

Salmon 2020 - Reintroduction of Atlantic Salmon in the river Rhine system

Du Plan Saumon Rhin 2000 au Plan 2020

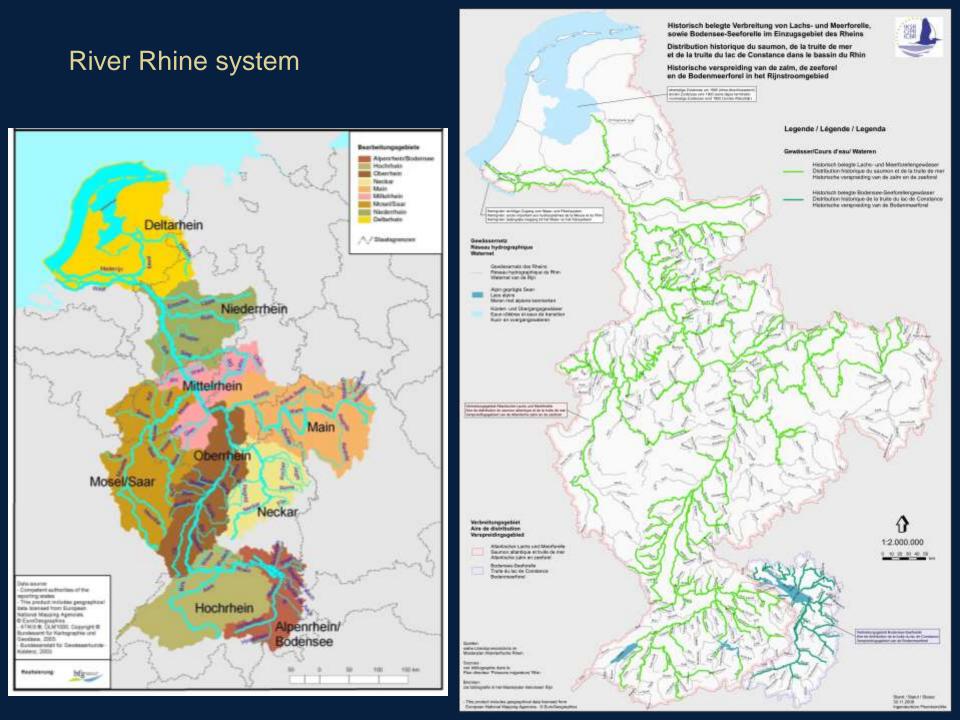


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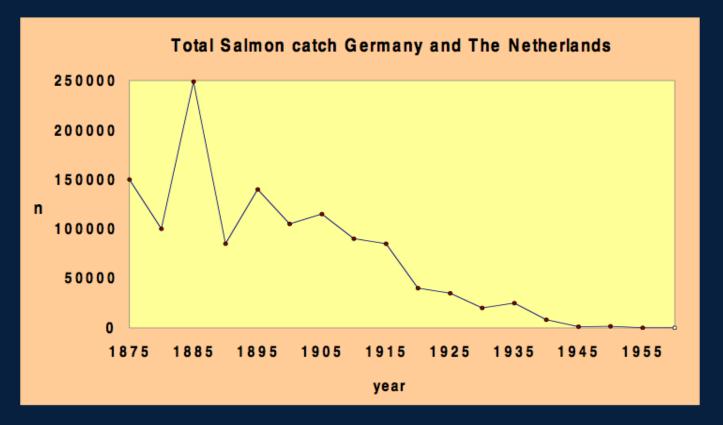
- Historical situation
- History and reasons for the reintroduction program SALMON 2020
- Monitoring stations
- Available habitat
- Migration and barriers
- Trends and conclusion



Decline of Atlantic Salmon Population in the Rhine

- Pollution

 (eutrophication, acid rain, pesticides, temperature)
- Barriers to migration (upstream and downstream migration)
- Over-exploitation
- Habitat destruction (flow alteration, siltation, river "correction")



... the historical population-size must have exceeded a million returners per year

Decline of Atlantic Salmon Population in the Rhine In the 1970ies the Rhine was the most polluted river in Europe!

