REPORT

on the results of the biomonitoring carried out in the area affected by the bottom-weir water-recharge system

Since 22nd June 1995 in the Upper- and Lower-Szigetköz a bottom-weir water recharge system have operated in order to reduce temporarily the damages caused by the diversion of the Danube.

By the operation of the temporary bottom-weir system 40-100 m^3/s^{-1} water can be channelled from the former main-branch into the side-branch system of the flood-plain. Based on our observations the quantity of the recharged water till the end of the growth period was continuously nearer to the upper limit of the above-given range. During this period some water-management constructions were carried out in this region. In the evaluation of the effects of the water-recharge on the biota some points must be considered and the results must be interpreted very carefully:

- On the assumed affected area of the recharge system several new sampling points had to be selected. The possibility to compare the data collected at these new points and those collected formerly is very limited.

- Biomonitoring is a method developed to detect the long-term changes of the biota. The temporal and spatial scale of the changes of the biota is very varied. Different parallel processes or changes take place at the same time. The high complexity and simultaneous nature of these changes make their detection and study very difficult.

- The biological effects will show only after a longer period of time than the one past after the installation of the bottom-weir. In 1995 only data could be collected and the first signs of changes could be detected.

- In the evaluation of the effects it is impossible to clearly separate the effects caused by the bottom-weir system and the effects of the Gabcikovo river barrage system. On top of all these artificial effects the natural yearly and seasonal population dynamics changes and the weather differences of the consequent years interfere with the above effects independently from the installation of water-recharge system.

Taxa involved in the monitoring

From the sampling points located in the study areas monitored in the Szigetköz Biomonitoring Programme those that are found in the hypothesized area affected by the bottom-weir system are involved in the data exchange with the Slovakian partners, and at several places (in the environs of Dunakiliti) new study areas were designated. The selection of the monitored taxa was achieved in agreement with the Slovak partners, and the suggestions of the EC experts, given in November 1993, were also considered. The following taxa were chosen: aquatic macrophyte vegetation, planktonic Cladocera and Copepoda, invertebrate macrofauna (Mollusca, Hirudinea, Ephemeroptera, Trichoptera, Odonata), beetles, fish.

The data collected in 1995 can be found in tables. Beside the tables are the short description of sampling points and the sampling methods.

The summary of our findings

1. The installation of the bottom-weir system created a new, though not too big, dammed waterbody, which might allow a detectable algae growth at certain periods of the year. This might produce a higher organic matter input in the areas downstream of the bottom-weir system.

2. As a consequence of the installation of the bottom-weir system the water charge of the Öreg-Duna decreased. Parallel with this the succession of the dry areas of the river-bed accelerated (spread of weedy vegetation and willow bushes, poplars).

3. The decrease in the number of species of the aquatic macrophyte vegetation, living in the floodplain, is already inevitable and its peace is alarming. The

decrease in species diversity of macrophyte vegetation living in the affected area of the water-recharge system outside the dikes indicate that the water recharge alone, without the former dynamics of Danube's water regime changes, can not ultimately solve this problem.

4. The formerly not experienced high velocity and greater volume of water in the water-recharge system caused a severe decrease both in the species diversity and the number of individuals of planktonic Crustaceans.

5. In the side-branch system the abundance of molluscans decreased. Some species, highly sensitive to the changes of the water level, were not recovered, but the land snail populations of the flood-plain did not change considerably.

6. If the above described conditions, detected in 1995, will remain the same in the side-branch system (high amount of fast flowing water) the Odonata fauna will become similar to that of the Mosoni-Duna. In the flood-plain of the Upper-Szigetköz relatively small, fast warming water bodies (ponds) appeared, in these several Odonata species were detected that were formerly present only in the Lower-Szigetköz.

7. Right downstream the bottom-weirs vegetation-free dry river-bed sections emerged, and such beetle species were found that were characteristic of the fauna of the main channel two years ago, which was then already dry.

8. As a consequence of the water recharge high numbers of caddisflies were observed. The high water current allowed the appearance of such caddisflies that were characteristic of the ╓reg-Duna formerly.

9. The bottom-weir does not form an impenetrable barrier for the rheofil fish species. But the separation of the main channel from the side-branch system is disadvantageous for the fish fauna.

Closing comments

1. The effects of the bottom-weir water-recharge system installed in the middle of the growth period can not be demonstrated unambiguously in the short time lapsed since its installation.

2. The result of water recharge in the flood-plain is that the side-branches, completely or almost completely dry since the diversion of the Danube, received a significant amount of water again. These water bodies were characterised with very high water levels and very fast flow velocities. The presence of water might give a chance for the survival of the yet not extinct aquatic organisms, if and when they withstand high water levels and fast current. But the water recharge system did not recover the former condition of these water bodies.

