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Protection, Restoration and Enhancement of Salmon Habitat
Focus Area Report

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I – **Introduction**

With 3,580km of western coastline, France has great potential for migratory diadromous species.

The Atlantic salmon (*Salmo salar)*, which was once abundant in all watercourses along the Atlantic, English Channel and North Sea coasts, is now among those species whose situation is of cause for concern, justifying its inclusion on the IUCN 'Red List' of endangered species.

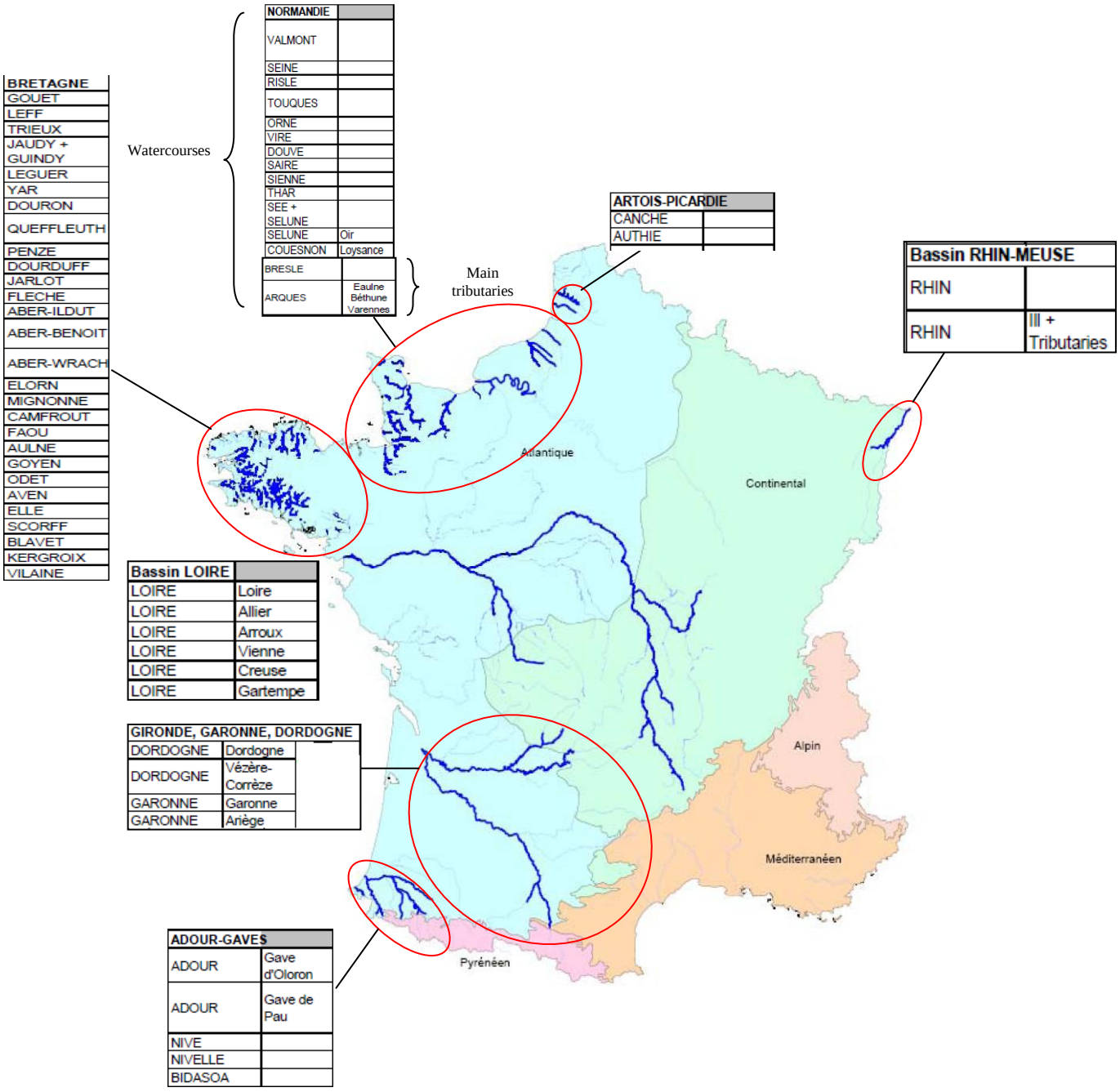
All French Atlantic salmon populations have declined, and in some cases have become locally extinct, as a result of various kinds of freshwater habitat changes which have been made, such as barrier construction, embankment building, river bed alterations and pollution.

As a result, Atlantic salmon now only inhabit approximately 50 watercourses or river basins in France (see figure 1). Although Atlantic salmon populations are found from the Rhine basin (in the North-East of France) to the Bidassoa (in the southwest), natural populations are extinct in almost a third of the rivers shown in the figure, which includes the majority of large rivers in France. Stock status varies amongst the remaining rivers, with some containing natural and sustainable stocks while others are in a much more precarious situation.

As such, only some populations in the majority of the small, coastal rivers of Brittany, some watercourses in Normandy (the Sée, the Sienne...), Picardy (the Bresle, Arques...) and the Gaves (a French term for certain rivers in the Pyrenees region) of the Atlantic Pyrenees, seem to be in a satisfactory situation.

This highlights the need to continue with the efforts undertaken since the first national 'Salmon Plan' established in 1976, with the aim of restoring independence and self-sustainability to salmon stocks.

Figure 1: Watercourses frequented by salmon in France



II - Salmon habitat in France

II.1 - Historical records

Although salmon were once abundant on all watercourses along the Atlantic, Channel and North Sea coasts, the area inhabited by the species has considerably declined. It is estimated that in the 18th century, the number of salmon returning to the French watercourses (shown in figure 2a) was circa 800,000 (MacCrimmon and Gots, 1979). It has also been estimated that at that time there were 2,200 hectares of salmon spawning grounds in the Loire Valley alone.

Figure 2a: Rivers frequented by salmon in the mid 18th Century (from Thibault 1994)

Figure 2b: Rivers frequented by salmon at the end of the 19th Century (from Thibault 1994)

At the beginning of the 1900s, 75% of salmon spawning grounds were inaccessible due to the construction of numerous obstacles. As such, at the end of the 19th century, the Garonne, Somme, Cher and Meuse basins were rarely frequented by salmon, as shown in figure 2b.

Figure 2c: Rivers frequented by salmon at the end of the 20th Century (from Thibault, 1994)

At the beginning of the 1990s, salmon had entirely disappeared from all, or part, of some basins such as the Rhine, the Somme, the Seine, the Rance, the Upper Loire, the Garonne, the gave de Pau, as well as from tributaries to the the Dordogne and the mid-Loire (figure 2c). Furthermore, salmon runs in almost all watercourses on the Picardy and Normandy coasts (the Canche, Authie, Yères, Risle Orne, Vire…), some very small rivers in Brittany, the Sèvre Niortaise, the Charente and the Dordogne and Garonne basins were irregular or very small.

However, even though the drainage basin area inhabited by salmon had greatly decreased, there were still significant returns to the Bresle and the Arques (Haute Normandie), around 25 watercourses in the Amoricain Massif, the Allier, the gave d'Oloron, the Nive and the Nivelle at the beginning of the 1990s (Thibault, 1994). Since then, the Allier and Nivelle populations have drastically declined, leading to fears for their continued existence in the natural environment in the short to mid term. In fact, only 5 main drainage basins or regions now support natural salmon populations (the Adour and Loire-Allier basins and the Picardy, Normandy and Brittany regions).

Efforts and protection measures taken in recent years have led to the return of salmon, albeit still dependent on stocking, to the Garonne and Dordogne basins, some tributaries of the Loire and, in a more sporadic manner, to the Upper Rhine (the Ill and its tributaries). This has resulted in distribution as shown in Figure 1 and the provisional conservation status as shown in Annex 1.

II.2 - Causes of habitat degradation

Population decline in almost all of the basins still inhabited by salmon can be attributed the construction of numerous obstacles. A unique national frame of reference, compiled of several databases, has revealed (before consolidation) that there are over 60, 000 obstacles on French rivers. Not only do some of these obstacles prevent access to upstream spawning grounds, the reservoirs they create also flood many other potential spawning and nursery sites.

Despite the fact that since the first restoration plan in 1976 it has become common for obstacles to be equipped with fish-passes, a large number of potential nursery areas remain inaccessible or difficult to access. If other physical alterations to habitat are taken into account, such as embankment building or gravel extraction, it becomes apparent that the vast majority of former spawning grounds have been lost. For example, it is estimated that in the French part of the Rhine basin, around 90% of the productive area has disappeared (Roche, 1996).

Finally, the situation is exacerbated by pollution. In addition to the problems caused by anoxia in some spawning grounds and migration routes, the accumulation of different pollutants can sometimes cause a chemical barrier. The increased build up of pollution in the Gironde and Loire estuaries are good examples of this phenomenon.

II.3 - Current habitat status

II.3.1 Habitat Quantity Assessment

Thanks to several studies carried out since the beginning of the 1990s, it is possible to estimate the maximum area of available nursery habitat before other environmental variables may affect it.

Using the pool and riffle equivalent area method (SERR) to assess the area in which salmon can reproduce, it is estimated that the current available habitat is approximately:

- 130 hectares in the Rhine Basin (Roche, 1996; Clair et al., 2009)
- 390 hectares in the Adour Basin (Chansea, pers. com)
- 200 hectares in the Garonne Basin (Bosc and Chanseau, 2006)
- 225 hectares in the Dordogne Basin (Chanseau and Guerri, 2007)
- 310 hectares in the Loire Basin (data from LOGRAMI and CSP)
- over 230 hectares in the small coastal rivers of Brittany (Arago and Vauclin, 2000).

II.3.2 – Habitat Quality Assessment

Water quality is an important factor for migratory species. Water pollution affects all stages of these species' development, both in spawning and nursery areas and on migratory routes.

Using information provided by Public Sector Water Agencies, Regional Government Divisions (DIREN) and the French National Agency for Water and Aquatic Environments (ONEMA), it is possible to assess the biological and physico-chemical quality of salmon habitat. The following indicators have been selected, according to the availability of information, to carry out this assessment:

- The quantity of organic and oxydisable matter, as this affects the quantity of dissolved oxygen which is an essential factor in salmon reproduction and juvenile development.
- The quantity of nitrates and phosphates as they increase the risk of eutrophication and environmental anoxia.
- The River-Fish Index (IPR), the Standardised Biological Global Index (IGBN) (based on macro-invertebrates) and the Biological Diatom Index (IBD), as each of these highlight different aspects of the ecological quality status of a watercourse.

It should be noted that in general, while water quality tends to deteriorate downstream, pollution caused by pesticides and toxic materials (which appears to be localised at present) tends to be downstream of large towns.

II.3.2.a The Rhine Basin

Water quality:
The physico-chemical quality of watercourses frequented by salmon, such as the Rhine and the Ill, is generally good to moderate, although it varies greatly throughout the basin (Annex 2). However, there are still problems concerning organic matter and phosphates in the Ill's tributaries. Furthermore, the Ill is heavily polluted by mercury from upstream of the outskirts of Mulhouse.

Finally, as shown in Annex 3, the biological quality of salmon rivers in the Rhine basin is generally moderate.

Access to spawning grounds:
As shown in Annex 4, access to spawning grounds is highly affected by numerous obstacles. The Vieux-Rhin, with approximately 50 hectares of nursery habitat, is currently inaccessible. Similarly, the recovery of the Ill is proving very problematic as a number of barriers prevent free passage along the migratory route. At present, only the Bruche (the most downstream tributary of the Ill) is easily accessible, and this access is limited to the first 8.5km, which is downstream of the optimal spawning and nursery areas.

II.3.2.b The Adour Basin

Water quality:
Watercourses in this basin are generally of acceptable quality, with variations occurring between rivers and dependent on the nature of the modifications made (Annex 5). The Adour, which is of moderate

quality regarding macro-pollutants (organic matter, nitrates and phosphates), deteriorates as it flows downstream to the extent that it is of poor quality at its confluence with the Midouze.

However, the Gaves and the Nive are of good to moderate physico-chemical quality.

Ecological status in the basin tends to be good. However there are some areas, particularly on the Adour, which are of bad ecological status (Annex 6).

Access to spawning grounds:
Despite the installation of numerous fish passes over the last few decades, significant problems remain. It is estimated that of the 94 recorded obstacles on the gave de Pau, the gave d'Oloron, the gave d'Aspe, the gave d'Ossau, the Vert, the Saison, the Grande Nive and the Nive de Baïgory rivers, almost half are likely to affect salmon stocks to some extent. Furthermore, almost 15% are major obstacles due to their impact or their position on the migratory route.

Finally, it is estimated that over 130 hectares of habitat, i.e. almost a third of that available, is either little or not used by salmon (Chanseau, per.com.). This area includes the most upstream sections of the basin's watercourses, which are difficult if not impossible to access (Annex 7).

II.3.2.c The Garonne and Dordogne Basin

Water quality:
Although water pollution levels are not totally unacceptable in the Dordogne basin, which has few large towns, little industry and little intensive agriculture, there are three main sections where water quality is a problem for salmon:

- the most downsream section of the Cère, particularly near Biars sur Cère;
- the Corrèze and the Vézère, near the town of Brive;
- downstream of Saint Céré on the Bave.

These sections cover approximately 44 hectares, or almost 20% of the habitat recorded in the basin.

Water quality problems are also found in the Garonne sub-basin, particularly downstream of large towns such as Toulouse (Annex 5), where summer temperatures and flow levels can be problematic if not limiting.

The basin is generally of good ecological status, although there are some areas of lower quality, especially on the Garonne downstream of Toulouse (Annex 6).

Access to spawning grounds:
At present, over 60% of the Dordogne drainage basin's area is inaccessible to migratory fish due to hydro-electric dams and a very high number of electricity sub-stations (Chanseau and Guerri, 2007).