- Pollution (eutrophication, acid rain, pesticides, temperature)
- Barriers to migration (upstream and downstream migration)
- Over-exploitation
- Habitat destruction (flow alteration, siltation, river "correction")



The Sandoz accident and SALMON 2000



- In 1986 a blast in the Sandoz chemical factory in Schweizerhalle / Switzerland polluted the Rhine on a stretch of several hundred kilometres
- Shortly after the ICPR was charged to draft a plan which would ultimately change the image of the Rhine as a sewer
- In 1987 the Rhine ministers approved of the "Rhine Action Plan"
- Important aim: the return of long-distance migratory fish, like the Atlantic salmon by the year 2000
- As salmon is a symbol for clean water and acts as an indicator species for a successful rehabilitation of the ecosystem, the project was named SALMON 2000 – later: SALMON 2020.





The aims of SALMON 2020:

Several thousands of salmon in the Rhine

Careful estimate: 20,000 to 30,000 salmon annually migrating upstream (SCHNEIDER, 2009).

Natural reproduction and selfsustaining populations

Suitable spawning grounds exist in most rivers stocked with salmon.

Self-sustaining populations are possible if free access to the spawning-habitats is re-established Salmon stocking started in 1987 and was significantly extended since 1994

Rhine:

- Switzerland
- France
- Germany
- Luxembourg

Maas:

- Belgium
- Germany

The Netherlands do not have spawning and rearing habitats

Salmon reintroduction projects





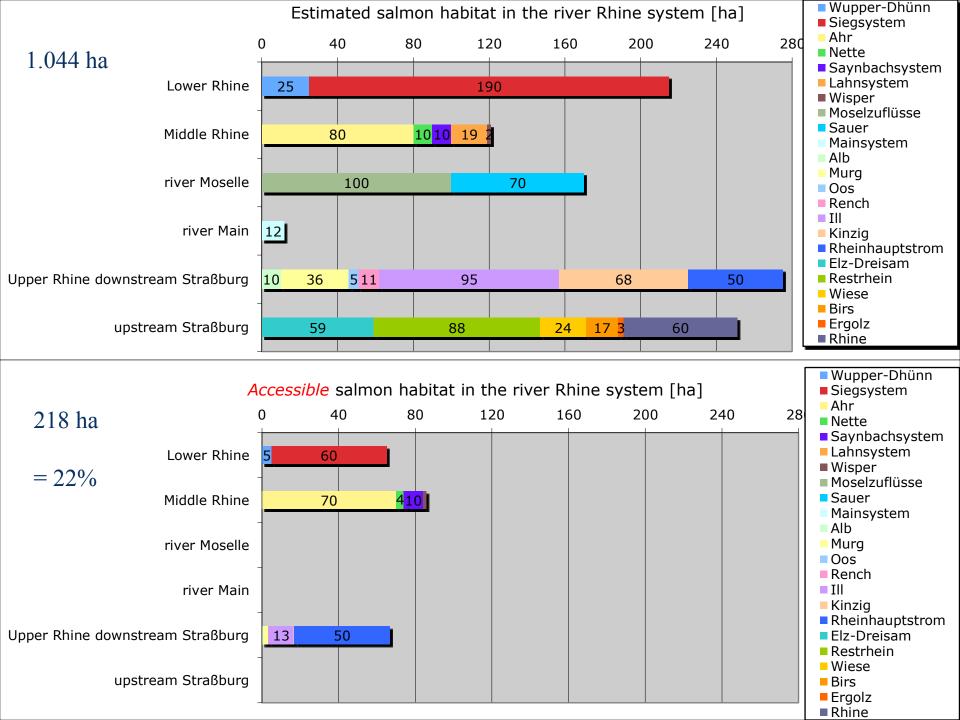




During the past 15 years, more than 16 million juvenile salmon have been released into the Rhine catchment