3. In the river-beds of the side-branches the survival of the fauna and flora depends not merely on the presence or absence of water. The natural values of this region (and their formerly exercised utilization) were in fact sustained by the former temporal and spatial diversity of these waterbodies, or we might say they were created by the ever changing nature of this area. This diversity can not be sustained with the flooding of the dry river-bed sections.

4. When we analyze the connections of the biota and the water-recharge system we have to pay special attention to the direct effects asserted on the aquatic fauna, and to the indirect effects operating through the changes in the water table of the soil, and hence affecting both the terrestrial flora and the phytophagous fauna feeding on it.

5. To carry out the biomonitoring in 1996 it is necessary to revise the already existing sampling points and to select new sampling points and taxa to be involved in the biomonitoring.

BIOLOGICAL MONITORING
LIST OF LOCATION AND DATA

Trichoptera

Station No	Sampling points	List of species	Date of sampling	Number of collected individuals
4	Rajka Danube bank	+	+	+
9	Dunasziget Jakab sziget	+	+	+
8	Cikolasziget	+	+	+

Mollusca

Station No	Sampling points	List of species	Density (individuals/m^2)
4	Rajka main channel	+	+
3	Dunasziget main channel	+	+
2	Cikolasziget side-branch	+	+
1	Ásványráró side-branch	+	+

Planctonic crustaceans

Station No.	Sampling points	List of species	Density (individuals/l)
12	Dunakiliti main channel	+	+
16	Dunaremete main channel	+	+
13	Dunakiliti side-branch	+	+
14	Dunasziget side-branch	+	+
15	Kisbodak side-branch	+	+
17	Lipót side-branch	+	+
18	Halászi Mosoni-Duna	+	+

Odonata

Station No	Sampling points	List of species	Date of sampling	Number of collected species
5	Dunakiliti Ördög-sziget	+	+	+
6	Dunakiliti Ördög-sziget	+	+	+
7	Dunakiliti Farkas-zátony	+	+	+
8	Dunasziget Doborgazsziget	+	+	+

Ephemeroptera

Station No.	Sampling points	List of species	Date of sampling	Number of collected individuals
4	Rajka	+	+	+
9	Dunasziget Jakab sziget	+	+	+
10	Lipót	+	+	+
11	Nagybajcs	+	+	+

Pisces

Station No	Sampling points	List of species	Percentage of a given species from the total number of collected fish
19	Dunasziget Schiler branch	+	+
20	Dunasziget branch-system	+	+
21	Dunasziget main channel	+	+
22	Dunaremete main channel	+	+
23	Lipót Holt-Duna	+	+
24	Dunasziget Gazfűi-Duna	+	+

Water macrophyton

Station No	Sampling points	List of species	Date of sampling	Density
3	Dunasziget main channel	+	+	+
19	Dunasziget branch system	+	+	+
20	Dunasziget Csákányi-Duna	+	+	+
23	Dunasziget dead branch	+	+	+
30	Dunasziget Gazfűi-Duna	+	+	+
25	Kisbodak branch system	+	+	+

BIOLOGICAL MONITORING
COORDINATE SYSTEM

Station No	'EOTR' SYSTEM		WGS-84 ELLIPSOID	
	Y [m]	X [m]	latitude degree-min-sec	longitude degree-min-sec
1	536600	278240	47-50-16.725	17-31-57.022
2	528000	288680	47-55-49.060	17-24-53.044
3	523650	293640	47-58-26.610	17-21-18.357
4	515450	297850	48-00-36.935	17-14-38.414
5	517390	295700	47-59-28.786	17-16-14.351
6	517960	295200	47-59-13.021	17-16-42.381
7	522200	294170	47-58-42.742	17-20-07.902
8	522920	292320	47-57-43.371	17-20-44.555
9	525950	289850	47-56-25.532	17-23-13.110
10	533320	281720	47-52-07.280	17-29-15.976
11	548310	270410	47-46-10.218	17-41-26.613
12	515820	296820	48-00-03.873	17-14-57.405
13	521830	293280	47-58-13.672	17-19-51.008
14	525330	289920	47-56-27.370	17-22-43.171
15	528960	285050	47-53-52.206	17-25-42.906
16	531410	283170	47-52-52.978	17-27-42.673
17	532840	282180	47-52-21.865	17-28-52.441
18	520380	284010	47-53-12.582	17-18-51.034
19	523680	291520	47-57-18.011	17-21-22.016
20	524280	291520	47-57-18.430	17-21-50.928
21	527675	289320	47-56-09.556	17-24-36.744
22	531310	283220	47-52-54.531	17-27-37.813
23	532390	281860	47-52-11.214	17-28-31.100
24	526050	285680	47-54-10.623	17-23-22.192
25	529880	285150	47-53-56.058	17-26-27.090

