



Agenda item 6.1
For information

Council

CNL(17)47

The policy relating to hatchery and stocking activities in France – managing risks and benefits

(Bénédicte Valadou, French Biodiversity Agency)

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Introduction

Of the around thirty salmon rivers in France, some are covered by a restocking programme aimed at:

- boosting an existing stock which has fallen below its conservation limit or restoring a residual stock,
- taking interim measures to ensure protection of the stock until other related management measures have taken full effect.

These measures are financed by the French government with the support of local and regional authorities. So far the stocks concerned have depended on fish being released into the rivers to feed them.

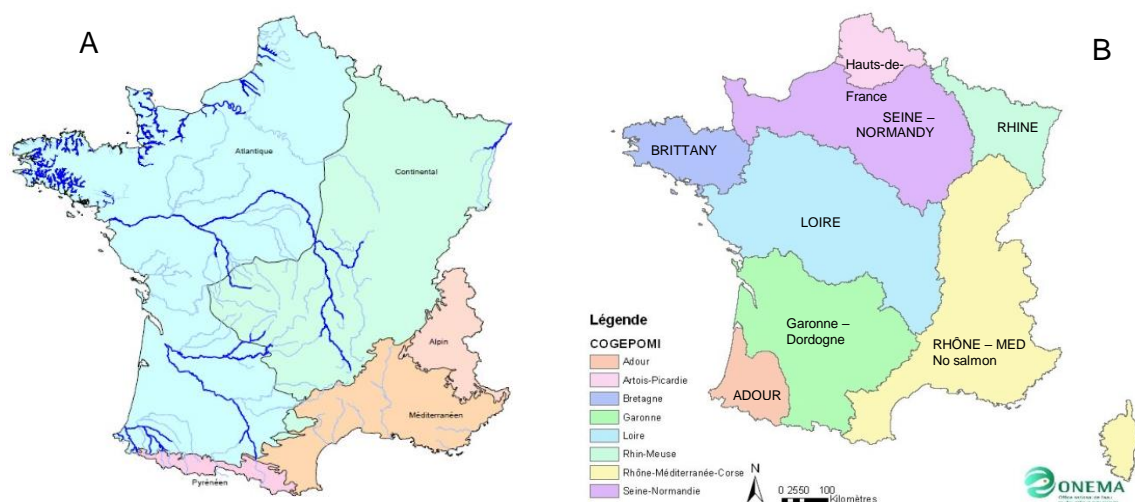


Figure 1: Current distribution of salmon in France (A) and breakdown by river basin (B)

The measures to be implemented are set out in a Migratory Fish Management Plan (*plan de gestion des poissons migrateurs*, PLAGEPOMI) for each major river basin (Figure 1). The plans take into account any measures that can be taken locally to protect anadromous fish species such as salmon. The restocking strategies in question, which complement other management measures, are aimed at sustaining stocks. This means that they may have to be adjusted to take account of any improvement or deterioration in stock levels, and that assessment tools will have to be developed and implemented.

In line with France's plan for implementing NASCO measures, the programmes comply with the following general principles:

- selecting broodstock that is as representative of local stocks as possible to avoid genetic drift;
- preserving the genetic diversity of the stock;
- ensuring that fish for restocking spend as little time in hatcheries as possible, i.e. carrying out restocking at early stages;
- ensuring that juveniles for restocking do not come into contact with juveniles in the wild;
- studying the benefits of restocking;
- not releasing adult fish that cannot contribute to the natural cycle.

Restocking programmes in France (Figure 2)

These include a number of stock support programmes that allow a loss of habitat and/or weak natural production to be compensated. This is the case for the Elorn (Brittany), the Gave d'Oloron (Adour) and the Loire.

Most of the programmes, however, are actual restoration programmes for rivers with very low or no natural restoration. This is the case for the Aulne (Brittany), the Garonne, the Dordogne, the Gave de Pau (Adour) and the Rhine.

Stock support programmes

In Brittany, following a positive index for the abundance of wild juveniles, restocking programmes were suspended for the Léguer, the Odet, the Leff and the Thieux between 1995 and 2000. In the Thieux in particular, between 20 % and 46 % of the adult salmon caught between 1994 and 1998 originated from fry for restocking.

For the Elorn the programme continues since it is a measure intended to compensate for the filling of the Drennec dam in 1982. The broodstock comes from the Elorn and the juveniles are released as smolt (Quinquis fish farm). Since 2006, the abundance of young salmon has increased considerably, reaching a peak in 2011. Upstream in the Elorn stock levels are still low in relation to the production area.

In the Adour basin, the first nursery ponds were created in 1970 with imported strains. Since the mid-1990s, only broodstock of local strains have been used in the Gave d'Oloron and its tributaries (Cauterets fish farm). Today, adult reproduction is mainly observed in the Gave d'Oloron where the stock, although fragile, is considered viable, and stock support has ceased.

