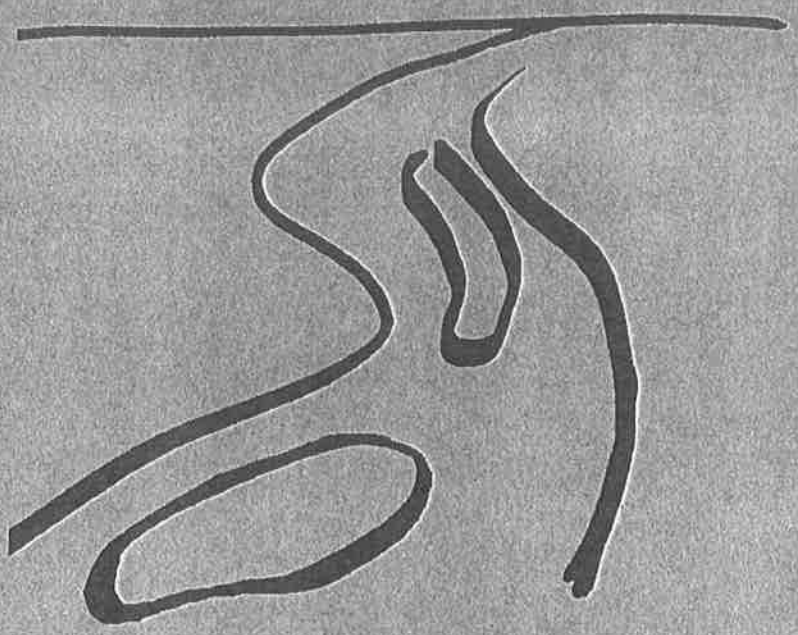

# A NEW SOLUTION FOR THE DANUBE

## WWF Statement

## on the EC Mission Reports of the „Working Group of Monitoring and Management Experts“ and on the Overall Situation of the Gabcikovo Hydrodam Project


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WWF

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# Executive Summary


On request of WWF, a group of independent scientists reviewed basic documents and the two Reports of the EC Working Group, produced in fall 1993. It states that contrary to popular belief, the cause of the severe lowering of the Danube river bed in the border region was the overexploitation of gravel resources in the Danube mainly near Bratislava. This erosion is used by Slovak engineers to justify the "needed" damming of the Danube by the Gabcikovo scheme.

The overall importance and economic value of the self-purification work of the intact floodplain was largely ingored in the EC Reports.

After Gabcikovo was operating for six months without the needed legal permissions, certain legal prerequisites in Slovakia (e.g. on the use of Danube water) are still not fulfilled until today.

The WWF scientists emphasize that, based on their international experience, the danube diversion and the operation of Gabcikovo will inevitably result in detrimental alterations of the wetland and adjacent areas.

The EC Reports largely underestimate and even ignore the warning signs of the environment that indicate the increasing degradation even after one year. The political interests of both states prevented an unbiased, comprehensive scientific review and interpretation of the ecological impacts of Gabcikovo in the region.

The positive conclusions of the EC Reports on groundwater quality are actually not supported by the provided data or by independent expert knowledge. The provision of more data and an independent water analysis is demanded.

The monitoring of Slovak floodplain biocenoses is done from a forestry perspective ignoring crucial ecological prerequisitesfor floodplains and existing data bases. The Hungarian data are insufficient.

The EC expert recommendations for a Temporary Water Regime are limited by the new schedule for the reparation and completion of the inundation weir at Cunovo. It is not clear why the EC Reports did not examine the ecologically more acceptable interim solution of a 65-75% discharge into the Old Danube. Most of the recommended "remedial measures" (underwater weirs, artificial water inputs into the side branches) and the suggested average discharge of 800 m3/sec into the Old Danube is decidedly too little to prevent further damages. New French studies by the university of Lyon reveal that the degradation of the Slovak floodplain due to the dissecting lateral dikes and to untypical water levels worsened in 1993.

For local people, a tunnel or a bridge crossing the canal near Vojka would be a better recompensation for the loss of life quality than a road to Bratislava, especially with respect to the technocratically oriented economic and social transformation of their region. The wetland must urgently be protected from the already started degradation into a recreation facility.

The technical problems with the fragile design and state especially of the Cunovo inundation weir are likely to bring more time delays, before a higher discharge into the Old Danube will be possible. It is urgently suggested that an independent water engineering study be conducted for the future using possibilities of this scheme and for the reconstruction of the storage lake into a navigation route.

Based on the priority objectives to reestablish the hydrological and morphological dynamics, WWF recommends, as a short term solution, the accumulation of sediment bodies in the old river bed in the form of islands and gravel banks. These will lift the water level and preserve the original river continuum. Lateral dikes in the floodplain and side-arm closures at the Danube should be reopened.

As a long-term solution, an extended lifting and constricting of the river bed is recommended including the filling in of a large layer of gravel and boulders. This idea is based on a guaranteed discharge of 65-75% in the Old Danube orienting on the Slovak legal conditions from 1991 and on the EC compromise proposal from 1993. Secondly, the Cunovo reservoir should be constricted to a navigation route with the restoration of adjacent areas: This will reduce the undesired sedimentation processes threatening the groundwater. It is believed by WWF scientists that these "gentle measures" can not only limit the alterations but partly even reverse them saving and preserving the Danube floodplains and its groundwater reservoir. This contributes to the re-establishment of the ecological-economic balance of the affected border region.

# Introduction

WWF (World Wide Fund for Nature) has been actively engaged in the Gabcikovo case since 1986. Several experts reported on the most important aspects of Gabcikovo(references 1,2,3). In January 1993, WWF submitted a joint NGO paper to the EC recommending much needed studies necessary to get a comprehensive overview of the benefits and negative impacts of the hydroengineering project on ecology, the economy, national/international law and on the social situation of the people affected.

Thanks to the ongoing efforts of the European Commission to mediate the continuing conflict between Hungary and Slovakia (until 1992 as CSFR), a new experts mission was agreed upon in July 1993. This follows the three other expert missions which took place in November 1992 (8) and May 1993 (9).

As a follow-up to the "Special Agreement for Submission to the International Court of Justice of the differences between the Republic of Hungary and the Slovak Republic concerning the Gabcikovo-Nagymaros Project" a group of experts from Hungary, Slovakia and the Commission of the European Communities was established

> *"in order to provide reliable and undisputed data on the most important effects of the current water discharge and the remedial measures undertaken as well as to make recommendations for appropriate measures"* for a Temporary Water Management Regime for the Danube river and for a Water Management and Monitoring Committee.

The mission lasted from 8 September 1993 to 1 December 1993 and produced two "Data Reports" (2 November 1993 (Ref. 4)) and a final "Report on Temporary Water Management Regime" (1 December 1993 (Ref. 5)).

The goal of this WWF paper is

* to give an independent, scientifically based review on the present situation in the Danube region affected by Gabcikovo,
* to critically comment on the Reports of the EC Mission and
* to give recommendations for the future management of the river.

