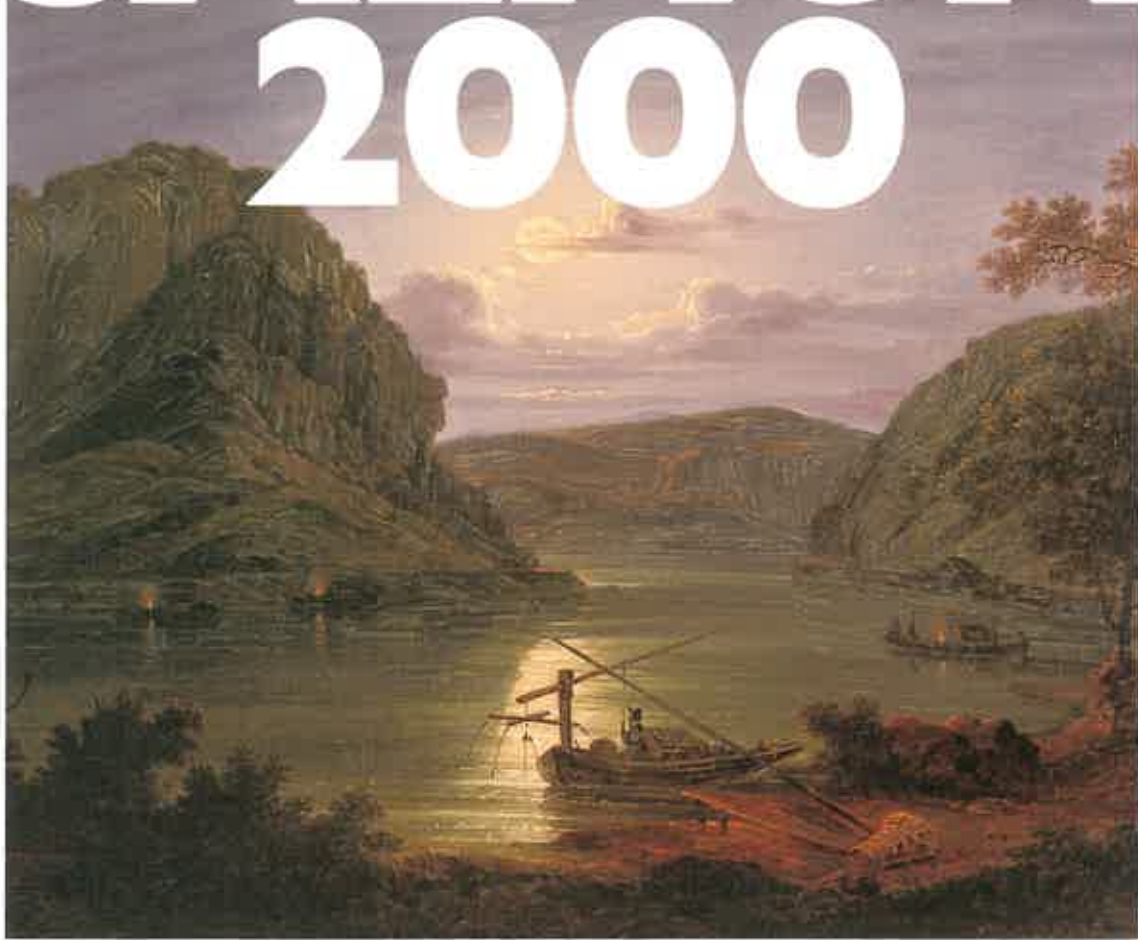


SALMON 2000



A late spring night on the Rhine, 150 years ago. The moon emerges from behind the clouds, the deep river by the Loreley reflects its beams. Bats flit across the surface chasing rising may flies. A late cuckoo calls and replies to the echo reflected by the precipice. Silently the eagle owl glides down and across the river. Fishermen in their boats lurk for salmon on their way upstream. The song of the nightingale emerges from the shrubbery along the banks ...

Here we postulate: If, instead of fishermen you imagine seeing an angler who, all of a sudden catches a salmon - and then returns it to the river - then this might be your experience on the banks of the Rhine by the year 2000.



**INTERNATIONALE KOMMISSION ZUM SCHUTZE DES RHEINS
INTERNATIONAL COMMISSION FOR THE PROTECTION OF THE RHINE**



**Christian Morgenstern (1910):
Der Salm**

Ein Rheinsalm schwamm den Rhein
bis in die Schweiz hinein.

Und sprang den Oberlauf
von Fall zu Fall hinauf.

Er war schon weißgottwo,
doch eines Tages - oh! -

da kam er an ein Wehr:
das maß zwölf Fuß und mehr!

Zehn Fuß - die sprang er gut!
Doch hier zerbrach sein Mut.

Drei Wochen stand der Salm
am Fuß der Wasser-Alm.

Und kehrte schließlich stumm
nach Deutsch- und Holland um.



SALMON 2000

Father Rhine is spreading good news: the great European river having suffered greatly expects a child vanished long ago to return. Mysterious helping hands still have plenty to do preparing the arrival while the most famous fish in the Rhine, the salmon, slowly but silently returns home.

Bonn and the Rhine tributary Sieg have already been reached. If the salmon, hard to satisfy as it is, succeeds on its way upstream in order to live and spawn in the tributaries, it will be proof that the Rhine ecosystem has really improved. Many other species and biotopes will also profit from this positive trend.

A lot remains to be done, but the International Commission for the Protection of the Rhine and many helping hands have addressed the matter. "Salmon 2000" is the name they have given to the Action Programme for the Rhine.

The first hurdles on the Upper Rhine, the Franco-German barrage weirs Iffezheim and Gamsheim, will be equipped with fish passes permitting migrating fish to reach the tributaries of the Rhine in Alsace and the Black Forest.

Understanding the project "Salmon 2000" is only possible once you have travelled into the past. Some 40 years ago the salmon disappeared from the Rhine. It is no more than 100 years since cohorts of this wonderful fish species travelled up the Rhine as far as the Rhine Falls of Schaffhausen ...

Contents:

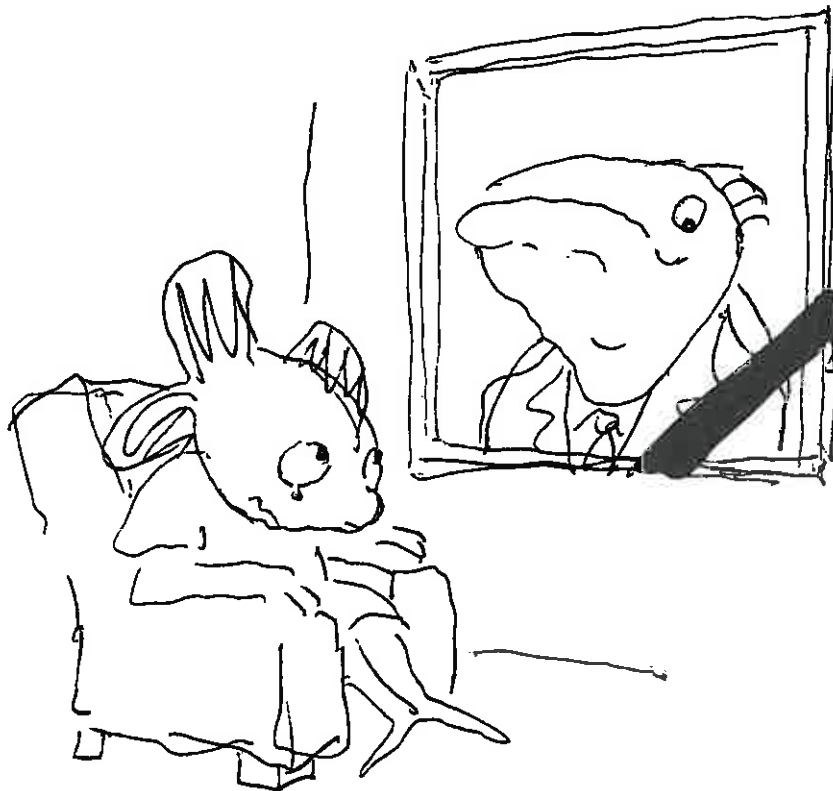
- 1. Song on the hock**
Stories of the salmon fishermen
Why Father Rhine fell ill
- 2. If the waters of the Rhine ...**
ICPR versus waste water
- 3. were golden wine ...**
Towards the goal "Salmon 2000"
- 4. then I'd like to be ...**
Remedial measures for migrants
- 5. a little fish!**
Portrait of the salmon

1. Song on the hock

A night on the sands of the Rhine in Alsace, last century.
A fisherman sitting on a timber scaffolding watches the river.
Once he makes out a tidal wave of salmon in the light of the
moonbeams, the guardian will wave his hat. Upstream, a boat
will leave the sands ...



Catching salmon on the Upper Rhine in Alsace (Drawing by LIX, 19th century)





Stories of the salmon fishermen

The history of fishery on the Upper Rhine is as old as are human settlements in this area. Celts and Romans seem to have fished intensively in the Rhine. In the fourth century, the Roman poet **Ausonius** particularly mentioned perch and salmon among the fish in the Rhine. In the 12th century, the nun and learned writer **Hildegard von Bingen** gave a more detailed description of the fish of the Rhine in her book "On fish". She distinguished between kelt and salmon. The flesh of the night-time kelt (**Salmo**) is poor while the salmon (**Lasz**), a daytime fish is considerably more healthy. On the other hand, in his book on "Birds, Fish and Animals" (1666) the Strasbourg fisherman **Leonhard Baldner** calls the **Salmen** "delicious to eat" and says that the **Lacks** "taste bad". He gives a precise description of fishery and behavioural biology. Until the salmon vanished from the Upper and the High Rhine, fishermen continued to distinguish "Salmen" caught in the first six months of the year from "Lachs" caught in the second half, in other terms "Salmen" migrating upstream and "Lachs" drifting downstream towards the sea.

The Rhine was considered to be the most important and the largest salmon river in Europe. Among the fish of the Rhine salmon was of greatest importance. For centuries, fishermen along the High Rhine (Hochrhein) and the Upper Rhine (Oberrhein) distinguished big fishery, that is salmon fishery, from small fishery, the fishery of all other fish species. Increasingly, fishing methods were refined. Fish baskets, fishing gallows, salmon scales and nets were used. Even today, numerous field names, coats of arms and signs of guesthouses recall the great importance of the Rhine salmon. According to the vivid descriptions

the author **Karl Simrock** gave around 1840, salmon fishery was prosperous on the Middle Rhine around the Loreley. **Jacob Diezler**, a painter of the late Romantic period, gives us an idea of the salmon fishing boats in his painting of 1843, entitled "Moonshine on the Loreley by night", the cover illustration of this brochure. But even then the Rhine was no longer what it used to be.