In the Loire, restocking operations began in the 1970s and were reinforced in the early 2000s, in line with Government policy, with the creation of the National Conservatory of Wild Salmon (Chanteuge fish farm). Adult salmon are of local stock, and in recent years fry has been used rather than smolt. While the stock has not yet reached a sufficient level of autonomy, the restocking contribution to adult returns has been around 40 % over the past fifteen years. A model of stock dynamics shows that discontinuing stock support now would not allow the stock to become viable.

Restoration programmes

In Brittany, a restoration programme for the Aulne was launched in 1984. Adult salmon have been caught in the Aulne basin since 2002, and 200 000 juveniles have been released as parr (Favot fish farm). The rate of return is low (0.04 - 0.11 %). Since 2011 juveniles are being released as smolt to reduce competition for space and food with native fish. Moreover, although releases were doubled from 1984-2001 to 2002-2011, this has failed so far to produce higher returns.

The restoration programme for the Garonne and the Dordogne was launched in the 1980s, after salmon had entirely disappeared in the early 20th century. Since 2007 broodstock of local strains have been used for releases, at five different stages according to habitat: 70 000 smolt eq. in the Dordogne and 50 000 smolt eq. in the Garonne. Four fish farms are involved: Castel, Bergerac, Pont-Crouzet and Cauteret. The stock is recovering but not yet viable. The return rate is 1 %, but the restocking plan needs to be better coordinated with other measures.

In the Adour basin there was a shift in 2004 from supporting the Gave d'Oloron stock (80 % of releases) to reintroducing salmon in the Gave de Pau (85 % of releases). The results were satisfactory with a good adult return and strong homing between the different mountain streams.

In the Rhine basin, restocking has taken place in both Switzerland and France since the 1990s. It has allowed the return each year of about a hundred spawning females to a few dozen spawning nests in the Upper Rhine. The Allier strain used since 2003 in the Upper Rhine allows fish to be selected that have spent several winters at sea, in line with the original stocks (Huningue fish farm).

Following the scheduled restoration of continuity, the available habitat for this species is expected to quintuple by 2020. Stock support is included as an accompanying measure in the strategy for long-term restoration of a self-sustaining stock.