This paper cannot discuss all the questions, issues and data which were discussed and concluded upon in the EC Reports. It concentrates on a few critical points and necessary activities that are to be discussed and decided upon on the political level.

WWF herewith wants to stress his appreciation of the great work done by the EC Working Group. Any critique has to respect the fact that this phase is only the beginning of a big monitoring program and that the political interests of both Hungary and Slovakia made every delivery of relevant data to the "other side" a delicate step in the bilateral conflict.

Also, the huge amount of monitoring data and the relatively small personal capacities of the EC experts resulted in a task which was practically impossible to be accomplished in a satisfying way. Nevertheless, the two Reports are of great importance for the evaluation of the Gabcikovo project and will have an impact on upcoming political decisions.

WWF having high competence on the Danube and in the Gabcikovo issue considers it as his responsibility to produce this independent Statement.

**Today, circa 8.000 hectares of interconnected, mostly very valuable floodplain biotopes and the second largest drinking water reservoir in Europe for up to 5 million people can still be saved. This makes this river stretch between Bratislava and Györ unique at Central and West European scale and an eclogical priority area.**
**It is the objective of our recommendations to prevent the continued, total destruction of this wetland and to develop a long-term, ecologically sound solution for the Danube.**

## Brief Review of the recent Gabcikovo "history"

On 24 October 1992, the Danube was diverted at the new diversion weir near Cunovo, Slovakia, into the Gabcikovo reservoir and canal (see attached maps).

Following WWF's international law study(3), presented in Bratislava on 20 October 1992, this "Variant C" is illegal because it violates the international principles of good neighourliness and of equitable utilization of shared resources. Also, Variant C violates several boundary agreements and does not constitute a legitimate response of CSFR or Slovakia to an alleged violation of the 1977 Treaty on Gabcikovo-Nagymaros by Hungary.

Since then, various political efforts of the European Community and its Commission resulted in the signature of the London Protocol (28 October 1992) - whose duties were totally ignored by Slovakia - and in numerous political negotiations which succeeded only in a joint agreement to address the dispute to the International Court of Justice (April 1993).

Furthermore, the EC organised three expert missions (November 1992, May 1993, Sept.-Dec. 1993) which brought about important progress in the knowledge of the overall technical and ecological situation around Gabcikovo. **However, all political efforts did not affect the growing detrimental impacts on the Danubian landscape downstream of Bratislava.**

After its diversion, the "Old" river bed received only 10-20% (200-400 m3/sec) of its water, while the "rest" was continuously diverted into the turbines of the Gabcikovo power plant. The debateable, one-sided benefit comes in the form of electricity production. Though, it involves numerous negative impacts on the hydrology and ecology of floodplains as well as on the social situation of local people.

In winter 1993, the Slovak investor company VVsp (Vodohospodarska Vystavba s.p.) started to build an artificial water-input system for the remaining parts of the valuable floodplain system which was about to totally dry up. Since May 1993, an input structure in the power canal near the village of Dobrohost leads ca. 30 m3/sec of Gabcikovo reservoir water into a large, sealed canal. This provides a constant filling of the interconnected side-arms which are dissected by newly errected or enlarged lateral dikes (creating 7 "cassettes").

Due to the ongoing river diversion and the drying up of its entire side-arm system, Hungary started at the end of July 1993 a similar input of water (10 m3/sec coming from the Cunovo weir) into its side-arm system.

In April 1993, WWF published excerpts from the first Slovak groundwater monitoring data (26 October to 31 December 1992) indicating some organic pollution in several groundwater observation wells near the storage lake(7). While this first monitoring is premature to give a sound information of possible changes in the aquifer, WWF's concerned, scientific interpretation contradicted the official, very positive interpretation by Slovak authorities. After this, no more comprehensive information on groundwater monitoring was published or available, even not extend needed for the EC experts (see chapter "Comments A").

Finally in fall 1993, the new EC Mission collected numerous data reports on hydrology, ecology, sedimentation/erosion, agriculture/forestry, electricity production and on engineering aspects which are presented in the Reports (4) and (5).

# New Important Facts

*Over the last months, WWF gained access to various pieces of information which we consider as crucial to a comprehensive, correct interpretation and evaluation of the Gabcikovo issue.*

*In addition, we want to stress these points because they were either not included or were largely underestimated in the EC Reports.*

## River bed erosion

Slovak sources often state that over the last two to three decades the growing river bed erosion had resulted in decreasing levels of surface and groundwater downstream of Bratislava, causing a serious detrioration of the wetlands and of the drinking water supply. However, the various origins of these effects were never reallyquantified. A Slovak study from June 1991 reveals that the reason for this impact was neither the river regulation measures for navigation (excavating 3,5 mio. m3 of gravel over 40 years) nor the catching of river sediments by the Austrian and Bavarian hydrodams located upstream (the regular bedload is 3-400.000 m3/year). The really outstanding interference was the huge gravel excavation near Bratislava: in the period of 1976 to 1989, ca. 50 mio. m3 were exploited from the river bed. Following a WWF estimation, this caused ca. two thirds of the deformation and erosion processes monitored both up- and downstream. This can be observed up to Hainburg (Austria) and in the floodplains near Gabcikovo. It also threatened the stability of the bridges in Bratislava and lowered the groundwater table reducing the productivity of several important drinking water wells near Bratislava.

This leads to the conclusion that the recent overexploitation of the gravel resources near Bratislava supported the "urgent need", as claimed by Slovak river engineers, to finish the Gabcikovo project. The excavated gravel was used for large-scale industrial constructions in Bratislava and for the building of the Gabcikovo scheme. Without this activity, the river bed erosion would be a small problem today.

## Drinking Water Supply

Numerous informed sources confirmed that, since summer 1993, the water works (drinking water wells) of Samorin and Kalinkovo reduced their production to two third resp. stopped it. Official sources explain this by claiming a surplus of drinking water production in other wells upstream, being positively affected by the lifted groundwater due to the Gabcikovo storage lake. However, other water experts expected before the filling of the lake that these wells would be the first to be potentially affected by a changed groundwater quality due to infiltration of more polluted Danube water or by enhanced leakage of old waste deposits in the area (including the refinery Slovnaft). Similar to the recommendations made in chapter "Comments A" it is therefore recommended that the original data be analysed and interpreted in this concern by an independant institution in order to check if the original monitoring data really indicate no harm for the drinking water reservoir.

## Economic benefits of self-purification processes

The Finance Institute of the Technical University in Vienna recently concluded a cost-benefit analysis comparing a Danube national park with several variants of hydropower plants downstream of Vienna. The extraordinarily better economic benefits of the national park alternative are based, among others, on the work of water organisms which in an intact floodplain significantly contribute to the cleaning of organic water pollution and thus, to the improvement of water quality on the surface and in the aquifer. Under the alternative of hydrodams, i.e. also in the case of the Gabcikovo scheme, this work has to be done by sewage treatment plants and water purification schemes for drinking water supply, both being very expensive installations. The Austrian Finance Institute calculated that in Austria investments of ca. ATS 640 million and operational costs of ca. ATS 60 million per year would be needed as a substitute to the "free work" of floodplain organisms.