TRICHOPTERA

Map code : 8
Location : Cikolasziget, weir-keeper house

List of species	Date and collected number of individuals 07.26	Abun-dance year	Domi-nance year %
Agapetus laninger	5	5	0.5 AD
Orthotrichia costalis	29	29	3.2 SD
Hydroptila sparsa	138	138	15.1 D
Hydropsyche bulbifera	35	35	3.8 SD
Hydropsyche bulgaromanorum	4	4	0.4 AD
Hydropsyche contubernalis	32	32	3.5 SD
Hydropsyche modesta	2	2	0.2 AD
Hydropsyche pellucidula	23	23	2.5
Hydropsyche sp. indet.	196	196	21.4 ED
Neureclipsis bimaculata	3	3	0.3 AD
Cyrnus trimaculatus	1	1	0.1 AD
Psychomyia pusilla	132	132	14.4 D
Ecnomus tenellus	140	140	15.3 D
Goera pilosa	3	3	0.3 AD
Athripsodes cinereus	7	7	0.7 AD
Ceraclea alboguttata	13	13	1.4 AD
Ceraclea dissimilis	59	59	6.4 SD
Mystacides azurea	4	4	0.4 AD
Mystacides longicornis	4	4	0.5 AD
Oecetis furva	1	1	0.1 AD
Oecetis lacustrus	1	1	0.1 AD
Oecetis ochracea	37	37	4.0 SD
Setodes punctatus	17	17	1.8 AD
Leptocerus tineiformis	2	2	0.2 AD

Location, characterization of the sampling points and the sampling methods:

Next to the water supply system but outside the dikes.
Sampling method as above.

TRICHOPTERA

Map code : 4
Location : Rajka

List of species	Date and collected number of individuals 06.27	Abundance year	Dominance year %
Agapetus laninger	9	9	1.2 AD
Hydroptila lotensis	10	10	1.4 AD
Hydroptila sparsa	1	1	0.1 AD
Hydropsyche bulbifera	1	1	0.1 AD
Hydropsyche bulgaromanorum	6	6	0.8 AD
Hydropsyche contubernalis	29	29	4.1 SD
Hydropsyche modesta	3	3	0.4 AD
Hydropsyche pellucidula	20	20	2.8 SD
Hydropsyche sp. indet.	218	218	30.8 ED
Psychomyia pusilla	307	307	43.5 ED
Goera pilosa	1	1	0.1 AD
Lepidostoma hirtum	2	2	0.3 AD
Ceraclea alboguttata	2	2	0.3 AD
Ceraclea dissimilis	3	3	0.3 AD
Mystacides longicornis	4	4	0.5 AD
Mystacides nigra	1	1	0.1 AD
Oecetis ochracea	88	88	12.4 D
Setodes punctatus	1	1	0.1 AD

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Location, characterization of the sampling points and the sampling methods:

The bank of the main channel, drying soft-wood riparian forest and willow shrub. After the damming of the Danube the water level was very low, following the construction of the underwater weir the water level rose significantly.

Sampling with a portable light trap and 125 UV lamp.

TRICHOPTERA

Map code : 9
Location : Dunasziget, Jakab-szigetek

List of species	Date and collected number of individuals 08.31	Abun-dance year	Domi-nance year %
Orthotrichia costalis	5	5	1.6 AD
Orthotrichia tragetti	3	3	1.0 AD
Oxyethira flavicornis	1	1	0.3 AD
Hydroptila lotensis	5	5	1.6 AD
Hydroptila sparsa	16	16	5.3 SD
Agraylea sexmaculata	7	7	2.3 SD
Hydropsyche contubernalis	18	18	3.5 SD
Hydropsyche pellucidula	4	4	1.3 AD
Hydropsyche sp. indet.	35	35	11.3 AD
Psychomyia pusilla	121	121	40.3 ED
Ecnomus tenellus	34	34	11.3 D
Ceraclea dissimilis	8	8	6.0 SD
Mystacides azurea	2	2	0.6 AD
Mystacides longicornis	8	8	2.6 SD
Oecetis furva	3	3	1.0 AD
Oecetis ochracea	18	18	6.0 SD
Setodes punctatus	2	2	0.6 AD

Location, characterization of the sampling points and the sampling methods:

In 1994 a soft-wood riparian forest stand with reduced water supply. Above the nearby dam the river bed was mostly dry, below it the water became eutrophic. Shallow, stagnant water. As a consequence of the installation of the water supply system fast current was established.

Sampling method as above.

