitional and



internal surface waters, as well as coastal and underground waters. The objective of “good” ecological and chemical status by 2015 must be reached by managing water on the scale, and within the framework, of the watershed, and not within the confines of administrative borders, pursuing the optimisation of uses and promoting the integration of existing measures regarding water and the sectors that depend on it.

The state of water quality

In 2007, water was monitored by the institutions assigned to the task under Legislative Decree n. 152/99, plus subsequent modifications and additions, while the monitoring of water bodies, pursuant to the European Directive and Legislative Decree 152/06, is currently getting underway. The departments and agencies responsible for the work are currently engaged in identifying, categorising and characterising the water bodies, while the identification of the sites and the reference communities for the different bio-indicators, activities preliminary to the start-up of the monitoring itself, has begun.

Data on the Ecological Status of Waterways (SECA), which combine the results of chemical analysis (LIM – Level of Pollution from Macro-descriptors) with those of biological analysis (IBE – Extended Biotic Index), showed that, in 2007, 48% of the sites monitored fell under classes 1 and 2, meaning an ecological status of “high” (5%) or “good” (43%) (Figure 4.1).

A total of 1,014 stations were monitored, distributed throughout the national territory.

The percentage of the stations ranking in quality class 1 remained the same as last year (5%), while there was an increase in the stations in class 2 (from 38% to 43%). This rise resulted in an overall decrease in the stations ranked in classes 3 (from 35% to 32%), 4 (from 16% to 15%) and 5 (from 6% to 5%).

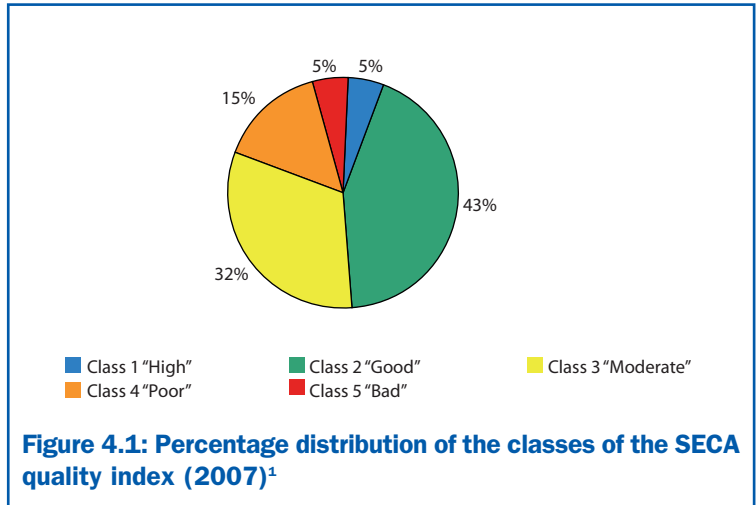
This year data were not received in complete form, or in time for processing, from the following regions: Calabria, Sardinia, Molise (only partial results) and Campania (where biological monitoring was not performed).

Assessment of the quality of water bodies with regard to their assigned use and specific objectives of environmental quality.

The SECA index defines the ecological status of waterways as a result of the impact of the primary pollutants of anthropogenic origin, as well as physical or morphological alterations in the rivers, when such changes have repercussions on the quality of the water, sediments or biota.



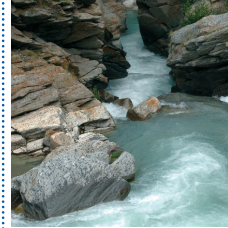
Of the 1,014 points monitored, 48% fall within the quality classes of “good” and “high”.



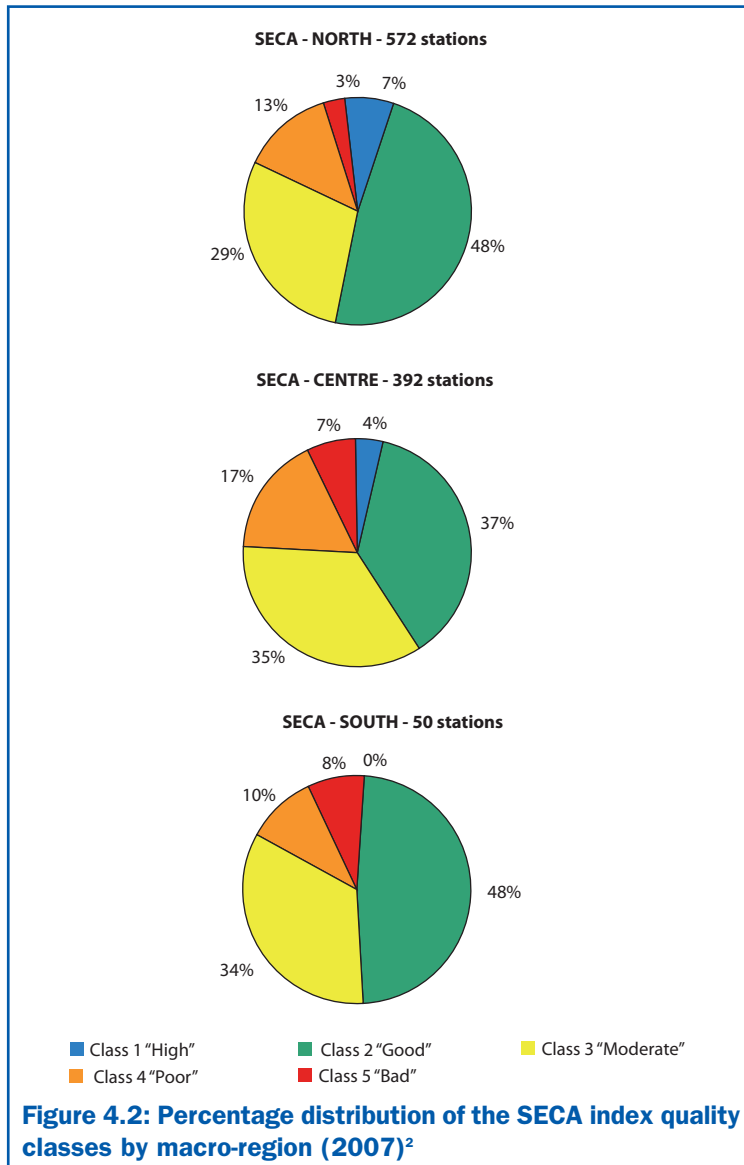
In Northern Italy, 55% of the points monitored fall in classes 1 and 2.