This significant economic value has been largely ignored in the evaluation of the EC Working Group Reports (especially in their Scenarios) when comparing the former river situation with the present one where the water is derivated from the floodplain into the storage lake with its many negative attributes (sedimentation, colmation, infiltration of less purified or even more polluted water into the aquifer and towards the near-by drinking water wells).

A discussion paper of the Slovak parliament from January 1992 states: "*Following the joint Gabcikovo-Nagymaros Treaty from 1977 sewage treatment plants are to be built with complete mechanical-chemical-biological purification along the entire Czecho-Slovak section of the Danube. The water quality of the Morava river* (remark: a heavily polluted tributary upstream of Bratislava*) is to be raised to the quality class II up to the start of operation of the Gabcikovo power plant*".

At the end of 1993, some of the largest polluters of the Danube still do not have the required purification treatment: the chemical company ISTROCHEM has no biological treatment and the city of Bratislava can clean only 65% of its sewage. The new sewage treatment plant in the big suburb Petrzalka has no biological treatment, while its mechanical treatment has severe technical problems until today.

Several villages along the Danube were promised by the investor company (as a recompensation for the direct and indirect drawbacks for the construction of Gabcikovo) to get their own sewage treatment plants before Gabcikovo will operate. Several months ago, it was stated in Slovakia upon request that the fulfillment of the investor's promises is postponed up to the time when Gabcikovo will make profit.
Therefore, it can be stated that **the loss of self-purification capacity due to the diversion of the Danube together with the lack of sufficient sewage treatment schemes has led to a decrease of Danube water quality downstream of Bratislava and to the increased need for respective, expensive investments.**

## Legal situation in Slovakia

In February 1993, WWF published an internal document from the Slovak environment ministry stating that the needed permissions for the completion of the Gabcikovo storage lake dikes, for the use of Danube water, for the diversion of the Danube and for the operation of the Gabcikovo scheme could not be granted by the responsible Slovak authorities to the operator VVsp.

Following WWF's present information, these permissions were granted by the responsible district authority Bratislava Vidiek only on 17 May 1993, i.e. **for more than 6 months the Danube was diverted and the Gabcikovo scheme was operating without the respective, needed Slovak permissions.** On 19 August 1993, this was confirmed by the Slovak state attorney in Bratislava. Also, VVsp was symbolicly fined for having done this.

The reason for the delayed permission process is the fact that, already on 25 June 1991, the **Slovak environment commission (= ministry) SKZP being the central authority for water economy prescribed a specific, binding "Statement"** (called the "19 Conditions" under § 14 of the Slovak Water Act no. 138/1973 Zb) **as a prerequisite to permit the use of water and to operate Gabcikovo.** This statement says that the suggested technical solution for Gabcikovo (i.e. the "Variant C") is only possible by the fulfillment of these specifically determined Conditions. The investor has the duty to fulfill this on top of the required permissions (it does not substitute them) and cannot appeal against it.

Especially, **the conditions no. 11** (demanding the inundation of the Slovak floodplains under natural conditions from the old river bed) **and no. 18** (demanding 1.300-1.500 m3/sec of water during the vegetation period in the Old Danube) **are not fulfilled by the investor company.**

**On 17 April 1993, a specific permission for the manipulation of Danube water was granted,** apparently replacing the Condition no. 18 for an interim period because the technical situation at the Cunovo weir did not allow a higher discharge at this time. The Slovak state attorney wrote in a letter on 19 August 1993 that, "*on 17 May 1993, the investor received the permissions for accumulation and damming of surface waters at the Danube on 17 May 1993. With this decision, the 'Preliminary Manipulation Order for the operation of the Gabcikovo powerplant by the preliminary solution on the territory of the Slovak Republic' was approved.*"

However, as the investor was unable to technically provide more water for the Old Danube, this specific order was granted by the authority under the conditions that a **minimum flow of 600 m3/sec be guaranteed in the Old Danube**, that a proposal for a new water manipulation order be presented by the investor by 1 October 1993 and that this order to expire on 15 November 1993. In fact, the monitoring data in the EC Reports show that only 300-400 m3/sec were flowing in the Danube throughout the year, i.e. **the order was not fulfilled. Today, this interim manipulation order has again expired and has not yet been renewed.**

# Comments to the Results of the EC Mission September - December 1993

It is not useful to consider this paper as a critical comment on all details of the two EC Reports. Again, it must be emphasized that a lot of valuable and important information was collected which will give a better base for the upcoming political discussions and negotiations. It is evident that the scientists of the Working Group were not given all available data and knowledge. **The political interests of both Hungary and Slovakia strongly affected the selected volume and data of the submitted reports. This led to the exclusion of available data/studies and of competent scientists to which the EC experts should have been given access to.**

The Hungarian side especially supplied far too few documents, data and detailed information that were needed for a sound evaluation of all issues. The Slovak side supplied much more data which, however, often supported the suspicion that selected details and samples were used to lead to a positive impression and conclusion.

**The first result of the review reveals that the largely missing or one-sided information does actually not justify the many general conclusions of the two EC reports.** Therefore, the continuation and extension of the monitoring (as suggested in the EC Reports), together with a more independent evaluation, is crucially needed over the next years - independently, what technical or ecological measures will then be happening in the affected area.

**Based on the year's experience gained from this section of the Danube, other rivers and similar engineering projects, it must be stated that the river diversion and the operation of Gabcikovo inevitably will result in detrimental alterations for the hydrology/biogeochemistry (ground- and surface waters), for the geomorphological processes (sedimentation/erosion) and for the floodplain ecology (diversity of biocenoses and especially adapted species) during the next years in the wetland and adjacent areas. Even though many impacts are not yet visible to the public, they can already be monitored by experts.**

**The monitoring data, as used for and presented in the EC Reports, only partly refer to the most sensible indicators. The experts' conclusions largely underestimate the importance of monitored impacts. By consequence, the experts' recommendations are based on insufficient knowledge, and miss basic facts and ecological needs crucial for the existence of the floodplain ecosystem and the preservation of the groundwater.**

The future monitoring has to respect these problems. In addition, it is strongly suggested that **any further "independent" scientific study or analysis should involve the local, competent but independent experts.** However, these must not be selected by the government, its authorities or the institution to be analysed or having personel interests in the examination. The names of such experts and of relevant studies can be found, e.g by help of other scientists or of NGOs. Otherwise, the political pressure on science (which can be observed especially in Slovakia) will never allow a really objective result. It is very much in the interest of scientists that their work be separated from political interests and interpretation.

# A. Evaluation of the Monitoring

## Surface and groundwater quality/quantity

It is regrettable that Hungarian groundwater data apparently were not provided. Even though qualitative changes mainly affected the Slovakian side, the possibility of detrimental changes on the Hungarian side is given.

The following findings are based on the two EC Mission Reports (4,5), the Slovak data reports on "Surface and Groundwater Quality" (6) as well as on the first monitoring report on water quality during the filling of the Gabcikovo dam (26 Oct. - 31 Dec. 1992) (7) which WWF could receive in its complete form; thus, this first report(7) can serve as a important reference for comparison with the other data provided.