MOLLUSCA

Map code : 1
Location : Ásványráró

List of species	Date and collected number of individuals 10.05	Abundance year	Dominance year %
Viviparus (Viviparus) acerosus	1	1	0.8 AD
Valvata (Cincinna) piscinalis	12	12	9.7 SD
Bithynia (Bithynia) tentaculata	7	7	5.6 SD
Lymnaea (Radix) peregra	5	5	4.0 SD
Lymnaea (Radix) auricularia	4	4	3.2 SD
Physella (Costatula) acuta	5	5	4.0 SD
Planorbis planorbis	1	1	0.8 SD
Dreissena plymorpha	4	4	3.2 SD
Sphaerium corneum	10	10	8.0 SD
Pisidium henslowanum	18	18	14.5 D
Pisidium supinum	4	4	3.2 SD
Unio pictorum	42	42	33.9 ED
Anodonta (Anodonta) cygnea	11	11	8.9 SD

Location, characterization of the sampling points and the sampling methods:

A side-branch, the right side of the eastern end of the Ásványi-Duna. A ruined and built bank section. The depth of water was constantly changing usually between 20-40 cm. There are pieces of floating timber and debris. As a consequence of frequent stirring up of the mud the rocks are not covered with algae. The bigger mussels are carried here, to the shallow water by muskrats.

The bigger species were collected by singling, while the smaller ones by sifting the mud form a 100 square metres section of the bank.

MOLLUSCA

Map code : 2
Location : Cikolasziget

List of species	Date and collected number of individuals 09.26	Abundance year	Dominance year %
Viviparus (Viviparus) acerosus	2	2	1.9 AD
Lithoglyphus naticoides	1	1	0.9 AD
Bithynia (Bithynia) tentaculata	10	10	9.4 SD
Lymnaea (Lymnaea) stagnalis	11	11	10.4 D
Lymnaea (Radix) peregra	15	15	14.2 D
Physella (Costatella) acuta	32	32	30.2 ED
Planorbis planorbis	5	5	4.7 SD
Planorbarius corneus	1	1	0.9 AD
Dreissena plymorpha	6	6	5.7 SD
Pisidium henslowanum	20	20	18.9 D
Unio pictorum	2	2	1.9 AD
Anodonta (Anodonta) cygnea	1	1	0.9 AD

Location, characterization of the sampling points and the sampling methods:

At the outlet end of the damned Cikola branch. From stagnant, muddy water, with bank of moderate indination. This part was flooded within a year, there is no water plant community here, the bank is shadowed by lowland tall vegetation herb weed communities.

Singling was performed in a 3-4 metres wide part with a dredge-net.

MOLLUSCA

Map code : 3
Location : Dunasziget

List of species	Date and collected number of individuals 09.28	Abundance year	Dominance year %
Viviparus (Viviparus) acerosus	1	1	4.2 SD
Valvata (Cincinna) piscinalis	1	1	4.2 SD
Potamopyrgus jenkinsi	1	1	4.2 SD
Lithoglyphus naticoides	4	4	16.6 D
Lymnaea (Radix) peregra	2	2	8.3 SD
Lymnaea (Radix) auricularia	2	2	8.3 SD
Ancylus fluviatilis	5	5	20.8 ED
Sphaerium cornuem	1	1	4.2 SD
Pisidium henslowanum	5	5	20.8 ED
Pisidium supinum	2	2	8.3 SD

Location, characterization of the sampling points and the sampling methods:

The right side of the main channel under the weir at Dunakiliti. Sampling from the gravel, filling the holes between the bank protecting basalts rocks, and from the surface of the rocks covered with algae.

Collecting from the surface of the rocks and from the algae covered rocks by singling and from the gravel by sifting.

MOLLUSCA

Map code : 4
Location : Rajka

List of species	Date and collected number of individuals 09.28	Abun-dance year	Domi-nance year %
Potamopyrgus jenkinsi	5	5	62.5 ED
Lymnaea (Radix) peregra	2	2	25 ED
Ancylus fluviatilis	1	1	12.5 D

Location, characterization of the sampling points and the sampling methods:

Main channel, right hand side of the former Jónási branch.

Sampling was carried out at the margin of the shallow but fast flowing water running over the sandy, gravelly bank. Approximately 10 litres of smaller gravel was extracted and washed.

CRUSTACEA

Map code : 12
Location : Dunakiliti

List of species	Date and collected number of individuals 05.19	07.19	08.11	09.22	10.18	Abundance year	Dominance year %
Daphnia juv.	1	0	0	0	0	1	5 SD
Bosmina longirostris	1	0	0	1	0	2	10 SD
Alona affinis	0	0	0	0	1	1	5 SD
Alona quadrangularis	0	0	0	0	1	1	5 SD
Disparalona rostrata	0	0	0	1	0	1	5 SD
Pleuroxus truncatus	0	0	0	0	1	1	5 SD
Cyclopidae juv.	2	0	0	0	5	7	35 ED
Dikerogammarus haemobaphes	0	3	1	0	1	5	25 ED

Location, characterization of the sampling points and the sampling methods:

Main channel, usually muddy, running water.

