

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

Du Plan Saumon Rhin 2000 au Plan 2020



# Contents



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

# River Rhine system



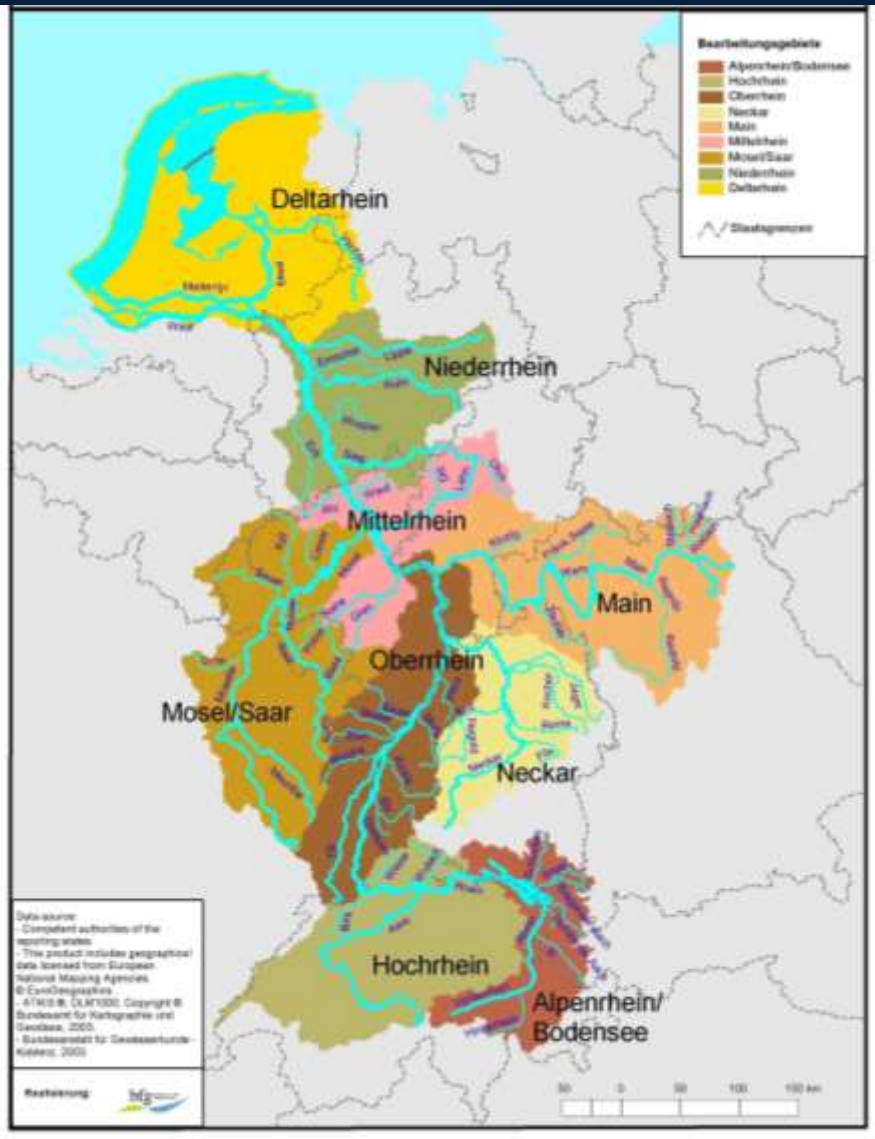
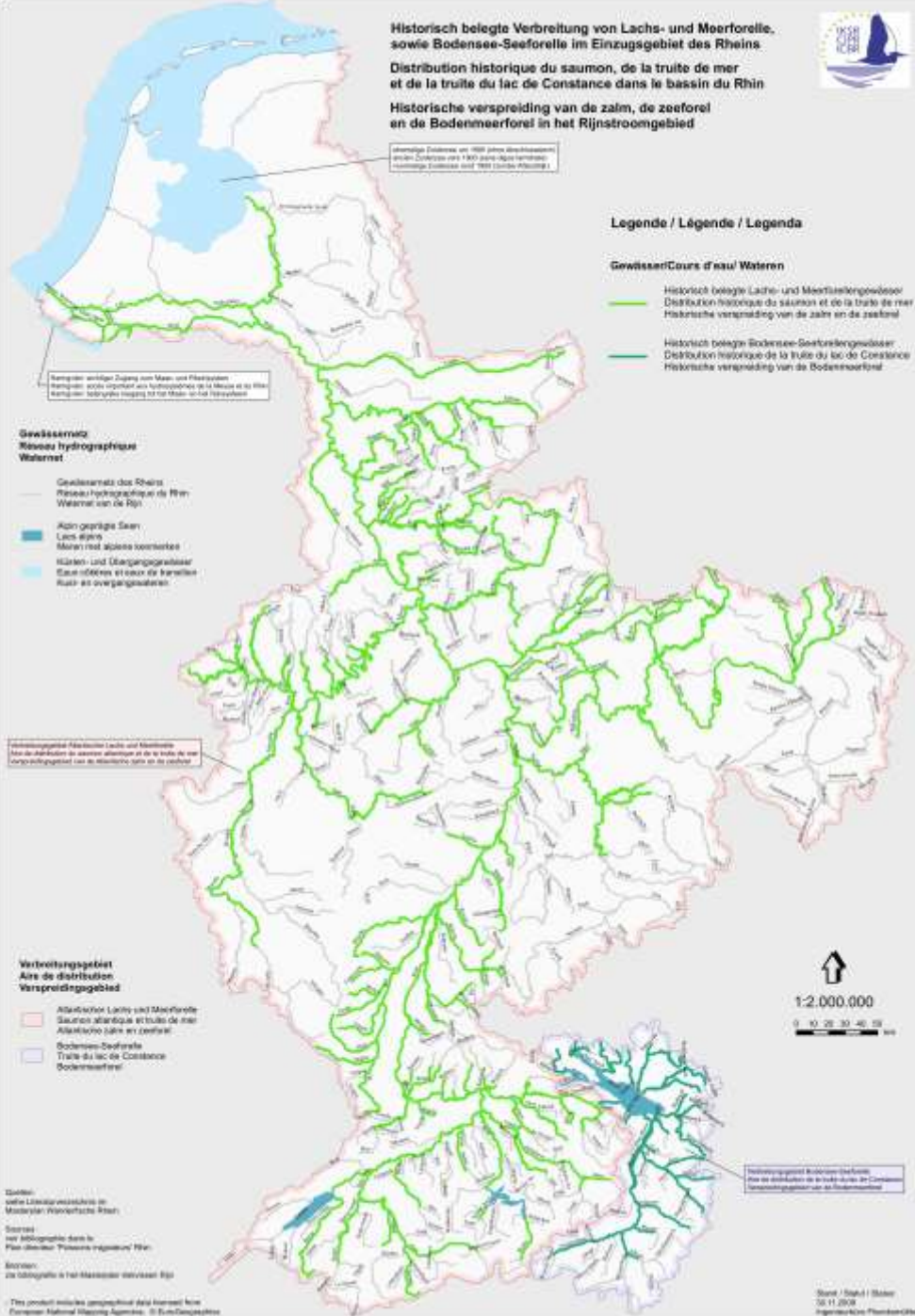
Historisch belegte Verbreitung von Lachs- und Meerforelle, sowie Bodensee-Seeforelle im Einzugsgebiet des Rheins  
 Distribution historique du saumon, de la truite de mer et de la truite du lac de Constance dans le bassin du Rhin  
 Historische verspreiding van de zalm, de zeeforel en de Bodenseeforel in het Rijnstroomgebied