It has to be stated that **the presented data in the reports (6) are not sufficient to scientifically justify the conclusions in the EC Reports.** The Report on a Temporary Regime(5) concerning surface and groundwater quality says that for the Scenarios I, II and III "*the impact on the surface water quality will continue to be insignificant*" and that "*the impact on the groundwater quality will in general be insignificant. However, there will be some local changes in areas close to the reservoir in certain parameters, such as total dissolved solids, nitrate etc. due to changes in flow pattern. These changes are not expected to lead to a worsening in the groundwater quality*".

For Scenario IV it is written: "*Directing less than 5% of the discharge through the downstream part of the reservoir, it can be expected that stagnant water with algae growth and sedimentation of organic material will occur in this water body. This may also have some negative impact on the surface water quality in the navigation canal and further downstream in the main Danube. The impact on the groundwater quality will, as in other scenarios, in most areas continue to be insignificant. However, ... the groundwater quality is likely to be threatened at the Samorin Water Works, which produces about 40% of the water supply for Bratislava.*"

The given Slovak information(6) looses credibility in interpreting the changes in the aquifer. The analysis is a general torso of results which is **non-representative** of the changes in the groundwater.

Examples:

* Table 2 indicates observation points ("10" and "RU") on the right banks of the river which are not identical to the selected observation wells for the reservoir's impacts, given in Table 4 (Rusovce-Ostrovne lucky "D1-D6");

* The data shown in the graphical analysis do not correspond to the data structure and frequency of the monitoring in the indicated period and in the respective tables (e.g. while the sampling frequency is once every 2 weeks, the attached respective graphs show much less data).

* The only given example (well S4 Kalinkovo) does not fulfill the demand of a solid documentation of the changes in chemistry and of the element concentration in the observed aquifer on both sides of the Danube. Looking at the monitoring of groundwater quality changes in the first stage of the reservoir filling (Oct. to Dec. 1992), this object was non-representative from the standpoint of specific organic elements. The presented Table 3 does not show the non-polar extractable matter which is part of every chemical analysis and which could indicate with high evidence the degree of organic pollution of the entire area and of all objects.

Table 10 shows the given technical parameters of observation objects having several horizontal levels. It is questionable why the object S4 Kalinkovo was given as model because S4 has only one, very large horizon (depth of 40-80 m), while most other wells have small horizons of only a few meters depth, being much more precise for the indication of changes.

Data on hazardous organic pollutants and heavy metals are not presented in the supplied documents in spite of their analysis. According to the first monitoring report (7), elevated concentrations of dichlorethen, dichlorbenzen, pentachlorfenol, benzopyren, hexachlorbenzen and lindan were recorded in the surface and groundwater.

Data on selected sampling points and selected water quality parameters are presented in ref. 6. It is not explained why these points and these parameters have been chosen and why only one example of statistical evaluation is presented. The important criterion for the impact assessment are the selected sampling points, for those are the most sensitive to the changes in water quality. The selected parameters also have the largest temporal variations and the most significant impacts on environmental health. **This has to be documented before the conclusions about insignificant impact on water quality are made.**

According to drinking water standards (in Slovakia CSN 75 7111 approved: 1989, CSFR) important physical and chemical indicators such as heavy metals (Cd, Pb, Hg, Cu, Zn), other trace inorganic elements (Ba, Be, Cr, Ni, Se, Ag, V) and many organic indicators (dichlorbenzen, dichlorethen, pentachlorfenol, hexachlorbenzen, lindan, PCB etc.) are important. Such pollutants can be dangerous even at very low concentrations, especially if they act in combination. Their effect on health is still not fully understood. Some of them tend to accumulate in sediments and later, under changing conditions of the water regime and the water quality, they can be released and migrate to groundwater reservoirs. This phenomenon is called an environmental time bomb" because of its retardation and accumulation effect.

**Unfortunately, any data and any discussion which would enable the evaluation of this environmental hazard could not be found in the documents. The data in (7), and previous data known about organic pollution of bottom sediments, indicate that a potential danger is real.** However, data are not complete enough to make any definitive conclusions. From the biogeochemical point of view, **the data on pollution** of heavy metals, other trace inorganic elements and organic pollutants of bottom sediments, alluvium sediments, surface water and groundwater **have to be presented <u>in full</u> before any scientific conclusion can be made as regards the impacts of Gabcikovo dam on water quality.**

The properties of sediments can vary considerably. It would be very helpful to know distribution coefficients of organic compounds between water and the sediments as well as experimental data on the ability of the sediments to yield the pollutants to groundwater.

* It is not evident why the data are not available for independent evaluation. If it is proved by inter-laboratory validity tests that the data are correct, it should be possible for a small team of independent hydrochemical, hygiene and medical experts to evaluate the impact of the Gabcikovo dam on water quality and on consumers of the water.

* It is therefore in conformity with the EC Report (4) that a continuous program of monitoring is needed, however it should be specified what parameters will be monitored. **A review of the originally monitored data together with a control sampling and analysis should be made by an independent expert team and not by parties involved in this difficult dispute.**

* Unless the Working Group which produced this report had other data available, we do not think that the data are adequate to justify their conclusions. Especially the Summary of Impact Assessments for Scenarios is not supported by relevant scientifically varified data in the rows dealing with surface and groundwater quality. On the contrary, the data in (7) indicate pollution of surface and groundwater by mutagenic organic pollutants.

## Flora and Fauna (incl. Forestry)

The Report sections and conclusions dealing with this topic reflect the poor data base which was provided by Slovakia and Hungary for evaluation. Even though a more profound scientific data base exists, the best available knowledge, data and experts were not involved in the evaluation.

The **Hungarian report** is insufficient to give any sound statement or conclusion. Large losses in fish biomass and the visible, critical state of the floodplain forests are a remarkable indication of the changed situation. However, these and other indicators are not properly documented and interpreted.

The following comment refers only with the **Slovak document**. It's authors prove to be mostly forest experts who omit many basic factors of floodplain ecology and subsequent demands for the affected area. The final phrase of the report about "positive consequences" of Gabcikovo reveals that the authors (were asked to?) consider the Gabcikovo dam construction as a benefit and needed for "the stabilization(!!) of these ecosystems". This phrase **is in contradiction to the very dynamic character and the varying environment conditions of this ecosystem, and to all scientific knowledge about impacts of dams on floodplains and forests.**

**The Slovak report and the reference list do not contain the very important Slovak monitoring studies or species databases which were produced in the Slovak floodplains over the last years** (especially by the Institute for Ecosozoology at the Slovak Academy of Sciences). However, certain details in this report are obviously taken from this monitoring.

The authors overestimate the detrimental impacts of the decreased water levels in the last decades ("disappearing of the whole nature biocenoses") and are far too optimistic regarding ecological benefits for the forests through the simulation of floods.