As part of the Salmon Restoration Plan in particular, fish passes have been installed over the last 15 years to aid upstream migration on the Garonne (at Golfech, Le Bazacle, Le Ramier, Saverdun, Pébernat…). As a result, fish can once again access some of the spawning areas downstream of Carbonne on the Garonne and Labarre on the Ariège. However, there are still some 'strategic' obstacles which, despite being equipped with fish-passes, remain a problem for the free passage of fish in the basin, especially at Golfech and Toulouse on the Garonne and on the downstream section of the Ariège.

Finally, the succession of obstacles (Annex 8) can delay migration and cause difficulties for some spawners arriving too late for ideal spawning conditions.

II.3.2.d The Loire Basin

Water Quality
Generally, the Allier and Vienne basins are of good quality, while the lower sections of the Loire, the coastal areas of Vendée and the Sèvre Niortaise are much more degraded. In fact, apart from some isolated exceptions caused by waste from towns such as St Etienne on the Loire, or eutrophication problems at some reservoirs, water quality in the upstream sections of the basin is considered to be satisfactory and progressively deteriorates as it moves downstream.

The sections most polluted by nitrates are those in areas used for intensive cereal production, believed to have a moderate to strong impact on the entire drainage basin downstream of the Loire-Allier confluence and the coastal rivers of the Vendée and Sèvre Nirotaise (Annex 9). This pollutant, which leads to eutrophication, is one of the major causes of aquatic ecosystem dysfunction in the Loire basin (Vauclin, pers. com).

The downstream section of the Loire and the watercourses in coastal areas of the Vendée region are most affected by changes caused by phosphorous material (Annex 9). Additionally, the level of organic and oxydisable matter generally deteriorates from good to poor as it moves downstream. It should be noted that around the town of Orleans (mid-Loire), water-quality is classed as bad.

The Loire estuary is in a very distinct situation, as pollution from the entire basin is carried there, making it one of the most severely polluted areas. The build-up which develops in the estuary at certain times of year (especially during summer months) can become an impassable physico-chemical barrier, compromising the migration and survival of fish species.

It should be noted that, in each of the main indicators of water quality in the Loire basin (nitrogen levels, organic and oxydisable matter, phosphorous...), there has been a general improvement over the last 20 years (Annex 10). However, this improvement has not been enough to avoid anoxia problems in the estuary which can have a major impact as they coincide with periods of salmon migration, although this coincidence has been less frequent in recent years (Logrami, unpublished data).

Finally, ecological quality, which improves upstream, is moderate in the Loire basin (Annex 11).

Access to Spawning Grounds
The watercourses of the Loire Basin, the coastal rivers in the Vendée region and the Sèvre Niortaise have a large number of obstacles. In total, there are more than 10,000 in the basin, of which approximately 2,800 (on the main watercourses) will affect migratory species. Some of these can be easily passed by salmon, but as they come in quick succession (on average one every 3.4km) they can considerably delay migration. There is also a large number impassable dams in the basin's headwaters. Additionally, there are obstacles sited from the mid-sections of some Loire tributaries (Annex 12) and these could jeopardise any salmon re-stocking programmes.

Although salmon migration on the Vienne-Creuse-Gartempe route has improved with the removal of the Maison-Rouge dam on the Vienne in 1998, it is still hindered by a succession of other obstacles. Also, despite the apparent lack of major difficulties on the Loire-Arroux route, access to some spawning grounds on the Haut-Allier is very limited by the Poutès dam. The Haut-Allier is the wild salmon's last refuge in the this basin which covers 20% of the country's surface area, and 60% of the basin's habitat favourable to young salmon is to be found upstream of the Poutès dam (Vauclin per.com). In summary the widely varied access conditions in the Loire basin result in the limited distribution of salmon as shown in Annex 13.

II.3.2.e The Brittany Watercourses

Water quality:
Watercourses in Brittany are generally of moderate to poor quality concerning organic matter and nitrates. However, there appear to be few or no problems related to the quantity of phosphorous matter (Annex 9).

The situation with regard to ecological status varies widely, with some watercourses of good to high quality, while others are of moderate to poor quality (Annex 11).

Access to spawning grounds
Most salmon rivers in Brittany are small watercourses less than 70km long. They are lined with many old mills with weirs of moderate height. These can cause access problems to a large number of nursery sites (Annex 14).

Generally, there are few or no problems with regards to passage on almost a third of the watercourses in Brittany, such as the Léguer, the Douron, the Goyen, the Mignonne, the Camfrout, the Odet, the Ellé, the Elorn, the Aven, the Kergroix and the main course of the Scorff. However, passage is limited, to a greater or lesser extent, by a succession of obstacles on over a quarter of the region's watercourses, such as the Trieux, the Leff, the Jaudy, the Penzé, the Couesnon, the Aber Wrac'h, the Dourduff, the pont du Roch, and the St-Eloi.

Finally, migration is highly affected by at least one obstacle on almost 40% of Brittany's watercourses. Ecological continuity is barely, or not, assured for Atlantic salmon on some rivers, including the Guindy, the Aber Benoit and Benouïc, the Aulne, the Pont l'Abbé river, the Belon, the Dossen, the Quillimadec, the Flèche, the Guillec, tributaries to the Scorff, the Loch, and the mid-section of the Blavet and its tributaries.

II.3.2.f The Normandy Watercourses and the Seine Basin

Water Quality
In recent decades, increased quality and quantity of water treatment systems have greatly reduced the effects of urban and industrial waste in this basin, which includes the Paris area. Therefore, the main pollution black spots (both urban and industrial) affecting migratory routes or spawning grounds are declining.

Although nitrate levels are high, water quality regarding organic and oxydisable matter and phosphates is good to moderate in most salmonid watercourses in the basin (Annex 15). However, salmonid rivers in Normandy (which are mostly trout rivers) are of good to high ecological status (Annex 16).

Access to spawning grounds
An inventory carried out in 2001 estimated that there are 8,000 weirs and dams in this basin, of which few are still of economic use. Among these, over 20 large dams, approximately 100 canal locks and almost 300 hydroelectric power stations are still in use. It should also be noted that tidegates can also impede or even completely block migration.

Although at first glance the drop heights of most of these installations are low, and others are equipped with fish-pass devices, migration can still be delayed or prevented. For example, although the area inhabited by salmon in Basse-Normandie has quadrupled since 1980, the actual distribution is still greatly restricted by approximately 2,000 impassable obstacles (Annex 17).

II.3.2.g The Artois-Picardie Basin watercourses (as per the Water Framework Directive)

The Artois-Picardie basin is one of 6 River Basin Districts identified under the European Water Framework Directive (see figure 3).

Water quality
A multi-criteria analysis carried out by the Artois-Picardie Water Agency classes the physico-chemical quality of the Canche and the Authie as acceptable (Annex 18). These rivers are of good to high ecological status (Annex 19).

Access to spawning grounds
There are 31 obstacles on the Authie and its main tributaries, of which 24 impede fish migration (CSP, 1994). Less than 10% of the Authie drainage basin is currently accessible to the main migratory species as their run ends at the foot of the Douriez dam. Only a low proportion of suitable habitat is located in the accessible 46km (Annex 20).

The Regional Plan for the Protection of Aquatic Environments and the Management of Fish Resources (PDPG) for the Canche and its tributaries refers to 140 obstacles, of which 91 are impassable to salmonids. Therefore, salmon returning by the main migratory route can only access half the area.

Finally, just over half of the main course of the Bresle is inhabitable by salmon (Annex 20).

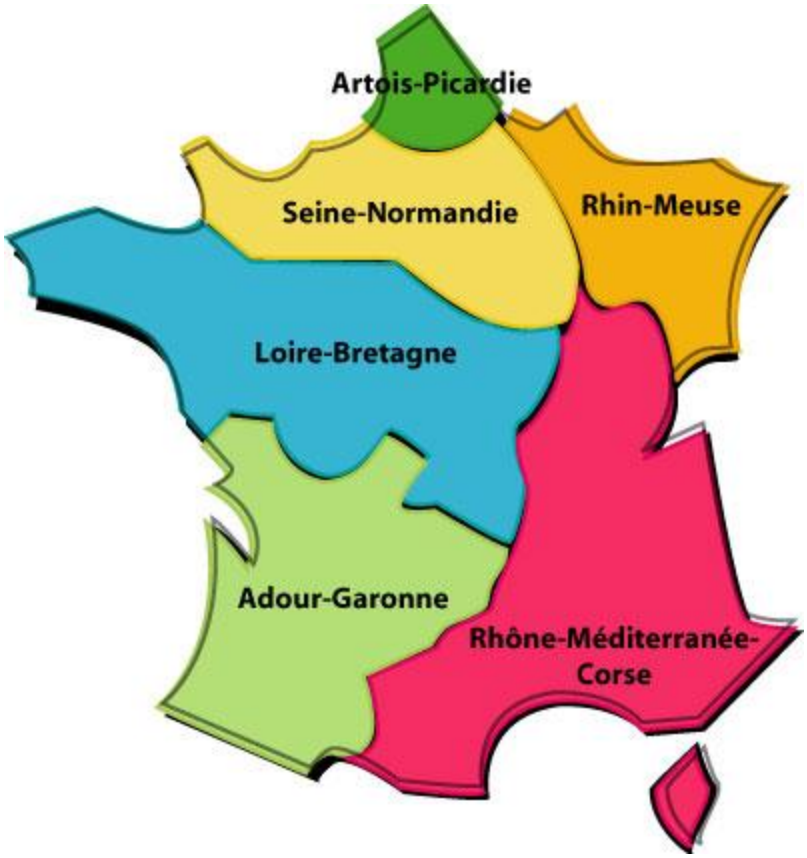


Figure 3: River Basin Districts in France, as defined under the Water Framework Directive (WFD)

III - Methods used to Identify and Designate Key Habitats and Issues to be Addressed

The identification of priority habitats and issues to be addressed is essential for the protection or restoration of salmon stocks in France. There is a variety of measures which can be coordinated at both a national level, such as the classification of watercourses, and at a more local level, such as establishing protected areas and carrying out technical studies.

III.1 - Designation of Key Habitats

III.1.1: The classification of watercourses

The regulatory framework which defines habitat preservation measures has been in place for many years. Under the Law of 16 October 1919 (amended by the 15 July 1980, 29 June 1984, 13 July 2005 laws and the recent Water and Aquatic Environments Law of 30 December 2006) relating to the use of hydraulic energy, watercourses may be classified as 'restricted watercourses'. On these watercourses no authorisation or concession for new hydraulic plants may be given (Annex 23a). As a short-term objective, the classification of some parts of salmon watercourses, under Article L.432-6 of the Environment Code, would make the installation of efficient fish pass devices obligatory.

III.1.2 Protected areas

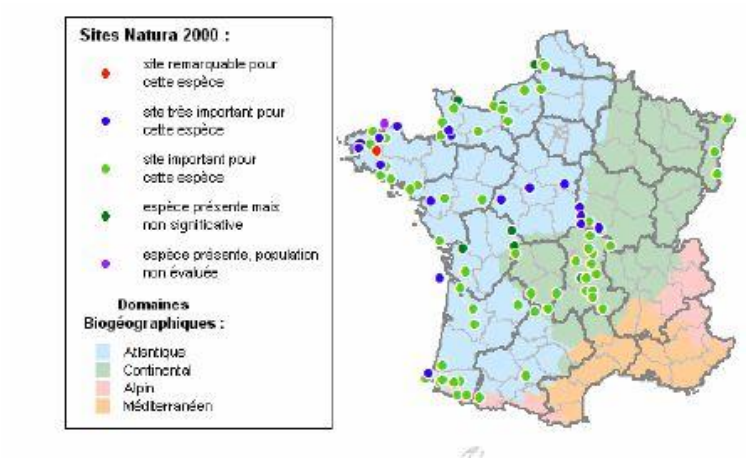
More than 80 'Natura 2000' sites have been designated for salmon under the Habitats Directive (figure 4). Annex 2 of this Directive defines salmon as a species of community interest whose conservation requires the designation of special areas of conservation in order to protect its habitat.

In addition, some habitat favourable to salmon is protected by Biotope Protection Orders (APBs) (see figure 5). Established by Order of the Prefect, this tool is widely used throughout France and aims to prevent the disappearance of protected species by implementing measures to protect their biotopes (Annex 23c).

Additionally, a less frequently used method of protecting special natural habitat of migratory species is by creating nature reserves. These protect the environment concerned by limiting the direct effects of human activity likely to degrade it and endanger the species. However, there are currently no nature reserves established to protect Atlantic salmon.

Finally, a property-based conservation policy could be implemented, by acquiring land and turning it into a natural space conservancy. The creation of protected areas by various means allows the species within to evolve and develop. This is a contractual tool, similar to Natura 2000 sites.

Figure 4: Location of Natura 2000 sites involving Atlantic salmon amongst other species (http://natura2000.environnement.gouv.fr/especes/1106.html)



Natura 2000 Sites:

- outstanding site for this species
- very important site for this species
- important site for this species
- species present but not in great numbers
- species present but population not assessed

Bio-geographical Regions:

- Atlantic
- Continental
- Alpine
- Mediterranean

Figure 5: APBs established to protect salmon habitat (http://inpn.mnhn.fr)

III.1.3 Technical studies

It is possible to assess the distribution of hosting potential in most basins due to hydromorphological studies, such as the mapping of parr habitat, which has been carried out on the majority of watercourses since the beginning of the 1990s.

The results of these studies, combined with spawning ground counts and other fish data,[1] justify the need to re-establish access to some sections of watercourses according to the potential habitat available. In some cases, they will also lead to protection for habitat and spawning areas.