Returning salmon are currently detected at seven monitoring stations:

Westervoort (IJssel) Auermühle (Dhünn, Wupper catchment) Buisdorf (Sieg catchment) Troisdorf (Agger, tributary lower Sieg) Koblenz (Moselle) Iffezheim (Upper Rhine) Gambsheim (Upper Rhine)



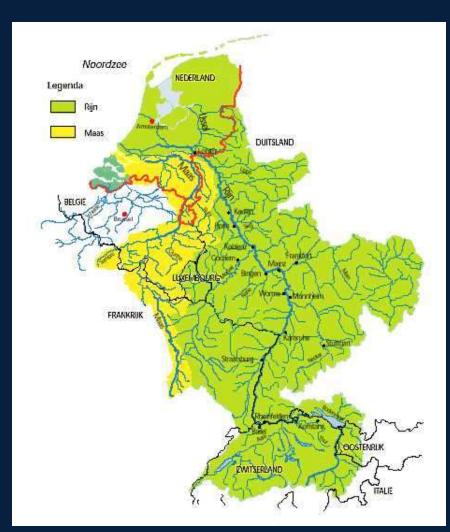
The Netherlands are the gateway for all migratory fish Three migration routes: Haringvliet, New waterway (Rotterdam, open) and IJssel

Salmon migrate two times:

- as smolts (juvenile emigration)
- as adults (spawning migration)



Female salmon caught in the river Rhine delta



Barriers in the Rhine river system

Discharge sluices in the Haringvliet dam in the Dutch delta –

Sorry, we are closed

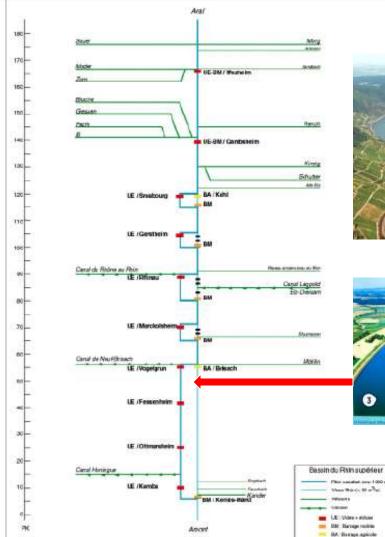


A huge dam blocks the Haringvliet, a former branch of the estuary of the Rhine and Meuse, from the North Sea. The discharge sluices are used to discharge excess water from the fresh water lake into the sea. Currently the government decided to let salt water intrude again on a small scale into the Haringvliet in order to restore the original ecosystem and to allow "free" fish passage.

Government plan: open gap in 2018

Barriers in the Rhine river system









03/07/2013

Upstream Salmon Migration again possible at some 480 Obstacles

Rotterdam, 3 July 2013

Result of the present ICPR balance of ecological measures taken during 2000 - 2012: Upstream migration is again possible at some 480 obstacles in the Rhine catchment.

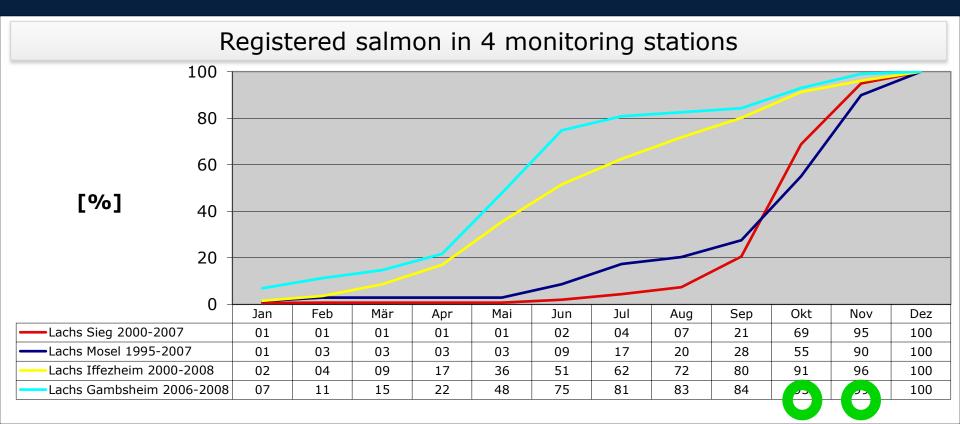
122 km² of floodplains have been reactivated, 80 oxbow lakes and backwaters have been reconnected to the dynamics of the Rhine. [...] leading to an ecologically more stable and varied Rhine system.

