

Transboundary cooperation in the Rhine river basin

Coopération transfrontalière dans le bassin du Rhin

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RÉSUMÉ

L'histoire du Rhin, un des plus grands fleuves d'Europe, est marquée par une phase de pollution considérable puis, plus récemment, par une phase de restauration spectaculaire. Les neuf Etats du bassin du Rhin et la Commission européenne coopèrent au sein de la Commission Internationale pour la Protection du Rhin (CIPR) et y ajustent leurs nombreux intérêts de gestion et de protection de l'espace rhénan. Les programmes entrepris portent leurs fruits, comme le montre la baisse sensible de la pollution des eaux, et même le saumon, espèce migratrice jadis éteinte, recolonise le Rhin. La qualité de l'eau est meilleure mais de nouveaux défis pointent à l'horizon. Les eaux usées contiennent différents micropolluants que les stations d'épuration n'éliminent que partiellement. De plus, les efforts de rétablissement de la continuité écologique doivent se poursuivre pour que les poissons migrateurs rejoignent leurs frayères, comme le revendique le Plan directeur 'Poissons migrateurs' de la CIPR. Avec son Plan d'action contre les inondations, la CIPR entend abaisser les dommages et les niveaux de crue et vise parallèlement à améliorer les prévisions de crue et la conscience du risque. Enfin, le changement climatique, déjà ressenti dans la plupart des champs d'activité de la CIPR, est un paramètre majeur à prendre en compte dans les travaux futurs de la Commission.

ABSTRACT

The Rhine, one of the largest rivers in Europe, has undergone a history of tremendous pollution and impressive restoration. In the International Commission for the Protection of the Rhine (ICPR) the nine states in the river catchment and the European Commission cooperate in order to harmonize the many interests of use and protection in the Rhine area. The launched programmes are a success story, as pollution could be reduced and even the salmon, a lost migratory species, is coming back to the Rhine. Today water quality is much better again but we are facing new challenges. Wastewater contains a diverse group of micropollutants, which are partly not eliminated in the wastewater treatment plants. Additionally, ecological continuity must be further improved to enable migratory fish to reach their spawning grounds, which is the goal of the Master Plan Migratory Fish Rhine of the ICPR. In the Action Plan on Floods, the ICPR sets the targets to reduce flood damage and water levels and to improve flood forecast and risk awareness. Last but not least climate change, which will affect all main working areas of the ICPR, will influence the work of the ICPR in the coming years.

KEYWORDS

Climate change, ecological continuity, flood risk management, Rhine, water quality

1 INTERNATIONAL COMMISSION FOR THE PROTECTION OF THE RHINE

The River Rhine has played an important role in the history and the social, political and economic development in Europe. In the International Commission for the Protection of the Rhine (ICPR) the nine states in the river basin and the European Commission cooperate in order to harmonize the many interests of use and protection in the Rhine area. The Convention on the Protection of the Rhine is the basis for international cooperation for the protection of the Rhine within the ICPR. The European directives (WFD, FD) and the corresponding ICPR programmes provide the basis of the work today. Besides, there is a working programme, which is updated and adopted on a regular basis.

2 WATER QUALITY

The improvement of the water quality has been a main task of the ICPR since its foundation in 1950. Flowing through densely populated and industrialized areas the Rhine had to cope with a huge load of untreated waste water in the past. Additionally, in 1986, due to a fire at Sandoz in Basel, tons of heavily toxic pesticides flowed into the Rhine with the fire extinction water. This caused the death of all aquatic life for up to 400 km downstream. But it also changed the political approaches and programmes against pollution, and for restoration were launched shortly after the accident.

These programmes are a success story and the water quality of the Rhine and of many of its tributaries has considerably improved following the many measures taken.

This improvement is reflected by the reduction of contaminants and the development of oxygen concentrations (Figure 1).

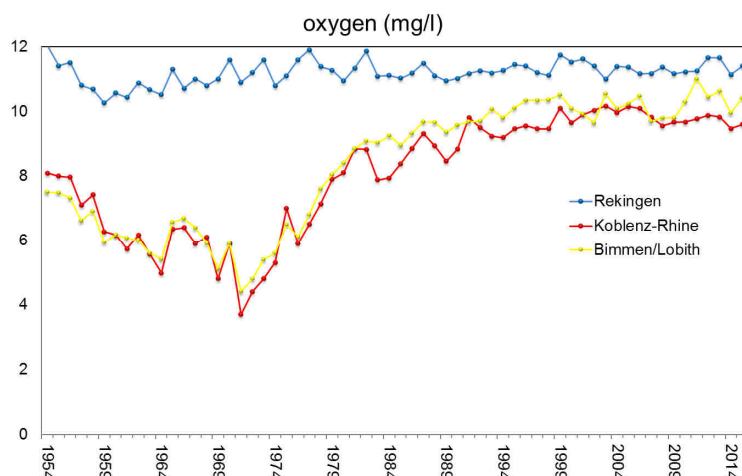


Figure 1: Annual average concentrations of oxygen from 1954 to 2015 in Rekingen (High Rhine, Switzerland), Koblenz (Middle Rhine, Germany) and Bimmen/Lobith (Lower Rhine, border Germany - Netherlands).