Sampling was carried out by using a plankton net of 100 micron mesh size, from 1 metre depth, 100 litres of water was sifted.

CRUSTACEA

Map code : 13
Location : Dunakiliti

List of species	Date and collected number of individuals 05.19	07.19	08.11	09.22	10.18	Abundance year	Dominance year %
Ceriodaphnia reticulata	0	0	0	0	2	2	1.8 AD
Simocephalus sp. juv.	0	0	0	0	1	1	0.9 AD
Bosmina longirostris	13	0	0	0	1	14	13.2 D
Acroperus harpae	0	0	0	0	1	1	0.9 AD
Alona sp. juv.	0	0	0	0	1	1	0.9 AD
Graptoleberis testudinaria	0	0	0	0	2	2	1.8 AD
Alonella excisa	0	0	0	0	1	1	0.9 AD
Pleuroxus aduncus	0	0	0	0	2	2	1.8 AD
Pleuroxus truncatus	0	0	0	0	1	1	0.9 AD
Chydorus sphaericus	2	0	0	0	0	2	1.8 AD
Eurytemora velox juv.	5	0	0	0	0	5	4.5 SD
Cyclops vicinus juv.	56	0	0	0	0	56	53 ED
Cyclopidae juv.	9	2	0	1	3	15	14 D
Ostracoda	0	0	1	0	0	1	0.9 AD
Limnomysis benedeni	3	0	0	0	0	3	2.7 SD

Location, characterization of the sampling points and the sampling methods:

Side branch, fast flowing water. The samples were collected either from under a weir at a quieter part of the bank, of from above the weir from a small, calmer bay.

Sampling method as above.

CRUSTACEA

Map code : 14
Location : Dunasziget

List of species	Date and collected number of individuals 05.19	06.21	07.19	08.11	09.22	Abundance year	Dominance year %
Diaphanosoma mongolianum	0	0	2	6	0	8	8 SD
Simocephalus vetulus	0	12	0	0	1	13	13 D
Scapholeberis mucronata	0	8	0	0	0	8	8 SD
Bosmina longirostris	6	0	11	0	0	17	17 D
Eurycercus lamellatus	0	1	0	0	0	1	1 AD
Alona quadrangularis	0	1	0	0	0	1	1 AD
Pleuroxus aduncus	2	2	0	0	0	4	4 SD
Chydorus sphaericus	12	6	0	0	0	18	18 D
Eurytemora velox	0	4	0	0	0	4	4 SD
Macrocyclops albidus	0	3	1	0	0	5	5 SD
Eucyclops serrulatus	2	3	0	0	0	5	5 SD
Acanthocyclops robustus	4	6	0	0	2	12	12 D
Mesocyclops leuckarti	0	0	1	0	0	1	1 AD
Cyclopidae sp. juv.	0	0	0	1	0	1	1 AD
Ostracoda	0	3	0	0	0	3	3 SD

Location, characterization of the sampling points and the sampling methods:

Side branch, in May and June lower water level, water sample was collected from the open water. From June the water level rose, fast current. Sampling was carried out from the bank.

Sampling method as above.

CRUSTACEA

Map code : 15
Location : Kisbodak

List of species	Date and collected number of individuals 05.19	06.21	07.19	08.11	09.22	10.18	Abundance year	Dominance year %
Simocephalus juv.	0	1	0	0	0	1	2	3.6 AD
Bosmina longirostris	1	4	1	0	0	0	6	10.9 D
Chydorus piger	0	3	0	0	0	0	3	5.4 SD
Chydorus sphaericus	1	0	1	0	1	1	4	7.2 SD
Eurytemora velox	18	1	0	0	0	0	19	34.5 ED
Macrocyclops albidus	11	0	0	0	0	0	11	20 D
Eucyclops serrulatus	0	3	0	0	0	0	3	5.4 SD
Parayclops fimbriatus	1	0	0	0	0	0	1	1.8 AD
Acanthocyclops robustus	0	4	0	0	0	0	4	7.2 D
Cyclopidae sp. juv.	0	0	1	0	0	1	2	3.6 SD
Ostracoda	0	0	1	0	0	0	1	1.8 AD

Location, characterization of the sampling points and the sampling methods:

Side branch, flowing water. Sampling around the weir, from 80-100 cm depth.

Sampling method as above.