Ancient names

In the primaevai Indo-European linguistic area, along the rivers flowing into the North and the Baltic Sea, the root of the words *lokso* and *salmo* developed, probably signifying "springer". The take-off power of the salmon had most certainly already impressed the Indo-European fishermen several thousand years ago.

Current names today

German: Lachs, Salm
 English: salmon
 French: saumon
 Dutch: zalm
 Norwegian: laks
 Russian: losòs'
 Swedish: lax
 Spanish: salmón



Why Father Rhine fell ill

The first wounds inflicted upon the Rhine and its widespread alluvial areas, its abundance beyond our imagination of fish, birds and plants dates back to Roman times. Father Rhine's insidious case history began some 2000 years ago. By the middle of the last century, illness confined him to bed, his state then deteriorated until the crisis came in the seventies of this century.

During the Roman period, the first woods were cleared for settlements along the Rhine and its tributaries. During the Middle Ages, this continued and was even intensified. Additionally, there was intensive fishing, hunting and the first mill weirs appeared in the Rhine tributaries as the first obstructions to fish migration. As an astonishing decline had been registered with respect to fish and fowl in and along the Rhine, the "Straßburger Ordnung der Rheinfischerei" ("Strasbourg Regulations on fishing in the Rhine") was laid down in 1449. During the 18th century, tributaries and brooks were used for floating wood, an activity which destroyed large ranges of spawning grounds for fish. The recklessness with which juvenile salmon - parr as they are called - were then caught may be illustrated by the following quotation.

SANDERS (1781):

"Juvenile salmon, commonly considered to be a wonderful meal and great amounts of which are being caught in the River Rhine ..."

The influence of fishery on the stock of salmon was thus already felt at a time when other negative influence was not yet as clear. In 1885, excessive fishery resulted in the conclusion of a treaty, the "Staatsvertrag über die Lachsfischerei im Rhein" (International treaty on salmon fishing in the Rhine) still in force. However, this treaty could not prevent the further decline of the stock of salmon in the Rhine. The very same year a record was set: in total 250 000 salmon were caught in the Rhine. Then the decline began. Presumably the stock of salmon had already been on the decline since the second

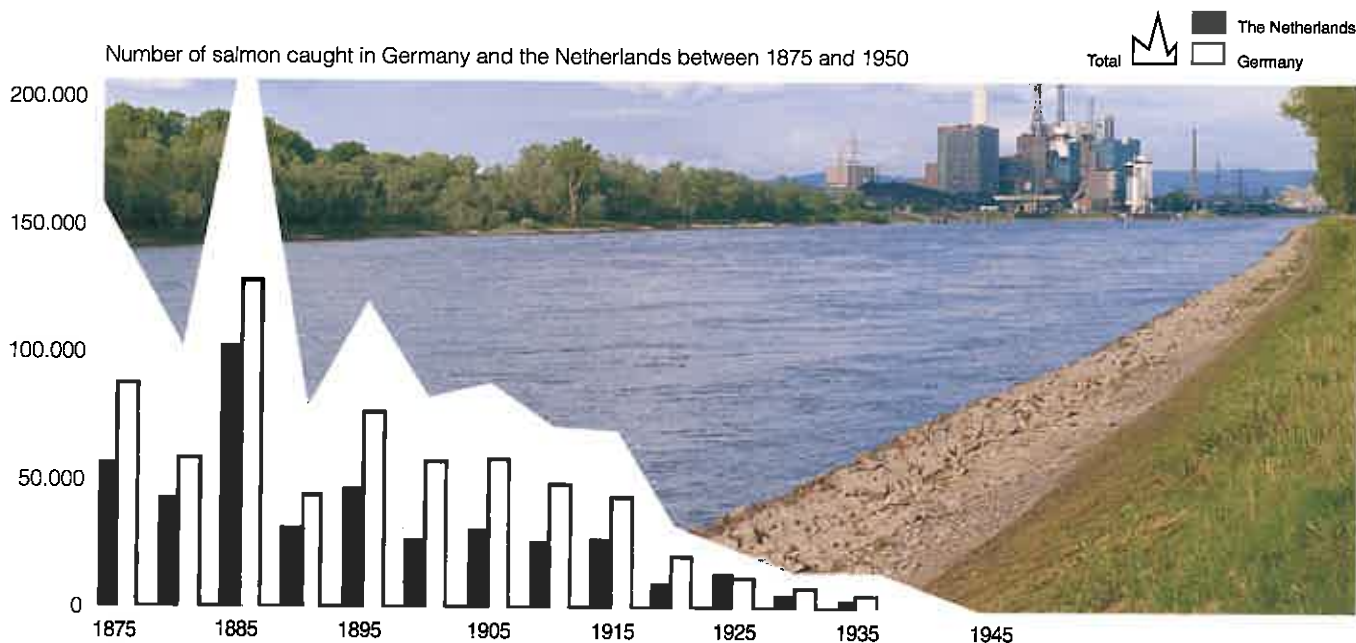
half of the 19th century. However, the perfection of fishing techniques and artificial stocking of fish may have disguised this tendency.

A time of change

As early as the 18th century the bed of the **Lower Rhine** had been subjected to changes. This continued until 1880. Meanders were cut off, dykes and warping dams were built. Consequently, a large number of resting places and spawning grounds for fish disappeared, the ground-water level sank, meanders silted up.

Between 1880 and 1900 man began regulating the **Middle Rhine**. Tributaries were enlarged. More and more barrage weirs obstructed fish migration, hindering salmon and other migrants from reaching their spawning grounds.

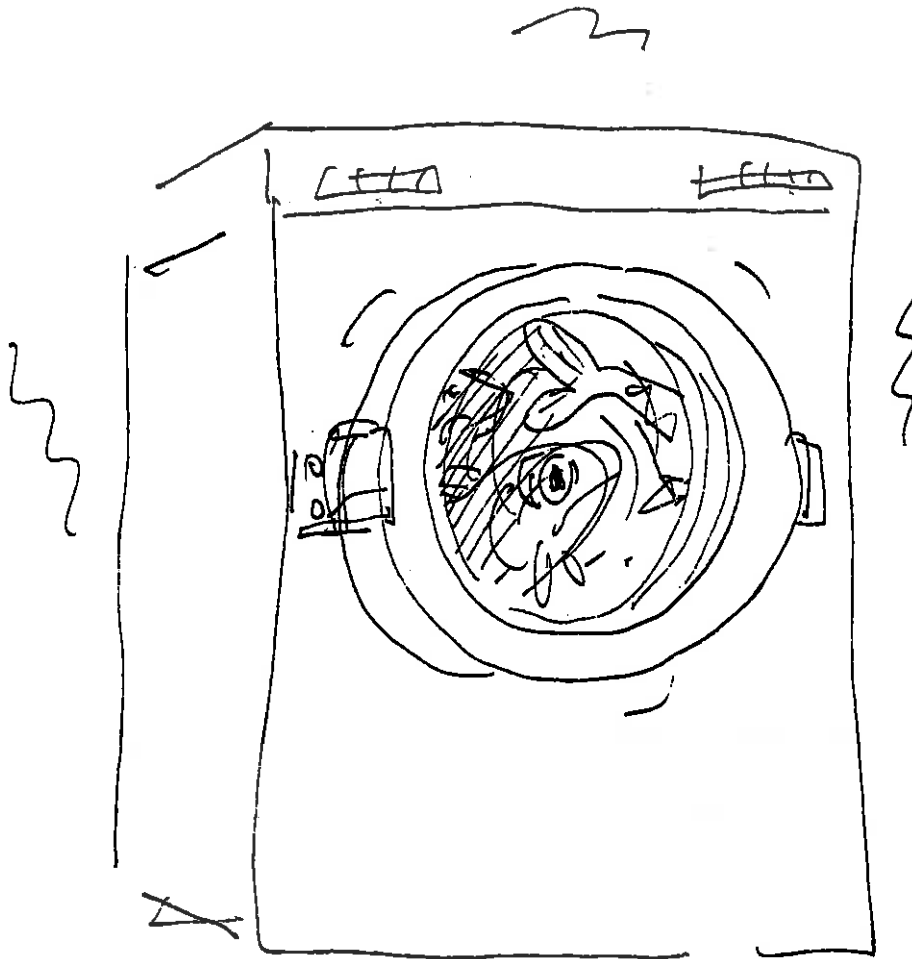
Between 1817 and 1874 the German engineer Tulla developed the programme for the major corrections of the **Upper Rhine**. The plan to protect people living on the banks of the Rhine against floods and epidemics and to enable the use of alluvial areas for other purposes was brilliant. Further corrections of the Rhine as well as the construction of the canal parallel to the Rhine (Rheinseitenkanal) followed in the 20th century. The river was now forced into an unchangable bed, between Basel and the border of Hesse its course was shortened by one fourth. The Upper Rhine saw undesired side-effects with severe consequences: As the flow velocity increased considerably, islands and gravel banks were destroyed, resting places and spawning grounds disappeared. Due to erosion the depth of the river bed increased, thus the ground-water level dropped. Meanders and alluvial areas were cut off. Lauterborn, carrying out research on the Rhine, described the effects of this development on fish.



2. If the waters of the Rhine...

So far, one of the reasons for the severe illness of the Rhine ecosystem has not been taken into account: the pollution of the Rhine due to industrial and domestic wastewater. In the second half of the last century, the river was unable to cope with it. Fish mortality began, people began complaining about a taste of petroleum in fish. As early as the end of the last century the noxious effect of industrial wastewater on fish was a topic of discussion, but opinions differed as to what was noxious.

Due to the rapid population growth and the expanding industry in the Rhine valley, the pollution of the Rhine increased more and more. However, in the post-war-period, water quality improved further to losses of production, particularly in the heavy metal industry. For some time, a larger number of salmon migrated upstream until the economic boom reversed this development. By the end of the 50s the salmon of the Rhine had died out. This certainly was an alarming signal.