The data analysis (Figure 4.2) shows that the best situation is found in Northern Italy, where the percentage of stations falling under classes 1 and 2 is 55%, while the result is 41% for the Central Italy and 48% for the South and the Islands. However, these results should be evaluated in light of the different numbers of stations monitored in the various macro-areas, as well as the fact, with regard to Southern Italy and the Islands, that no data are available for Basilicata, Campania, Calabria or Sardinia. In 2007, there were 1,014 monitoring points distributed throughout the national territory, as compared to 1,257 registered in 2006. Further differences in 2007, compared to the previous year, were the 102 fewer stations monitored in Northern Italy, the 121 additional stations in the central regions and the 262 fewer stations in Southern Italy and the major islands. The differences in the number of monitoring points makes it difficult to compare the 2007 data with those for 2006.

¹ Source: ARPA/APPA data processed by ISPRA



In 2007, the ecological status of waterways in Italy was not especially critical. Of the 572 stations in Northern Italy, 55% fell within classes 1 and 2. Of the 392 stations in Central Italy, 41% were rated in the “high” or “good” classes, while 48% of the 50 stations in Southern Italy and the Islands were rated in these classes.

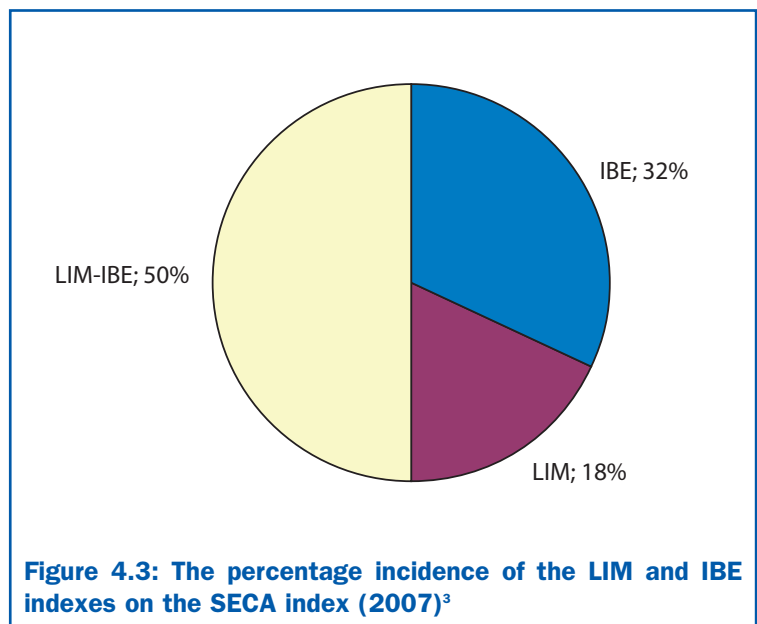


² Source: ARPA/APPA data processed by ISPRA



As noted earlier, seeing that the SECA is established with the integrated results of the chemical and biological analyses, when the incidence of LIM and IBE in determining the SECA is examined (Figure 4.3), it is found that, in the case of half the points sampled, the chemical and biological analyses both contribute to determining the ecological status, though, in the majority of the cases where the results show discrepancies, it is the biological analysis that determines the ecological status, given that the animal organisms analysed are sensitive not only to the water quality, but also to alterations and artificial modifications in the river and stream beds, as well as fluctuations in the flow.

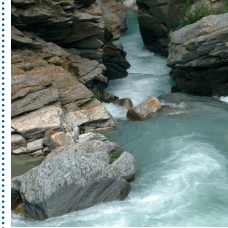
In 2007, as in previous years, the macrobenthic community played a greater role in determining the SECA than did the chemical-physical macro-descriptors.



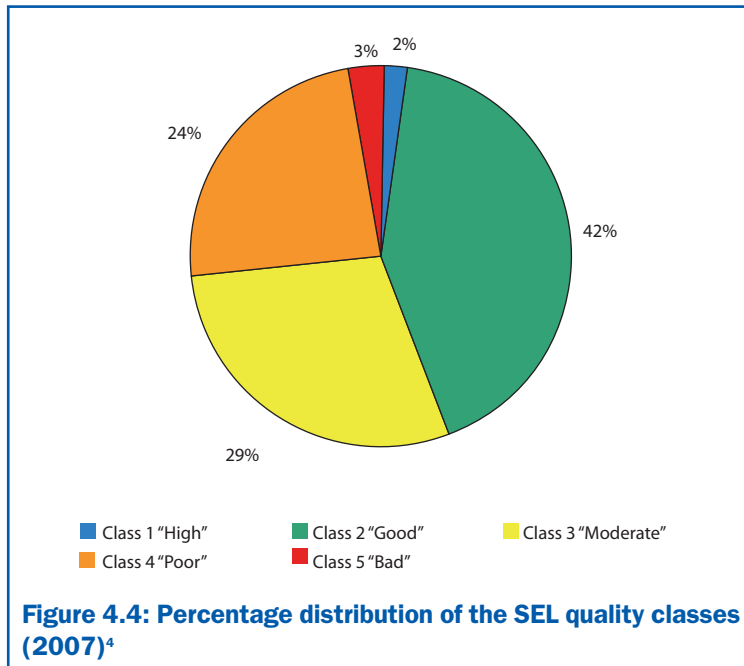
The SEL is used to determine the ecological status of lakes by evaluating their different trophic states.

In 73% of the cases, lake quality readings (Ecological Status of Lakes - SEL), taken from a total of 148 stations in 14 regions, fall within the classes ranging from “moderate” to “high” (Figure 4.4), an incidence that has decreased by 1% compared to 2006.

³ Source: ARPA/APPA data processed by ISPRA



In 2007, 73% of the stations (148, representing 134 lakes) were ranked in the classes from “moderate” to “high”.



An analysis of Northern Italy shows that 52% of the 107 stations are classified “high” and “good”. The percentages of lake quality by macro-geographic area bear relatively little significance, given the limited number of monitoring stations for the regions of Central Italy (38 stations) and the South (3 stations). This situation reflects not only the fact that a number of regions have failed to send in the data, but also the uneven distribution of lakes within Italian territory: 85% of the lake bodies (natural and artificial) are found in Northern Italy⁵.

⁴ Source: Autonomous provinces and ARPA/APPA data processed by ISPRA/ARPA Lombardy

⁵ LIMNO Project: complete, updated databank of the main morpho-metric, chemical, biological and anthropogenic characteristics of Italian lake environments.