CRUSTACEA

Map code : 16
Location : Dunaremete

List of species	Date and collected number of individuals 07.19 08.11 09.22 10.18	Abundance year	Dominance year %
Macrothrix laticornis	0 0 0 3	3	17.7 D
Alona affinis	0 0 0 1	1	5.9 SD
Pleuroxus truncatus	0 0 0 1	1	5.9 SD
Chydorus sphaericus	0 0 0 2	2	11.8 D
Cladocera juv.	0 0 0 4	4	23.6 ED
Cyclopidae juv.	2 0 1 3	6	35.1 ED

Location, characterization of the sampling points and the sampling methods:

Main channel, flowing water.

Sampling method as above.

CRUSTACEA

Map code : 17
Location : Lipót

List of species	Date and collected number of individuals 05.19	06.21	07.19	08.11	09.22	10.18	Abundance year	Dominance year %
Sida crystallina	0	1	0	0	0	0	1	2.2 SD
Alona guttata	0	0	0	0	0	2	2	4.4 SD
Chydorus sphaericus	4	3	0	0	0	2	9	19.5 D
Eurytemora velox	4	0	0	0	0	4	8	17.4 D
Paracyclops fimbriatus	1	0	0	0	0	0	1	2.2 SD
Acanthocyclops robustus	12	0	0	1	0	0	13	28.1 ED
Cyclopidae sp. juv.	0	4	0	0	0	4	8	17.4 D
Ostracoda	0	0	0	1	0	0	1	2.2 SD
Limnomysis benedeni	1	0	0	0	0	0	1	2.2 SD
Dikerogammarus haemobaphes	0	0	0	0	0	2	2	4.4 SD

Location, characterization of the sampling points and the sampling methods:

Side branch, quite turbid flowing water. The water level rose considerably from July, and hence sampling was carried out from the bank.

Sampling method as above.

CRUSTACEA

Map code : 18
Location : Halászi

List of species	Date and collected number of individuals 07.19	08.11	09.22	Abundance year	Dominance year %
Sida crystallina	0	0	1	1	20 D
Chydorus sphaericus	0	0	1	1	20 D
Eucyclops serrulatus	0	0	1	1	20 D
Cyclopidae sp. juv.	0	0	1	1	20 D
Ostracoda	0	0	1	1	20 D

Location, characterization of the sampling points and the sampling methods:

Outside the dikes (Mosoni-Duna), slowly flowing, a somewhat bit turbid water. The abruptly deepenning bank is not covered with rocks.

Sampling method as above.

ODONATA (larva)

Map code : 6
Location : Dunakiliti (Ördög-sziget)

List of species	Date and collected number of individuals 08.22 10.11 06.28			Abundance year	Dominance year %
Platycnemis pennipes	20	0	0	20	6.7 SD
Erythromma najas	0	7	0	7	2.3 SD
Erythromma viridulum	0	0	34	34	11.4 D
Ischnura elegans pontica	57	92	5	154	51.8 ED
Coenagrion puella	0	10	0	10	3.3 SD
Anax imperator	0	3	1	4	1.3 AD
Anax parthenope	1	0	0	1	0.3 AD
Hemianax ephippiger	1	0	0	1	0.3 AD
Orthetrum albistylum	1	0	1	2	0.6 AD
Crocothemis erythraea	0	63	0	63	21.2 ED
Sympetrum striolatum	0	0	1	1	0.3 AD

Location, characterization of the sampling points and the sampling methods:

Gravel pit lake inside the dikes.

Sampling method : with a 40 cm diameter net of 2 mm mesh size, from the bottom and submerged plants for 30 minutes.

ODONATA (larva)

Map code : 5
Location : Dunakiliti (Ördög-sziget)

List of species	Date and collected number of individuals 08.22	Abundance year	Dominance year %
Platycnemis pennipes	5	5	3.5 SD
Enallagma cyathigerum	2	2	1.4 AD
Ischnura elegans	52	52	37.18 ED
Anax imperator	4	4	2.8 SD
Hemianax ephippiger	42	42	30.0 ED
Orthetrum albistylum	3	3	2.1 SD
Crocothemis erythraea	4	4	2.8 ED
Sympetrum fonscolombii	28	28	20.0 D

Location, characterization of the sampling points and the sampling methods:

A shallow, approximately 50 cm deep lake within the dikes.

Sampling method as above.

ODONATA (larva)

Map code : 7
Location : Dunakiliti, Farkas-zátony

List of species	Date and collected number of individuals 08.22	Abund-dance year	Domi-nance year %
Platycnemis pennipes	7	-	-

Location, characterization of the sampling points and the sampling methods:

Flowing water.

Sampling method as above.