IWAN GOLL (1924)

Rheinkohle statt Gold
Die Fisch und die nackten Nymphen
Sterben im romantischen Wasser aus

Rhine-coal instead of gold
Fish and naked nymphs are
Dying out in the romantic waters

WILLY BAROCK (1963) Niederrhein

Ich will dir
kein verlogenes Loblied mehr singen. ...
Den toten Fischen will ich einen Nachruf spenden,
die verreckten an dem Gebräu,
das du rechts und links deiner Straße
aus zahllosen Abwasserkanälen säufst.
Das Meer sträubt sich, dich zu empfangen.

WILLY BAROCK (1963): Lower Rhine

I will no longer sing
mendacious songs of praise for you. ...
I will bestow an obituary notice upon the dead fish
croaking on the concoction
you drink from plenty of sewers
left and right of your road.
The seas stand on end, will not receive you.

ALLEN GINSBERG (1979)

Too much industry
No fish in the Rhine
Lorelei poisoned
Too much embarrassment

FRIEDRICH CHRISTIAN DELIUS (1981)

Geschichte vom Rheinfisch

Dieser da, Lachs oder Hecht, hatte den Rhein
von unten gesehen, kannte Metallschlamm, Ölfleck,
Reichtum der Welt. So gut wie heut
Gings dem noch nie. Lachs oder Hecht, der schwamm
Ins Netz, zuckte im Netz des Beschützers, Erforschers
Des Flusses. Der wirft in sauberes Wasser das Tier,
Schon kracht, noch wünscht der Mensch ihm glückliches
Leben, der Schlag ins Genick Sauerstoff ins Blut.
Schreit der Fisch: Salze und Cadmium für meine
Kiemen! Hilfe! Blei her oder ich sterbe!
Und kriecht am Schock. Wieder bietet ein Toter
Das Beispiel, der Fisch.

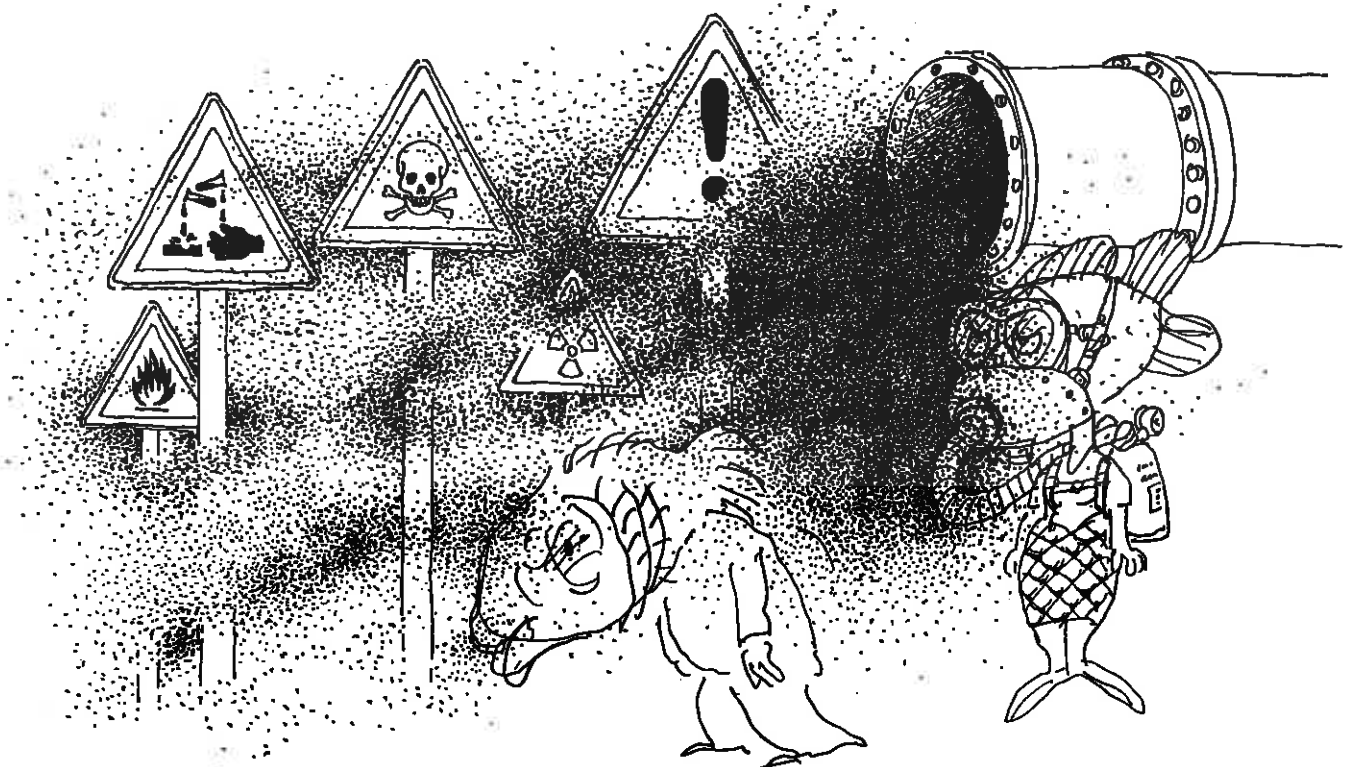
The story of the fish in the Rhine

That one, salmon or luce had seen the Rhine
From below, knew of metal sludge, oil spots,
Riches of the world. He was never as well off
As today. Salmon or luce swam into
The net, twitched in the net of the protector, explorer
Of the river. He casts the animal into clean water,
Man wishes him a happy life, though stricken by
The fist blow in the neck, oxygen in the blood.
The fish cries for salt and cadmium to its
Gills! Help! Give me lead, or I'll die!
Shocked, he dies a wretched death. Again, a corpse
States an example, the fish.

WOLF BIERMANN (1972)

Der Rhein fließt unter den Brücken hin
Das Wasser voll Öl und voll Ruß
Die Lorelei stürzt in den Rhein
Damit sie nicht singen muß

The Rhine flows below the bridges
its waters full of oil and soot
Lorelei plunges into the Rhine
She will not sing any longer



ICPR versus wastewater



As early as 1950 the countries bordering the Rhine had joined together in an association which they gave a somewhat complicated name: **International Commission for the Protection of the Rhine against Pollution (ICPR)**.

In other words, a European association protecting the Rhine, a gremium of doctors who would analyse the disease of Father Rhine and decide on the necessary therapies.

In 1963, an international convention entrusted the ICPR with the following tasks:

- make a detailed analysis of the pollution of the Rhine (nature, extent and source) and evaluate the results;
- propose actions to protect the Rhine;
- prepare international treaties.

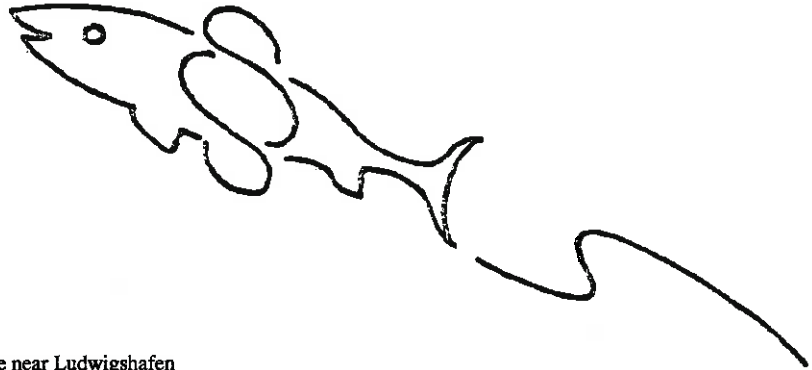
In 1976, the European Community also joined in this convention.



ICPR monitoring station on the Rhine near Lauterbourg

Organisation of the ICPR

- officials and experts of all contracting parties
- alternating presidency
- annual Plenary Assembly
- Ministers' Conferences every few years lead to results binding the contracting parties;
- some 20 international working groups assisted by national gremiums dealing e.g. with chemical pollution, security of industrial plants, ecological and legal questions, surveillance of the Rhine water quality;
- technical-scientific secretariat with an international staff of 10 persons in Koblenz.



Wastewater treatment plant on the banks of the Rhine near Ludwigshafen



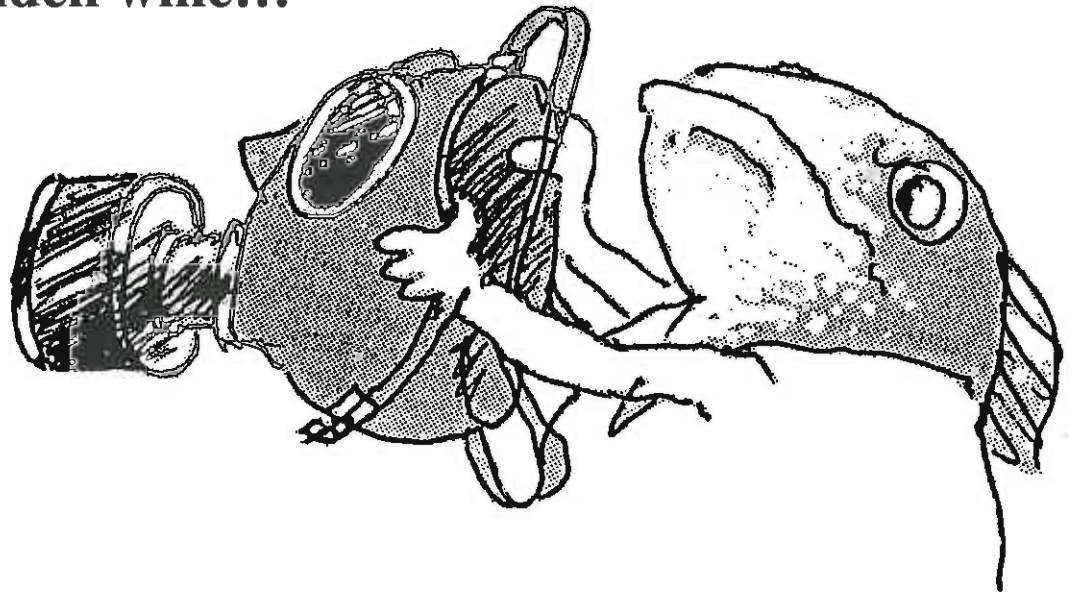
Nevertheless, the Rhine was still deteriorating. The crisis came in the beginning of the seventies. Father Rhine almost fell into a coma. Large quantities of untreated organic wastewater drew on the oxygen supply and led to an alarming decrease of the oxygen content in the Rhine water. The number of species of aquatic fauna diminished considerably, the spectrum of species changed in favour of species tolerating the influence of wastewater. Certain smaller salt-tolerating crustaceans settled, sensitive insects and fish died out. More problems arose, such as the pollution with toxic, non-degradable heavy metals concentrating in fish and sediments. The mercury and cadmium pollution of the Rhine sludge reached its peak in the mid-seventies. The mercury contamination of fish was excessive.