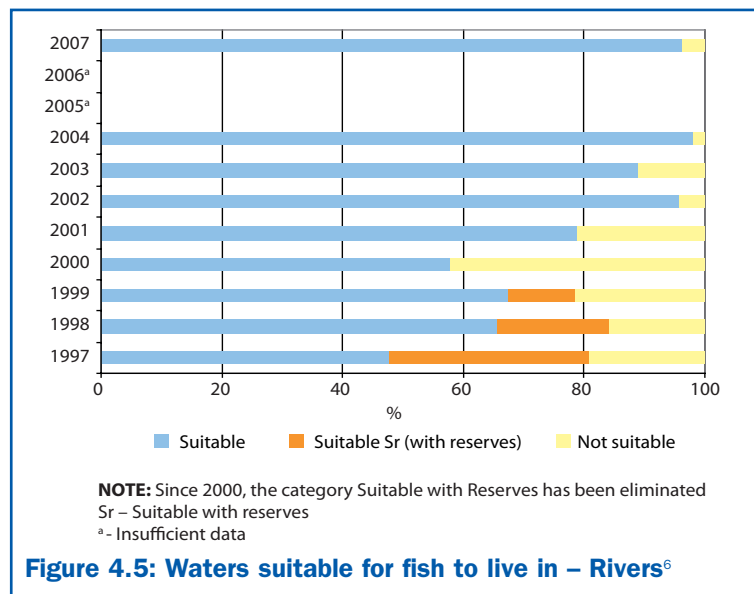


In 2007, based on the monitoring of segments of rivers and lake areas designated as being suitable for fish to live in, 96.2% of the segments examined and 100% of the lakes were found to be suitable.

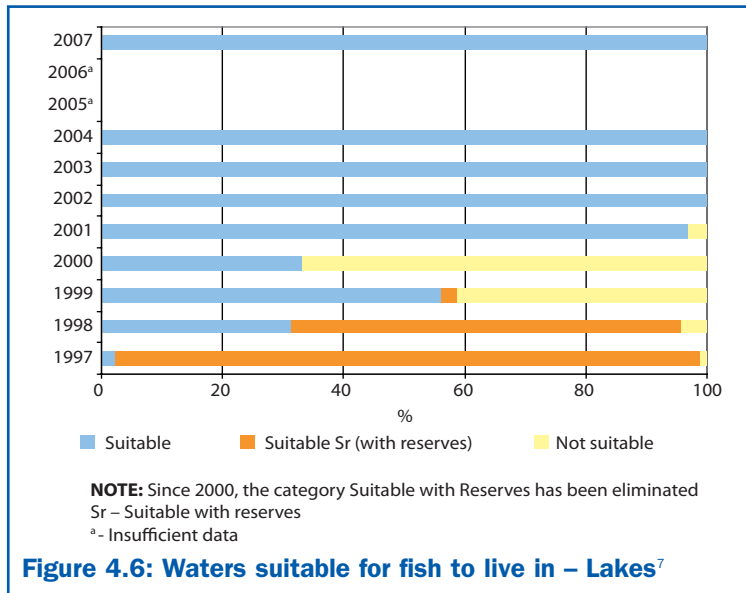
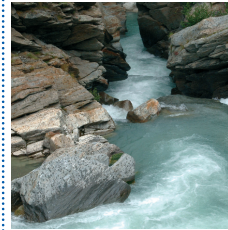
Looking ahead, and in light of the new monitoring programs carried out under Legislative Decree 152/06, which transposed the contents of Directive 2000/60/EC into Italian legislation, it can be assumed, in the case of surface water bodies (rivers and lakes), that the stations ranked in ecological quality classes 1 and 2 (SECA and SEL) belong to water bodies that should not present particular problems in achieving the quality objective set under the new legislation.

Another assessment of the water bodies quality regards the satisfactory state of segments of waterways and of lake areas requiring protection or upgrading to be suitable for fish life.

The monitoring data for 2007 (on 14 regions) show that the state of the designated waterways complies with the irremovable values found on Table 1/B – Annex 2 – Part III of Legislative Decree 152/06 for chemical and physical parameters, and that only 3.8% of the segments classified are not suitable (Figure 4.5). Lake bodies, on the other hand, proved 100% suitable (Figure 4.6).



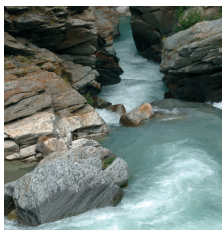
⁶ Source: Regions and the Autonomous provinces data processed by ISPRA



The monitoring for 2007 (data on 7 out of 15 coastal regions) of marine and brackish areas suitable for mollusc life, designated by regions, sites and natural populations of bivalve and gastropod mollusc-beds, requiring protection and/or upgrading, in order to improve the quality of the molluscs as food, regards a total of 66 designated areas, of which 45 are marine zones and 21 brackish areas. A ranking of suitable was given to 47 areas, of which 36 are marine and 11 brackish (Table 4.1).

Looking at marine areas and brackish waters suitable for molluscs to live in, 47 were found to be so, consisting of 36 marine areas and 11 brackish zones.

⁷ Source: Regions and the Autonomous provinces data processed by ISPRA



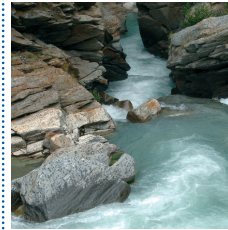
Suitability of marine and brackish areas designated for molluscs to live in.

Table 4.1: Waters designated as suitable for molluscs to live in (2007 monitoring)⁸

Region	Designated Areas									
	TOTAL		Marine		Suit able	Un- suit.	Brackish		Suit able	Un- suit.
	n.	km ²	n.	km ²	n.	n.	km ²	n.		
Veneto	8	684	1	46.5	1	0	7	637	5	2
Friuli Venezia Giulia	12	312	10	204	6	4	2	108	0	2
Liguria	2	3,92	2	3,92	2	0	0	0	0	0
Emilia Romagna	13	1,784	11	1,748	11	0	2	36.5	1	1
Tuscany	-	-	-	-	-	-	-	-	-	-
Marche	-	-	-	-	-	-	-	-	-	-
Lazio	3	-	3	-	3	0	0	0	0	0
Abruzzo	-	-	-	-	-	-	-	-	-	-
Molise	11	65.5	11	65.5	11	0	0	0	0	0
Campania	-	-	-	-	-	-	-	-	-	-
Basilicata	-	-	-	-	-	-	-	-	-	-
Apulia	-	-	-	-	-	-	-	-	-	-
Calabria	-	-	-	-	-	-	-	-	-	-
Sicily	-	-	-	-	-	-	-	-	-	-
Sardinia	17	-	7	-	2	5	10	-	5	5
TOTAL	66	2,849	45	2,068	36	9	21	781.5	11	10

The designated waters are considered suitable when the parameter values contemplated under the legislation fall within the guideline values or satisfy the irremovable limits listed on Table 1/C - Appendix 2 - Part III of Legislative Decree 152/06. The waters were found to be suitable for 100% of the samples in terms of organic-halogen substances and metals; for 95% of the samples in terms of salinity and dissolved oxygen; for 75% of the samples in terms of pH, temperature, colouring, suspended materials, hydrocarbons originating from petroleum, faecal coliforms and algae bio-toxins.