ODONATA (larva)

Map code : 8
Location : Dunasziget (Doborgazsziget)

List of species	Date and collected number of individuals 08.22	Abundance year	Dominance year %
Ischnura elegans pontica	4	4	80 ED
Orthetrum albistylum	1	1	20 D

Location, characterization of the sampling points and the sampling methods:

The weir cut at Doborgaz, water flowing with high velocity.

Sampling method as above.

EPHEMEROPTERA

Map code : 4
Location : Rajka

List of species	Date and collected number of individuals 05.08 - 08.29	Abun-dance year	Domi-nance year %
Baetis alpinus	1	1	20 D
Cloeon dipterum	2	2	40 ED
Caenis macrura	2	2	40 ED

Location, characterization of the sampling points and the sampling methods:

A drying soft-wood riparian forest and willow shrub. After the damming of the Danube the water level was very low, following the construction of the underwater weir the water level rose significantly.

Traps with 440 square centimetres catching area covered with non-drying. Tangle-trap glue were applied.

EPHEMEROPTERA

Map code : 9
Location : Dunasziget (Jakab-szigetek)

List of species	Date and collected number of individuals 05.08 - 08.29	Abundance year	Dominance year %
Baetis vernus	3	3	23 ED
Heptagenia flava	1	1	7.7 SD
Caenis horaria	5	5	38.4 ED
Caenis luctuosa	2	2	15.3 D
Caenis macrura	1	1	7.7 SD
Paraleptophlebia werneri	1	1	7.7 SD

Location, characterization of the sampling points and the sampling methods:

In 1994 a soft-wood riparian forest stand with reduced water supply. Above the nearby dam the river bed was mostly dry, under it the water became eutrophic. Shallow, stagnant water. As a consequence of the installation of the water supply system fast current was established.

Sampling method as above.

EPHEMEROPTERA

Map code : 10
Location : Lipot

List of species	Date and collected number of individuals 05.08 - 08.29	Abun-dance year	Domi-nance year %
Cloeon dipterum	1	-	-
Heptagenia flava	1	-	-

Location, characterization of the sampling points and the sampling methods:

A drying willow shrub. During the early summer flood it received damned water, and its level decreased continuously during the summer.

Sampling method as above.

EPHEMEROPTERA

Map code : 11
Location : Nagybajcs

List of species	Date and collected number of individuals 05.08 - 08.29	Abun-dance year	Domi-nance year %
Ecdyonurus subalpinus	4	4	40 ED
Heptagenia flava	2	2	20 D
Heptagenia sulphurea	1	1	10 S
Caenis horaria	2	2	20 D
Caenis macrura	1	1	10 SD

Location, characterization of the sampling points and the sampling methods:

A soft-wood riparian forest and willow shrub good water supply covered the ground next to the main channel.

Sampling method as above.

PISCES

Map code : 21
Location : Dunasziget

List of species	Date and collected number of individuals (20 samples) 08.10	number / sample	Domi-nance %
Leuciscus leuciscus	2	0.1	1 AD
Leuciscus cephalus	8	0.4	6 SD
Leuciscus idus	7	0.35	5 SD
Rutilus rutilus	21	1.05	15 D
Alburnus alburnus	68	3.4	47 ED
Aspius aspius	4	0.2	3 SD
Chondrostoma nasus	4	0.2	3 SD
Blicca bjoerkna	3	0.15	2 SD
Gobio albipinnatus	5	0.25	3 SD
Rhodeus sericeus amarus	2	0.1	1 AD
Barbus barbus	3	0.15	2 SD
Carassius auratus	2	0.1	1 AD
Perca fluviatilis	1	0.05	1 AD
Proterorhinus marmoratus	14	0.7	10 SD

Location, characterization of the sampling points and the sampling methods:

Main channel with bank protecting rocks, stronger current and gravelly bottom.

Random point abundance sampling. At the study site data were collected at 20-40 randomly chosen points at 10 metres intervals. Collecting with 80 W fishing device.

PISCES

Map code : 19
Location : Dunasziget (Schisler branch)

List of species	Date and collected number of individuals (30 samples) 08.07	number / sample	Domi-nance %
Leucaspius delineatus	1	0.03	2 SD
Carassius auratus	22	0.73	33 ED
Rhodeus sericeus amarus	41	1.37	62 ED
Scardinius erythrophthalmus	2	0.07	3 SD

Location, characterization of the sampling points and the sampling methods:

A 500 m long 30-40 m wide muddy, stagnant water body inside the dikes, wich is being at a later phase of silting up. In the autumn of 1992 its connection with the branches of the flood-plain ceased. Since 1993 it gets some leaking watersupply from the Zátonyi-Duna.

Sampling method as above.