Historische Verbreitung um 1900 (aus dem Bericht des Bundesamtes für Naturschutz vom 19. März 2003)  
 Historical Distribution around 1900 (from the report of the Federal Agency for Nature Conservation of 19. March 2003)

Legende / Légende / Legenda

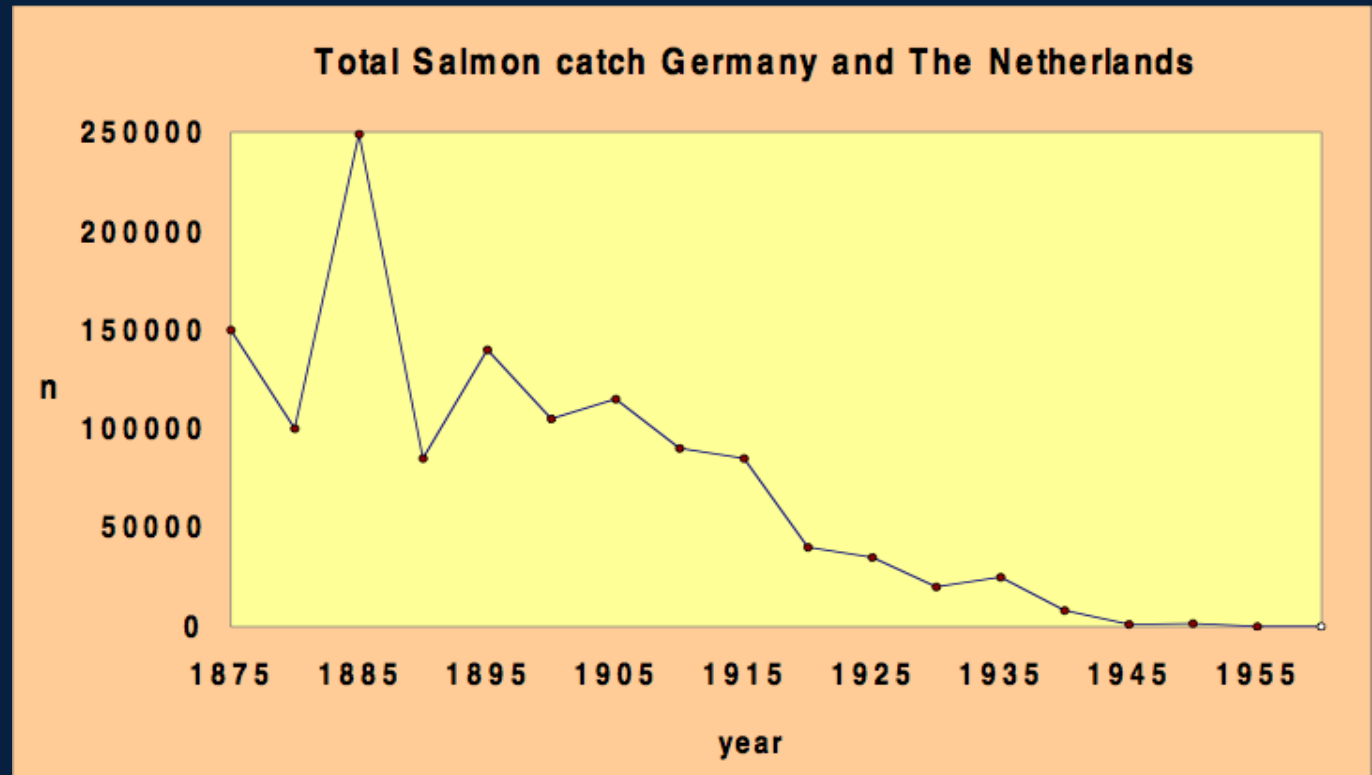
**Gewässer/Cours d'eau/Wateren**

- Historisch belegte Lachs- und Meerforellengewässer  
 Distribution historique du saumon et de la truite de mer  
 Historische verspreiding van de zalm en de zeeforel
- Historisch belegte Bodensee-Seeforellengewässer  
 Distribution historique de la truite du lac de Constance  
 Historische verspreiding van de Bodenseeforel



# 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 self-sustaining 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



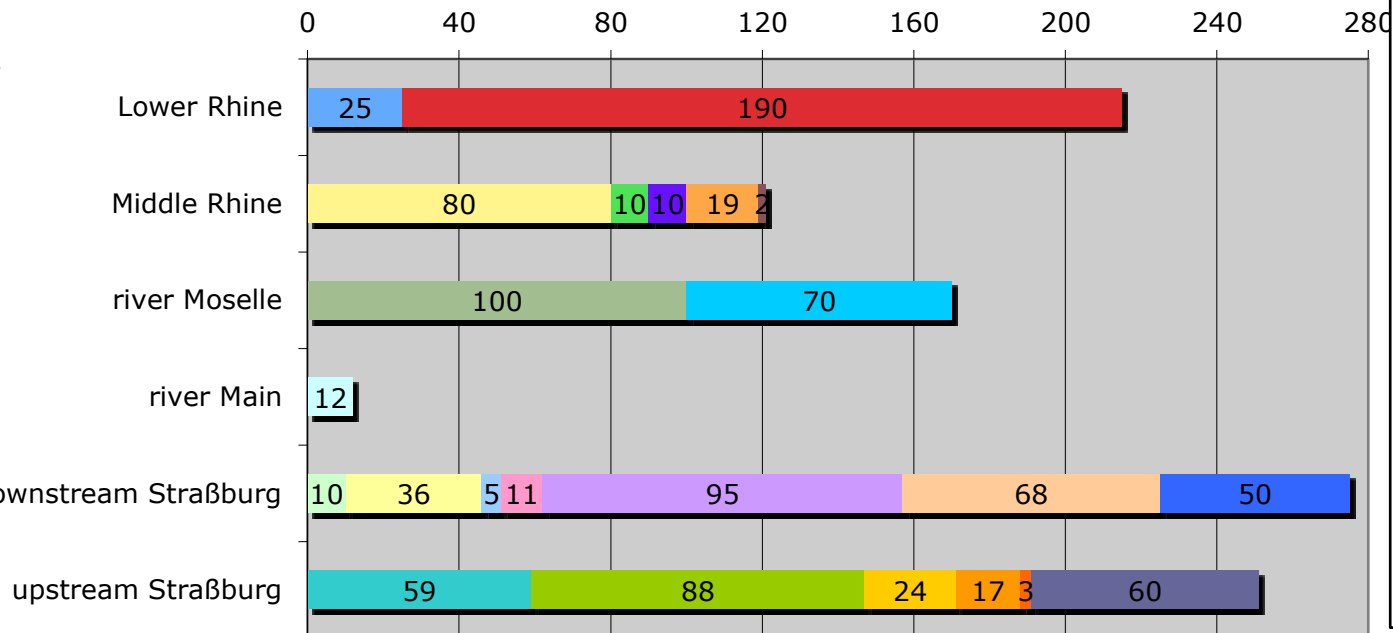
Returning salmon are currently detected at seven monitoring stations:

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



### Estimated salmon habitat in the river Rhine system [ha]

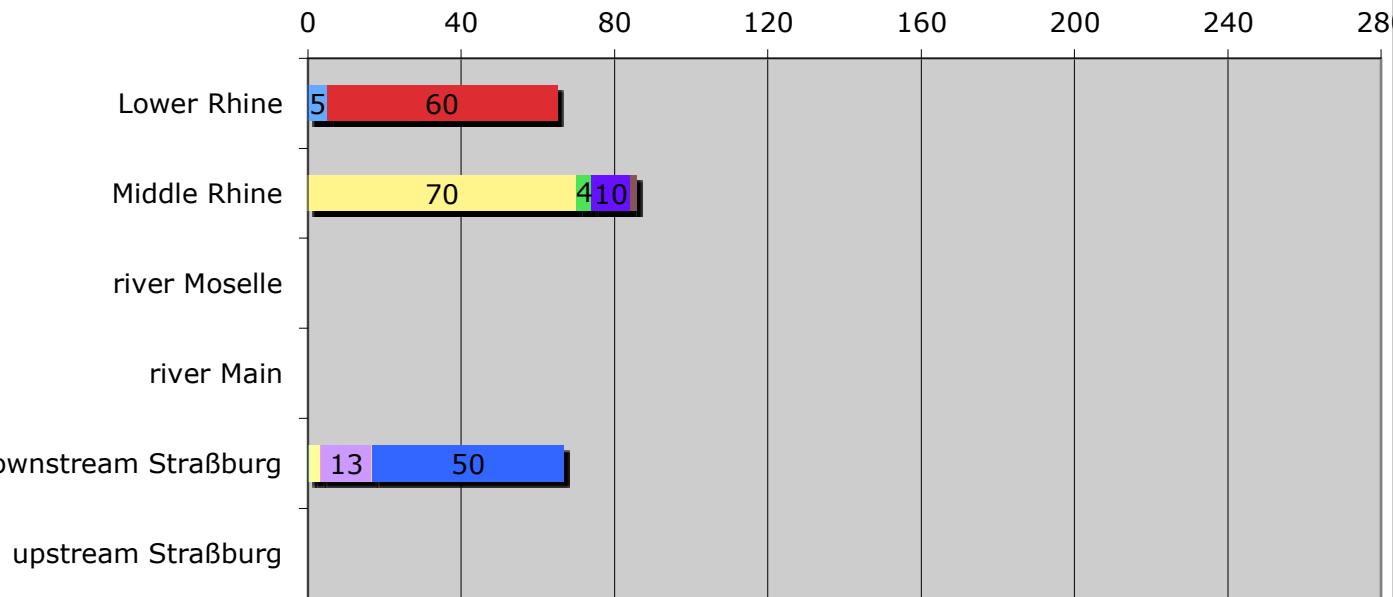
1.044 ha



### Accessible salmon habitat in the river Rhine system [ha]

218 ha

= 22%



# The Netherlands are the gateway for all migratory fish

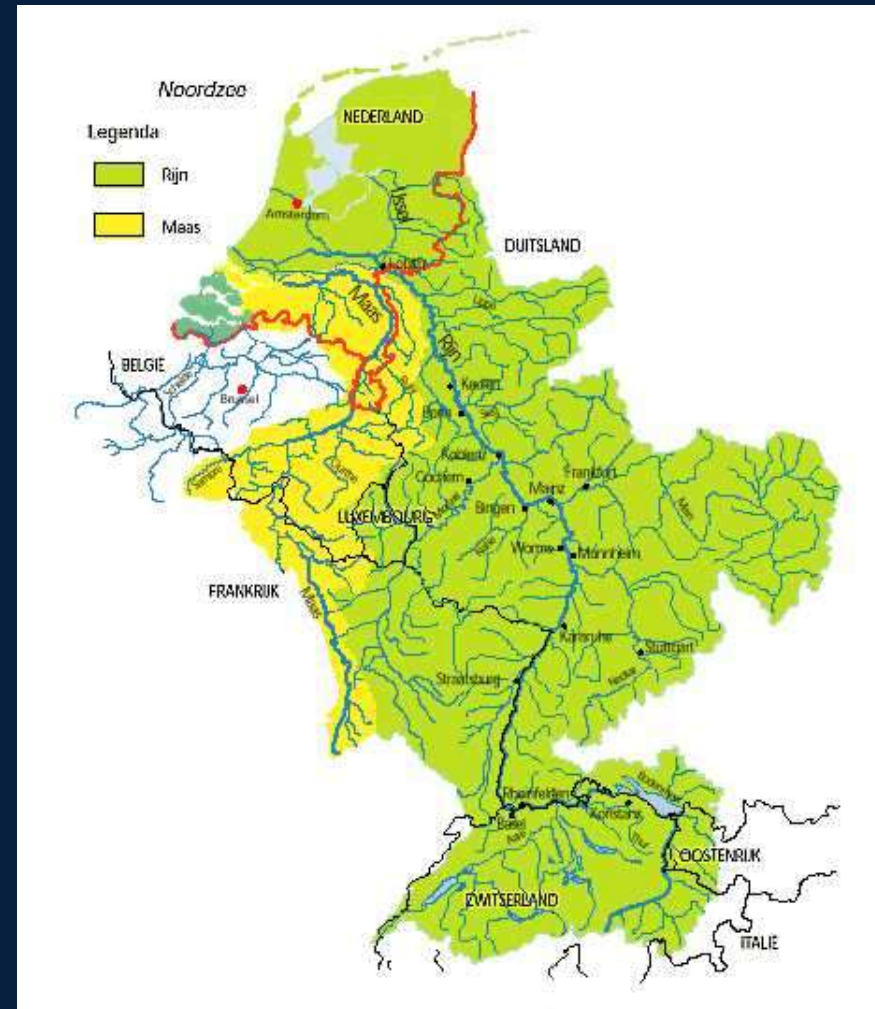
## Three migration routes: Haringvliet, New waterway (Rotterdam, open) and IJssel