From 1975 to 1986 the Rhine gradually recovered. Major industrial plants, towns and communities discharged their effluent into wastewater treatment plants, the oxygen content of the Rhine rose accordingly. So did the number of fauna species.

Then, on 1 November 1986, a fire broke out in Schweizerhalle: extremely toxic pesticides mixed with the water extinguishing the fire and flowed into the Rhine near Basel, thus causing the death of fish and small animals downstream as far as the Lower Rhine.

And all of a sudden the Rhine, considered as dead and thus given up by many, was the focus of public interest. He was still alive, old man river. How else could fish have died? But the recovering river had received a severe blow. However, Schweizerhalle gave a strong impetus to the work of the ICPR and thus hopefully also to the Rhine, as the Rhine Action Programme resulted from this accident.

3. were golden wine...



Towards the goal "Salmon 2000"

In 1987, while the Rhine was still suffering the consequences of the chemical catastrophe, the ICPR presented the "Rhine" Action Programme (RAP) and - believe it or not - the governments of the Rhine bordering countries and the EC Commission supported it unanimously.

**This programme is not to be underestimated, there is no skirting the issue, the ways to reach the ecological target formulated by the Ministers' conference in December 1986 are clearly indicated:
The return of the salmon to the Rhine by the year 2000.**



Conference of Ministers in charge of the Rhine 1986 in Rotterdam, target for the year 2000:

"The ecosystem of the Rhine must become a suitable habitat to allow the return to this great European river of the higher species which were once present here and have since disappeared (such as salmon)."

Thirty years after the Rhine salmon had died out and shortly after the considerable fish mortality this certainly did sound rather utopian and the plan was greeted with smiles accordingly.

It was hard to believe: within 13 years the Rhine ecosystem was supposed to recover to such an extent that it would be able to cope with the demands of the sensitive migrants? After all, the salmon had died out in the Rhine because of highly insufficient conditions with respect to water quality, fish migration and spawning biotopes.

If the salmon is supposed to return to the Rhine by the year 2000, a lot of conditions have to be fulfilled. The salmon would be both a proof and a reward for a factual ecological improvement of the Rhine ecosystem.

The ICPR was quite aware of all this. Therefore, distinct goals are to be reached by 1995:

- the discharge of the most important noxious substances into the Rhine is to be cut down by 50 % compared with 1985 (55 substances or groups of substances);
- safety norms in industrial plants are to be tightened;
- a minimum surveillance of dischargers is to be installed;
- adequate environmental conditions must be restored for the flora and fauna typical of the Rhine, for salmon and other migrants barrage weirs must be equipped with fish passages and spawning grounds must be restored in the upper reaches of the tributaries.

Target: return of the migrants

- Salmon
- Sea trout
- Alice shad
- Sea-lamprey
- Sturgeon



In 1991, the ICPR presented the **Ecological Master Plan for the Rhine**, giving a more detailed description of conditions for the return of the migrants to the Rhine and its tributaries and projects on the way to reaching this ambitious target: the main stream is to be restored as the backbone of the entire ecosystem, at the same time all reaches of ecological importance are to be protected, preserved and improved.

The remnants of alluvial forests and cut-off meanders are still the habitats of a surprising variety of birds, amphibians and fish. These are the resources for reanimating the Rhine ecosystem. The ICPR has proposed to prohibit the further exploitation of the alluvial areas - such as building sites and the extraction of gravel - and to reduce the existing exploitation of these areas in order to increase the variety of species along the Rhine.

1993 - semi-annual and interim statement

Salmon caught in the R. Sieg in December 1993

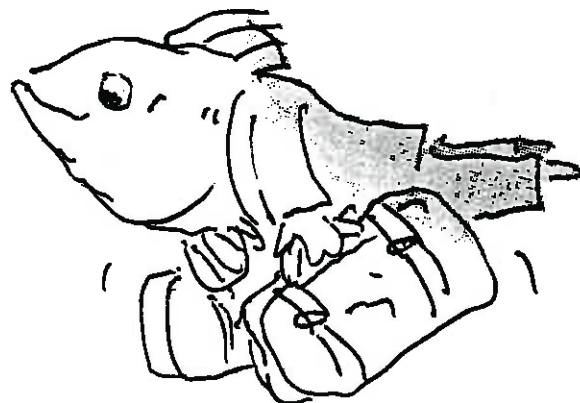


Wastewater in the Rhine today:

The number of accidents in the chemical industry along the Rhine has been drastically reduced, but we are far from having removed the risk of accidents. Water quality has improved in most rivers and brooks of the Rhine catchment area. However, considerable pollution is still being registered near agglomerations and in some tributaries.

Additional sources of pollution must be taken into account, such as erosion from agriculture and atmospheric depositions of noxious substances. The phosphorous and nitrogen concentrations in the Rhine water are still too high. About one third of the nitrogen load discharged into the North Sea by rivers comes from the Rhine. Thanks to decreasing heavy metal content the Rhine water is today considerably less toxic than it was only a few years ago. But even in 1990 maximum mercury concentrations were measured in fish in the Rhine which in some cases were above the maximum content permitted in food stuff. Also, remnants of organic chlorine compounds such as HCB and PCB were found, in some cases the contents lay above the threshold values. However, compared with 1985, PCB-, DDT- and HCH-contents in fish have decreased.

First signs indicate that actions in favour of the migrants are successful: salmon and sea trout returning to the Rhine have been reported.



4. then I' d like to b e...

Weir on
the R. Sieg with
new fish ladder



R e m e d i a l m e a s u r e s f o r m i g r a n t s

The ICPR has asked for an EC subvention for several expensive projects in order to create adequate conditions enabling salmon and other migrants to return to the Rhine by the year 2000. In June 1992, the EC granted the subvention so that work could start in 1993. Action for restoring the stocks of salmon and sea trout has been going on in part since 1988. This is, for example, true of the R. Sieg in Northrhine-Westphalia, where considerable success is being registered since 1990: salmon and sea trout have returned from the sea to this Rhine tributary. Since 1992/93 natural reproduction has been recorded. In the autumn of 1993 at least 14 salmon mature to spawn returned to the R. Sieg, in February 1994 newly hatched yolk sac alevins were found in natural spawning grounds of the R. Sieg and its tributary, the R. Bröl.

Extract of an Irish folktale according
to EILEEN O'FAOLAIN (1965):

Children of the Salmon

"There was a king in Ireland long ago, and neither he nor his wife had any children. ... He went to the Wise-Old-Blind-Man. ... 'Speak to the boatman, and ask him to get you a salmon. Get your cook to roast it for you, ... Give that to your wife to eat, ... and you will see that you will have a child.' ..."

Expenditures of the salmon habitat projects for which subventions were asked:

about 4.900.000 ECU = about 10 million DM

EC-subvention: 50 %

Participation of states or Länder: 50 %

Expenditures for fish passages on the barrage weirs Iffezheim and Gambsheim and on weirs on the R. Lahn:

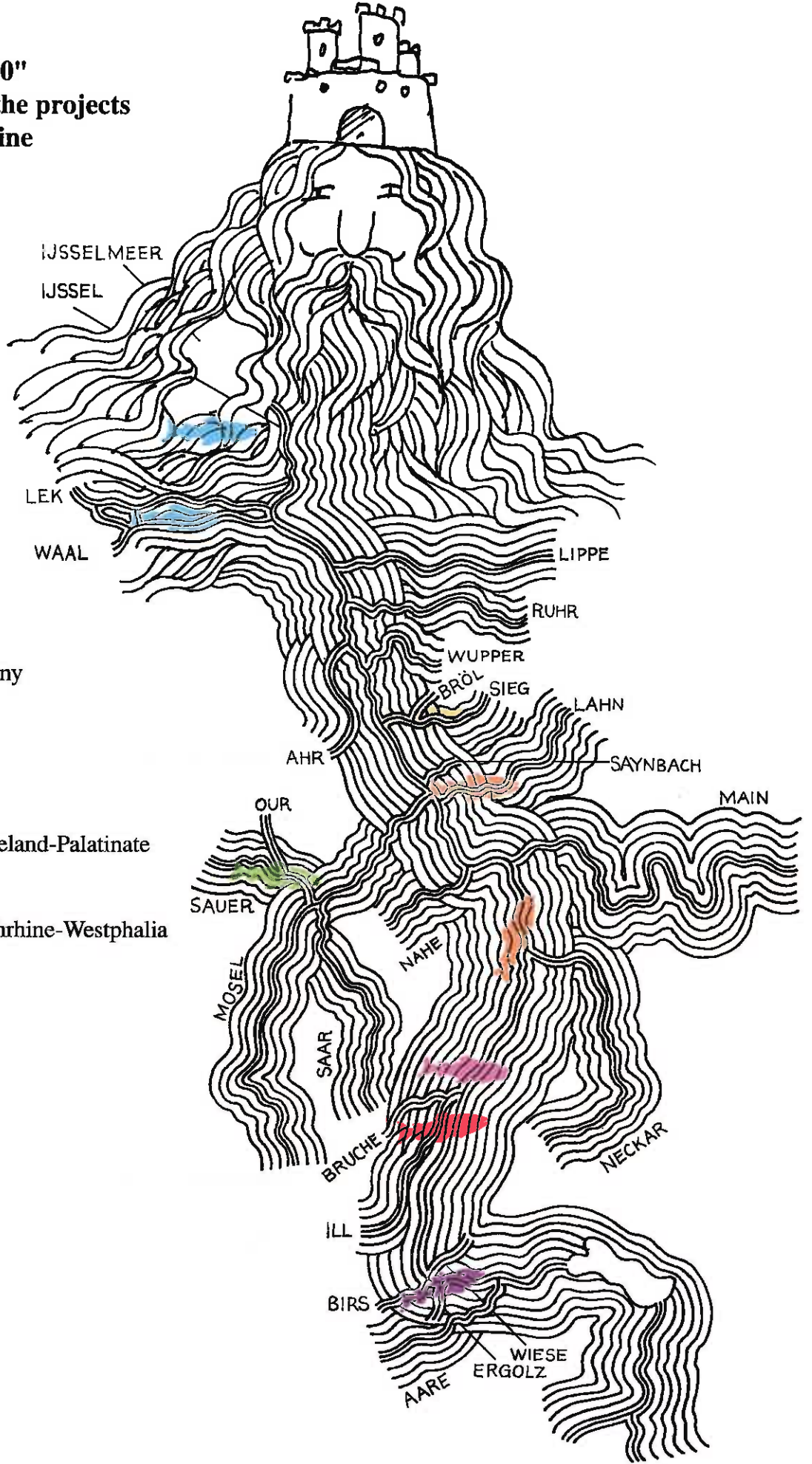
12.000.000 ECU = about 24 million DM

EC-subvention: 5 %

France, Germany, Rhineland-Palatinate:
95 %

ECU = European
Currency Unit
corresponding
to about 2 DM

"Salmon 2000"
Situation of the projects
along the Rhine



Switzerland

France + Germany

France / Alsace

Germany / Rhineland-Palatinate

Germany / Northrhine-Westphalia

Luxembourg

Netherlands

What is happening in Switzerland?