⁸ Source: Regions and the Autonomous provinces data processed by ISPRA



Legislative Decree 152/99 has defined the “environmental status” of underground waters, which consists of the “quantitative” and “chemical” status. To date there are no data available on quantity, but only on “chemical” status, meaning the figures used to establish the SCAS (Chemical Status of Underground Waters) index. Expressed in 5 classes (1-2-3-4-0), this index indicates the quality of the zones subject to the most critical environmental conditions: the first three classes stand for levels of quality from good to moderate, while the remaining two point to poor quality: on account of anthropogenic contamination, in the case of class 4, and of natural origin with class 0. The contaminants of anthropogenic origin include nitrates, which, beyond the limit of 50 mg/l (drinking water limit), are responsible for the demotion to class 4 of many regions. Their presence is correlated to widespread pollution, such as the use of nitrate-enriched fertilisers, the disposal of livestock waste, poor management of slime and dispersion from sewage systems, as well as specific sources of pollution, such as plants for the treatment and discharge of urban and industrial liquid waste that has not been denitrified. Apart from nitrate pollution, a number of dangerous substances of unmistakable anthropogenic origin were found to be present at certain sampling points, such as plant care products, aliphatic halogenate compounds and aromatic polycyclic hydrocarbons, plus certain heavy metals (primarily chrome, lead, nickel and zinc).

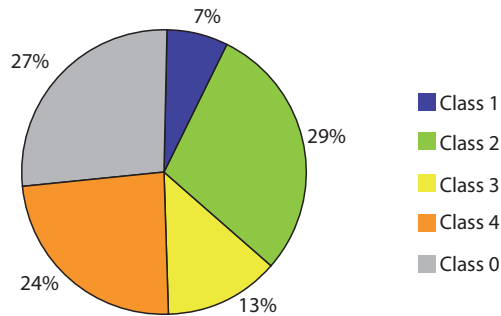
The presence of arsenic, iron, manganese, the ammonia ion, sulphates, chlorides and conductivity beyond the legal limit has been attributed by various regions to natural causes, in certain hydrogeological settings, producing a class 0 result.

The results for 2007 (Figure 4.7) show that 49% of the sampling points present a chemical status falling within classes 1 to 3, meaning a level of quality between good and moderate, while poor quality due to anthropogenic causes was observed at 24% of the points, with the remaining 27% were rated poor due to natural causes (the specific hydrogeochemical conditions of the water tables).

The Chemical Status of Underground Waters defines the quality of water tables and is obtained by analysing their content of both pollutants originating from anthropogenic activities and chemical substances which, though natural in origin, can nevertheless compromise the use of the water.



In 2007, on a national level, out of 2,890 sampling points distributed in 11 regions and 2 autonomous provinces, 49% present a chemical status ranked between classes 1 and 3, while 24% are characterised by water of poor chemical quality due to causes of anthropogenic origin, and the remaining 27% are rated poor due to natural causes.



Note: Judgment of quality attributed to the classes:

Class 1 – Anthropogenic impact non-existent or negligible, with excellent hydrochemical characteristics;

Class 2 – Anthropogenic impact limited and sustainable long-term, with good hydrochemical characteristics;

Class 3 – Anthropogenic impact noteworthy and hydrochemical characteristics generally good, but with certain signs of compromise;

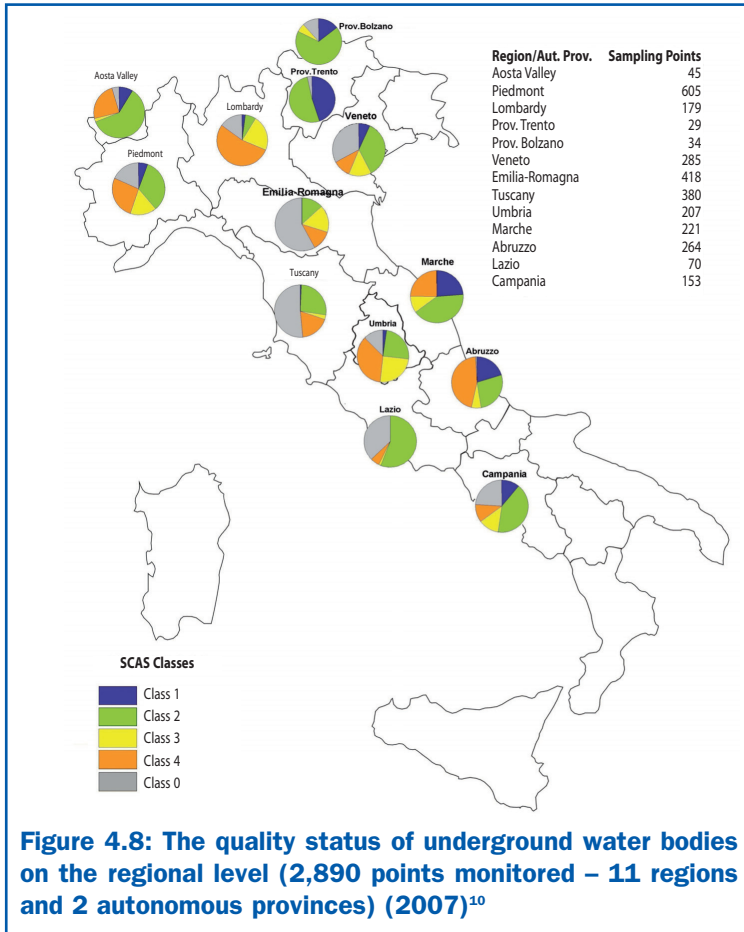
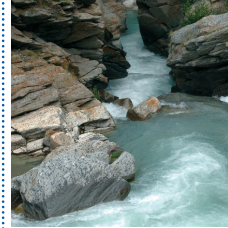
Class 4 – Anthropogenic impact significant, with poor hydrochemical characteristics;

Class 0 – Anthropogenic impact non-existent or negligible, but with certain natural hydrochemical *facies* present in concentrations above the class-3 levels.