The study lacks a more thorough, critical evaluation of the newly constructed lateral dikes (cf. chapter B) in Slovak floodplains and of several important indicator groups other than forests (e.g. birds, beetles, mammals and molluscs).

WWF learned that a special ichthyological prognose study on the impacts of Gabcikovo was ordered and submitted in the summer of 1993 by relevant Slovak authorities. However, it did not became part of the Slovak or the EC reports.

The Slovak report is incorrect in stating that the decrease of surface and groundwater levels were only caused by river bed regulation and the construction of upstream hydrodams. The huge impacts originating from Slovak and Hungarian gravel excavation are ignored.

There is no comparison with other intact floodplain ecosystems (e.g. the Danube upstream of Bratislava) or with floodplains damaged in the past by other hydroschemes (the Danube upstream of Vienna, the Rhine downstream of Basel, the Rhone etc.) from which the state of the floodplain ecosystem prior and after the Danube diversion could be better compared and estimated (cf. page 65: Hügin 1981). Then it would have been possible to give a better prognosis than the authors did.

It is not clear how "*a considerable part of biotopes*" will "*gradually turn by successive way to 'original state'*" (at the end of the fifties), if only some forest plantations, an increased water level and a watering of the side-arm system will be provided for the floodplain area.

The many problems of the Danube river bed itself are not discussed nor were respective conclusions made. The crucial importance of the open connection with the floodplain side-arm system is largely ignored. There are no comments on the changed nutrient input and exchange when discussing the artificial water input from the canal in comparison to the natural situationat the end of the '50s.

**The estimation, that the needed floods can be simulated from the Dobrohost intake structure of the Gabcikovo canal and that this can recreate the hydropedological situation of this territory at the end of the fifties, ignores all available data and experience about such artificial measures from the Rhine and Upper Danube; it is far too optimistic** (cf. chapter B).

The given example used to "prove" the restoration of soil moisture due to the Gabcikovo scheme, while comparing the mean losses of leaves in August 1992 and 1993, is actually unfair:

* August 1992 was a very dry period, as it is even stressed
* In other locations (rather than the quoted Cunovo/Rusovce area) especially along the Danube up- and downstream of Dobrohost, the groundwater level was not raised, but lowered by up to 2 meters due to the river diversion: there, not positive but damaging effects in the floodplain forests can be found in 1993, as compared to 1992.

Another example is the strange comparison of Aranea species diversity of the very wet, morphologically dynamic Danube inland delta with the xerothermal, stable Jur peat-bog: spiders are no indicators for floodplains because they prefer constant habitat conditions; second, the peat-bog (Carici elongatae - Alnetum) is not a floodplain ecosystem.

The same applies for the example of butterflies. For floodplain biotopes, such a comparison would be much more appropriate by taking beetles (Carabidae, Staphylinidae).

The report does not treat the problems of the important Istragov side-arm area (upstream of Palkovicovo) which is yet not supplied by artifical water input (a **new canal** is planned from Gabcikovo power plant!) and therefore drying out, since the Danube was diverted in fall 1992.

**The whole report concentrates too much on the forest productivity (plantations). For instance, there are no recommendations to reconnect the side-arms with the main river even though this is partly recognized as absolutely crucial for the survival of the biocenoses, especially the regeneration and migration of the fishfauna.**

**Even though it is true that a one-year-period is too short to produce a sound scientific evaluation of potentially caused changes in fauna and flora, the monitoring data could have given many more results than the EC Report has referred to. It is not clear why the summary assessment of impacts ignores the visible damages in fish fauna, forests and habitats. The early general conclusion that the forestry has been positively influenced in Slovakia must at least be doubted, especially when looking at the slow reaction of forests to changed environmental conditions.**

**The suggested monitoring program will help to provide a clearer picture if it will be financed and really executed. This, however, is anything but certain in both countries.**

# B. Comments to the Recommendations for a Temporary Water Management Regime

The EC Report recommendations are restricted to the technical limits, especially of the Cunovo weirs, indicated to the EC group by the Slovak side (see also chapter C). Secondly, the discussed scenarios look only at the range between 20% and 40% and at the 95% alternative. **The ecologically more acceptable range between 40% and 95% of water for the Old Danube as an interim solution, which in fact is realistic from the technical point of view, was not discussed at all.**

This includes that the EC experts did not notice the original Slovak legal prerequisites for the operation of Gabcikovo (the "19 Conditions" demanding 65-75% of water in the Old Danube) as well as the 66% compromise solution which was suggested in February 1993 by EC Commission and accepted by the Hungarian side. **Such a scenario would certainly reduce the ecological problems and would still leave a large amount of water for Slovak energy production.**

On the other side, **the package of measures, the EC experts recommended** (an average 800 m3/sec discharge plus 1-3 floods of more than 3.500 m3/sec per year, the installation of two underwater weirs in the Old Danube and the higher discharge of the artificial input of water into the floodplain) **is decidedly too little to prevent further damages and obviously accepts the technical limits of the Cunovo weirs.** Detailed comments are:

The suggested minimum discharge of 400 m3/sec is well below the historical minimum of the river in this region. This will promote the extraordinary drainage effect of the river, affecting the floodplains and the adjacent lands. A minimum discharge of 600 m3/sec is close to the historic minima and technically feasible at the Cunovo bypass weir.

## Underwater weirs

As one "remedial measure", the new construction of two underwater weirs is recommended. The Slovak engineers plan to built the same kind of such weirs as on the Southern Upper Rhine (e.g. near Strasbourg). **From the many years of experience about these weirs on the Upper Rhine and the many scientific data produced on its impacts it can be stated that this measure will be inappropriate, inefficient and ecologically detrimental for the Danube and it will rather worsen the situation:** it will dissect the river continuum into a chain of ponds and result in higher erosion downstream of each weir (cascade effect); upstream of the weirs it will create standing water, higher eutrophication and sedimentation processes (colmation) reducing the river water quality, i.e. a complete change of the former bedload regime. The design of the planned underwater weirs creates such great velocities that fish will not migrate; artificial fish ladders proved to be useless investments.

On top of this, **underwater weirs proved to have no decisive, positive impact on the groundwater.** The water levels will be adjusting only to the water level of the **downstream** level of each weir. Even with a narrow sequence of many weirs, these drawbacks could only partly be reduced. In addition, the important exchange between surface and groundwater will be reduced after some time due to upstream colmation. On the Upper Rhine e.g. in the Weisweil weir section, less than 20% of the "inundated" area maintained ecological conditions similar to floodplains, but over 80% of the former, typical ecosystem is lost today.