Between Basel and the Rhine Falls of Schaffhausen, several tributaries draining from the Black Forest and the Alps reach the High Rhine. Presumably, salmon formerly lived in all of them.

Switzerland is participating in research programmes for the project "Salmon 2000" in order to create adequate conditions permitting salmon and other fish, such as umber and nase to live in the High Rhine and its tributaries. The Bundesamt für Umwelt, Wald und Landschaft in Bern is supporting this research.

Rhine Falls of Schaffhausen



Where?
Tributaries of the High Rhine:
Birs
Ergolz
Wiese

1) Registration of habitats
Before the winter of 1994/95 possible spawning and nursery grounds for salmon as well as obstacles disrupting migration are to be recorded on a map.

2) Improvement of habitats
By the year 2000, 12 projects will be carried out on the High Rhine in order to achieve ecological improvements for the fish fauna and to state an example for further action.

Where?
High Rhine



France and Germany joining forces



Expenditure
estimated 1994:
15 million ECU

Schedule:

Fish passage

Iffezheim by 1998,

Gambsheim

by 2001

On their way to the tributaries of the Upper and High Rhine, ascending migrants must surmount the barrage weirs on the Upper Rhine. Soon migrants will be able to pass the first two weirs downstream of Strasbourg on their way to reaching tributaries in Alsace and the Black Forest.

ICPR contracting parties:

- Wasser- und Schiffahrtsdirektion Südwest, Mainz
- Voies Navigables de France, Paris

The Iffezheim barrage weir near Rastatt



The weirs of the Iffezheim and Gambsheim power plants will now be equipped with adequate fish passages - basin passages - for all migrants. Enormous expenditures will have to be

made. Several solutions have been examined, prototype tests have been evaluated. A decision concerning the best possible solution has been taken.

What else is happening in France?

In Alsace, several supporters have taken an initiative in favour of the salmon. The Association Saumon-Rhin in Strasbourg coordinates all actions. Apart from practical work on site creating or improving salmon habitats, a new stock of salmon is raised, parr are released, their behaviour will be subject to research and surveillance. A guest exhibition offers possibilities for fry sponsorship.

Estimated expenditure:
about 1.600.000 ECU
Schedule:
1992-96

ICPR contracting party:
Association Saumon-Rhin, Strasbourg

Control catches of juvenile salmon released into the R. Bruche and sponsors



Where?
Draining canal of the Rhine between Iffezheim and Strasbourg
R. Bruche west of Strasbourg

1) Increasing habitat diversity
Salmon require diversified habitats, weirs disrupt their migration. Therefore, warping dams, deep water zones and resting areas will be created, vegetation will be planted on river banks, meanders will be restored. Step by step locks and superfluous barrage weirs will disappear.

Where?
Trained Rhine near Ottmarsheim

2) Creating protecting islands
Islands will be created in the Rhine increasing the diversity of flow and offering habitats for plants.

Where?
Hoodt near Gamsheim
Roessmoerder in the Offendorfer Auwald

3) Providing cut-offs with water
Two lateral branches of the Rhine might offer 6.5ha of spawning grounds to salmon if they were again provided with water. There are plans to clean up the bed of the R. Hoodt by draining water downstream. Furthermore, possibilities of re-filling the Roessmoerder with water will be examined



Area in the old bed of the Rhine near Kembs apt as salmon spawning ground





Under the surveillance of salmon sponsors a juvenile salmon from the R. Bruche is examined in order to control its growth before releasing it back into the river

Eggs from where?
 Brittany
 Scotland
 R. Nive
 R. Loire-Allier
Alevinate where?
 R. Rhine
 R. Ill

4) Restoring the stock of salmon

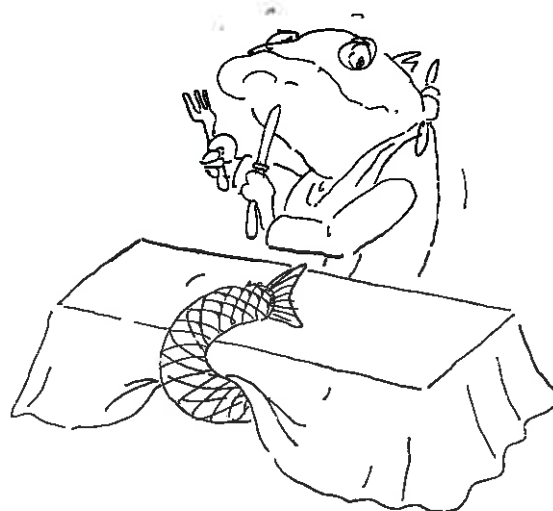
Parallel action is required in order to create a new stock of Rhine salmon: on the one hand, parr are released, on the other hand, a breeding stock of salmon is raised. For this purpose, in 1993, 180.000 salmon eggs were bought from Brittany, Scotland and from the southwest of France. They were hatched in two fish hatcheries, 111,000 alevins were released into the Rivers Rhine and Ill. 4,000 eggs of R. Loire origin were bred in the aquarium of Nancy. This action aims at raising a breeding stock of 300 - 400 salmon.

5) Success control and accompanying research

Spawning grounds will be subject to an electro-fishing survey, magnetic tags will be implanted in the noses of juvenile salmon (smolts) and three control stations equipped with traps will be built in order to learn more about how to improve fish passages and about the behaviour of migrants. For upto one year, sea trout will be observed by means of radio control. At the same time, research will concentrate, for example, on genetic questions, furthermore, reproduction of migrants and their spawning grounds will be examined.

Where?

Control station in:
 Iffezheim
 Strasbourg
 Avolsheim



What is happening in Rhineland-Palatinate?

Numerous projects in favour of the salmon are being carried out in Rhineland-Palatinate on the Rivers Lahn, Saynbach, the upper reaches of the Sieg and the Upper Rhine. They are supported by the Ministerium für Umwelt, Mainz. 6 projects are being carried out under the auspices of the regional government of Koblenz. The weirs on the Rivers Saynbach and Sieg as well as on the tributaries of the Lahn may only be equipped with fish passages if those responsible for their maintenance - i.e. communities and private persons - agree and give support.

Estimated expenditure:
4,100,000 ECU
Schedule:
1992-97

ICPR contracting party:
Ministerium für Umwelt, Mainz

Lahnstein barrage weir with old fish ladder



Where?

Lower Lahn:
between Lahnstein
and Cramberg

1) Building fish passages on weirs along the R. Lahn

Ten weirs on the Lower Lahn will be equipped with fish passages in order to enable migrants to ascend into the Lahn tributaries. In 1994 the Lahnstein weir, today equipped with an out-dated fish ladder will receive a testing device for a weir basket in order to control migrants.

Where?

Saynbach
Little Saynbach
Brexbach
Masselbach

2) Changing the weirs of the Saynbach river system

All in all 27 weirs will be torn down or equipped with fish passages in order to gain 12,6 ha of spawning and nursery biotopes for salmon and sea trout.

Where?

Upper Sieg

3) Changing the weirs on the R. Sieg

The construction of 9 fish passages for weirs on the R. Sieg and its tributaries Wisserbach and Nister will make about 21 ha of spawning grounds accessible to salmon and sea trout.



Nassau barrage weir on the R. Lahn



Cut-off meander in the alluvial area of the Upper Rhine and featherfoil in blossom



4) Making the tributaries of the Lower Lahn accessible

Weirs will be torn down or equipped with fish passages in order to make a 13,6 ha area accessible, half of which has favourable conditions with respect to spawning and nursery biotopes both for salmon and for sea trout.

Where?
Gelbach
Mühlbach
Dörsbach

5) Restoring the stock of salmon

Alevins and eyed ova of salmon are being released with a view to restoring the stock of salmon. About 100,000 of them are released annually into the R. Saynbach.

Where?
Saynbach
Lahn
Upper Sieg

6) Control of success

Fish are tagged and attempts are made to recapture them in order to learn more about their rate of survival and their migration. Preparations have been carried out or were begun in 1993 (register of fish species, work on genetic questions concerning fish populations).

Where?
Saynbach
Lahn
Upper Sieg

7) Research on the development of alluvial areas along the R. Rhine

In order to protect or develop refuges from where the R. Rhine might be repopulated after considerable accidents and in order to achieve extensive ecological improvements not only for the fish fauna, a plan for tending and developing alluvial water bodies will be established, the stock of fish will be inventoried and strategies aiming at preserving living conditions will be developed. Preliminary studies for 6 - 8 research projects have been carried out.

Where?
Upper Rhine km
352 - 529, that is
Franco-German border as
far as the mouth
of R. Nahe

What is happening in Northrhine-Westphalia?