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***

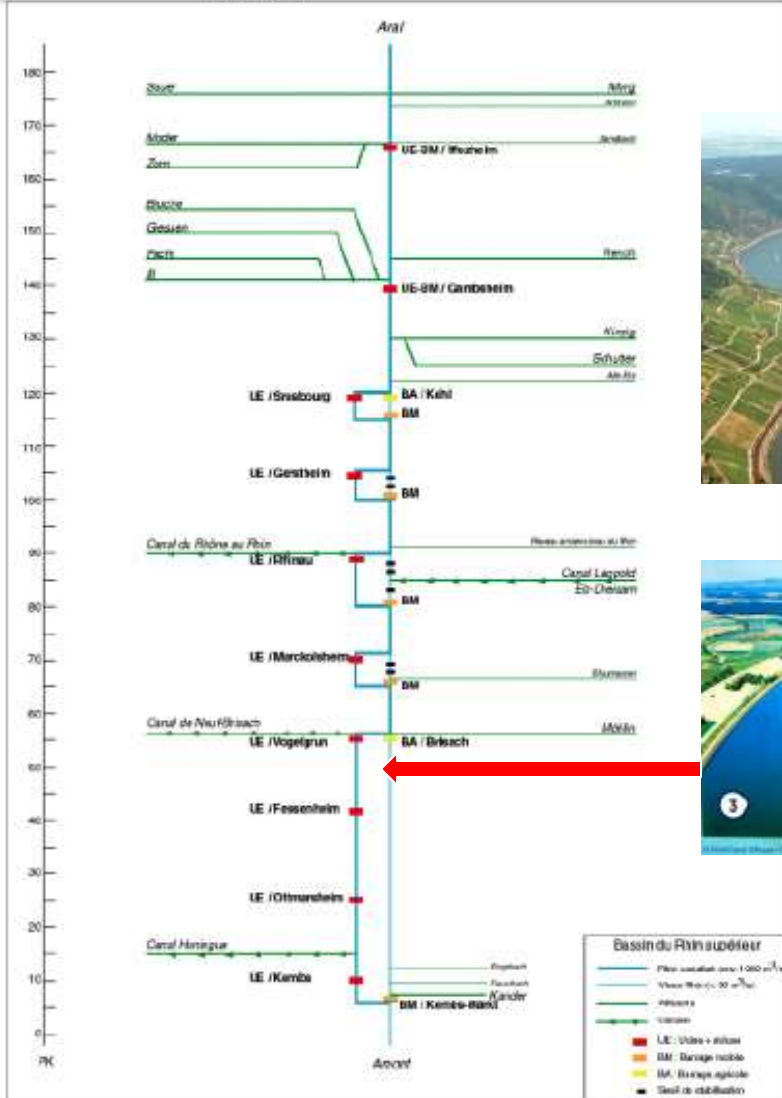
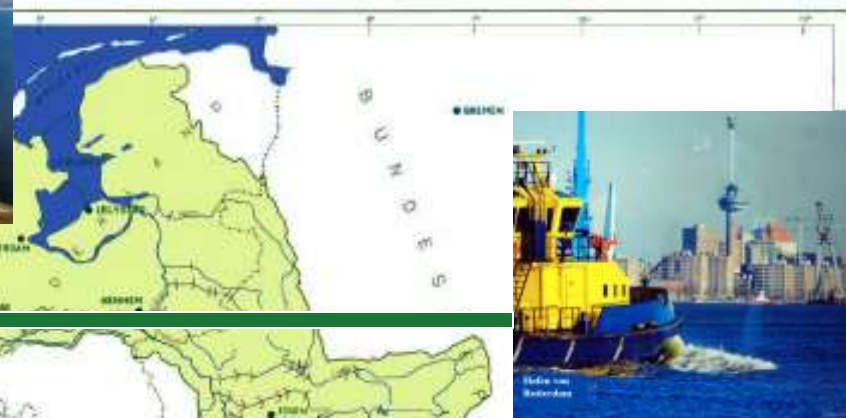


A huge dam blocks the Haringvliet, a former branch of the estuary of the Rhine and Meuse, from the North Sea. The discharge sluices are used to discharge excess water from the fresh water lake into the sea. Currently the government decided to let salt water intrude again on a small scale into the Haringvliet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

## The Upper Rhine with the Alsace canal





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 km<sup>2</sup> 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.