III.2 - Identification of problems to be addressed

III.2.1: Radio-Tracking Programmes

Over almost 15 years, large-scale radio-tracking programmes have been carried out in various basins such as the Loire, Garonne, Adour and the Aulne (in Brittany), and have highlighted problems regarding access to production areas which, in some cases, were very serious. Problems related to passing obstacles and the causes of delayed migration are also better understood as a result of these operations.

An improved understanding of unrestricted fish movement also highlights reforms which still need to be made. It is now apparent that some problems once believed to be solved by 'traditional' methods, such as the installation of fish-passes, still exist albeit in a different manner.

III.2.2: Silting Assessments

Assessments of the silting-up of spawning grounds have been carried out in several basins, especially in Brittany. This is done by assessing survival under-gravel. As a result, hypoxia problems, caused by high quantities of fine particles in the sediment, have been highlighted. Solutions are being sought to problems caused by agricultural activity in basins.

III.2.3: Terracing-ratio Assessments[2]

Various studies estimate the artificial reduction of gradient by totalling the drop-heights of the weirs on the watercourse. It is therefore possible to calculate the terracing ratio, integrating both the break in flow caused by obstacles and the transformation of a flowing-water environment into an artificial reservoir which floods spawning and nursery sites. This can provide a note of the pressures caused by the obstacles.

III.2.4: Physico-chemical and Biological Monitoring

In general, if the information gathered through years of monitoring biological, physico-chemical, temperature and flow measurements is centralised and interpreted, it can be used to quantify and prevent damage to the habitat of aquatic species, including salmon.

[1] Standardised Global Abundance Indices specific to parr or fish by the Operational Control Network and Surveillance Control Network in connection with the Water Framework Directive.

[2] The terracing ratio is the total drop height of all obstacles over the natural gradient of a watercourse from source to mouth

IV Methods of Sharing and Exchanging Information on Salmon Habitat

Information regarding salmon and its habitat in France is shared at different levels. On the one hand, planning documents, issued after consultation with stakeholders in each of the 6 main hydrographical basins, provide overall information concerning migratory species. On the other are the specialised organisations in France, such as the "Migratory Species Associations" which produce and distribute a large part of the specific information available.

Environmental databases also provide and relay habitat-related information.

IV.1: Planning and regulatory tools

Regional Fish Plans (SDVPs) have been drawn-up in most of the 95 regions of mainland France since the 1990s. They provide guidance on the management and preservation of aquatic environments and fish fauna, particularly in connection with public decision-making. By reviewing the status of watercourses and defining goals and priority actions at a regional level, these SDVPs aid, *inter alia*, the coordination of measures to protect salmon and its habitat, according to the priorities and measures adopted at a local level.

Under the 16 February 1994 Decree (Annex 23d), Migratory Fish Management Committees (CO.GE.PO.MI) have been created in 8 major basins (Annex 21). These were created in order to establish Management Plans and better coordinate the exploitation and protection of migratory fish and their habitat.

Migratory Fish Management Plans (PLAGEPOMI) are drawn-up and adopted every 5 years. Although these do not apply solely to salmon, they recapitulate all information on migratory fish habitat within the basin in question and as such act as a means of information exchange.

Finally, since 2006, under the Water and Aquatic Environments Law, regional fishing associations and federations (both professional and amateur) must be notified of any authorisations relating to any structures, works or activities which could destroy fish spawning, nursery or feeding sites. (Article 214-3 of the Environment Code, Annex 23e). These new measures will aid the distribution of information relating to threats to salmon habitat.

IV.2: Migratory Species Associations

In France, 'Migratory Species Associations' work to protect and improve our understanding of salmon and their habitat. There are 7 of these highly active organisations in France (Annex 22), and they exchange information both by compiling study reports and through their annual activities report. Most of these associations have websites which also act as a means for information exchange.

IV.3 Environmental Databases

Environmental databases are another mechanism for sharing and exchanging information on salmon habitat.

The Water Information System (SIE), established to address stakeholders' needs for public environmental information on water, is one of the main interfaces for information exchange regarding aquatic

environments (http://www.eaufrance.fr/). This information, although not specific to salmon, relates to aspects of the species' habitat (such as water quality (basin specific databases), fish data (the BDMAP database) and integrated water management data (Gesteau)).

Additionally, the geographic database CORINE Land Cover, established as part of the European Programme for Coordination of Information on the Environment, provides general habitat information. Created, maintained and distributed by the Observation and Statistics (SOeS) Department of the Ministry responsible for the environment, the information provided can be applied to salmon habitat regarding both physico-chemical quality and threats to the environment such as water abstraction or land use.

V Habitat Protection, Restoration and Enhancement Plans

Many steps have been taken in recent years to protect and restore salmon habitat in France. These are mainly managed and coordinated at a basin-specific level.

V.1: The Implementation of Management Plans

Five-year management plans (PLAGEPOMI) which include habitat issues, are in place in all salmon basins. These plans propose necessary measures for the continuity of migratory species, including habitat protection and restoration. However, they do not provide any additional finance.

V.2: Improving Migration Conditions

The issue of obstacles to anadromous species migration was first addressed over 30 years ago in France. Today, most Water Planning and Management Development Plans (SDAGE) (five-year plans for each of the six drainage basins established under the Water Framework Directive) aim to restore ecological continuity, particularly through the removal of dams no longer considered to be of economic use. Although this has encountered many problems, there are some successful examples of dam removal, such as the Kernansquillec dam on the Léger in Brittany in 1996, the St Etienne du Vigan dam on the Upper Loire in 1998 and the Maison Rouge dam on the Vienne in the Loire basin in 1998.

Improvements are necessary in all basins, including some major watercourses where weirs and dams are already equipped with migratory fish passes. It should also be noted that while upstream migration is often addressed, little has been done to improve downstream migration due to technological limitations.

At present, there are projects underway to improve migration in some areas which pose significant problems for fish migration, such as:

- the French Rhine basin in Alsace (the Ill and its tributaries) where the access to appropriate spawning grounds has not been re-established to any extent;
- the mid sections of the Dordogne (the Bergerac, Tuilières and Mauzac dams) and the Garonne (Golfech and Le Bazacle), where the efficiency of the existing migratory passes is to be reviewed;
- the Haut-Allier (particularly the Poutès dam) and its tributaries (the Sioule, the Dore, the Alagnon), the Gartempe and the Arroux in the Loire basin.

V.3: Water Abstraction Management

Low-water Management Plans (PGEs) have been introduced, particularly under the Adour-Garonne SDAGE in 1996. These aim to address the imbalance between the competing demands for the resource from its different users and the needs of the aquatic environment itself.

By establishing water sharing and management regulations through low-level flow objectives, these plans help, albeit indirectly, to improve fish migration. However, some problems remain concerning summer water levels and temperatures in the mid Garonne for example, which are likely to limit the return of salmon, especially grilses and 1 sea-winter salmon.

V.4: Sluice Management

Since 2002 a study carried out by several local partner organisations has made possible to understand the effects of sluice water from a chain of major dams on the mid and upper sections of the Dordogne and Garonne. As a result, actions and measures to limit the impact of these dams have been proposed (Lascaux and Caseneuve, 2006).

This study has also shown that due to their frequency and size, numerous and heavy modifications to the rate of flow can cause problems during the spawning, hatching, growth and migration of fish species. The extent of the problem is highlighted by the fact that almost 128 hectares of the Dordogne basin, i.e. over half of the sections favourable to these fish, are affected by sluice water (Chanseau and Guerri, 2007).

A 'sluice challenge' has been launched, which has resulted in base flow rates increasing to 30% of mean annual flow on the Dordogne and 20% on the Garonne during periods of salmonid emergence (March – June). The acceptance of this challenge has led to a notable reduction in problems related to the drying-up of spawning grounds, and 95% of these now appear to be preserved (Chanseau and Guerri, 2007). In practical terms, the expected improvements include increased natural recruitment in the basin.

This approach, in conjunction with works on river-beds, which is being taken in order to protect some habitat susceptible to the damaging effects of sluice water, should improve the chances of success for the stocking programmes which began in the 1980s and 1990s.

V.5: Improving Water Quality

Finally, some general actions are being taken to reduce domestic and industrial pollution. It is, however, important to note that this is not being undertaken solely to protect salmon habitat.

Improvements made since the 1970s and 1980s, and the widespread construction of water treatment sites, have led to a reduction of the main pollution blackspots. Therefore, chemical pollution is today considered to be less limiting to the preservation or restoration of salmon.

The current implementation of the Water Framework Directive will ensure an improvement in salmon habitat, for both migratory routes and spawning and nursery habitat.

VI - Current and Future Initiatives

VI.1: The revision of watercourse classifications

In addition to the actions taken in connection with ecological continuity under the Grenelle Environment Conference (the blue corridor), there are plans to introduce a new classification system under Article L214-17 of the Environment Code (Annex 23f) by 2014. This system will supercede the system as defined in Article 2 of the 16 October 1919 Law and Article L432-6 of the Environment Code. The watercourses affected by this change (listed in the second paragraph of Article L.214-17 of the Environment Code) must ensure sufficient sediment transport and the unrestricted passage of migratory fish species.

VI.2: Compiling an inventory of obstacles to migration

Although most weirs and dams on salmon watercourses have already been inventoried, ONEMA are currently consolidating a database which will index obstacles to migration. This database will be a single reference point for the whole of France and will soon be complemented by a more in-depth study on the difficulties related to passing obstacles.

In time, the information will be integrated into the Water Information System (SIE), ensuring its inclusion and distribution. This should improve access to general and consistent information on ecological continuity.

VI.3: Compiling an inventory of spawning grounds

A recent development, the 25 March 2008 Decree relating to spawning, nursery and fish feeding grounds, will allow precise and statutory identification of those watercourse sections which are of potential interest for the reproduction of some species of historic or cultural interest, such as salmon. Incorporated in Articles R432-1 to R.432-1-5 of the Environment Code (Annex 23g), this decree defines spawning and feeding ground identification methods and the administrative procedures which should be implemented once the areas have been identified. Once completed (the deadline for which is 30 June 2012), it will provide some guarantee that the salmon spawning areas identified will be taken into consideration and protected.

VI.4: The physical restoration of habitat

In those tributaries which have not yet been studied, there are plans to study and restore their habitat over the next few years. One example of this is the project to restore sediment in the Vieux-Rhin, downstream of Kembs which is currently under study. In time, this project should re-energise the Vieux-Rhin by re-establishing natural sedimentary transport. The restoration of natural sediment in the pebbly and gravelly areas used for spawning should also lead to an improvement in the quality of salmon habitat in future years, with the exception of remaining problems related to access.

Similarly, natural substrate refill trials are being carried out on small watercourses in the Loire basin which have been modified by hydrological and agricultural activity. Although the restoration of salmon habitat

is not a current goal, it could be in future. This kind of physical watercourse restoration activity could, therefore, be adapted in future to benefit the principle salmonid migratory species.

VI.5: Flow Management

There are plans to implement sluice water management processes on the Garonne and Vézère similar to those already in place on the Dordogne. Additionally, projects should also be commenced to remove excessive deposits where these might adversely affect flow and to re-connect side channels which have been cut-off from the river. Together, these projects should markedly improve habitat conditions, while simultaneously reducing the impacts of sluice water.

VI.6: Updating, sharing and improving knowledge

Over the next few years a more precise method of habitat characterisation, based on usage, will be developed and distributed by the French National Institute for Agricultural Research (INRA).

As using descriptions of hydraulic features to assess a habitat's hosting potential is not entirely satisfactory, weighting factors linked to silting and other basin characteristics will be taken into account. This should lead to more precise targeting of those habitats most favourable to salmon, and to refine productive capacity estimates.

Furthermore, ONEMA is currently developing a sampling methodology regarding the current distribution of migratory diadromous species. This should lead to the creation of precise distribution maps, which would be of notable assistance in enforcing spawning ground protection regulations and in establishing the new water course classifications as defined by Article L214-17 of the Environment Code (annex 23e). In time, the Organization will be able to incorporate these into the technical advice it prepares. It is intended that the 2011 Habitat FAR will include an up-to-date salmon distribution map.

Finally, on 21 and 22 October 2009 ONEMA held a symposium in compliance with NASCO's recommendations on salmon habitat and aquaculture, with the intention of bringing together a large number of participants involved in salmon management. The presentations given can be accessed at http://colloque-saumon.oieau.fr.

Sharing experiences of the steps taken to protect salmon habitat should improve future restoration programmes and help draw-up a National Migratory Fish Strategy. To do so it will be necessary to:

- Deal with migratory issues under the Water Framework Directive, by including management guidance in the Regional Development and Water Management Programmes (SDAGE). In order to put this guidance into practice, it will be necessary to highly recommend the implementation of Water Management and Development Plans on watercourses which will, in 2014, be classified as Major Migratory Species Watercourses under Article L.214-17 of the Environment Code.

  This strategy must be at the heart of the Water Framework Directive reports France will prepare for the European Commission. In these reports, France will describe the methods used to assess the 'Good Status' of water bodies through the Water Status Evaluation System (S3E). This

incorporates the River-Fish Index (IPR) which in time will involve a specific migratory fish measurement.

- Deal with migratory issues under the National Biodiversity Strategy (SNB). This is an action plan regarding biodiversity and natural heritage. It includes both the restoration of endangered species and the restoration of ecological continuity of aquatic ecosystems. Furthermore, this plan includes actions in accordance with the 'blue and green network' as defined at the Grenelle Environment Conference, which are in compliance with the goals of the Migratory Species Management Strategy. In effect, this National Strategy should also adhere to the Grenelle principles, particularly in connection with the protection of species and the environment.

- Consider other texts such as the Renewable Energy Directive and the conclusions of the current round-table talks on hydro-power.

  Furthermore, an in-depth study of all national and international texts (and their recommendations) regarding migratory species should be carried in the near future to make this strategy as clear as possible.