The pilot project "Salmon 2000" in the Northrhine-Westphalian R. Sieg was begun as early as 1986. Considerable success has been registered since 1990. In February 1994, the first proof of natural reproduction since the 1950s was given. By the end of 1993 the reconstruction of the four lowermost weirs on the R. Sieg was accomplished. Within the ICPR programme three projects are being carried out along the Sieg and its tributaries. The Northrhine-Westphalian Ministerium für Umwelt, Raumordnung und Landwirtschaft in Düsseldorf is partner to the treaty, the programme is being followed up by the Landesanstalt für Fischerei and the Fischereiverband of Northrhine-Westphalia.

ICPR contracting party:
Ministerium für Umwelt,
Raumordnung
und Landwirtschaft,
Düsseldorf

Expected expenditures:
about 490,000 ECU
Schedule:
1993-96

Where?

R. Sieg and its
tributaries, e.g.
R. Bröl

Since 1990 salmon
return from the seas
and migrate upstream
the Rhine until reaching
the R. Sieg.
Female salmon releasing
spawn for controlled
salmon hatching.



Newly hatched larva
of salmon with yolk sac
are about 2 cm long;
at this stage only a
genetic analysis can
prove whether it is a
salmon or a sea trout



1) Registration of spawning grounds

In order to be able to develop plans for the improvement of habitats, spawning grounds will be registered and examined and eggs will be bred under surveillance.

2) Restoring the stock

Different actions will be taken: a biotope management plan for sea trout and salmon will be developed, the reproduction of homing salmon will be examined, the species concurrence of salmon and sea trout in spawning rivers and the significance of the rest of the fish fauna with respect to the successful reproduction of both salmonide species will be analysed. For the first time since the 1950s, the first female salmon ready to spawn as well as sexually mature males reached the R. Sieg by the end of 1992. Impregnation and the development of eggs and alevins until the parr stage in breeding basins was successful! In 1992/93 salmon eggs of Irish and Norwegian origin were bought.

3) Proof of success

The success of the projects is being controlled: salmon and sea trout are kept under radiotelemetric surveillance, their reproduction (development of eggs, hatching, mortality) is controlled, genetic differences are a subject of research.

The examination of the strontium contents in the scales and of an organic nitrogen compound (TMAO) in the tissue gives evidence of the time spent in marine environment. The Landesanstalt für Fischerei carries out these examinations together with the Institut für Biochemie und Technologie at the Bundesforschungsanstalt für Fischerei in Hamburg. The University of Heidelberg gives valuable support with respect to the genetic distinction of salmon and sea trout. In 1994 genetic analysis gave evidence of the first natural salmon reproduction in the R. Bröl.



What is happening in Luxembourg?

Expected expenditures:
about 95,000 ECU
Schedule:
1992-96

The Grand Duchy of Luxembourg is well on the way with its projects. The Administration des Eaux et Forêts, Luxembourg is partner to the treaty. Unfortunately, salmon and sea trout will only be able to reach the spawning grounds prepared in the Rivers Sauer and Our once the barrage weirs on the R. Moselle are equipped with fish passages. This will presumably not be the case before the turn of the century.

ICPR contracting party:
Administration des Eaux et Forêts, Luxembourg



Where?

Dillingen,
Blesbruck (R. Sauer)
Bettel (R. Our)

1) Restoration of possible spawning grounds

Fluid kokkolithic chalk (fossile marine plankton) is being used in order to remove the sludge from the gravel banks. Organic particles are degraded more rapidly, even though the effect is limited in time.

This work, which began in 1992 and 1993 is to be accomplished in 1994.

Eggs from where?

Scotland (Connon River)
Southwest of France (R. Adour/Nive)

Juvenile salmon to go where?

R. Sauer
R. Our

2) Restoration of the stock

With a view to producing salmon alevins, parr and smolt in the state fish hatchery, 150,000 eggs will be bought over 5 years. In 1992, 30,000 fertilized salmon from Scottish wild living salmon were bought. The same amount originating from wild salmon in the southwest of France was bought in 1993. In 1992 and 1993 salmon were released into the Rivers Sauer and Our. In 1993 400 juvenile salmon were equipped with microtags before being released into the R. Sauer.

3) Accompanying research

With a view to improving existing fish ladders or to preparing their installation it will be examined how long-distance migrants may circumvent the hydraulic power plant of Rosport/Ralingen. Also, technical measures to be carried out in smaller weirs will be examined.

Where?

R. Sauer and tributaries

What is happening in the Netherlands?

Expected expenditures about 220,000 ECU
Schedule: 1992 - 96

In the Netherlands, sluice management along the coastal line of the IJssel has been adapted to fish migrations. At the time being, 9 huge fish passages are under construction on the Rivers Rhine and Meuse. The success control is also carried out in the Netherlands. The Ministerie van Landbouw, Natuurbeheer en Visserij in The Hague is the contracting party for the ICPR.



ICPR contracting party:
Ministerie van Landbouw, Natuurbeheer en Visserij, The Hague

Fish passage on the R. Meuse near Linne

1) Surveillance of fish migration

The migration of the sea trout is controlled by echo sounding. Additionally, sea trouts are caught in the fish passages, strontium contents in the scales are examined in order to determine the residence time in salt water. This is done in collaboration with the Landesanstalt für Fischerei NRW.



Sea trout

Where?
Coastal areas
Barrage weirs on the R. Meuse
R. Lek

In 1992, 436 sea trout and 2 salmon were tagged, 16 sea trout were recaptured in 1992/93; fish migration was controlled in the basin passages at 2 weirs on the R. Meuse. The knowledge gained will be useful when building the Hagestein fish ladder on the R. Lek.

Where?
Northern estuary of the IJssel Sea

2) Improved management of the IJssel Sea

The ecosystem and the stock of fish of the IJssel Sea will be kept under surveillance in order to examine whether it is suitable as a habitat or migration area for salmon and sea trout. Background: 50 % reduction of fishery, but an increase of the cormorant populations along the IJssel Sea. The stock of smelt and the connections with populations of predatory fish, birds feeding on fish and fishery have been under examination since 1992.



Cormorant

5. a little fish !



Portrait of the salmon

The life of Atlantic salmon is full of secrets. They migrate for thousands of kilometres through the Atlantic Ocean and back to their home rivers in Canada or Europe. The life of a salmon may be considered as a novel of travel, as in the Dane Svend Fleuron's salmon

novel "A Viking's heroic journey". The hero of this novel is a salmon called "Flitz" whose life, beginning with the hatching in a meadow brook, life in the sea and death on an angler's hook in his home river is full of adventures. The life of a Rhine salmon is just as exciting. Once upon a time, in the upper reaches of one of the Rhine tributaries, in a clear, well oxygenated brook with gravel bed - and that is what is supposed to happen again ...

SVEND FLEURON (1930) in "A viking's heroic journey - A salmon novel":

No obstacle paralysed his courage, no barrage weir, no sands ...

Water never abandoned him, neither fresh nor salt water, neither the seas nor the river."



Eggs of salmon (*Salmo salar*)...



... develop into yolk sac larvae...

Once upon a time in spring,

in the month of March or April, the salmon hatches. It leaves the pea-sized egg his mother dug into the river gravel together with many others. The tiny fish is 2 cm long and carries a yolk sac, so to speak a rucksack on the breast containing the food supply for about 4 weeks. The tiny salmon remains hidden in the gravel as long as this supply lasts.

But then hunger makes the salmon leave its hiding place, it takes to hunting. To begin with, it only catches small suspended creatures, cyclops and water fleas. As the summer goes by and the "fry" grows, it gradually ingests insect larvae and water fleas.

During the autumn, at the latest during the following spring, the "parr" as it is now called, increasingly prefers smaller fish.

At the age of about two years, the juvenile salmon has reached a size of 10-20 cm. Then, something very peculiar happens. For a few hours or days the salmon is extremely sensitive to the particular smell of its parent river. Once impressed on its memory, the salmon will never again forget this smell.

And now there is nothing to hold the salmon back in its parent river. Drifting downstream, it joins its conspecifics, smaller swarms reach the R. Rhine and continue descending towards the sea.

For some time it will remain in the estuary until it has got used to the salt water, then life in the marine land of salt and honey commences. Small, floating crustaceans and fish of the sea disappear in its mouth. Under such conditions the salmon grows rapidly, within a year its length triples.

In the ocean, the salmon remains near the surface, and at a maximum depth of 10 metres it crosses the Atlantic Ocean until it reaches the preferred feeding grounds west of Greenland where American and European salmon meet.

However, after about three years in the sea - our salmon has reached a length of about 1 metre and a weight of more than 10 kg - it becomes homesick. An inner compass similar to that used by migrant birds helps the salmon to find its orientation in the magnetic field of the earth and it returns to the estuary of the Rhine. For some time, it again remains in the brackish water in order to get accustomed to the low salt content of the fresh water. The period of fasting begins and will last for several months, until the end of the spawning period.



To the left the food of juvenile salmon in their parent river: larva of ephemera (above), miller's thumb (below).

Right: In the sea salmon feed on shrimps (above) and sand-eel (below).