Besides the improvements in water quality, there are still a few substances detected in too high concentrations, especially ubiquitous substances (e.g. mercury). Ubiquitous substances are persistent and occur almost everywhere in the Rhine catchment. Unfortunately, only few measures are able to reduce the pollution with these substances on the short run.

Additionally, wastewater contains a diverse group of micropollutants, which are partly not eliminated in the wastewater treatment plants. Very low quantities of these pollutants are detectable in waters and may detrimentally affect life in the Rhine and drinking water production. There is a diverse group of micropollutants, like e.g. medicinal products or pesticides. For most of the micropollutants groups, wastewater of final effluents is the most important discharge pathway into surface water bodies, but there are also micropollutants with diffuse emission pathways (ICPR Report 246).

The ICPR will continue its efforts towards reducing point source inputs, inputs of diffuse origin (e.g. nutrients and plant protection agents) and the inputs of micropollutants.

3 MIGRATORY FISH & HABITAT PATCH CONNECTIVITY

Due to the cooperation of the countries in the Rhine catchment within the ICPR, not only the water quality of the Rhine but also its ecological state has improved.

However, the ecological continuity of the Rhine from Lake Constance to the sea and of its tributaries

must be further improved. Therefore, the ICPR has drafted a "Master Plan Migratory Fish Rhine" (ICPR Report 179).

Anadromous long distance migratory fish like salmon (spawning in fresh water) and the catadromous eel (spawning in sea water) migrate from the sea into fresh water or vice versa for the purpose of reproduction (Figure 2).

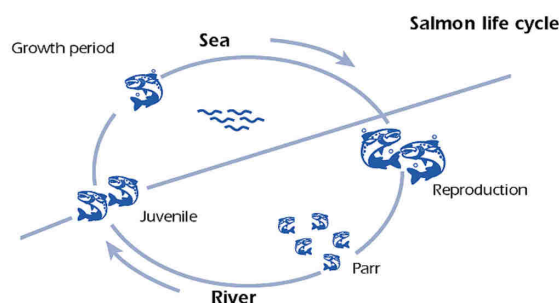


Figure 2: Life cycle of migratory fish Atlantic salmon.

Since the 19th century systematic river training, e.g. for navigation and hydropower uses, on the Upper and High Rhine, and along many tributaries has heavily interfered with ecological continuity in the Rhine system. Spawning grounds and juvenile fish habitats of migratory fish have partly been destroyed, are no longer accessible or their accessibility is considerably reduced.

Due to the implementation of the Masterplan Migratory Fish, ecological continuity has been improved at more than hundreds of barrages, e.g. by constructing fish passes. In 2015, around 20 % of the salmon spawning grounds were again accessible. Since about the year 2000, annually several hundreds of salmon again migrate upstream up to the Upper Rhine and reproduce naturally in the accessible salmon waters.

Biotores along the Rhine are again to be interconnected, in order to maintain an ecological continuity. The ICPR is working to increase habitat patch connectivity, as it is a very important functional characteristic of the Rhine ecosystem which will serve water protection, nature protection as well as flood protection.

4 TRANSBOUNDARY FLOOD MANAGEMENT AND CLIMATE CHANGE

Since 1998, the ICPR has implemented the Action Plan on Floods including four action targets: reduce damage and water levels, improve flood forecast and risk awareness. Since 2007 a framework for the exchange of information and coordinated implementation of the European Floods Directive in the Rhine basin was established.

Based on the principle of solidarity, the states should avoid taking measures which due to their extent and their effect increase the flood risk in other countries upstream or downstream. Exceptions are possible if these measures are coordinated between the Member States concerned and a common solution has been found.

The ICPR is also working on the topic of climate change effects on the water regime, the water quality and the environment. In 2015, a first climate change adaptation strategy for the Rhine basin was published, based on hydro-climatic observations and measurements from the 20th century and scenarios for the 21st century (ICPR Report 219).

Direct effects of climate change are expected on flow regime (wetter winter, drier summer) and water temperature (increasing water temperature). This will also have indirect effects on ecology and water quality, especially because the increased water temperatures will occur during summer and low water.

The ICPR acknowledged the need for action due to climate change and included it in the working programme, for example by starting a new expert group on low water.

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