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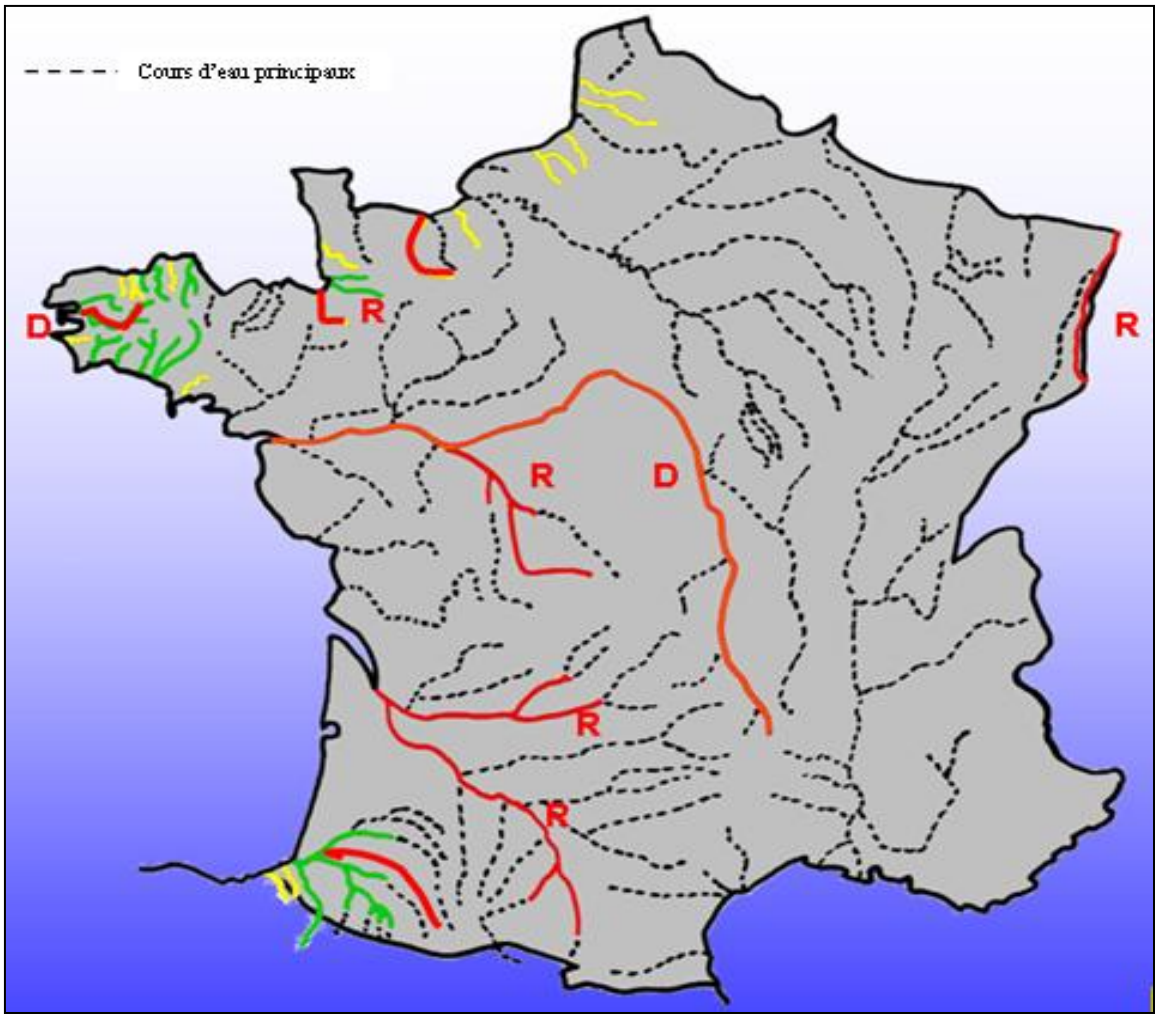
ANNEXES

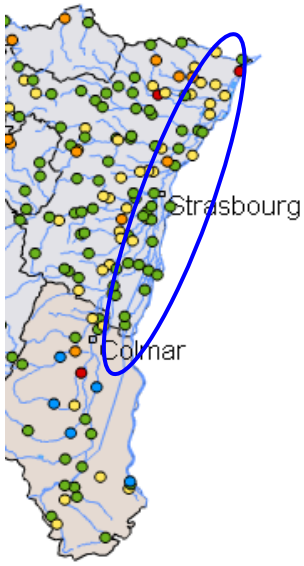
Annex 1: Conservation status of salmon populations in France
(Source: Baglinière and Vauclin, ONEMA)



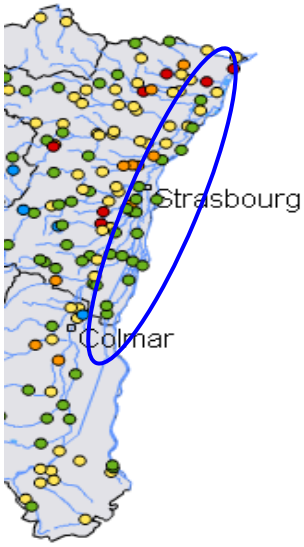
- - - Principal watercourses
Vulnerable population
Self-sustaining population
Endangered population (D)
Population currently being restored (R)

Annex 2: Physico–chemical quality status in the Rhine Basin
(Source: Rhine-Meuse Water Agency)

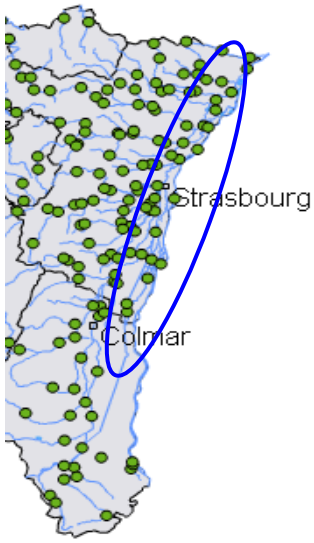
Organic matter



Phosphorous

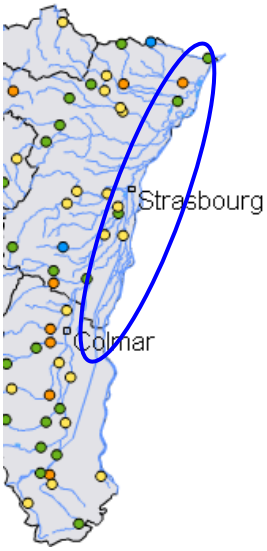


Nitrates

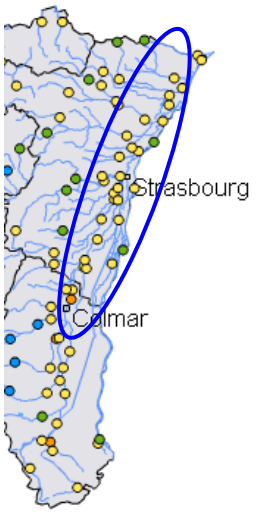


Annex 3: Ecological quality status in the Rhine Basin
(Source: Rhine-Meuse Water Agency)

Standardised Biological Global Index



Biological Diatom Index

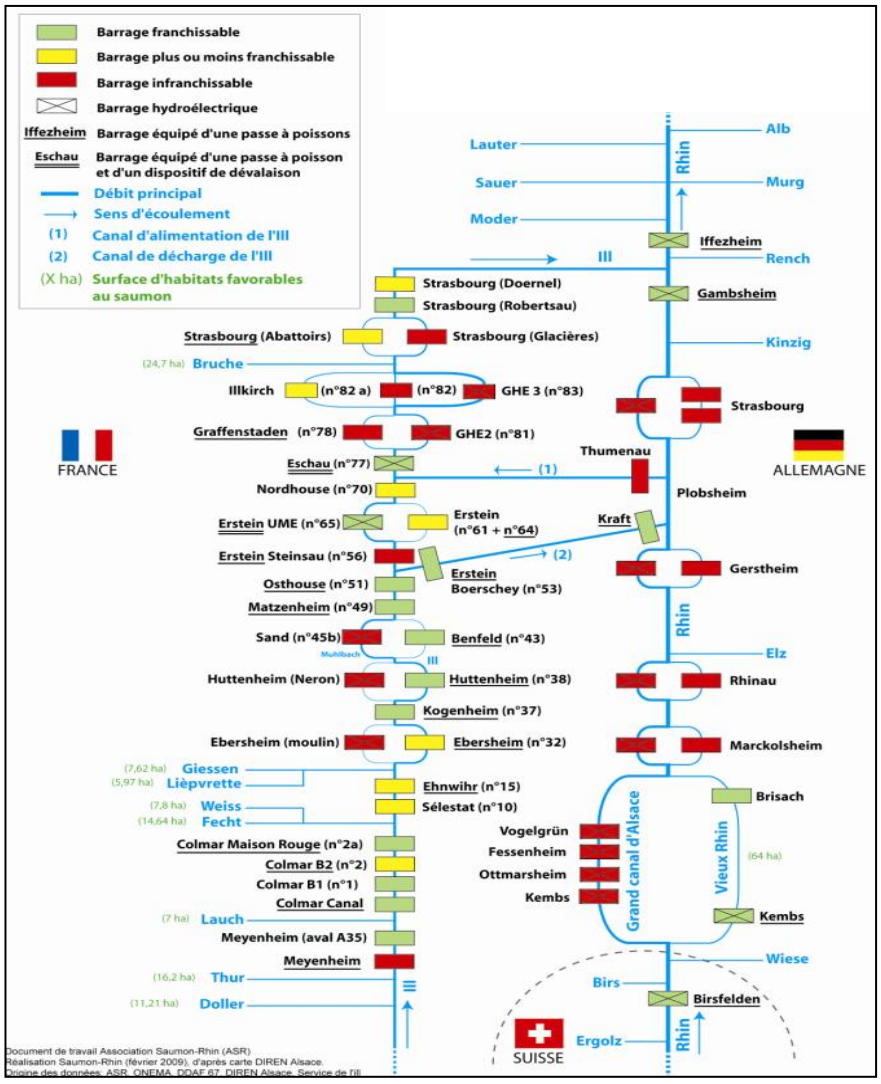


Area inhabited by salmon (Rhine + Ill)

- High quality
- Good quality
- Moderate quality
- Poor quality
- Bad quality

Annex 4: Access to spawning grounds in the Rhine Basin

Annex 1: Diagram illustrating the difficulties experienced by migratory salmonids in clearing obstacles on the Rhine and on the main channel of the Ill – Progress report January 2009.



- Passable obstacle
- Obstacle passable to an extent
- Impassable obstacle
- Hydroelectric dam

Iffezheim — Obstacle equipped with a fish pass

Eschau — Obstacle equipped with a fish pass and downstream migration device

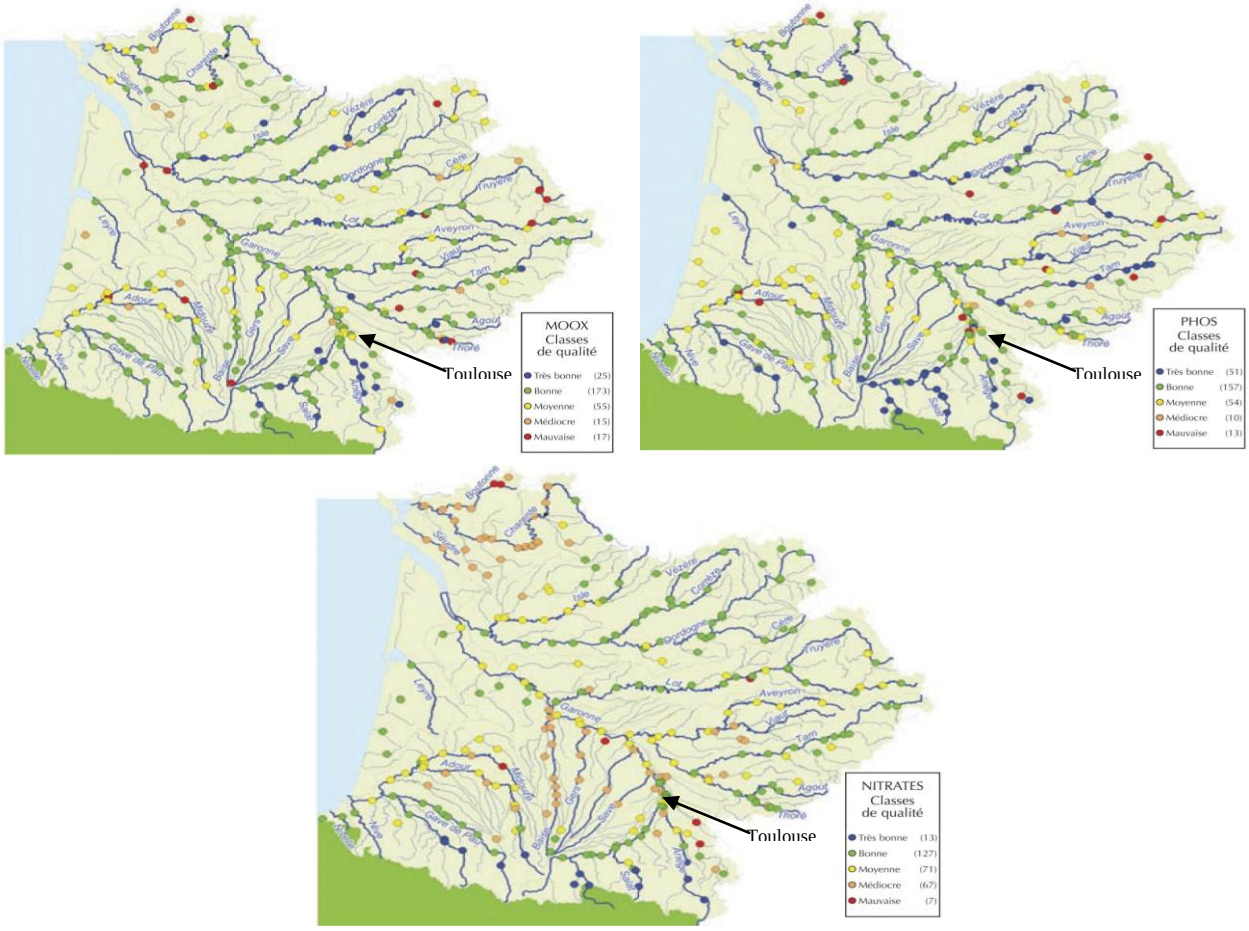
- Main flow
- Direction of flow

(1) Canal tributary to the Ill

(2) Canal draining from the Ill

(X ha) Area of habitat favourable to salmon

Annex 5: Physico–chemical quality status in the Adour-Garonne Basin watercourses
(Source: Adour-Garonne Water Agency)