## Lateral dikes in the floodplain

Even though the EC experts did not expressively recommend the construction of lateral dikes in the floodplain area as a "remedial measure", their operation is included in their recommendations. They were constructed on the Slovak side dissecting the wetland into 7 "cassettes". **Even though in 1991 the Slovak environment ministry expressively(!) critisized such measures to be very detrimental and demanded a solution ensuring a water input in the side-arms from the Danube and a removal of the disclosures between the river and the side-arms (no. 11 of the "19 Conditions" from 25 June 1991), the Gabcikovo engineers started to build this scheme in winter 1992/93 destroying parts of the side-arm system, re-enforcing the disclosures with the Danube and starting a permanent inundation of the wetland in May 1993.** Condition no. 11 stated already in 1991 that "*the construction of lateral dikes in the inundation area and the creation of cassettes will damage the thru-flowing of the side-arms and result in an unnatural water regime of surface and groundwater, which with their oxygen regime and nutrient contents will not correspond to the needs of floodplain forests. It would provoque a non-desired long-term inundation of the forests causing its complete or significant change.*"

This view is strongly supported by the WWF scientists: these dikes will transform the previous continuum of the floodplain into a chain of practically independent ponds which **perhaps give the impression of an intact wetland at first sight and in**

**very short term**. It even may be true that the new water levels following the new artificial water input from the Dobrohost intake structure lifted the water level to a higher level than under recent predam conditions. However, the single-point inflow of water, its stable, significantly reduced volume and its changed water quality (the water comes from the storage lake having lost most of its suspended matter including nutrients crucial for the floodplain ecosystem) in fact result in detrimental effects.

The water level just upstream of each lateral dike is lifted too high and remains stable over many months. This is damaging for natural floodplain biocenoses. Further upstream of each lateral dike, the water damming has no more impact: the dammed water remains horizontal, while the floodplain morphology is inclined.

**This measure induces a real threat to the affected floodplain forests. Opposite to the propaganda of the Slovak investor company in 1993, the artificial water input has <u>not</u> "saved the Danube inland delta". Even more, the negative scientific prognosis is already reality, as it was revealed during recent studies** by French scientists from the Lyon University who investigated the lower part of this Slovak floodplain section in 1992 and 1993: they found clear signs of physiological problems for willows which in large numbers soon will die or died already (especially large trees).

In addition, the lateral dikes proved to impede the migration of fish and other water organisms because they created high barriers which no Danube fish can cross. In 1992, there were four small lateral dikes in the side-arms near the village Baka; in fall 1993, the number of even larger barriers increased to ten. The French studies documented a drastic loss of fish biomass as compared to the 1992 situation: apparently almost all large fish have gone, only a few species dominate (e.g. bleaks = Alburnus a.) while the original diverse fish cenoses are largely altered today. The detailed analysis will be available in January 1994.

Finally, the construction of these new lateral dikes together with the permanent, controlled filling of the channels provided unlimited access for many more visitors (recreation!) and for the often illegal construction of weekend houses all over the floodplain: **the wetland, which until recently hosted many threatened, but sensible species is today dramatically endangered to turn into a big recreation area for thousands of people.**

**It can be concluded that after thes weirs and dikes were largely tested on the Upper Rhine in the 1960s and 1970s, they will have no satisfying effect on ecology, groundwater or forestry at the Danube.**

Unfortunately, the most important recommendation of the EC Report suggesting a "**deposition of gravel**" downstream of the Cunovo weir is not discussed any further. However, WWF thinks that this actually could become a very positive route changing of the present situation (see WWF Recommendation B.).

# C. Technical Limits of the Present and Future Discharge into the Old Danube

The technical possibilities to restore the hydrodynamics of the Danube region and to establish an ecologically acceptable Temporary Water Management are largely dependent on the technical situation of the Gabcikovo scheme, especially the Cunovo diversion weir with its various openings (see attached map). A major problem arose from the fact that the diversion of the Danube in October 1992 happened at a stage when the whole scheme, but especially the Cunovo weir, was still under construction. Its completion was scheduled for the end of 1992. However, the interest of the Gabcikovo investor to deviate the Danube at the earliest moment possible resulted in a high risk of technical problems and damages.

A relatively small problem arose with the **ferry service** in the Gabcikovo canal providing a second connection to the three isolated villages. It turned out that the ferry is operating in a very unreliable way, causing a lot of frustration and anger among those who need it (see chapter D).

A second problem was the **left lock chamber of the Gabcikovo power plant** which, subsequent to an accident, had to be repaired and could be opened for navigation only in May 1993, i.e. not, as the EC Report is stating, in November 1992. Also, **navigation** was closed several times, especially on 29 days between 20 October and 30 November 1992.

The **Cunovo bypass weir** was originally designed for auxiliary purposes with a hydraulic capacity of 1.460 m3/sec (4 gates). However, after a few hours of operation, it proved to have a faulty design for the strong erosion activities at its downstream parts (9). Therefore, the weir's discharge is limited in all cases to 600 m3/sec, otherwise it could be destroyed by erosion.

Similarly, the original design of the adjacent **Cunovo inundation weir** (20 gates with 4.600 m3/sec discharge capacity) allowed only a few days use per year (during large floods). In fall 1992, it was still under construction and protected by a small earth dike. An "unexpected flood" on 25 November 1992 washed away the protection dike searching its way through the construction site back into the old river bed. Downstream of the weir, the flood caused major destruction of the unfinished bottom protection. Scour holes of 11 m developed locally and caves were formed underneath some downstream parts of the weir. Between 2 and 3 million m3 of soil, sand and gravel were eroded from the former floodplain(5). Two tainter gates (each 24 m long and 25 t heavy) were washed 2 km downstream onto Hungarian territory.

Until today, the repairing works and the redesigning of the weir for continuous use has made little progress; only four gates can be used at present. The reconstruction of the spillways of the 16 remaining openings is now planned by Slovak engineers to start only in May 1994. Other protection measures are scheduled to be completed in May 1994. Following the EC Report(5), the technical circumstances allow only a very limited discharge of, all together, 940 m3/sec through the bypass and inundation weirs. Following the Slovak engineer plans, only in the summer of 1996, the discharge capacity of the weir can be extended to 5.900 m3/sec. This is also (by chance?) the scheduled completion for the construction of new ship locks and a small power plant at Cunovo; for this "Phase II", financing is apparently very insecure.

In addition, the EC Reports (5) phrase "*the time schedule will depend on weather conditions*" reveals that **new damages caused by, technically undesired, floods or ice going through this weir will probably not only delay the whole construction/repairing works, but could actually threaten the entire weir** ("*it is necessary to inspect the fortifications each week and make frequent repair work*").

This explains why one of the remedial measures of the EC Working Group recommends the "*construction of an underwater weir at RKM 1845.5 for improving the operational reliability of water supply from the inundation weir (less maintenance of the spillway). ... Without this there is a large risk that the inundation weir spillway will be under repair most of the time.*"

The obvious inability of the Slovak side to quickly and satisfactorily bring this weir to an operational state over the last 11 months should be compared to the hasty construction of the entire "Variant C" scheme (new storage lake with dikes, new large diversion weir etc.) which has been achieved between November 1991 and October 1992 (= 11 months).

The EC Report's technical discussion of the possibilities to quickly enlarge the discharge capacities of this weir is very limited. The Report's recommendation that "*a design review be carried out by an independent, specialized institute*" **for river engineering is strongly emphasized by the WWF scientists and should be realized as soon as possible.**

This technical study should investigate whether the technical situation of the weirs allow more than the indicated volumes e.g through other, not discussed technical measures which can help to soon increase the discharge into the old river bed.