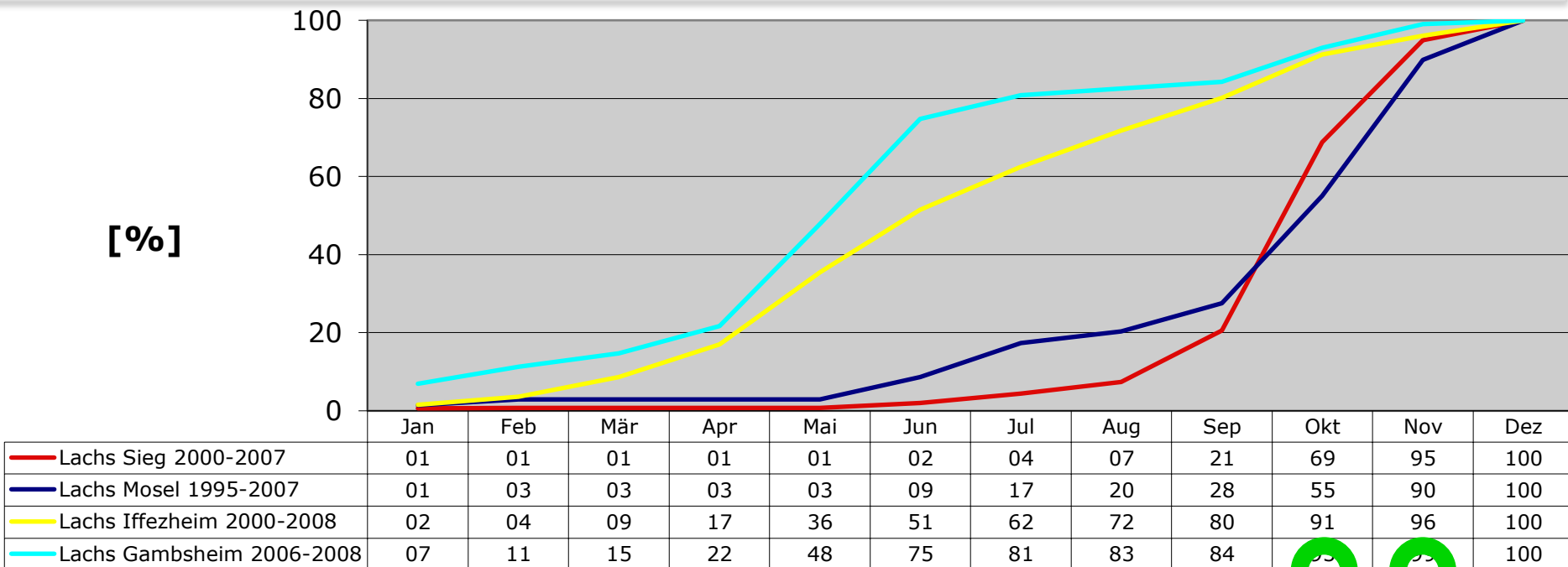
[www.iksr.org](http://www.iksr.org)

## 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 Gamsbheim 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 ...**