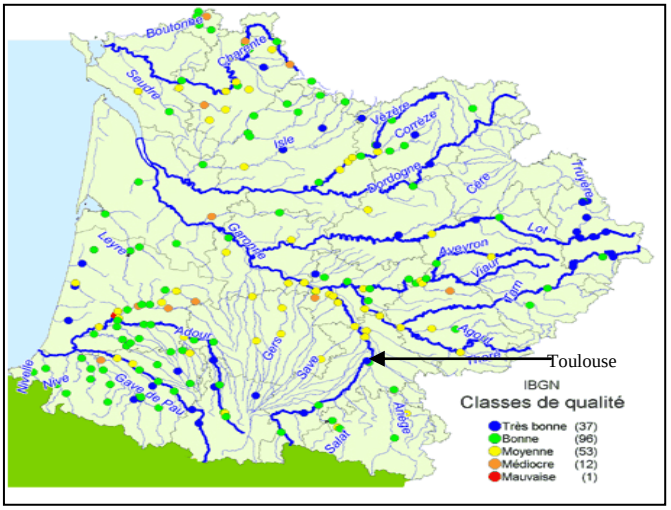


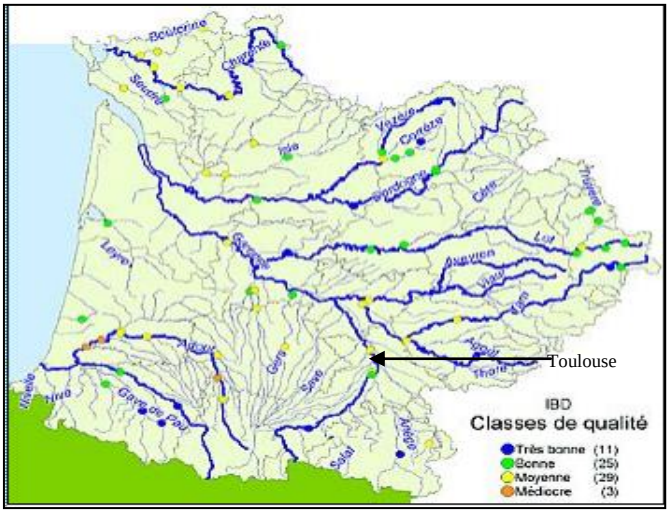
MOOX	Organic and Oxydisable matter
PHOS	Phosphorous
Nitrates	Nitrates

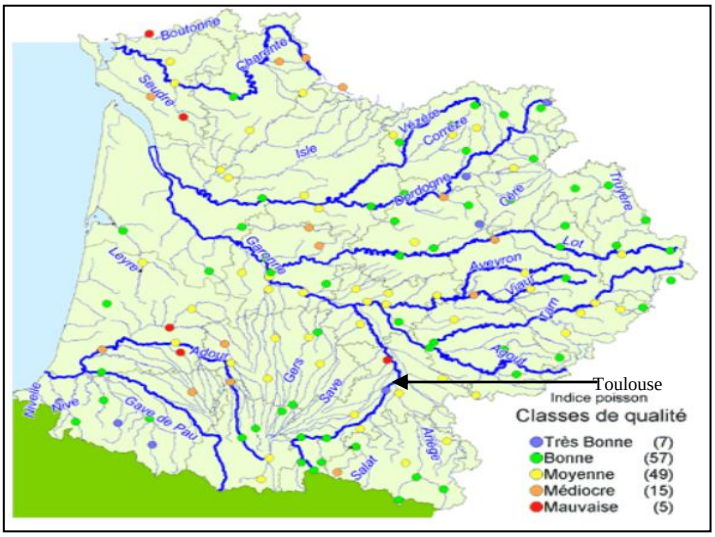
<u>Quality Classification</u>

- High
- Good
- Moderate
- Poor
- Bad

Annex 6: Ecological quality status in the Adour-Garonne watercourses
(Source: Adour-Garonne Water Agency)





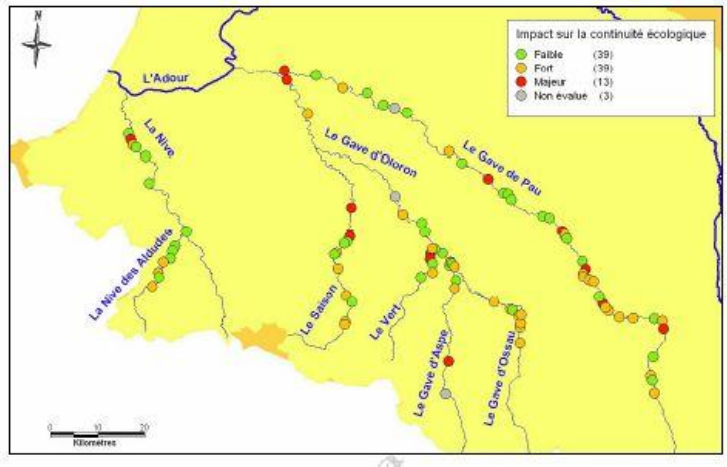


IGBN	Standardised Biological Global Index
IBD	Biological Diatom Index
Indice Poisson	River-Fish Index

<u>Quality Classification</u>

- High
- Good
- Moderate
- Poor
- Bad

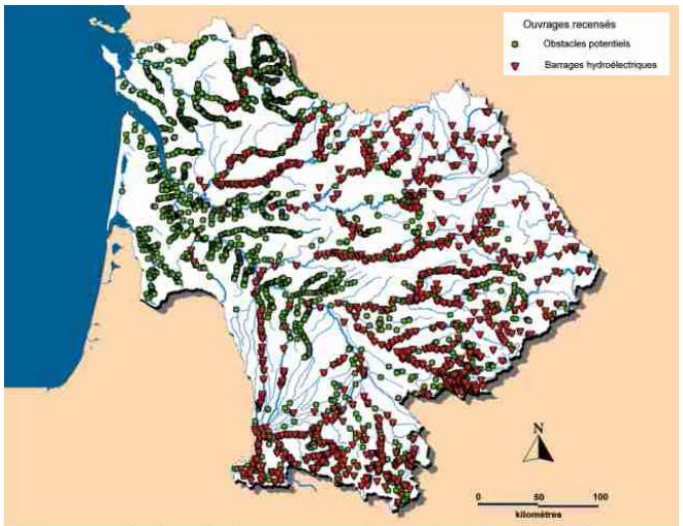
Annex 7: Access to spawning grounds in the Adour basin
(Source: ONEMA)



Impact on ecological continuity

- Minor
- High
- Major
- Not assessed

Annex 8: Access to spawning grounds in the Garonne-Dordogne Basin



Carte des ouvrages recensés sur les cours d'eau du COGEPOMI Garonne Dordogne Charente Seudre Leyre. Identification des ouvrages hydroélectriques. (Sources : AEAG ; EPTB Charente ; MIGADO ; ONEMA ; PNR des Landes de Gascogne ; SMIDDEST).

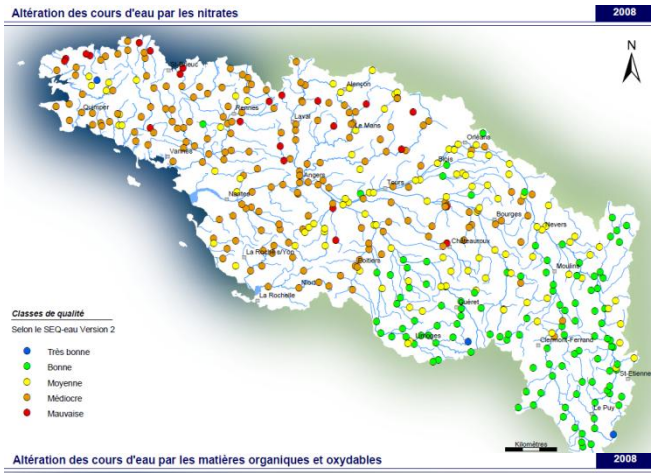
Inventoried obstacles

- Potential obstacles
- Hydro-electric dams

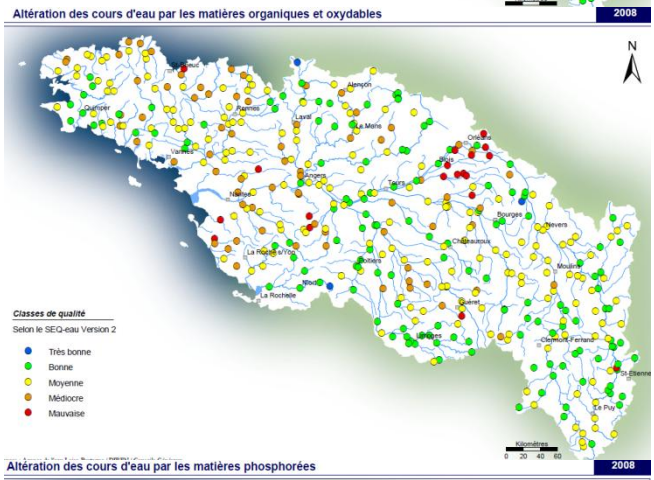
Map of obstacles inventoried on the watercourses of the COGEPOMI Garonne Dordogne Charente Seudre Lyre. Identification of hydroelectric obstacles. (Sources: AEAG: EPTS Charente: MIGADO: ONEMA: PNR des Landes de Gascogne: SMIDDEST).

Annex 9: Physico–chemical quality status of the Loire-Brittany Basin watercourses
(Source: Loire-Brittany Water Agency)

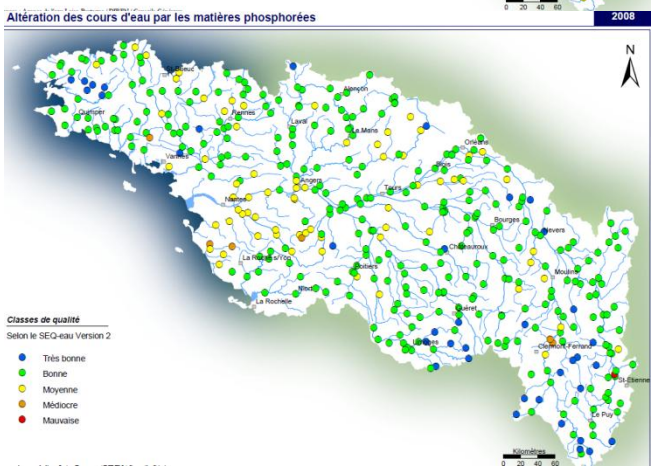
Modification of watercourse quality caused by nitrates



Modification of watercourse quality caused by organic and oxydisable matter



Modification of watercourse quality caused by phosphorous matter

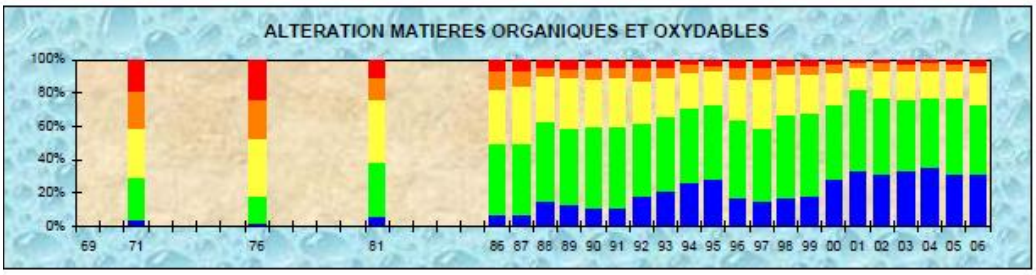


Watercourse quality

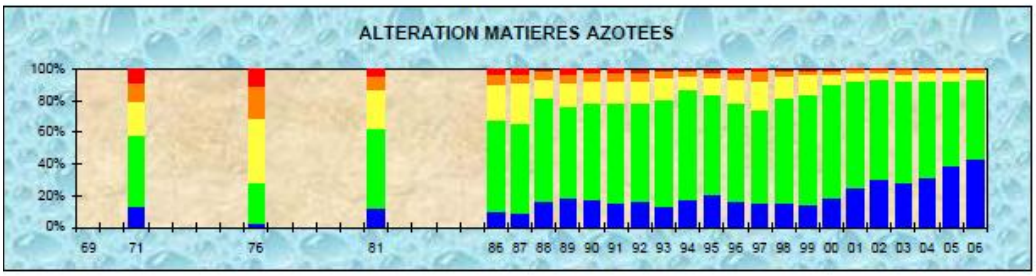
- High
- Good
- Moderate
- Poor
- Bad

Annex 10: Evolution of physico–chemical water quality in the Loire-Brittany Basin
(Source: Loire-Brittany Water Agency)