Figure 4.7: Sampling points for SCAS quality classes (2,890 points – 11 regions and 2 autonomous provinces) (2007)⁹

Considering the different numbers of monitored points in the regions and autonomous provinces (from a minimum of 29 to a maximum of 605), Figure 4.8 shows that, in the autonomous provinces of Trento and Bolzano, and in the regions of Marche, Aosta Valley, Campania, Lazio, Veneto, Piedmont and Abruzzo, 97% to 53% of sampling points ranked within classes 1 to 3. The highest percentages for class 4 were the respective figures of 54% and 46% registered in Lombardy and Abruzzo. Finally, 58% of the monitoring points in Emilia Romagna and 52% of those in Tuscany fell under class 0, for bad quality on account of natural causes.

⁹ Source: Regions, Autonomous provinces and ARPA/APPA data processed by ISPRA/ARPA Emilia Romagna



The numbers of sampling points in the regions vary widely (from 29 to 605). In the autonomous provinces of Trento and Bolzano, and in the regions of the Marche, Aosta Valley, Campania, Lazio, Veneto, Piedmont and Abruzzo, the percentages of sampling points ranked in classes 1 to 3 range from 53% to 97%, while 54% of the points in Lombardy are ranked class 4, and 58% of those in Emilia Romagna fall in class 0.

The waters of the Venice Lagoon constitute a case apart. For these waters, which belong to an especially valuable ecosystem, and one subject to marked anthropogenic pressures, objectives of coastal water quality were set in the Inter-Ministerial Decree of 23 April 1998 (“Ronchi-Costa”). These objectives do not repre-

Water quality objectives for the Venice Lagoon are set under the “Ronchi – Costa” Decree.

¹⁰ Source: Regions, Autonomous provinces and ARPA/APPA data processed by ISPRA/ARPA Emilia Romagna

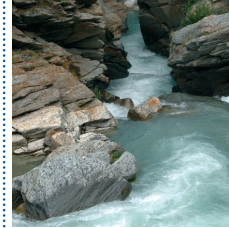


sent legal limits, but rather concentrations of pollutants in lagoon waters to be aimed at in order to ensure the protection of human health and the integrity of the lagoon ecosystem, and they are to serve as an aid in defining environmental policies for the protection and the environmental restoration of the Lagoon.

In setting these criteria, a variety of different factors must be taken into account, including the different types of contaminants involved. The first priority is to guarantee that pollutants do not accumulate in the lagoon environment, and in particular in the sediments and the organisms that populate the lagoon, making possible self-purification of the environment. It is also of fundamental importance that controls be run on bio-accumulative products, such as dioxins and other persistent organic pollutants (POP¹¹) of synthetic origin, which tend to last for lengthy periods in water-based environments. An obvious reference for the formulation of objectives of quality is the environmental condition of comparable areas where anthropogenic influxes are negligible. As for the substances present naturally in the environment (macro-constituents, metals etc.), reference can be made to the background values, meaning, in this case, the waters of the Adriatic Sea, which replenish the Lagoon. In this way, the range within which a quality objective may be set for the lagoon environment has a lower limit consisting of the figures taken from the reference environments or the background values and an upper limit established on the basis of evaluations of toxicity and ecotoxicity, as well as the assigned uses of the different lagoon settings, should such exist.

Based on these considerations, the “Ronchi-Costa” Decree introduced two values as objectives for the Venetian Lagoon: the “guide” value, which can be compared with the background situation, and the “imperative” value, which is higher than the first figure, but not higher than the values that point to a threat to human health or water life. Furthermore, the “Ronchi-Costa” Decree has set a single value as the objective for the entire Lagoon, without any distinction between imperative and guide values, thus ignoring considerations on the different lagoon settings and their specific designated uses.

¹¹ Persistent Organic Pollutant



There can be no doubt that, thanks to anti-pollution efforts involving industrial waste discharge in the Porto Marghera area, as well as the water flowing into the entire drainage basin and the historic core of Venice, the quality of the lagoon water has improved decisively over the last few decades. Nevertheless, there is growing concern over the ubiquitous presence of chemical substances produced by man: the POP and substances capable of interfering with the endocrine system, including dioxins and polychlorobiphenyls, which, though found in the waters at only trace levels, are capable of accumulating in tissues, first those of animals and then man, with a series of grave repercussions on health and the environment.

For this reason, the Decree of 23 April 1998 set imperative values for POP that were extremely low (0.013 pg/L I-TE for dioxins and 40 pg/L for polychlorobiphenyls), without fixing guideline values, seeing that the required level is so low as to not be observable with even the most sensitive analytical techniques commonly in use. The refinement of environmental monitoring techniques has made it possible to detect hazardous substances at the levels stipulated for the quality objectives for the lagoon, and to determine the pollution status of waters due to POP and to other pollutants, an indispensable precondition for the planning and orientation of initiatives of environmental defence.

The main causes of alteration

Water is a resource subject to multiple and widely varying forms of pressure, as a result of massive human settlement in the territory, as well as the dimensions of the production system, including services, small and medium size industry (SME), large-scale industry and the sectors of energy, agricultural and livestock. The areas highly settled by man constitute a critical component in the elevated water demand for civic, industrial, agricultural and recreational uses, as well as the equally voluminous flows of waste needing to be purified. In certain cases, the systems of collection and purification prove to be inadequate and not suitable (in terms of potential, levels of processing, absence of appropriate measures to control stormwater runoff) for reducing the pollution content of the volumes of sewage and industrial waste water produced by vast areas of devel-

An improvement has been observed, in recent decades, in lagoon waters, thanks in large part to the anti-pollution efforts involving industrial waste discharges in the Porto Marghera area. Of continuing concern is the presence of chemical substances, POP, dioxins and polychlorobiphenyls.

Refinement of monitoring techniques.

The massive human development of the territory, plus the dimensions of the production system, place noteworthy pressure on national water resources.



The Framework Directive on Water calls for examination of the impact of human activities on the status of water.

The noteworthy use of fertilisers and plant care products has an impact on water life, in addition to modifying the quality of surface and underground waters.

The quality of water resources is influenced both by widespread pollution and specific industrial discharges, as well as by the civic purification system.