The **sedimentation processes** in the Cunovo storage lake were always stressed by Slovak side to be an important limit for a higher discharge of water into the Old Danube because a reduced discharge in the storage lake will enhance the undesired settling of sus*pended load. The new EC Report(4) confirms that "all bed load and 60% of the suspended bed load have settled in the reservoir*" and that the damming at Cunovo has high significantly disturbed the sedimentation/erosion balance in the Danube. It must be stated:

1. **The Slovak side now admits for the first time that this problem in the storage lake already exists.** Even the building of artificial islands in the storage lake cannot stop this process. Most-likely, detrimental biogeochemical processes inducing a threat for the groundwater quality have started and thus will probably threaten the drinking water wells near-by.

2. Beside finer bed sediments, there will be a clear deficite of transportable matter compared to the river's transport capacity in the Danube downstream of the reservoir. **This will inevitably result in erosion processes downstream of both the Cunovo and the Gabcikovo weirs**, similarly to such effects on other dams elsewhere.

This leads to the conclusion that still something has to happen in order to reduce or balance these negative processes, induced by the Gabcikovo scheme.

Modern river engineering knows only two alternatives:

* the construction of further dams downstream, i.e. especially the Nagymaros project which itself will result in the need to continue the building of more dams downstream, or

* measures to balance the transport capacity, like the continuous input of gravel (example: downstream the Iffezheim dam on the Upper Rhine) or the fortification of the river bed with large-sized gravel (example: downstream the Vienna-Freudenau dam in the Danube where this method is now being tested).

If politicians don't want to dam up the entire Danube they have to vote for the second option. This is where WWF's recommendations are aiming at (see chapter WWF Recommendations, esp. C,D).

# D. Comments to the Social Situation of Local People

The question of local people suffering from the Gabcikovo scheme was discussed in the EC Reports only from the point of view of the Gabcikovo investor. It may be that the new road presently under construction between Dobrohost and Cunovo will soon open a new communication route with Bratislava.

However, the local people of the three villages use to mainly commute with their relatives and neighbors living in adjacent villages, now located on the other side of the canal. In addition, it is the near-by city of Samorin which serves them as a center for shopping, medical and administrative attention. The unreliable ferry service (it runs just once an hour due to limited fuel; its limited capacity often leads to long waiting times; it has to stop during fog, wind or ice) caused unacceptable travel times. Several workers even lost their job.

As a result, this new road will mainly serve those who (now develop an interest to) spend their week-end or recreation time in this area. Together with the new, permanent access to the entire wetland over the lateral dikes, the permanently filled-in water-ways, the hundreds of often illegally built week-end houses along the side-arms and the newly planned recreation areas at the gravel pits, a **total transformation/ alienation of the wetland character and of the traditional villages with their social structure is now being implemented from the outside:**This process is technocratically oriented ignoring local interests and ecological sensibilities. It must urgently be stopped.

**To balance this, not only a much more limited access into the wetland, an active involvement of local people into the economic development of their region but also an investigation on how to improve their damaged life quality is needed. It is suggested to seriously consider the substitution of the ferry crossing the canal by a tunnel or a bridge near Vojka which could, at least partly, allow the native people to regain their former communication network.**

# Recommendations by WWF and Independent Scientists

## A. Recommendations with Respect to the EC Reports

As stated above, WWF suggests to produce as soon as possible

* a **water quality study** including
  - control sampling and analysis on the changes in surface and groundwater quality,
  - changes of the underground currents and
  - potential impacts on the drinking water reservoir;

* a **river engineering study** investigating
  - the present state of the Cunovo scheme,
  - the technical possibilities and costs for the improvement of the discharge into the Old Danube and
  - the new variant to reduce the undesired sedimendation processes in the storage lake up- and downstream of the Cunovo weir through the construction of a small navigation route (see WWF recommendation C).

**Each study should be worked out by an independent expert team also involving local, competent experts**, providing that they can work independantly from the government and Gabcikovo operator.

## B. Alternative Recommendations for the Future Water Regimes

WWF is aware of the fact that due to the present technical state of the Cunovo weirs, to the very short time up to the next vegetation period (March 1994) and to the difficult political situation it is hard to achieve significant improvements.

**However, it is clearly a question of the European political interest how quickly the needed political negotiations will produce results and how much time will be allowed to pass by for the realisation of the urgently needed and hopefully agreed steps.**

WWF tried to keep this "time problem" in mind when discussing and formulating the following recommendations. The scientists involved are convinced that this "gentle solution" can be achieved faster, cheaper and politically easier, than the "technical solution" the EC Mission's Working Group was able to agree on.

### Priority objectives

Every new solution has to respect the following priority objectives:

1. **The reestablishment of the hydrological dynamics both**
   in the old river bed,
   in the side-arm system and
   in the floodplains.

   This means that the water level fluctuations in their amplitude (height-depth), number and duration, in the channels and in the floodplain, have to run in such a way as they were at least under pre-dam conditions, and at best before the serious gravel excavations started (i.e. 1960s). This automatically entails the needed input of nutrients into the floodplain.

   The water supply for the Old Danube is closely dependend of the upstream Danube discharge fluctuations, as measured at the Devin gauge.

2. **The restoration of the groundwater table dynamics**

   This is possible only under a non-restricted connection between the surface water and the aquifer.

3. **The reestablishment of a direct and non-inhibited connection between the river and the floodplain including the side-arms.**

   This will allow the migration of organisms and diaspores.

4. **The enhancement of the morphodynamics**

   Erosion and sedimentation are prerequisites for the habitat and biological dynamics of floodplains. They should be promoted to the largest extent possible.

5. **The restoration of self-purification processes**

   They have to be supported to the maximum extent in the entire floodplain and river area.

# C. Short-term Solution

Based on the technically possible

* discharge minimum of 600 m³/sec and
* maximum of at least 940 m³/sec (more up to 1.500 m³/sec depending on the technical possibilities of the Cunovo weirs and with respect to the Slovak legal order stated in the "19 Conditions" from June 1991),

WWF suggests as an urgent measure for the next two years, which are needed for the preparation of the long-term solution, instead of underwater weirs

**the accumulation of sediment bodies in the old river bed in the form of gravel banks and islands.**

The goal of this measure is to **reduce the discharge area**, which provokes a lifting of the water level and thus will even permit an inflow of Danube water into some of the side arms (whose closures have to be reopened again).

Even though this interim solution cannot balance the drawbacks of underwater weirs concerning the groundwater levels,

* it largely prevents upstream colmation and
* eutrophication,
* it preserves the river continuum and
* allows free migration of fish and other organisms in the river bed.
* In addition, it is no alien construction (like an artificial underwater weir) in the river bed, and uses authochtonous material from the river bed itself and from the banks. This measure does not disturb or change the typical environment for the river biocenoses.
* These sediment bodies allow an easy transition towards the needed long-term solution which is suggested in D.