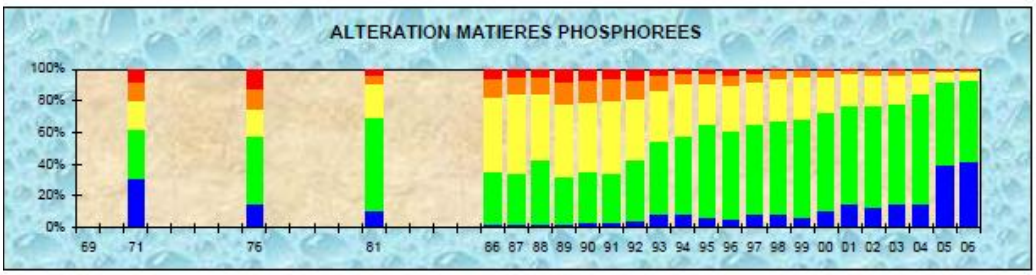
Modification causd by organic and oxydisable matter



Modification caused by nitrogenous matter

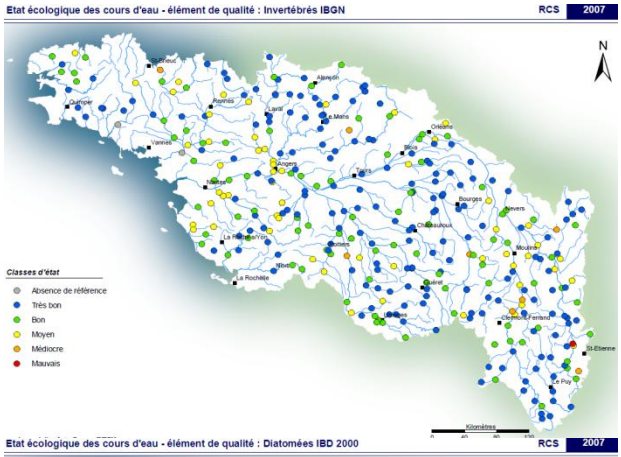


Modification caused by phosphorous matter

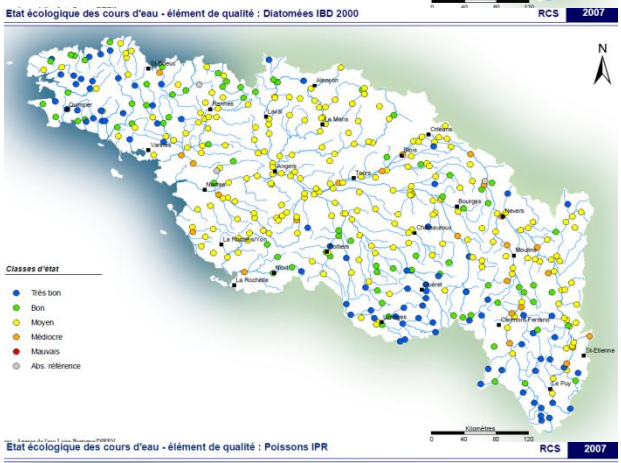


Annex 11: Ecological quality status in the Loire-Brittany Basin watercourses
(Source: Loire-Brittany Water Agency)

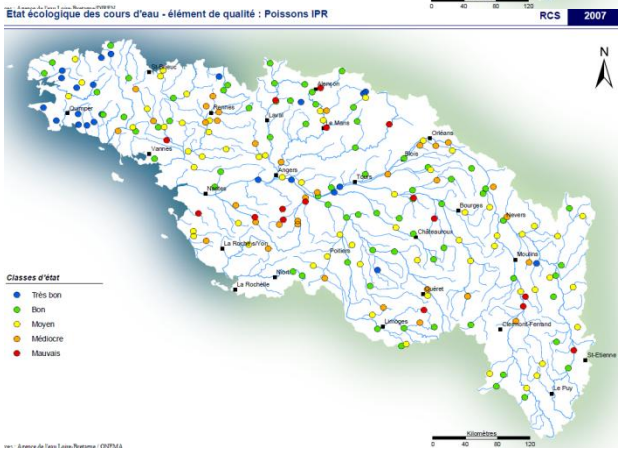
Quality indicator:
Invertebrates IBGN



Quality indicator: Diatoms
IBD 2000



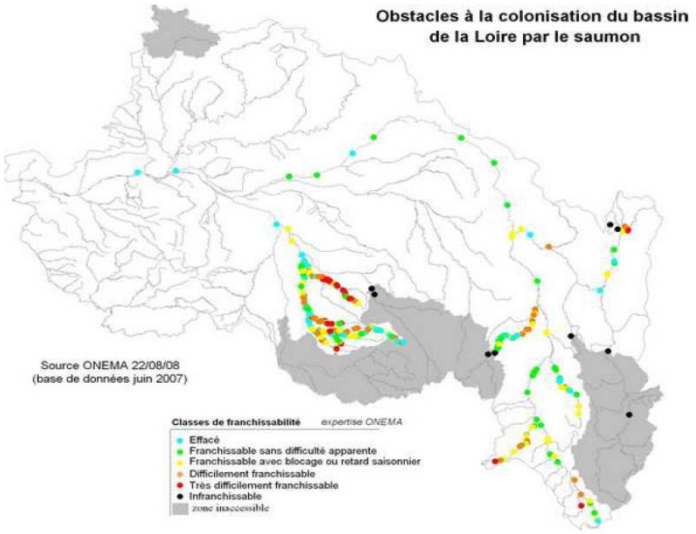
Quality indicator: Fish IPR



Status

- Not classified
- High
- Good
- Moderate
- Poor
- Bad

Annex 12: Access to spawning grounds in the Loire-Brittany Basin
(Source: Loire-Brittany Water Agency)



Obstacles to salmon inhabiting the Loire Basin. Source ONEMA 22/08/08 (database June 2007)

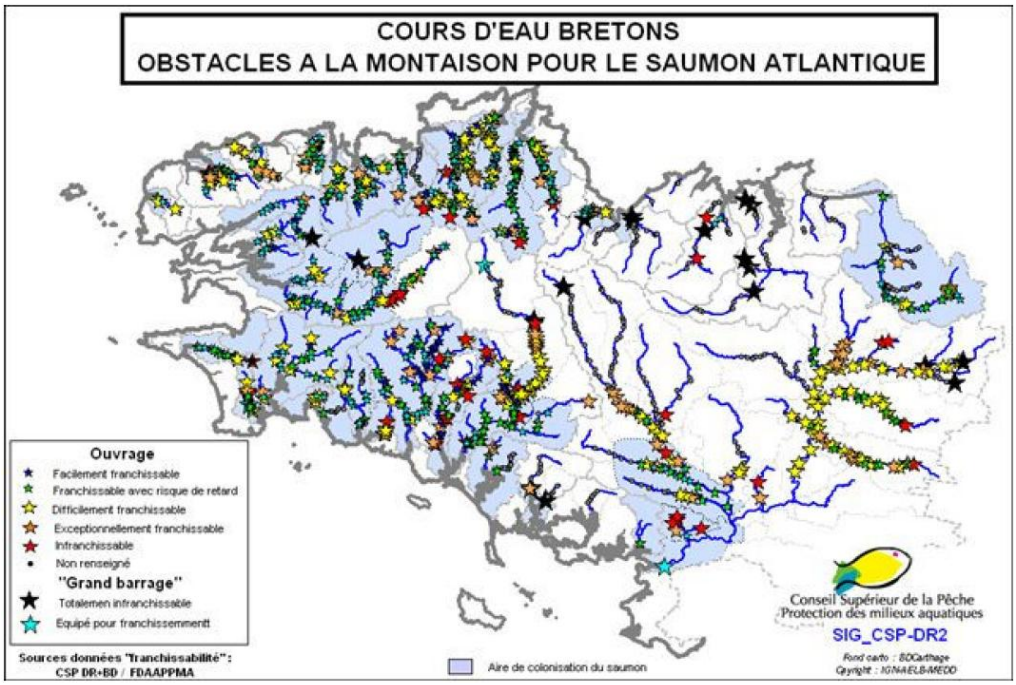
Level of difficulty in passing obstacles

- Removed
- Passable with no apparent difficulty
- Passable with seasonal delay or blockage
- Passable with difficulty
- Very difficult to pass
- Impassable
- Inaccessible area

Annex 13: Salmon distribution in the Loire Basin in 2008

Large barriers preventing access to spawning grounds

Annex 14: Obstacles to returning Atlantic salmon and access conditions to salmon spawning grounds in Brittany



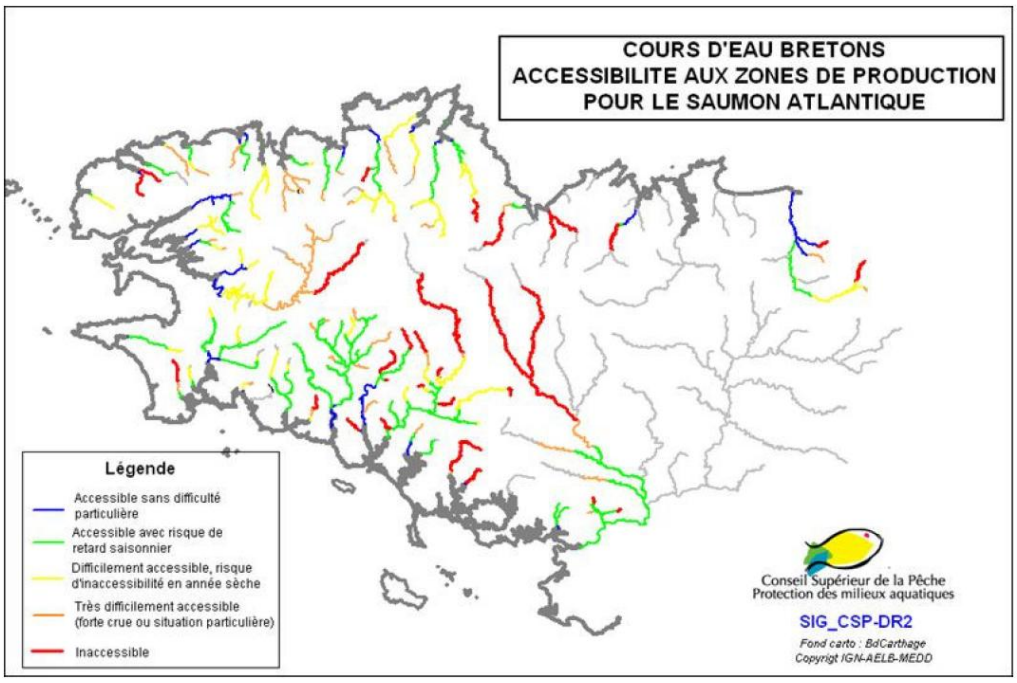
Barrier

- Easily passable
- Passable with risk of delay
- Difficult to pass
- Passable on occasion
- Impassable
- No information provided

Large Barriers

- Completely impassable
- Equipped with passing device
- Area inhabited by salmon

Brittany watercourses: Obstacles to Atlantic salmon migrating upstream

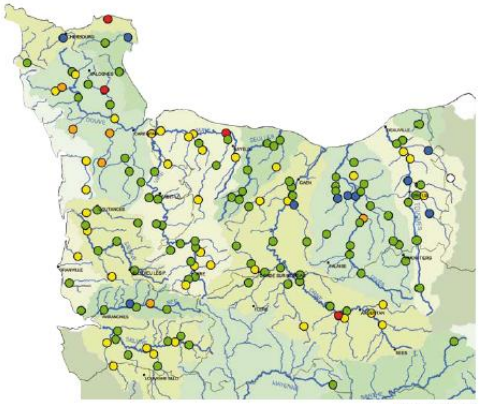


- Accessible with no real difficulty
- Accessible with risk of seasonal delay
- Accessible with difficulty. Risk of no access during dry periods
- Very difficult to access (high flooding or exceptional circumstances)
- Inaccessible

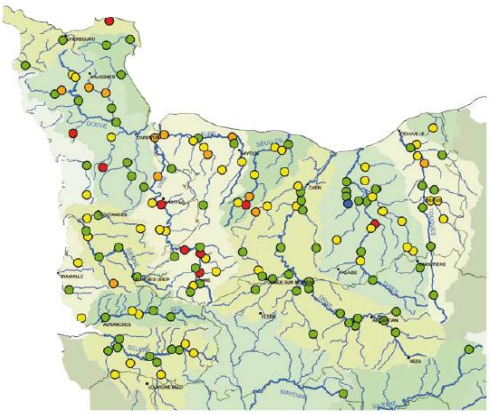
Brittany Watercourses: Access to Atlantic salmon spawning grounds

Annex 15: Physico–chemical quality status in the Normandy watercourses
(Source: DiREN Basse-Normandie)

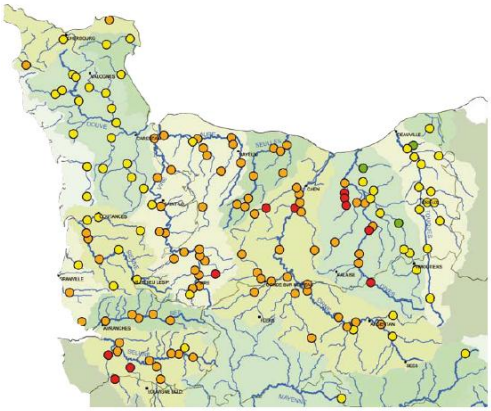
Organic and Oxydisable Matter



Phosphorous



Nitrates



Not classified

High

Good

Moderate

Poor

Bad

County Boundary

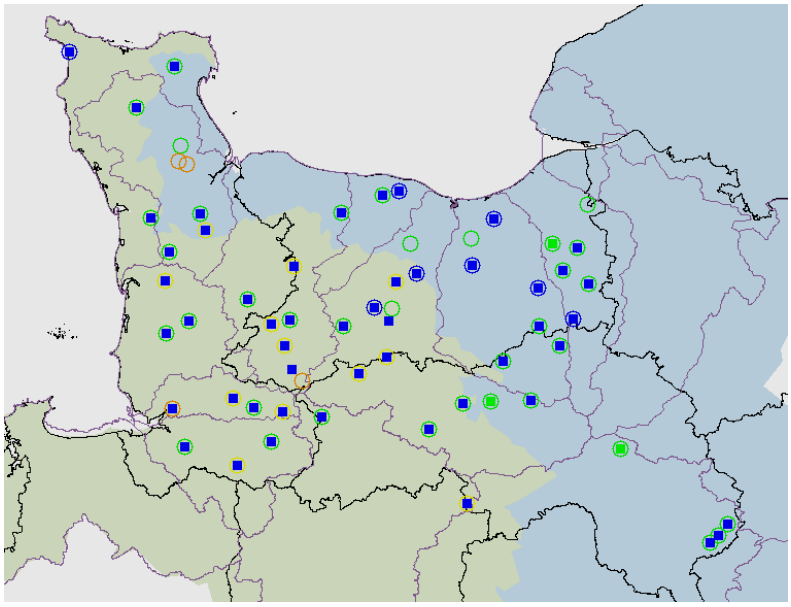
Annex 16: Ecological quality status in the Normandy watercourses
(Source: DIREN Basse-Normandie)