Registered salmon in 4 monitoring stations





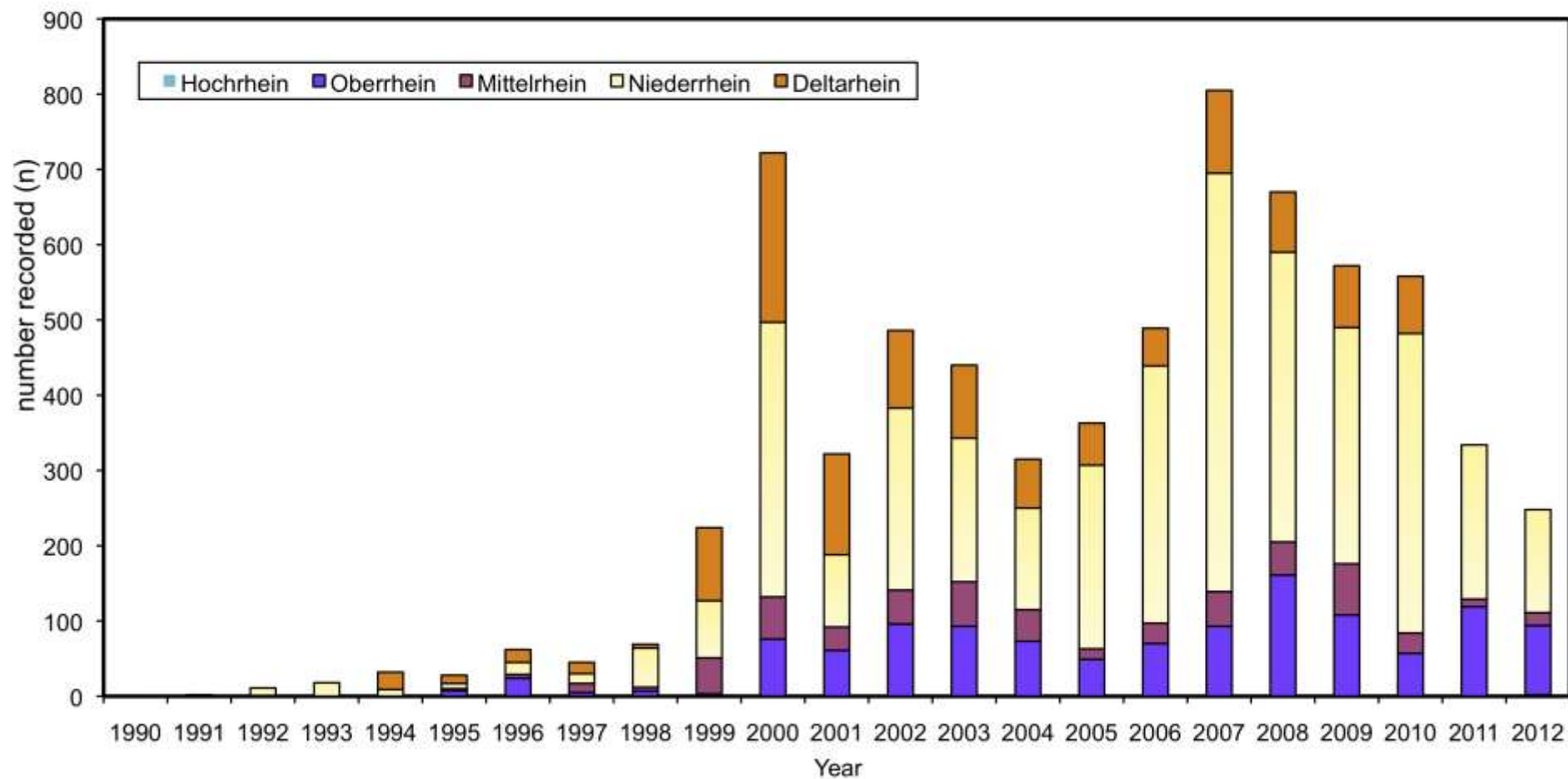




# Returners



6.816 recorded salmon in the river Rhine since 1990