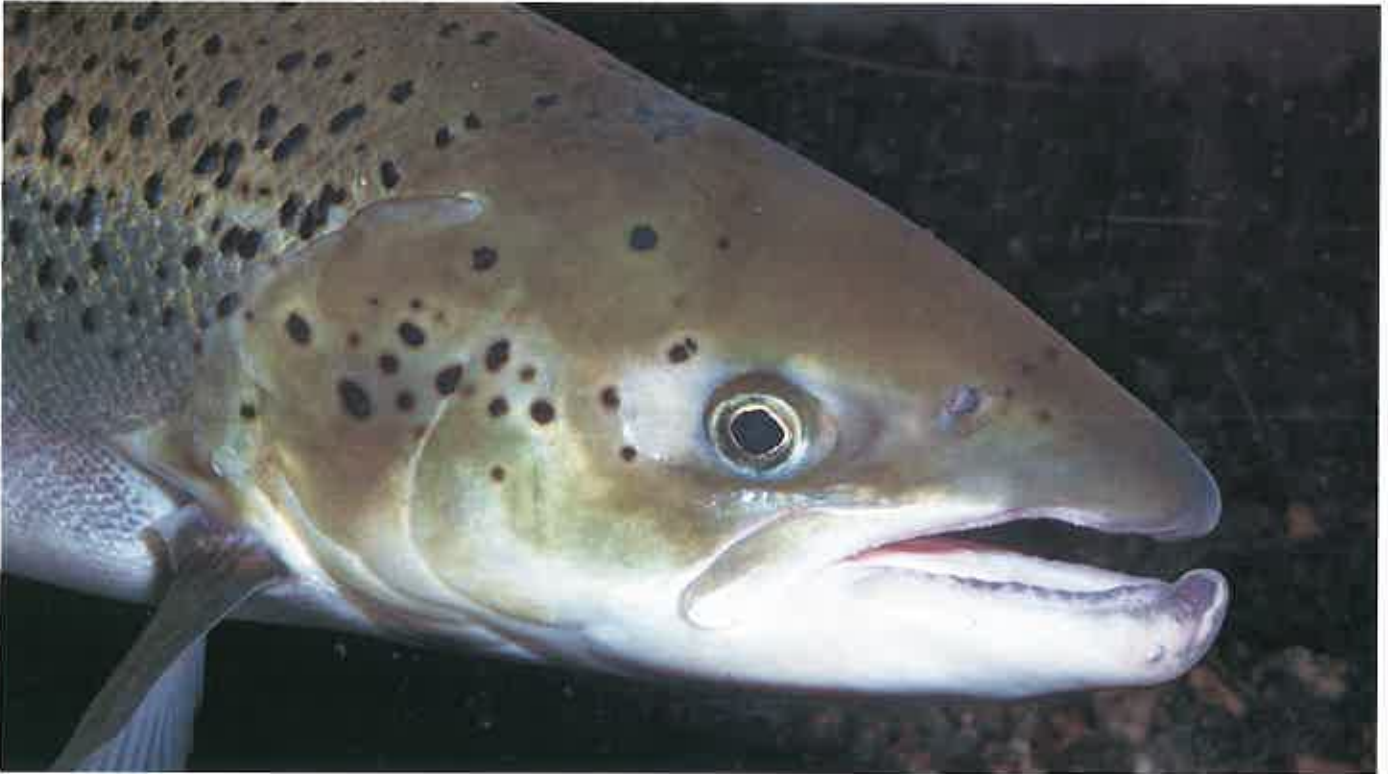


... which turn into juvenile fry ...



... before becoming parr. The spotless smolt migrates downstream to reach the sea.

Follow the smell



Upstream migration begins. It is believed that the salmon mainly finds its way by the smell. The nose indicates the way. The salmon ascends the Rhine until it reaches the mouth of its home river. That is where it leaves the Rhine and continues its way up the tributary. Obstacles, such as rapids and smaller waterfalls do not bar its way. A mighty beat of the tail makes it jump out of the water 3m high and on 5m. So the salmon ascends to the upper reaches of its parent river with cool, clear water and a gravel bed. Our salmon feels well, it has at long last fulfilled its aim, it has returned home, to where it hatched. Autumn has come, time for salmon weddings.

Together with other males the salmon has to fight for his bride. While fighting goes on, the female prepares the marital bed which will also serve as nursery. With powerful movements of the body and the tail the female digs a cavity of 20-30 cm depth and 1 m length in the direction of the current. Our salmon has chased away all rivals and from behind it approaches the bride. The foreplay begins. Trembling, the bridegroom introduces himself, the fins spread apart. Repeatedly, he prods her side with his mouth. Side by side they swim off, and finally, in the cavity, they nestle up to one another and keep their mouths wide open while they simultaneously deposit eggs and release milt.

Further upstream, the female constructs another bed, as she has to deposit between 10,000 and 30,000 eggs. While constructing the new bed, the old one is being covered with gravel. Spawning takes several days and is mainly done by night. Afterwards the salmon is worn out. Most of them die at the end of the spawning period, only 5 % survive, letting themselves drift to the sea in order to return to the home waters after some two or three years. A maximum of one per cent of fish homing for the first time will spawn three times.

When ascending the river, the male salmon changes its silver colour into the speckled nuptial dress, its lower jaw becomes hooked.

The pike also hunts juvenile salmon.



The old world otter has vanished from the Rhine system for the same reasons as the salmon: wastewater and hydraulic engineering.



An autumn day along the Rhine

Sun penetrates the early morning fog, drops of dew glitter on the cobwebs in the reeds along the cut-off. The sharp voices of water rails and the nasal gabbles of ducks emerge from the reeds. Croaking coarsely, a heron rises from the banks. Suddenly, a gigantic bird flings itself headfirst into the spattering waters of the Rhine, then, beating its powerful wings, the sea eagle rises into the air, carrying a huge wriggling fish with red spots and a marked hook on the underjaw in its claws - a kipper salmon in its nuptial dress.

The life of a salmon is full of dangers. The mean survival rate from the egg to the smolt as the salmon is called when descending into the sea is 1 to 2 per cent. And about 1 to 2 per cent of the descending smolt return several years later to spawn in their home river. In the natural system the salmon can cope with this situation, nature has planned these losses and compensates them with a surplus of eggs.

From the very beginning, the salmon is a hunted hunter. Eating and being eaten is the mechanism dominating its life. In its youth, the salmon does not shrink from cannibalism.

Trout, burbot, pike, perch and zander can devour great amounts of younger fish, such as salmon. Also, diving petrels such as goosander and sawbill ducks as well as cormorants hunt for smaller fish. A typical bird of prey of the alluvial areas of the Upper Rhine, the black kite, mainly feeds on dead or diseased fish found on the water surface. Formerly, his table must have been well furnished after the salmon spawning period. Neither heron nor osprey are capable of killing big, adult salmon. Only the rare sea eagle catching fish up to a weight of 15 kg is capable of doing so. Today, the sea eagle has died out in large parts of Europe, in rare cases it may appear along the Rhine on its migration and keep a look out for big fish. An autumn day on the Rhine in the year 2000 - perhaps.



Goosander



Heron



Black kite



Osprey



Sea eagle

Literature quoted:

- AUSLÄNDER, R. (1982): Gedicht "Lorelei" aus: "Südlich wartet ein wärmeres Land" / "Festtag in Manhattan", Pfaffenweiler Presse, Mittlere Straße 23, D-79292 Pfaffenweiler, 1982/1985.
- BALDNER, L. (1666): Das Vogel-, Fisch- und Thierbuch des Straßburger Fischers Leonhard Baldner aus dem Jahre 1666, hrsg. mit einer Einleitung und erläuternden Anmerkungen versehen von Robert Lauterborn, Ludwigshafen am Rhein (1903). - Zitiert in: KUHN, G. (1976): vgl. dort.
- BARTOCK, W. (1963): Gedicht "Niederrhein" aus: Neue Industriedichtung (c) by Paulus Verlag, Recklinghausen.
- BEZZEL, E. (1985): Kompendium der Vögel Mitteleuropas: Nonpasseriformes - Nichtsingvögel. - Wiesbaden, 792 S.
- BIERMANN, W. (1972): aus Gedicht "Ballade von Leibzig nach Köln" in: GUMZ, W.-D. & F.J. HENNECKE (Hrsg.)(1986): vgl. dort, S. 37, 374, (c) Verlag Kiepenheuer & Witsch, Rondorfer Str. 5, 50968 Köln.
- DELIUS, F.C. (1981): Gedicht "Geschichte vom Rheinfisch" in: GUMZ, W.-D. & F.J. HENNECKE (Hrsg.)(1986): vgl. dort, S. 338, 376, (c) Rotbuch Verlag, Parkallee 2, 20144 Hamburg.
- FLEURON, S. (1930): Eines Wikings Heldenfahrt - Ein Lachsroman. Jena, 190 S.
- GINSBERG, A. (1979): Gedicht in: MINATY, W. (1988): vgl. dort, S. 229, (c) Viking, New York.
- GLUTZ VON BLOTZHEIM, U.N. (Hrsg.)(1971): Handbuch der Vögel Mitteleuropas. - Bd. 4 Falconiformes, 943 S.
- GOLL, I. (1924): Gedicht "Kölner Dom" aus: Rheinreise - Gedichte und Lieder, Stuttgart (1986), S. 335, (c) Argon Verlag GmbH, Berlin.
- GRZIMEK, B. (Hrsg.)(1968): Enzyklopädie des Tierreichs, Bd. 4 Fische 1., Bd. 12 Säugetiere 3. - Zürich.
- GUMZ, W.-D. & F.J. HENNECKE (Hrsg.)(1986): Rheinreise - Gedichte und Lieder. - Eine Textsammlung. - Stuttgart, 415 S.
- HILDEGARD VON BINGEN (1959): Naturkunde - Das Buch von dem inneren Wesen der verschiedenen Naturen in der Schöpfung. - Nach den Quellen übersetzt und erläutert von Peter Riethe. - Salzburg, 176 S. - Zitate S. 95, 96.
- HÜBNER, P. (1974): Der Rhein von den Quellen bis zu den Mündungen. - Frankfurt, 544 S.
- HUMBORG, G. (1990): Der Rheinlachs als Indikator für den Zustand des Ökosystems Rhein. - Literaturstudie - IKSR-Programm: "Rückkehr der Langdistanz-Wanderfische in den Rhein" - Teilprojekt: "Zuwanderungsmöglichkeiten und Laichplätze am Oberrhein". - Institut für Wasserbau u. Kulturtechnik, Univ. Karlsruhe, 71 S.
- ICPR (1987): Rhine Action Programme, 28 p.
- ICPR (1990): TOPIC RHINE May 1990
- ICPR (1991): Ecological Master Plan for the Rhine, RAP-report no. 24.
- ICPR (1991): Übergreifender Plan für die Rückkehr der Langdistanz Wanderfische - Kurzfassung, APR-Bericht Nr. 26.
- ICPR (1992): 1. + 2. EG-Subventionsantrag der IKSR - NORSPA-92-1.
- ICPR (1992): TOPIC RHINE July 1992, no. 6
- ICPR (1993): Statusbericht Rhein - Chemisch-physikalische und biologische Untersuchungen bis 1991 - Vergleich Istzustand 1990 - Zielvorgaben. - Koblenz, 120 S.
- ICPR (1993): TOPIC RHINE, September 1993; no. 9.
- ICPR (1994): Projekt.Titel: Rückkehr der Langdistanz-Wanderfische in den Rhein (Lachs 2000) - 1. Vorschlag - 1. Jahresbericht über den Zeitraum 7.12.92 - 31.10.93.
- KRAUSE, W. (1961): Zum Namen des Lachses. - Nachrichten der Akademie der Wissenschaften in Göttingen aus dem Jahre 1961: S. 83-98.
- KUHN, G. (1976): Die Fischerei am Oberrhein. - Geschichtliche Entwicklung und gegenwärtiger Stand. - Hohenheimer Arbeiten, Schriftenreihe der Universität Hohenheim, Reihe Agrarökonomie, Heft 83, 196 S.
- LAUTERBORN, R. (1917): Die geographische und biologische Gliederung des Rheinstroms. - II. Teil, Heidelberg. - Hier S. 16.
- LELEK, A. & BUHSE (1992): Fische des Rheins - früher und heute. - Berlin, Heidelberg, 214 S. - Hier S. 72-75.
- MINATY, W. (1988): Die Loreley - Gedichte - Prosa - Bilder. - Ein Lesebuch von Wolfgang Minaty. - Frankfurt, 293 S.
- MISLIN, H. (1941): Der Phasenwechsel des Rheinlaches (*Salmo salar* L.) unter besonderer Berücksichtigung des Ernährungsapparates. - Inaugural-Dissertation. - Basel, 181 S.
- MORGENSTERN, C. (1910): Gedicht "Der Salm" in: GUMZ, W.-D. & F.J. HENNECKE (Hrsg.)(1986): vgl. dort. S. 345.
- MUUS, B.J. (1991): Meeresfische der Ostsee, der Nordsee, des Atlantiks. Biologie, Fang, wirtschaftliche Bedeutung, München, Wien, Zürich. 244 S.
- O'FAOLAIN, E. (1965): Children of the Salmon and other Irish Folktales. - London, 349 S., Quotation p. 287.
- PEDROLI, J.-C., ZAUGG, C. & B. ZAUGG (AQUARIUS) (1991): Aktionsprogramm "Rhein", Rückkehr der Langdistanz-Wanderfische in den Rhein; Internationale Kommission zum Schutze des Rheins gegen Verunreinigung, Projekt Nr. 6 Schweizerischer Beitrag, Literaturstudium, 142 S.
- ROCHE, P. (1990): Le Saumon du Rhin: Données historiques. - CSP, N° 0655-2-115, 65 S. here: p. 10, S. 39 - figure 8.
- SANDERS (1781), zitiert in: HUMBORG, G. (1990): vgl. dort. S. 45.
- SCHULTE-WÜLWER-LEIDIG, A. (1991): Ecological Master Plan for the Rhine - "Salmon 2000". - ICPR, Koblenz, 23 p.
- SIMROCK, K. (o.Jg.)(1978): Der Rhein. - München, 541 S. - Hier S. 356: Text St. Goar, zitiert und datiert in MINATY, W. (1988), S. 72.
- STRASSBURGER ORDNUNG DER RHEINFISCHEREI (1449), zitiert in HUMBORG, G. (1990): vgl. dort S. 45.
- VALK, S. van der (1984): Der Rhein: Probleme zwischen Mensch und Strom. - Merian Niederrhein, 37. Jg., H. 5, S. 141-142