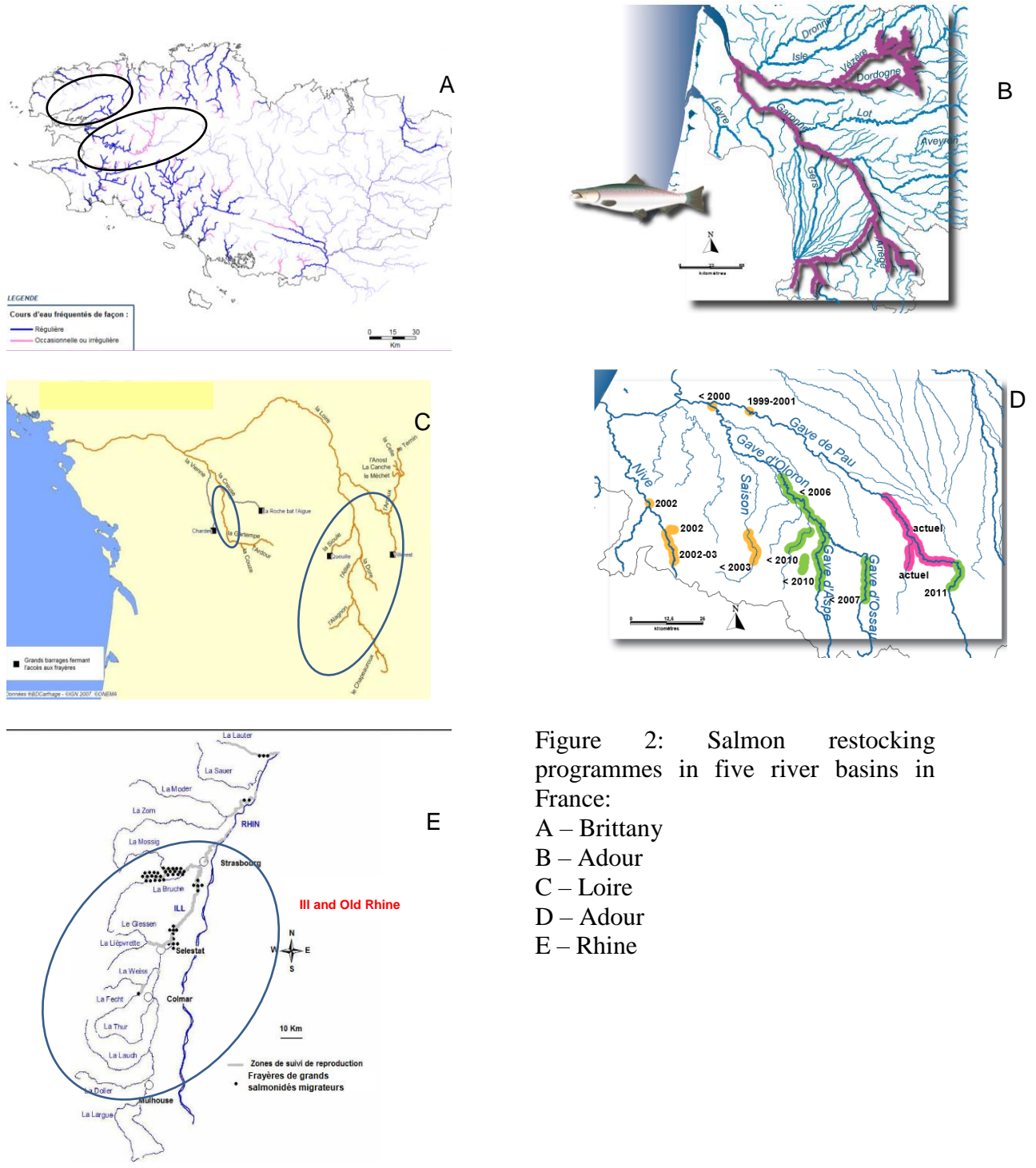


Figure 2: Salmon restocking programmes in five river basins in France:
 A – Brittany
 B – Adour
 C – Loire
 D – Adour
 E – Rhine

Legend

A

Cours d'eau fréquenté de façon: = River frequented:

Regulière = Regularly

Occasionnelle ou irrégulière = Occasionally or irregularly

C

Grands barrages fermant l'accès aux frayères = Large dams hindering access to spawning grounds

D

actuel = current

E:

Zones de suivi de reproduction = reproduction monitoring zones

Frayères de grands salmonidés migrateurs = spawning grounds for large migratory salmonids

Risk of genetic drift

The impact of restocking rivers with non-native strains has been presented in a study (Perrier, 2010). This was mainly done before the 1990s, but has had the effect of altering the genetic characterisation of stocks.

In France there are five genetically distinct groups (Figure 3), but due to the use of non-native strains the genetic distance between the groups has diminished. For example, a high degree of introgression can be found in the current salmon stock of the Couesnon, where restocking began in the 1970s.

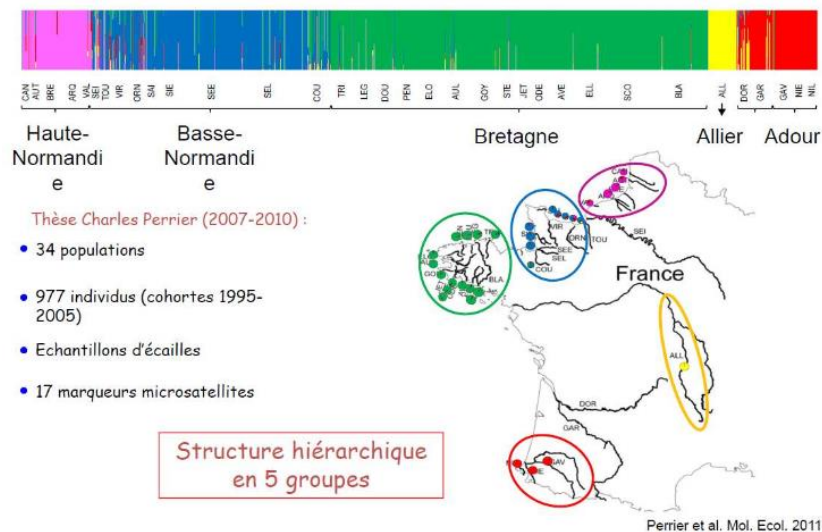


Figure 3: Genetic structure of the French Atlantic salmon stock

Legend

structure hiérarchique en 5 groupes = hierarchical structure in five groups

populations = stocks

individues = individual fish

cohortes = cohorts

échantillons d'écaillés = scale samples

marqueurs microsatellites= microsatellite markers

Also, as mentioned above for the Aulne, stock support could limit the development of the wild stock as the bigger and more aggressive fish released for restocking start competing for food or living space with native fish (Einum S. & Fleming I. A., 1997).

The benefits of knowledge

As the risk of genetic drift is now well known, it is essential to put into place coordinated management tailored to each of the large genetic groups identified.

All the migratory fish management plans share the following objectives in terms of stock support or recovery:

- any restocking operation is subject to an expert opinion and approval by the Migratory Fish Management Committee (*Comité de gestion des poissons migrateurs, COGEPOMI*);
- restocking is banned for rivers where the stock is not at risk;
- scientific monitoring of restocking operations must be ensured;
- restocking must go hand in hand with measures to help restore ecological continuity;
- all operations must be assessed in the light of how they contribute to the restoration plan.

These guiding principles are in line with the NASCO resolution which recommends that all restoration measures should be regulated, that restocking should be part of an overall programme, that clear long-term objectives should be set and that the results should be monitored in terms of catches, production and impact on wild stocks.