www.iksr.org

Do salmon find the entrance to the fishpasses in the *large* river Rhine "in time"?

In 2006-2008 some 93 % of ascending salmon passed the 2nd fishpass Gambsheim in October = 4 to 8 weeks before spawning time. In November 99% have passed the obstacle.

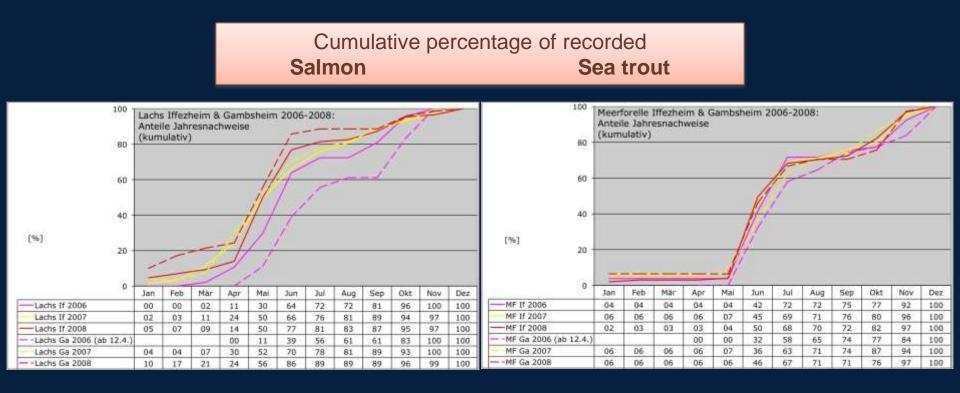
=> No indications of a conflict with the time budget ...



Do salmon find the entrance to the fishpasses in the *large* river Rhine "in time"?

Comparing the cumulative percentage of recorded salmonids: it takes **salmon** and **sea trout** only a few days from the passage of Iffezheim (1st obstacle, see full line) to the passage of Gambsheim (2nd obstacle, see dotted line)