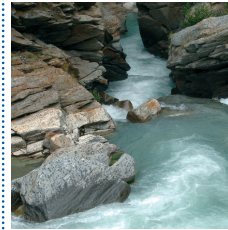
opment. A further difficulty is monitoring industrial discharges precisely, as well as the lack of awareness of such problems on the part of some operators in the various production sectors.

Of particular note, from this perspective, is the absence of a full national information framework on industrial discharges, regarding both quality and quantity, a key instrument in attempts to meet the obligations arising from the legislation in force, which calls for the implementation of measures designed to reduce the pollution caused by the substances referred to above. Along these lines, it should be remembered that art. 5 of the Framework Directive on Water calls for an analysis of the impact of human activities on the status of surface and underground waters within four years of its enactment. Another problem tied to areas developed by man regards pollution caused by the runoff from sealed soil in urban areas and in zones falling within the range of small-scale industrial and service activities. The intensive use of fertilisers in agriculture (mineral, organic, organo-mineral fertilisers and soil enhancers), as well as plant care products (herbicides, fungicides, insecticides, miticides and various others), used to defend crops against parasites and pathogens, to control the development of infesting plants and to ensure greater quantities and higher quality standards of agricultural products, can potentially have an impact on water life, in addition to modifying the quality of both surface and underground drinking water.

The shortcomings in the quality of water resources are traceable not only to widespread pollution from fertilisers and plant-care products, but also to inadequacies in the design and operation of the civic purification system, as well as the difficulty of controlling water supplies and discharges in the sectors of agriculture and industry, plus insufficient government efforts in terms of policies to heighten awareness and provide incentives for practices leading to sustainable use.

Actions designed to protect water quality

The defence and improvement of the overall state of water resources draws on a variety of different instruments of legislation, control, planning and management that result in increasingly elaborate and complex policies, seeing that the objectives to be reached call for integrated initiatives on different levels.



On the national level, the key planning instrument for formulating strategies of action regarding water is the Water Defence Plan (PTA) drawn up by the regions, in accordance with art. 121 of Legislative Decree 152/06. This specific sector plan has to contain not only initiatives designed to guarantee the achievement or maintenance of quality objectives, but also the measures needed to defend the levels of quality and quantity of the water system.

Approval of this plan by the regional governments (art. 44 of Legislative Decree 152/99), together with the first characterisation of significant watersheds and the classification of the environmental status of surface and underground water bodies, based on the monitoring carried out under Legislative Decree 152/99, have made it possible, to date, to obtain excellent knowledge of the status of water resources.

The current national situation, in terms of Defence Plans, consists of six plans that have been implemented (Veneto, Liguria, Marche, Campania, Apulia and Sicily) and eight plans that have been approved (Aosta Valley, Piedmont, Lombardy, the Autonomous Province of Trento, Emilia Romagna, Tuscany, Lazio and Sardinia). With its Decree no. 3243 of 2004, the government of the Autonomous Province of Bolzano approved a "separate plan for limiting drainage basins in sensitive areas".

Finally, the Umbria Regional Government approved preliminary passage of a Protection Plan with its Resolution no. 1175 of 16 September 2008.

With the passage of Legislative Decree 152/06 (art. 121), the deadline for the approval of defence plans by the regions was extended to 31 December 2008.

In terms of planning and management tools for the defence of aquatic resources, the legislation required that the regional governments present programs of measures for water bodies used for drinking, in order to ensure a constantly increase water quality.

The measures undertaken by the regions consist primarily of works meant to maintain and upgrade the systems for collecting and purifying waste water; poor management of such facilities represents one of the main causes of the pollution of drinking water. In order to be used or allocated for the production of drinking

The Water Defence Plan makes possible updated knowledge of the state of the resource, plus definition of environmental objectives and of the measures to be undertaken, as well as control of their effectiveness.

To date, 6 PTAS have been implemented and 8 have been approved.

To defend the resource, the regions must present programs of measures for water bodies to be used for drinking supplies.



*Decrease in the number of water bodies subject to improvement.
Increase in the programs of measures.
Sardinia the region with the highest level of critical problems.*

water, surface waters are ranked by the region, based on the physical, chemical and biological characteristics contemplated under the legislation, and classified as: A1 (requiring simple physical treatment and disinfection); A2 (requiring normal physical and chemical treatment and disinfection); A3 (requiring intensive physical and chemical treatment, refinement and disinfection); subclass A3 (waters that present parameters beyond the allowable limits, which the regions may exceed in the event of flooding, natural disasters, exceptional meteorological circumstances or extraordinary geographic conditions, assuming there is no threat to human health).

Monitoring for 2005/2007 showed a decrease from 78 to 60 in the number of water bodies used for drinking supplies and subject to improvement. Still, the number of programs of measures presented rose from 110 to 130. The region that presented the greatest number of programs was Sardinia (47), followed by Lombardy (26), Tuscany (22) and Veneto (14).

The elevated number of programs presented by Sardinia was due both to the presence of the greatest number of water bodies classified sub A3 (making it the region with the highest level of critical problems involving quality) and to the virtuous approach of the Regional Government, which procured the funds for the activities in question. The other regions with water bodies sub A3 are Liguria and Emilia Romagna.

Given that the official classification of water bodies used for drinking supplies has still not been published by the Ministry of Health, only those water bodies for which the regional governments drew up programs of measures in the three-year period 2005-2007 have been considered for this edition, meaning that not all of the classified water bodies nor all of the water bodies subject to improvement are included.

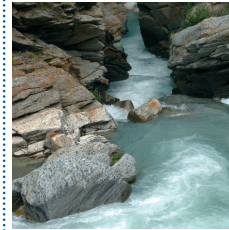


Table 4.2: Number of water bodies for drinking supplies subdivided by categories, and for which programs of measures have been implemented (2005-2007)¹²

Region/Autonomous Province	A1	A2	A3	Sub A3	Number of water bodies subject to improvement	Programs of measures (three-year period 2005-2007)
Piedmont	0	0	4	0	4	4
Aosta Valley	0	0	0	0	0	0
Lombardy	2	6	1	0	9	26
<i> Bolzano Bozen</i>	0	0	0	0	0	0
<i> Trento</i>	0	0	0	0	0	0
Veneto	0	0	3	0	3	14
Friuli Venezia Giulia	0	4	0	0	4	4
Liguria	0	0	3	2	5	6
Emilia Romagna	0	0	1	2	3	5
Tuscany	0	0	18	0	18	22
Umbria	0	0	0	0	0	0
Marche	0	0	0	0	0	0
Lazio	0	0	1	0	1	2
Abruzzo	0	0	0	0	0	0
Molise	0	0	0	0	0	0
Campania	0	0	0	0	0	0
Apulia	0	0	0	0	0	0
Basilicata	0	0	0	0	0	0
Calabria	0	0	0	0	0	0
Sicily	0	0	0	0	0	0
Sardinia	0	0	0	13	13	47
TOTAL	2	10	31	17	60	130

The monitoring for 2005-2007 shows a large number of water bodies classified as sub A3 in Sardinia, the region with the most critical problems, followed by Liguria and Emilia Romagna.