<u>Diatoms 2007</u>

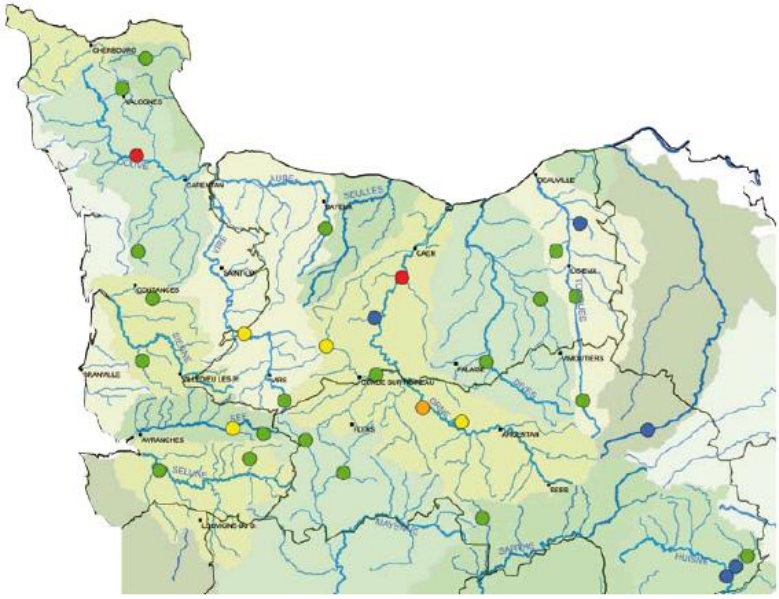
- IPS quality High
- IPS quality Good
- IPS quality Moderate
- IPS quality Bad

<u>Macro-invertebrates 2007</u>

- IBGN quality High
- IBGN quality Good



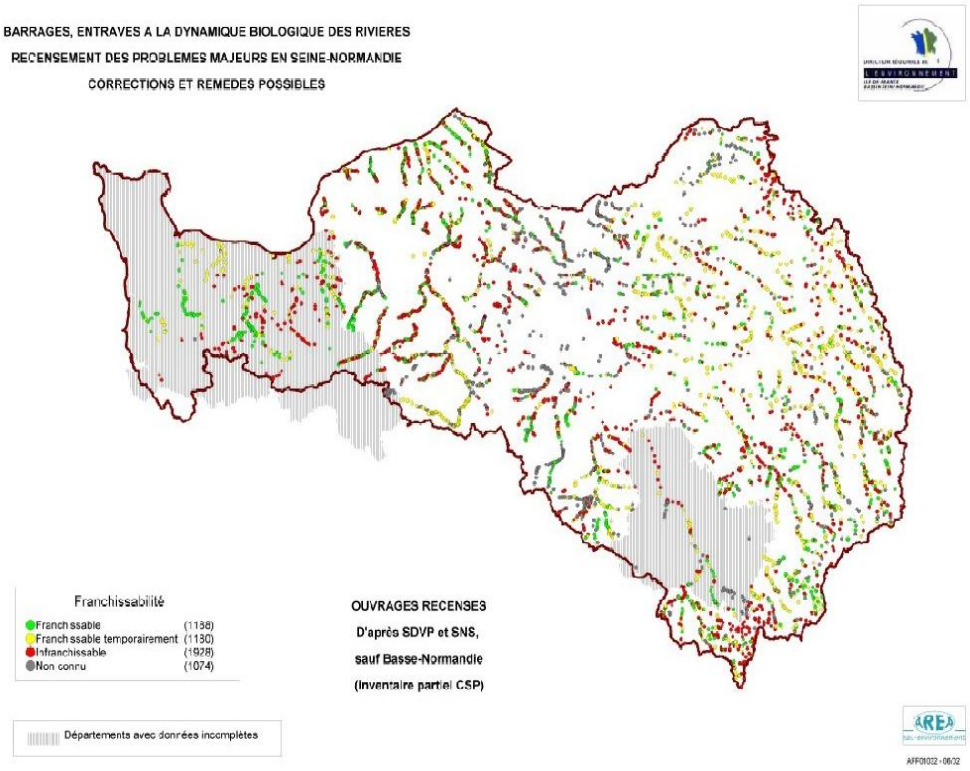
<u>River-Fish Index</u>



Quality Classification

- High
- Good
- Moderate
- Poor
- Bad

Annex 17: Obstacles in Seine-Normandie and level of difficulty to pass



Barriers which present an obstacle to the biological diversity of rivers.

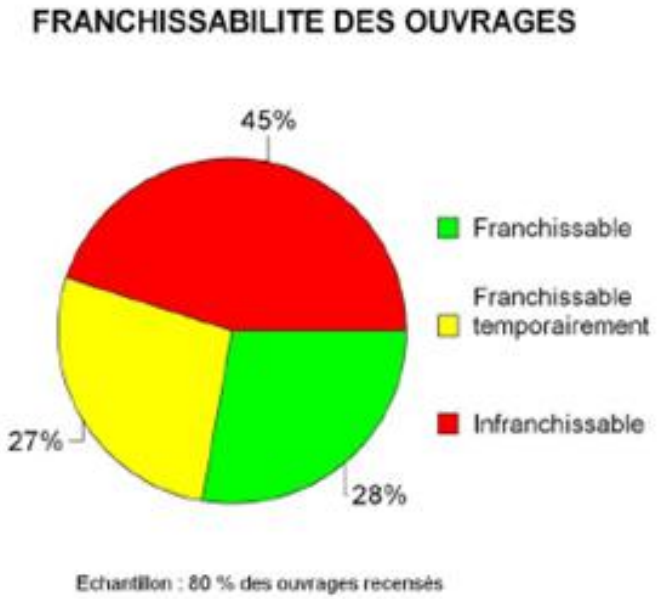
Inventory of major problems in Seine-Normandie

Corrections and possible solutions

Obstacles inventoried by SDVP and SNS except in Basse-Normandie (partial inventory by CSP)

Level of difficulty to pass

- Passable
- Passable at times
- Impassable
- Unknown
- Counties with incomplete information

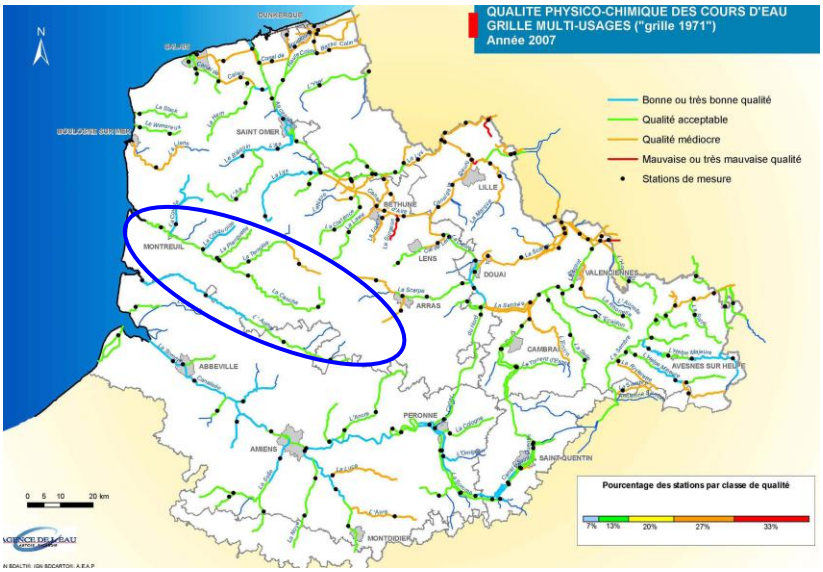


Level of difficulty to pass

- Passable
- Passable at times
- Impassable

Sample: 80% of barriers recorded

Annex 18: Physico-chemical quality status in the Artois-Picardie Basin in 2007
(Source: Artois-Picardie Water Agency)

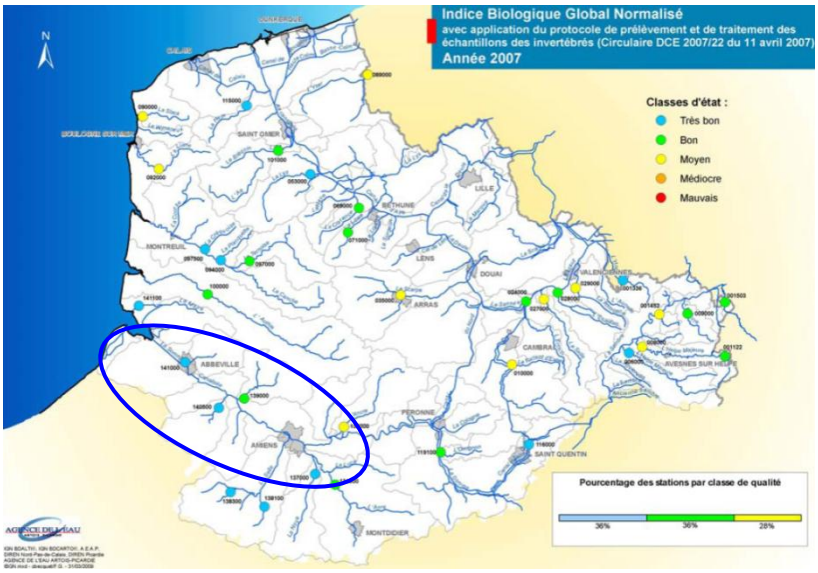


Good to High Quality
Acceptable Quality
Moderate Quality
Bad or Very Bad quality
Measuring station

Percentage of stations per quality status

7	13	20	27	33

Annex 19: Ecological quality status in the Artois-Picardie Basin in 2007



Standardised Biological Global Index applying the Invertebrate Sampling and Treatment Protocol of 11 April 2007

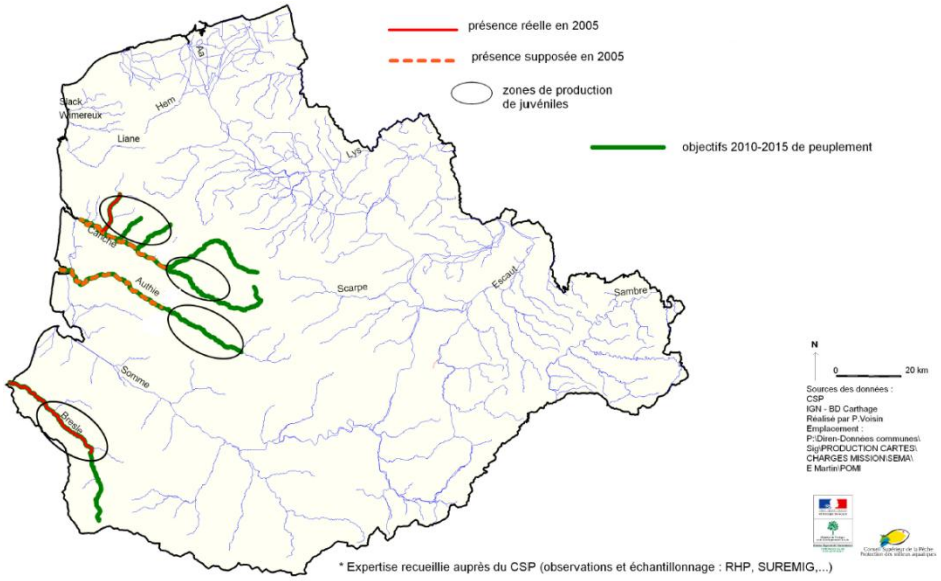
Quality Status

High
Good
Moderate
Poor
Bad

Percentage of stations per quality status

36	36	28

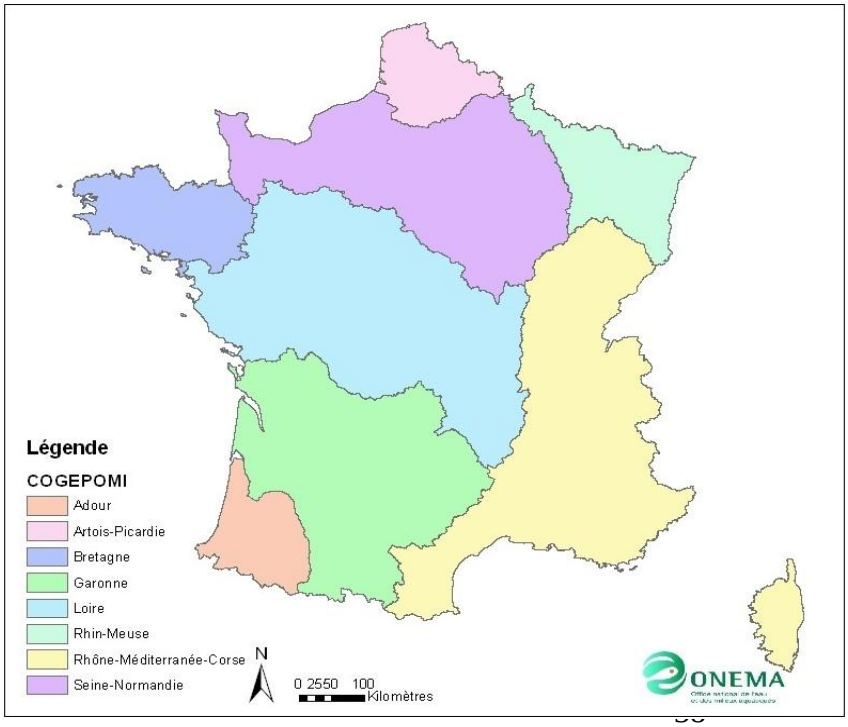
Annex 20: Salmon distribution in the Artois-Picardie Basin