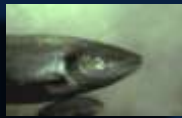
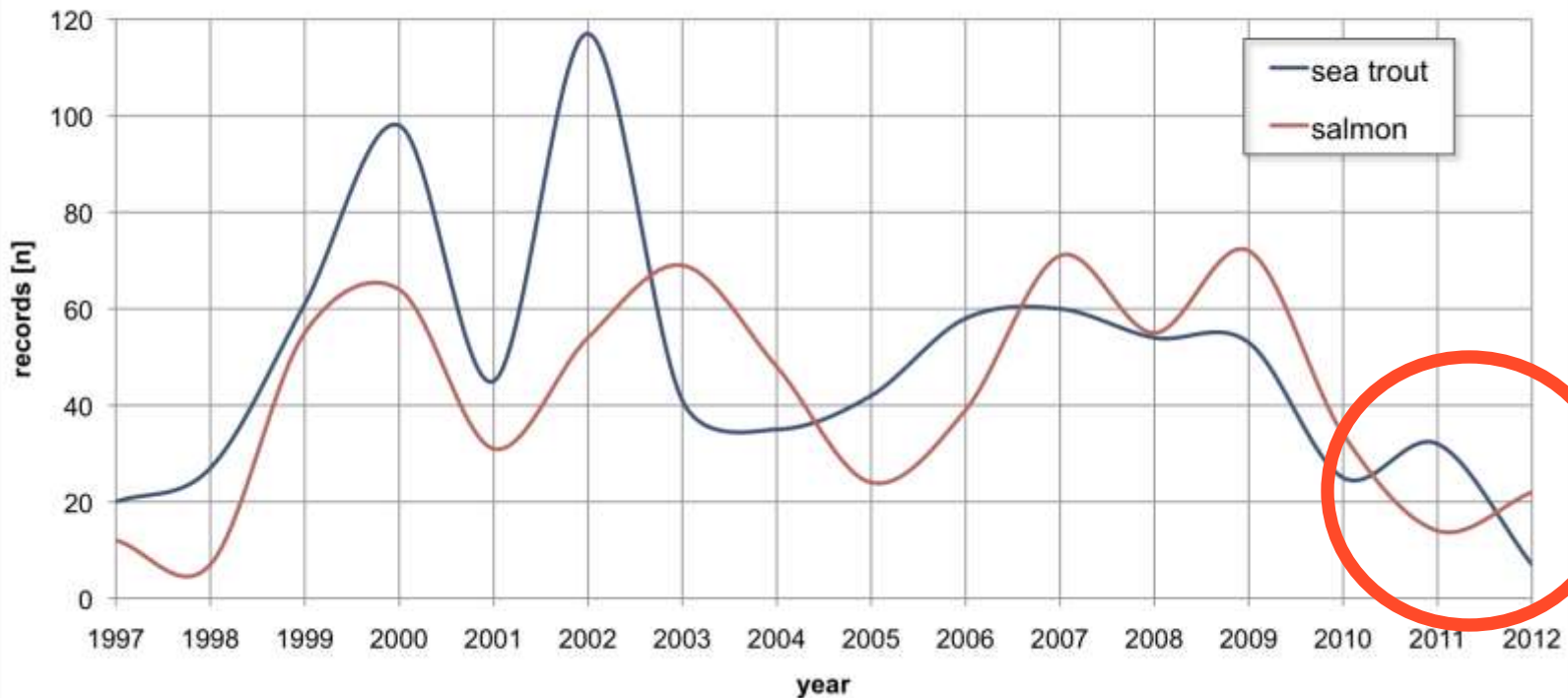


2011 and 2012: no data from the Delta-Rhine !