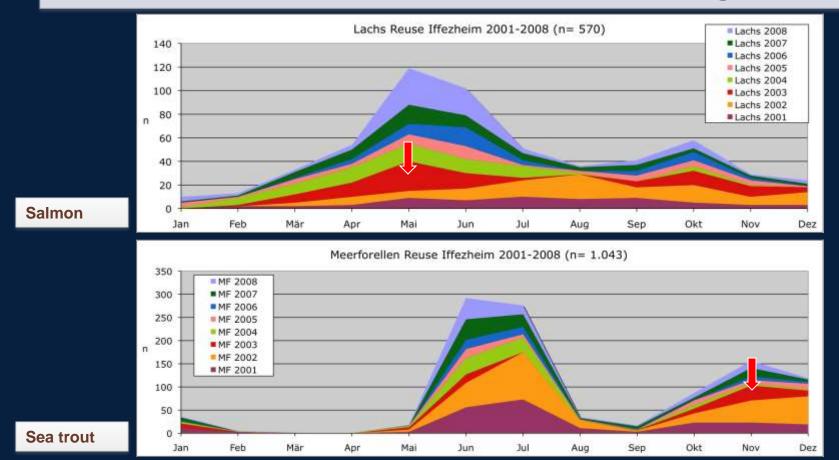
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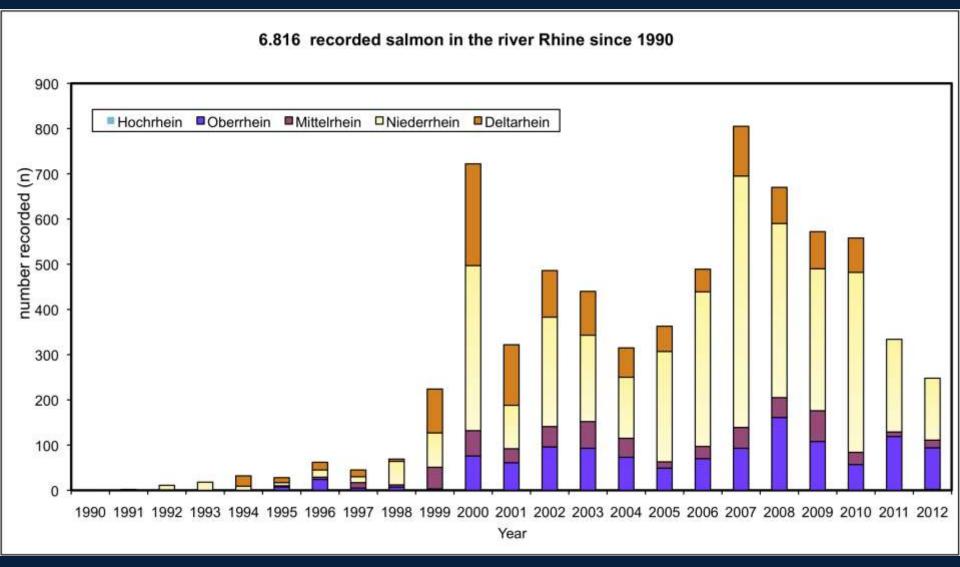
Water temperature and time budget

The migration pattern and the number of recorded salmonids in the extreme hot summer 2003 (red) (WT > 30° C) displayed only a gap in the migration – but no breaking off ! The migration started again as soon as the temperature decreased

=> No indications of a conflict with the time budget ...