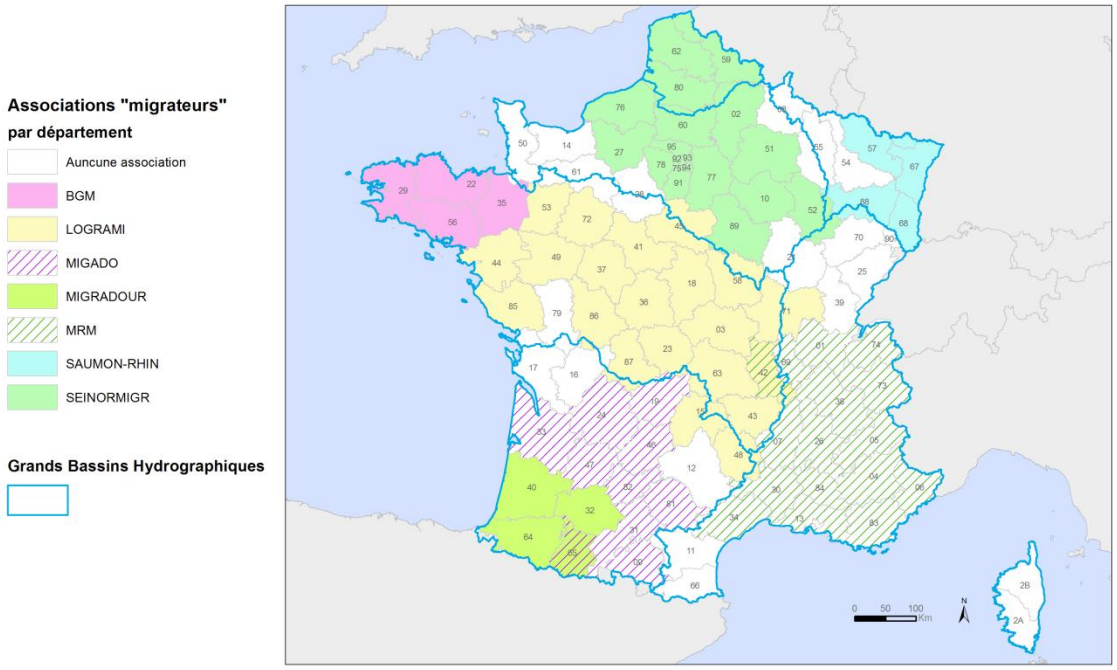
Presence confirmed in 2005
Presence assumed in 2005
Area of juvenile habitat
Stocking objectives 2010 - 2015

Annex 21: Atlantic salmon COGEPOMI (Migratory Fish Management Committees)

(There are no salmon present in the Rhône Mediterranée-Corse Basin)



Annex 22: The Principal Migratory Fish Associations
(source ONEMA)



Associations "migrateurs" par département	Migratory Associations by County
Aucune association	No association
Grands Bassins Hydrographiques	Main Hydrographic Basins

Annex 23: Extracts of Legislation

a) Law of 16 October 1919 relating to the use of hydraulic energy

Article 1 (completed by Law 80-531 1980-07-15 ART.24, 26 JORF 16 July 1980)

"No-one can use energy derived from waves, lakes or watercourses, regardless of their classification, without concession or authorisation from the State.

However, no concession or authorisation will be granted without prior notice being given to the County Councils, which represent regional collective interests in the area from which the energy will be derived.

Under Article 18 of this law, any person undertaking hydraulic activity without concession or authorisation, shall be fined between 5, 000 Francs and 120, 000 Francs. This shall be doubled in the event of a repeat offence.

Any person granted authorisation or concession who does not respect the rules applicable to hydraulic usage, or the specifications given, shall be fined between 3,000F and 80,000F. This shall be doubled in the event of a repeat offence. In case of conviction under this article, the Court shall determine, where appropriate, the timescale for removal of the installation or to make it comply with legislation, in addition to a fine of between 500F and 3, 000F per day of additional delay. The physical person or corporate body under civil law not respecting said timescale shall be responsible for paying the fine. The fine is recoverable in the conditions provided for by the clauses relating to the recovery of state products, to benefit the Public Treasury.

This clause shall also apply to users who modify their installations."

Article 2 (Amended by Law 84-512, 1984-06-29 ART.8 III JORF 30 June 1984)

"Installations whose power (the product of the drop height by the maximum flow rate of the diversion) exceeds 4,500 kilowatts, will be regulated by the concession system. All other installations shall be regulated by the authorisation system.

Installations with a maximum power of equal to or less than 4,500 kilowatts for which the public enquiry in relation to an application for concession concluded before the law 80-531 of 15 July 1980 came into effect, will remain negotiable for a period of one year from that date.

In order to protect nature, fauna and flora, statutory clauses will establish the technical conditions for managing and operating power stations. On some watercourses or sections of watercourses, a list of which will be established by State Council decree, no authorisation or concession will be given for new hydraulic activities. For those existing installations in compliance with current legislation at the time law no 80-531 of July 1980 comes into effect, or provided for in Article 27 of that law, a concession or authorisation can be given provided that the height of the obstacle is not altered.

The extension of the authorisation system to include installations whose power is between 500 kilowatts and 4,500 kilowatts, does not undermine the obligations imposed by the concession system regarding the delivery of reserved energy at a preferential tariff.

The procedure by which the Prefect may grant authorisation will include a public enquiry and the publication of an impact study or notice dependent upon the size and extent of the installation. Authorisation obliges the holder to respect water regulations, particularly concerning the amount of water abstracted and reserved flow rates."

b) Article L.432-6 of the Environment Code

"In those watercourses, sections of watercourses and canals established by decree, all installations must have systems in place to guarantee passage for migratory fish within six months of consultations with the County Council. The user of the installation is responsible for ensuring that these systems work.

Existing installations must be adapted, with no compensation given, to comply with the clauses contained in this article within five years from the publication of any list of migratory species by basin or sub-basin, established by the Minister responsible for freshwater fisheries, and, where appropriate, by the Minister responsible for the Sea."

c) Text establishing Biotope Protection Orders (Article R411 – 15)

"In order to prevent the disappearance of those species included in the list defined under Article R411-1, the Prefect can establish, by order, in all or part of the territory of a County, excluding that in the public maritime domain or those measures which fall under the domain of the Minister responsible for freshwater fisheries, measures to facilitate the conservation of biotopes such as ponds, bayous, marshlands, hedgerows, copses, moors, dunes, grassy areas or any other natural formation which has been little exploited by man where these biotopes or formations are required for feeding, reproduction, resting or survival of said species."

d) Extract from 16 February 1994 Decree

A Migratory Fish Management Committee has been created in each of the following basins:

I. The Artois-Picardie Basin Migratory Fish Management Committee covers the Artois-Picardie watercourses, and is chaired by the Prefect of the Nord – Pas-de-Calais region, the coordinating Prefect of the Artois-Picardie Basin, or his representative;

II. The Rhin-Meuse Basin Migratory Fish Management Committee covers the Rhin-Meuse Basin watercourses and is chaired by the Prefect of the Lorraine region, the coordinating Prefect of the Rhin-Meuse Basin, or his representative;

III. The Seine-Normandie Basin Migratory Fish Management Committee covers the Seine-Normandie Basin watercourses and is chaired by the Prefect of the Ile-de-France region, the coordinating Prefect of the Seine-Normandie Basin, or his representative;

IV. The Brittany Watercourses Migratory Fish Management Committee covers those watercourses with mouths located in the Brittany region, and their tributaries, and is chaired by the Prefect of the Brittany region or his representative;

V. The Loire Basin Migratory Fish Management Committee covers the Loire-Brittany Basin watercourses, with the exception of those which come under the Brittany Watercourses Migratory Fish Management Committee, and is chaired by the Prefect of the Pays de la Loire region or his representative;

VI. The Garonne Basin Migratory Fish Management Committee covers Adour-Garonne Basin watercourses, with the exception of those which come under the Adour Basin Migratory Fish Management Committee, and is chaired by the Prefect of the Aquitaine region or his representative;

VII. The Adour Basin Migratory Fish Management Committee covers the Adour Basin watercourses and those coastal watercourses with mouths located in the Landes and Pyrénées-Atlantique Counties, with the exception of the Bidassoa, and is chaired by the Prefect of the Aquitaine region or his representative;

VIII. The Rhône-Méditerranée-Corse Basin and Mediterranean Watercourses Migratory Fish Management Committee covers the Rhône-Méditerranée-Corse Basin watercourses and is chaired by the Prefect of the Rhône-Alpes region, the coordinating Prefect of the Rhône-Méditerranée-Corse Basin or his representative.

e) Article L214-3 (As in effect on 22 September 2009, since 31 December 2006, amended by Law No. 2006-1772 of 30 December 2006)

I. All structures, works and activities likely to present a threat to public health and security, to impede the free flow of water, to reduce amount of water, to notably increase the risk of flooding, to seriously endanger the quality or diversity of the aquatic environment particularly in relation to fish stocks, will be regulated by the administrative authorities via the Authorisation system. Necessary provisions to protect the interests cited in Article L.211-1, surveillance methods, detailed rules on monitoring techniques, and methods of intervention in case of incident or accident are stipulated in the Authorisation Order and, if necessary, by further actions taken subsequently. The County or Inter-County Federation of Fishing Associations and Aquatic Environment Protection Associations and the County and Inter-County accredited Professional Freshwater Fishing associations must be informed of any Authorisation relating to structures, works and activities which could destroy fish spawning, nursery or feeding areas.

II. All structures, works or activities, although unlikely to present such threats, must respect the stipulations prescribed in application of Articles L.211-2 and L.211-3. The administrative authority may oppose, within any timescale established by Order of the County Council, a proposed activity if it is deemed to be incompatible with the Water Planning and Management Development Plan or the Water Management and Development Plan, or could damage those interests mentioned in Article L.211-1 to an extent that no provision could be put in place to rectify the situation. No work may commence before the expiration of the timescale given. If the interests

cited in Articles L.211-1 are not protected by the stipulations prescribed in application of Articles L.211-2 and L.211-3, the administrative authority may, at any time, impose any necessary further provisions by Order.

III. An Order will determine the circumstances in which the stipulations prescribed in I and II may be established, amended and communicated to third Parties.

IV. An Order of the County Council will determine the circumstances in which several applications for Authorisation and Declaration relating to connected activities or to the same activity can be subject to a joint procedure.

f) Article L.214-17 of the Environment Code

"After consultation with concerned County Councils, the concerned basin's territorial public bodies, the Basin Committee and, in Corsica, the Corsican Assembly, the administrative authority will establish for each basin or sub-basin:

1. Among watercourses or parts of watercourses or canals of high ecological status, identified by the Water Planning and Management Development Plans as being a biological pool necessary to maintain or reach good ecological status in watercourses within a drainage basin, or in which the total protection of diadromous migratory fish is necessary, a list of those watercourses, parts of watercourses or canals in which no authorisation or concession can be given for new installation if they pose an obstacle to ecological continuity. Renewal of concessions or authorisations for existing installations, which are complaint with legislation, on these watercourses, parts of watercourses or canals, is subject to requirements to ensure that high ecological status of waters is maintained, good ecological status of watercourses is maintained or reached in the drainage basin, or total protection of diadromous migratory fish is ensured;

2. A list of watercourses, parts of watercourses or canals in which it is necessary to ensure sufficient sedimentary transport and passage of migratory fish. Any installation must be managed, maintained and equipped according to the rules established by the administrative authority, in collaboration with the owner or, failing that, the user."

g) Extract from the 25 March 2008 Decree Relating to Spawning Grounds

Art. R.432-1

Fish species whose spawning, feeding and nursery areas require special protection from destruction under Article L.432-3 are divided, by Decree of the Minister responsible for the environment, into the following two groups:

1. The first group comprises those species whose reproduction depends heavily on the substrate of the river bed. The Order will specify the characteristics of the mineral content of the substrates for the spawning ground of each species;

2. The second group comprises those fish species whose reproduction is dependent on several factors, and crustacean species.

Art. R.432-1-1

The County Prefect will establish the following inventories:

I. For each species of fish included in the first group, an inventory of those parts of watercourses likely to contain spawning grounds, deduced from the gradient and breadth characteristics of the watercourse in conjunction with the natural distribution area of the species.

II. For each species of fish included in the second group, an inventory of those parts of watercourses, or flood plains known to have been spawning or nursery areas during the last ten years.

III. For those crustacean species included in the second group, an inventory of those parts of watercourses where the species in question is known to have been present during the last 10 years.

Art R. 432-1-2

The inventories established under application of Article 432.1.1 will be passed to the County or Inter-County Federation of accredited Fishing and Aquatic Environment Protection Associations, the County Environment and Health and Technological Risk Department, and to the County Commission for Nature, Landscape and Sites, who will have three months in which to provide their opinion. If no opinion is given, it is to be assumed that the opinion is favourable.