Further bibliography:

- BUNDESANSTALT FÜR GEWÄSSERKUNDE (Hrsg.)(1994): Erarbeitung einer Konzeption für ein langfristiges Beobachtungssystem des Rheins - 1. Stufe: Literaturstudie. - Im Auftrag des Umweltbundesamtes. - Projektleiter: T. Tittizer, F. Krebs, Bearbeiter: M. Zimmer, J. Bäche, M. Dommermuth.
- SHEARER, W.M. (1992): The Atlantic Salmon: natural history, exploitation and future management. - Fishing News Book, Oxford, 244 p.
- TÜMMERS, H.J. (1994): Der Rhein - Ein europäischer Fluß und seine Geschichte. - München, 479 S.

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Front cover: "Die Loreley im Mondschein bei Nacht", painting by Jacob Diezler (1843), oil on canvas, Stadtmuseum Bonn

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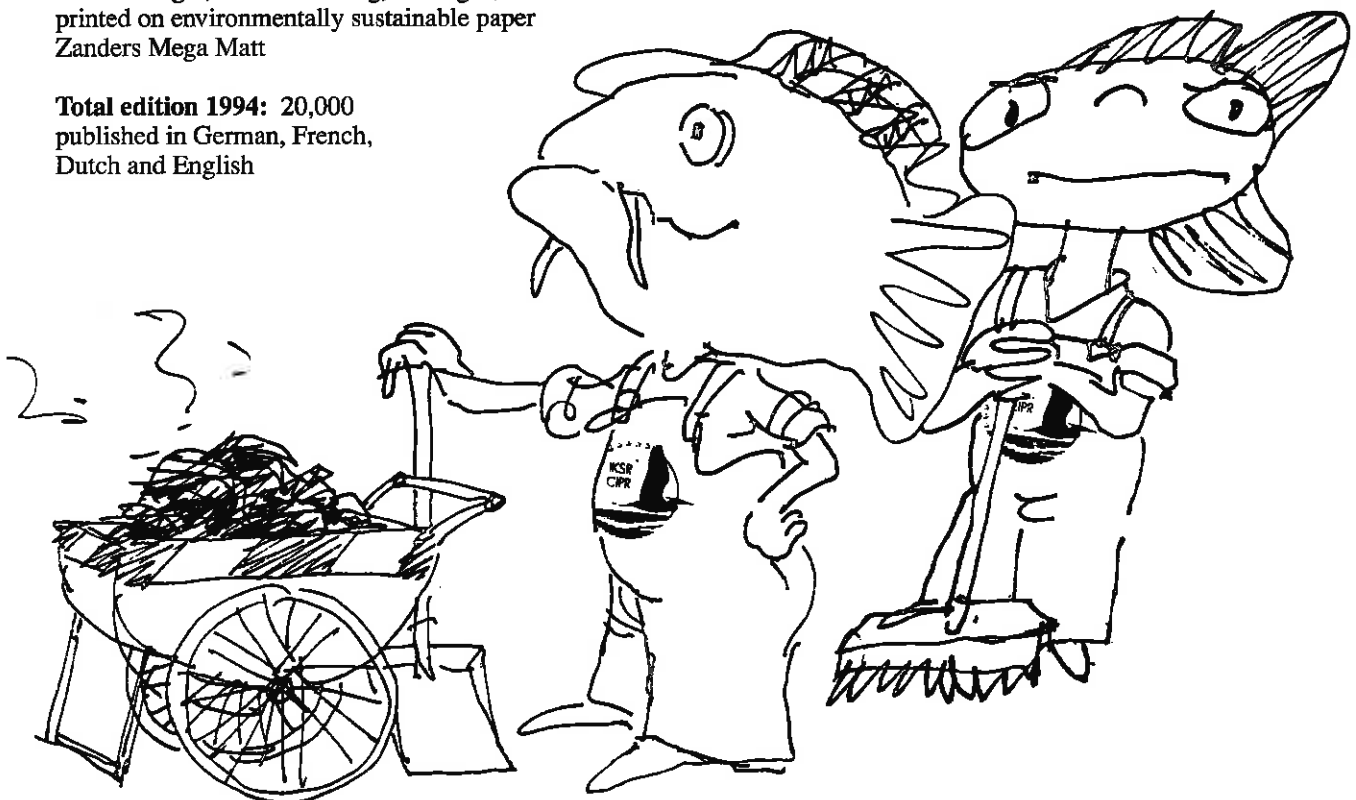
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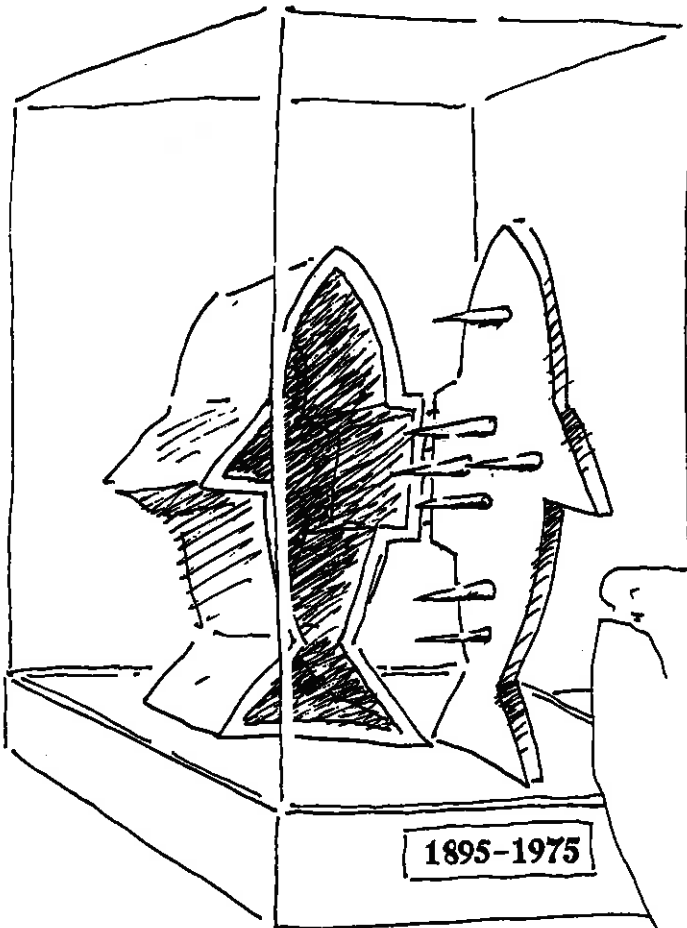


The ICPR says: A lot remains to be done, we've only just started. It is firmly hoped that, by the year 2000, the target set in 1986 will have been reached: migrants - such as salmon - will have returned to the Rhine and its tributaries and be self-supporting.

The Rhine will never be quite its old self. But it is still powerful, even though it is being limited by a canal corset. Some of its tributaries are nearly as beautiful as they were in former times or little needs to be done for them to reach that state.

Things cannot return to what they used to be. Today, it is not the old world otter that is waiting for salmon and sea trout, but man. Wise anglers know that these rare migrants depend on our protection. Osprey do not breed in the alluvial areas of the Rhine, but for some years, the number of breeding herons has increased.

They too indicate that our old Father Rhine is recovering.



ROSE AUSLÄNDER (1982)

Lorelei

Unter dem Rhein
singt die Lorelei

Under the Rhine
Lorelei is singing

Fische
verschweigen das Lied

Fish
conceal the song

Ein hellhöriger Angler
fängt es heraus
schenkt es

An angler quick of hearing
fishes it
gives it

uns allen

to us all