These sediment bodies can easily be built up within a short-term of a few weeks **using the existing local gravel and sand deposits in the old river bed.**

Even moderate changes of these sediment bodies by erosion will not reduce their expected purpose and positive effects.

The design and planning preparation of the suggested measure can be accomplished within a few months.

**Subsequently to this measure in the river bed, the lateral dikes especially in the Slovak floodplain and the bilateral closures between the side-arms and the Old Danube should be reopened (lowered) to the maximum extent which is ecologically supportive.**

# D. Long-term Solution

Starting from the above-mentioned facts

* that the previous, natural water level dynamics with all its positive effects for the floodplains and the groundwater have to be restored,

* that the discharge in the Old Danube realistically will remain below the former discharge,

* that at least the Slovak legal standards (as stated in the "19 Conditions" from June 1991 following § 14 of the Slovak Water Law) be fulfilled, but in their meaning of a dynamic discharge (cf. description in B) of 65 to 75 % of water

* that an acceptable compromise be found, orienting on the EC proposal from February 1993 (average discharge of 66%) which was already accepted by Hungary,

the compensation of the discharge deficite (25-35%) can only be achieved by

**lifting and constricting the present river bed**

which is entailed by a reduction of the existing discharge area.

The lifting and constricting of the river bed can be achieved by the deposition of gravel and small sized boulders in the old river bed. Similarly to the short-term solution, this measure includes the forming of islands and gravel banks. It is expected that a stretch of ca. 20-30 km downstream of Cunovo has to be filled up with a volume of one to two meters. For this purpose, an amount of ca. 5-10 million m3 gravel and boulders will be needed.

The origine of such material, its environmentally sound exploitation and transport still has to be investigated. In comparison to the amount excavated from the Danube alone on Slovak side (e.g. 50 million m³ within 14 years) it becomes evident that the volume needed is realistic and technically feasible. The cover layer of this "new river bed" should be provided by gravel with locally typical size that can be acquired from the vicinity.

As a second WWF recommendation it is suggested that

**the storage lake up- and downstream of Cunovo be reduced by new dikes to a navigation route.**

The objective is to reduce the sedimentation and undesired biogeochemical processes in surface and groundwater of this artifical lake (which has no efficient sealing to the underground like the the power canal) to the minimum extent. This will reduce the potential water pollution threatening the near-by and downstream drinking water wells. The area in-between the new dikes parallel to the navigation route and the present lake dikes should be turned into restoration areas. If done in the appropriate way, these man-made biotopes can develop over the years into secondary wetland biotopes.

It is evident that the entire planning and realisation of this solution has to be examined thoroughly and in detail by an **independent, international water engineering institute <u>together</u> with an ecological institute experienced in river management.**

**However, the preparation of this solution has to be started as soon as possible because it will require several years for its completion.**

**Opposite to other proposals this "gentle" solution offers a comprehensive approach to the river area. It wil help to limit and partly even reverse the detrimental changes induced by the Gabcikovo scheme. It will not only bring a long-term preservation of this floodplain ecosystem of European importance but it guarantees an improvement of the presently critical groundwater situation. It is a solution for the Danube and the base for an ecologically-oriented, economic development of the border region which is to serve the livelihood of poeple living on both sides of the river.**

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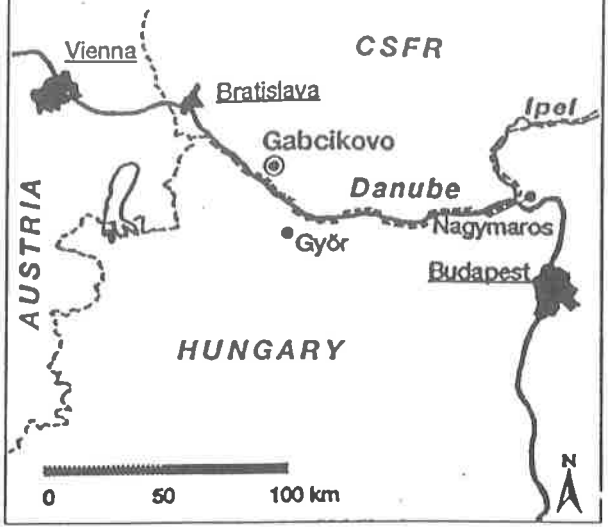
WWF® World Wide Fund For Nature

# SAVE THE DANUBE - NOW - STOP GABCIKOVO!

## LARGE SCALE OVERVIEW:

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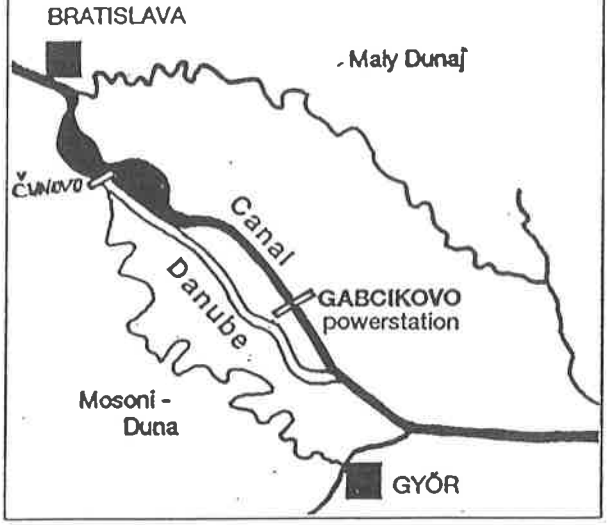
## TODAY'S SITUATION:

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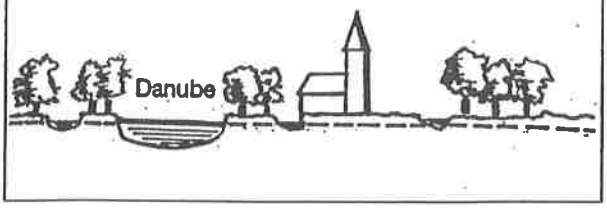


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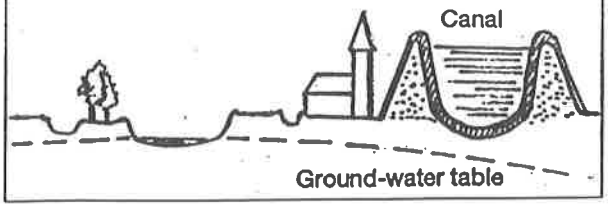


- The Danube - essential part of Europe's Natural Heritage
- Av. 2.000 $m^3$/sec of water flowing in the Danube
- Dynamic changes of ground- and river water, Central Europe's largest drinking water reservoir
- 200 $km^2$ European-wide unique floodplain ecosystem

- Gabcikovo, mega-powerstation, 30 km channel
- 85 % of the water in the channel, only 15 % in the Danube bed
- Storage lake, sinking of the ground-water table, endangering of the drinking water for millions of people
- Drying up and destruction of the riverine landscape

# TEMPORARY SOLUTION OF GABČÍKOVO ON THE TERRITORY OF ČSFR (ALT.C)