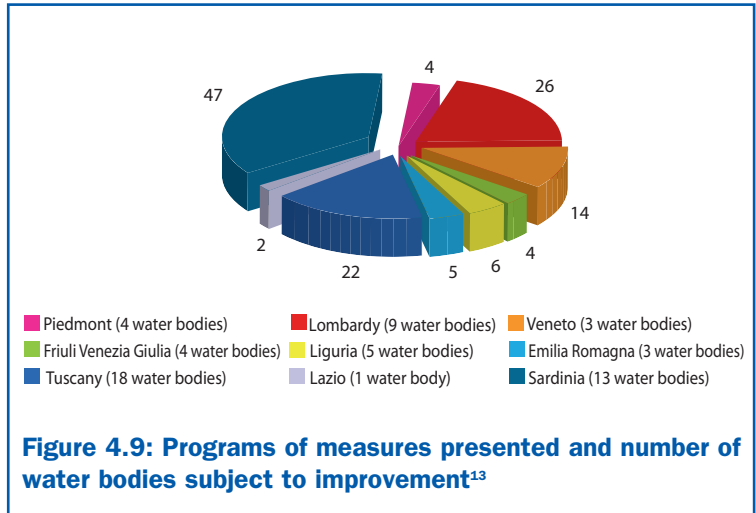
Programs of measures have been presented by 9 regions: Piedmont, Lombardy, Veneto, Friuli Venezia Giulia, Emilia Romagna, Tuscany, Liguria, Lazio and Sardinia (130 programs regarding 60 water bodies) (Figure 4.9).

The programs of measures implemented in the three-year period 2002-2004 did not achieve the objective of improving the water bodies involved. In fact, for the three-year period 2005-2007, the classifications of these water bodies remained unchanged. Only following completion of the works underway will it be possible to note an improvement.

¹² Source: Regions and the Autonomous provinces data processed by ISPRA



130 improvement projects were presented by 9 regions regarding 60 water bodies. Based on the monitoring for 2005-2007, application of these programs (2002-2004) has not reached the objective of improving quality.



Improvement programs for the restoration of sites not suitable for swimming.

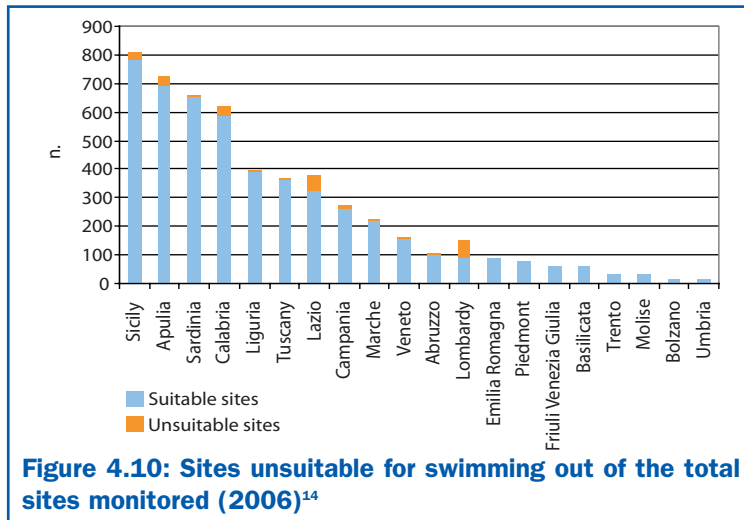
Another response instrument for protecting water quality is represented by the improvement programs of the regions for the recovery of sites not suitable for swimming.

The 2006 monitoring, performed on waters earmarked for swimming, regarded 5,265 sites, breaking down into 4,724 points for marine waters, 534 for lakes and 7 for rivers. In 2005, the number of sites classified as unsuitable for swimming was 147, while the number stood at 256 for 2006.

This worsening of the situation for all the categories of unsuitability identified under Presidential Decree 470/82, with the sites classified as unsuitable on the basis of arts. 6, 7.1/A and 7.1/B rising from 126 to 191, while those classified as unsuitable on account of insufficient monitoring (art. 7.2) went from 21 to 65 (Figure 4.10).

The decision on suitability for swimming is reached prior to the start of the swimming season, based on the monitoring carried out during the previous year.

¹³ Source: Regions and the Autonomous provinces data processed by ISPRA



The improvement programs for the restoration of sites unsuitable for swimming are another instrument of response. The 2006 monitoring, carried out on waters earmarked for swimming, regarded 5,265 sites, breaking down into 4,724 points for marine waters, 534 for lakes and 7 for rivers. The unsuitable classification was given to 256 sites.

With regard to the measures of improvement implemented for the restoration of zones unsuitable for swimming, the regional governments have sent in programs for 112 sites.

In 2006, the programs and the information presented by the regional governments decreased compared to the previous year (from 159 to 112), as did the number of sites recovered, which went from 219 in 2005 to 66 in 2006. Overall, the total number of sites to be recovered, including those of earlier years, is 719. The reason for the small number of sites recovered each year and the large number still to be recovered is the lengthy periods of time needed to implement the measures.

In 2006 the number of programs presented by the regional governments decreased. Only 66 sites were recovered for swimming.

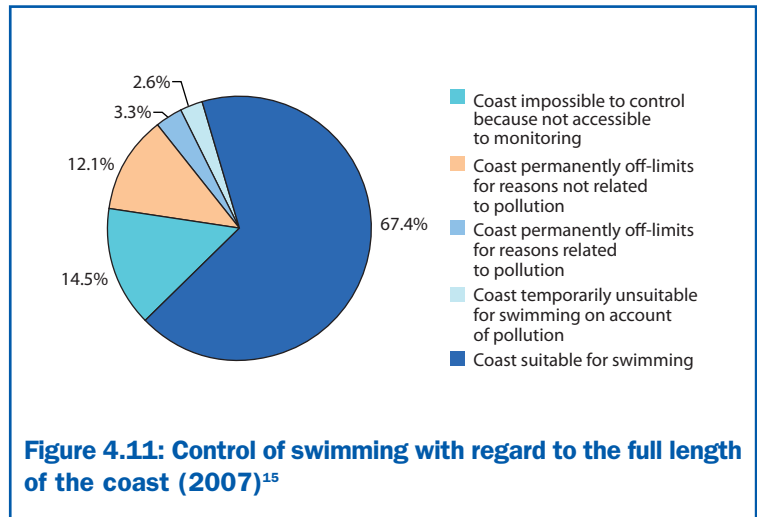
Data are also available on the portion of Italian coastal waters controlled suitability for swimming (Figure 4.11). These controls show the variations in the length of coastal waters suitable for swimming as a result of temporary bans due to pollution in areas where reclamation measures are to be carried out in order to restore suitability for swimming.