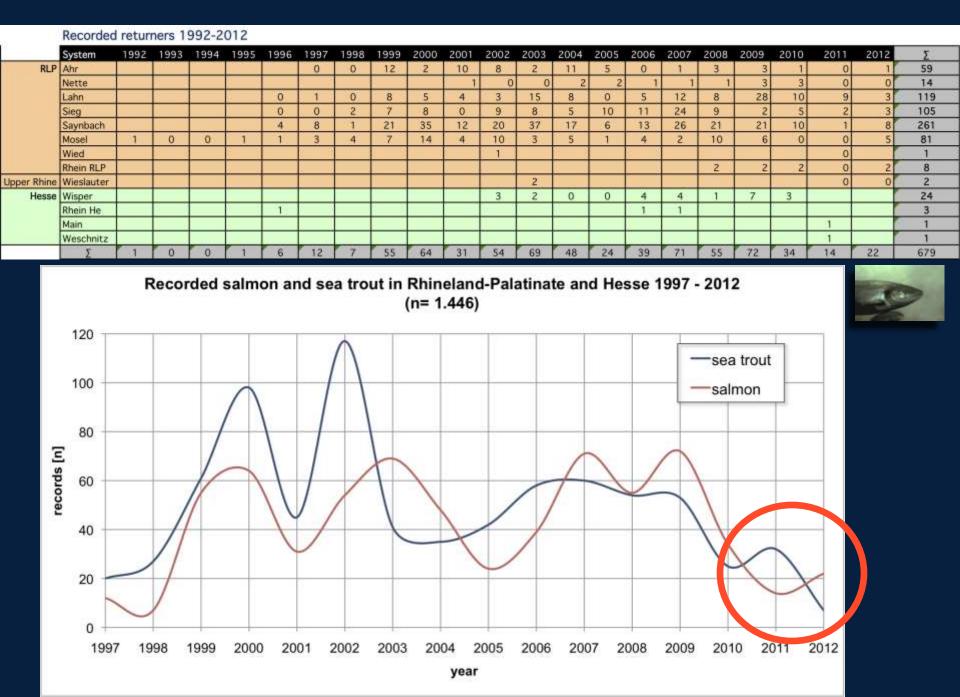


Returners



2011 and 2012: no data from the Delta-Rhine !

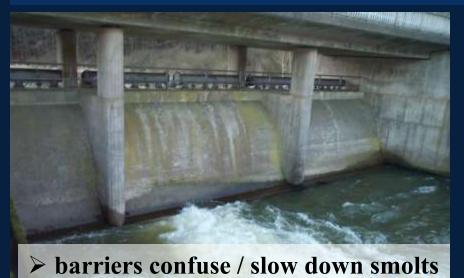
CIPR







The negative human impact is often linked with hydro-energy plants – *politicians want it, salmons don't …*



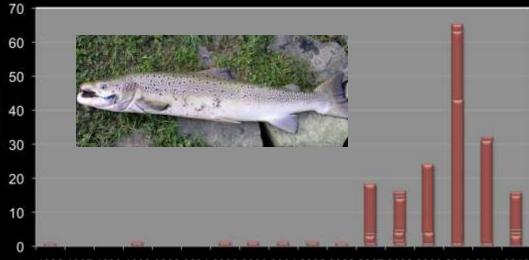


Poaching and "by-catch" seems to be an increasing problem ...

number



Reported catches of returning salmon in the Rhine catchment (investigation in progress)



1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012

Year

Other factors

More predators, such as cormorants, asp, catfish, sander inhabiting the migration routes; sculpin and cormorants in the rearing habitats

More hydropower, incl. additional turbines in the Upper Rhine

Climate change, more dry years, like the drought of the century in autumn 2011 (picture), hot summers like 2003 with water temperature of 30° C in the Rhine

More very large container ships operating with some thousands horsepower (an under-estimated factor ?!)









Natural reproduction

Natural reproduction has been recorded in almost all accessible tributaries:

- Sieg-system
- Wupper, Dhünn
- Ahr, Nette, Saynbach
- Wisper
- Wieslauter
- Upper Rhine
- III, Bruche

In rivers Sieg (system) and Saynbach densities where particular high in some years.

Reproduction is recorded over more than 12 years

In the rivers Sieg and Saynbach 10 - 30% of the returners are allready 2nd generation (= "wild")

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production in the Rhine system

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palitative Nashweise / Rückkehrer oberhalb Wanderhindernis eingesetzt	(X)
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oher Reproduktionsenlolg (> 5 - 50 Pens/100 m2)	XXX
ehr hoher Reproduktioneerfolg (> 50 Parrs/100 m2)	1000
Interauchung durchgeführt, keine Nachweise	0
ioht untersucht	1
lachweis unsicher	2

Laichgründe (größtenteile) erreichbar	-
Laichgründe partiellieingeschränkt erreichbar	
Laichgründe nichtlausnahmsweise erreichber	



Conclusions

River-specific problems, like dams, weirs, hydroelectric power stations, navigation, habitat quality, temperature, have not improved significantly in the past years – some got worse (e.g. poaching and "by-catch").

The return rate to the spawning rivers is insufficient and most probably even decreasing

The documented natural reproduction and fish-pass efficiency are clear indicators, that the reintroduction can be achieved – and yes: as far upstream as Switzerland !!!

Finally: Reintroduction is a process of adaptation – nobody knows, how many generations it takes ...

Thank you very much for your attention



Merci beaucoup pour votre attention