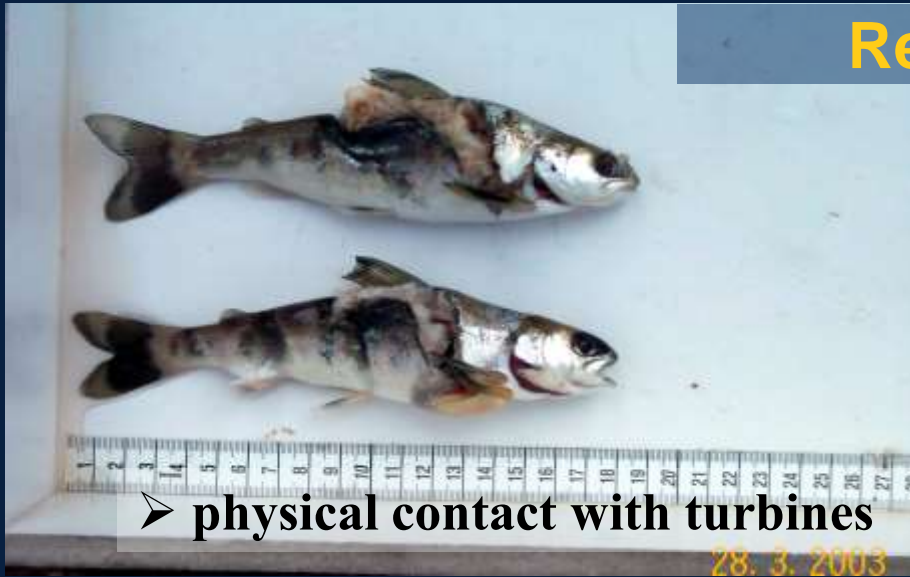
Recorded returners 1992-2012

System	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Σ	
RLP	Ahr					0	0	12	2	10	8	2	11	5	0	1	3	3	1	0	1	59	
	Nette									1	0	0	2	2	1	1	1	3	3	0	0	14	
	Lahn					0	1	0	8	5	4	3	15	8	0	5	12	8	28	10	9	3	119
	Sieg					0	0	2	7	8	0	9	8	5	10	11	24	9	2	5	2	3	105
	Saynbach					4	8	1	21	35	12	20	37	17	6	13	26	21	21	10	1	8	261
	Mosel	1	0	0	1	1	3	4	7	14	4	10	3	5	1	4	2	10	6	0	0	5	81
	Wied											1									0	0	1
	Rhein RLP																	2	2	2	0	2	8
Upper Rhine												2									0	0	2
Hesse	Wisper										3	2	0	0	4	4	1	7	3				24
	Rhein He					1									1	1							3
	Main																				1		1
	Weschnitz																				1		1
Σ	1	0	0	1	6	12	7	55	64	31	54	69	48	24	39	71	55	72	34	14	22	679	

Recorded salmon and sea trout in Rhineland-Palatinate and Hesse 1997 - 2012 (n= 1.446)



## Reasons



➤ physical contact with turbines

28. 3. 2003



➤ high predation in stagnating water

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



➤ barriers confuse / slow down smolts

14. 2. 2003



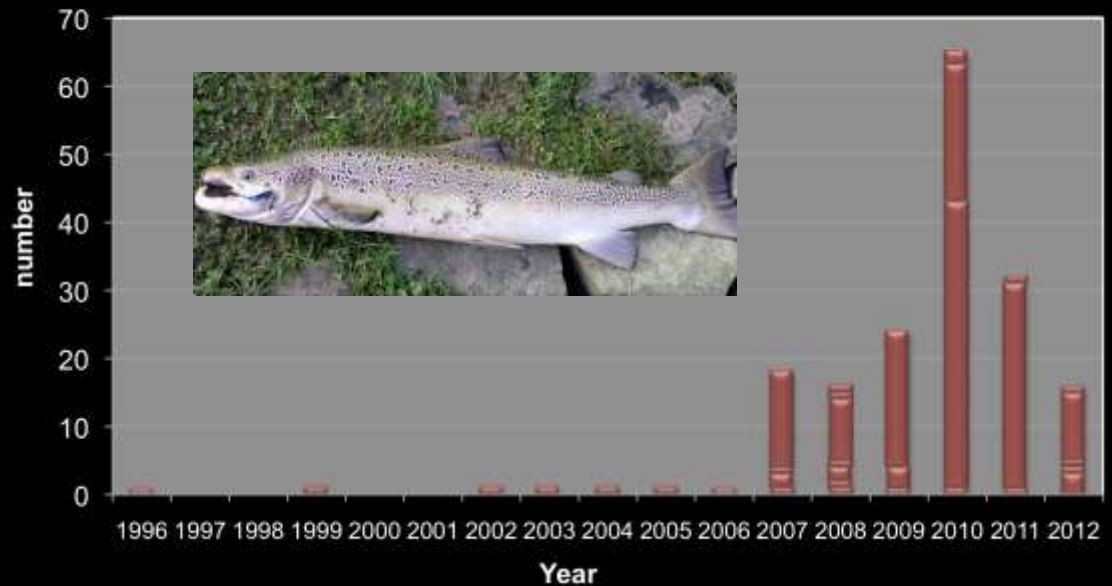
➤ alteration of flow

21. 4. 2003

# Poaching and „by-catch“ seems to be an increasing problem ...



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



## Other factors

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

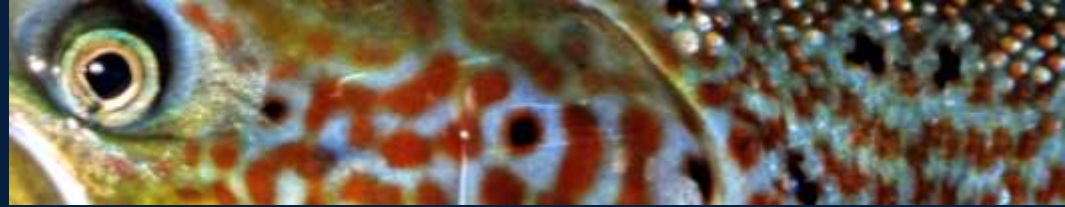
**More hydropower**, incl. additional turbines in the Upper Rhine

**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 ?!)







## 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