Control of the coast.

¹⁴ Source: Ministry of Labour, Health and Social Policies data processed by ISPRA



Based on the monitoring performed in 2007, between 2006 and 2007 there was an increase of approximately 28.8 km in the length of coastline suitable for swimming (from 4,941.4 in 2006 to 4,970.2 in 2007).

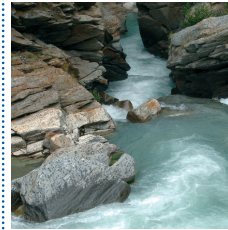


Compared to 2006, the percentage of the total coastline suitable for swimming showed a small increase of 0.34%, corresponding to approximately 29 km. This was due, at least in some cases, to the implementation of programs of improvement resulting in the recovery of portions of coastline previously off-limits for swimming. An analysis of the controls for 2007 also points to a slight decrease in the portions of the coastline temporarily off-limits to swimming. The overall picture confirms the successful implementation of a legislative tool of proven effectiveness, following a noteworthy period of application.

Initiatives for the protection of water include the construction and upgrading of collecting systems and urban waste water treatment plants.

When listing actions for the protection of water, the construction and upgrading of collecting systems and waste water treatment plants should be included. In terms of the compliance with Directive requirements and level of completeness of collecting systems and urban waste water treatment plants, Council Directive 91/271/EEC(UWWTD) concerning urban waste water treatment, set 31 December 2005 as the deadline for the technical upgrading of waste water treatment plants for all agglomerations with equivalent populations (e.p.) of more than 2,000.

¹⁵ Source: Ibidem



Compared to 2005, it has been possible to extend the assessment of compliance to treatment and sewage systems serving smaller agglomerations as well. Nevertheless, the national reference framework for 2006 is not complete, seeing that the ISPRA (formerly the APAT) has received information on only 14 regions, plus the autonomous provinces of Trento and Bolzano.

In 2006, though all the information necessary for a complete overview has not been transmitted, the national level of compliance of purification systems was 76% for agglomerations with waste-water discharges located in normal areas and 70% for those discharging waste water in sensitive areas or drainage basins; with regard to sewage systems, the respective figures for compliance were 82% and 96%.

A critical problem affecting the overall system for rationalising the use of the resource on the national level is represented by the scarce reuse of treated waste water. In Italy initiatives involving the reuse of waste water are much more limited than in other countries, though there is a positive trend that has resulted in an increase in such efforts in recent years.

The reuse of treated waste water is governed by Ministerial Decree no. 185 of 2003. The decree regulates the designated uses and the related quality requirements, in order to protect the quality and quantity of water resources, and with the objective of limiting the procurement of supplies of surface and underground waters, reducing the impact of discharges on the receiving water bodies and favouring water savings through the multiple use of waste water.

The measure referred to above stipulates that treated waste water may be used for *irrigation purposes* (crops meant for the production of food for human and animal consumption, areas earmarked as green oases or for recreational or sports activities), *civic purposes* (washing of streets in urban population centres, feeding of heating or cooling systems, feeding of dual supply networks for the operation of the discharge plants of hygienic services) and *industrial purposes* (such as water for fire prevention, processing, washing and the thermal cycles of industrial processes).

In 2006, assessment of compliance was extended to the purification and sewage systems of smaller size agglomerations.

Though the overview of national compliance is not complete, the figures for purification systems were 76% in normal areas and 70% in sensitive areas.

Scarce reuse of treated waste water.

Ministerial Decree 185/2003 stipulates that treated waste water may be used for irrigation or for civic or industrial purposes. Reuse must take place under conditions of environmental security, in order to avoid alterations in ecosystems, the soil or crops, as well as hygienic-healthcare risks for the exposed populations.



The Nitrates Directive, in order to reduce or prevent water pollution caused by nitrates of agricultural source, calls for the member nations to carry out controls of concentrations, designate vulnerable zones, draw up codes of good practices etc.

Systematic monitoring of the waters of the Venice Lagoon makes it possible to evaluate the effectiveness of the restoration measures implemented.

A integrated and sustainable operating strategy.

The reuse must occur under conditions of environmental security, avoiding alterations in the ecosystems, in the soil and in crops, as well as hygienic-healthcare risks for the exposed population, all the while complying with the measures currently in force on health and safety, as well as the rules of proper industrial and agricultural practice.

With reference to pollution caused by nitrates from agriculture, in '91 the Council of the European Communities passed Directive 91/676/EEC (the Nitrates Directive), transposed into Italian Law first under Legislative Decree 152/99 and then under Legislative Decree 152/06, for the purpose of reducing or preventing the pollution of waters caused either directly or indirectly by nitrates from an agricultural source. Following implementation of this decree, the member states are required to carry out controls on the nitrate concentration of waters, to designate “vulnerable zones” and to draw up action programmes for the same, in addition to formulating Codes of Good Practice and drawing up programs for training and informing farmers.

Of the measures undertaken to protect the Venice Lagoon, the systematic continuation of the monitoring of lagoon waters by the Waters Magistrate is definitely worthwhile. This will make it possible to assess, over time, the effectiveness of the environmental restoration measures implemented in the Venice Lagoon, which, given its complex, distinctive characteristics, has always constituted a “test case”, providing both inspiration and a framework for evaluation of subsequent measures issued, and initiatives implemented, in the rest of the national territory.

The European strategy for the sustainable use of water resources has led to noteworthy changes in Community and Italian legislation. In order to complete the progress made by transforming the EU directives into Legislative Decree 152/06, further measures are planned. The recently issued Ministerial Decree 131/2008 regards the technical criteria for categorising and identifying water bodies and for analysing pressures and impacts. Once the European Community measures have been fully transposed into Italian law, it shall be possible to obtain data and information that can be used to describe water quality, potentially by means of new biological indicators.