PISCES

Map code: 20
Location : Dunasziget

List of species	Date and collected number of individuals (40 samples) 07.13	number / sample	Domi-nance %
Leuciscus cephalus	3	0.08	1.0 AD
Leuciscus idus	1	0.03	0.4 AD
Rutilus rutilus	12	0.03	4.2 SD
Alburnus alburnus	225	5.63	79.5 ED
Aspius aspius	1	0.03	0.4 AD
Blicca bjoerkna	12	0.3	4.2 AD
Abramis brama	5	0.13	1.8 AD
Vimba vimba	1	0.03	0.4 AD
Rhodeus sericeus amarus	17	0.43	6.0 SD
Scardinius erythrophthalmus	1	0.03	0.4 AD
Lepomis gibbosus	5	0.13	1.8 AD

Location, characterization of the sampling points and the sampling methods:

The main branch of the Cikola braided channel syste, which is separated from the Danube by a dam. Prior to the Diversion of the Danube when the water level was higher than 440 cms at Dunaremete, the water from the main channel could flow over this dam. This branch-system was characterised by 1-5 m depth and gravelly bottom.

Sampling method as above.

PISCES

Map code: 22
Location : Dunaremete

List of species	Date and collected number of individuals (20 samples) 08.12	number / sample	Domi-nance %
Leuciscus cephalus	5	0.25	6 SD
Leuciscus idus	2	0.1	2 SD
Rutilus rutilus	10	0.5	12 D
Alburnus alburnus	35	1.75	42 ED
Aspius aspius	3	0.15	4 SD
Chondrostoma nasus	6	0.3	7 SD
Blicca bjoerkna	7	0.35	8 ED
Gobio albipinnatus	2	0.1	2 SD
Barbus barbus	3	0.15	4 SD
Gymnocephalus baloni	1	0.05	1 AD
Cottus gobio	3	0.15	4 SD
Proterorhinus mamoratus	7	0.35	8 SD

Location, characterization of the sampling points and the sampling methods:

Main channel, a canalised section with 350 m average width. Moving gravelly sediment, bank protecting rocks.

Sampling method as above.

PISCES

Map code : 23
Location : Lipót (morotva)

List of species	Date and collected number of individuals (20 samples) 08.07	number / sample	Domi-nance %
Esox lucius	1	0.05	1 AD
Rutilus rutilus	58	2.90	40 ED
Alburnus alburnus	38	1.90	26 ED
Blicca bjoerkna	17	0.85	12 D
Rhodeus sericeus amarus	22	1.10	15 D
Scardinius erythrophthalmus	6	0.30	4 SD
Carassius auratus	1	0.05	1 AD
Perca fluviatilis	3	0.15	2 SD

Location, characterization of the sampling points and the sampling methods:

A former dead branch, a 100 ha reed covered marshland area with some open waters. Presently water is recharged via a recharge canal.

Sampling method as above.

PISCES

Map code : 24
Location : Dunasziget (Gazfűi-Duna) 28 rkm

List of species	Date and collected number of individuals (30 samples) 08.07	number / sample	Dominance %
Esox lucius	2	0.07	1 AD
Rutilus rutilus	57	1.90	36 ED
Alburnus alburnus	8	0.27	5 SD
Blicca bjoerkna	30	1.00	19 D
Tinca tinca	6	0.20	4 SD
Rhodeus sericeus amarus	12	0.40	8 SD
Scardinius erythrophthalmus	10	0.33	6 SD
Carassius carassius	3	0.10	2 SD
Carassius auratus	3	0.10	2 SD
Perca fluviatilis	6	0.20	4 SD
Lepomis gibbosus	2	0.07	1 AD
Proterorhinus marmoratus	18	0.60	11 D

Location, characterization of the sampling points and the sampling methods:

A dead branch like river section characterised by constant water, little changes of water level, muddy bottom. After 1993 it received direct water supply, the branch was filled up to the rim. Current velocity and water depth increased considerably.

Sampling method as above.

MACROPHYTON

Map code : 3
Location : Dunasziget

List of species	Kohler-index 09.13	life form 09.13
Myriophyllum spicatum	1	rs

Location, characterization of the sampling points and the sampling methods:

Abandoned main branch with high number of spillvais near to the side-brach system of Tejfalusziget.

The description of mass relations (Kohler 1978) was based on the life forms of species (according to Luther).

MACROPHYTON

Map code : 19
Location : Dunasziget

List of species	Kohler-index		life form	
	08.08	09.13	08.08	09.13
Ceratophyllum demersum	4	5	mp	mp
Cladophora sp.	1	-	mp	-
Lemna minor	2	1	ap	ap
Myriophyllum spicatum	5	4	rs	rs
Najas marina	1	-	rs	-
Najas minor	1	-	rs	-
Potamogeton pectinatus	1	2	rs	rs
Potamogeton perfoliatus	2	1	rs	rs
Ranunculus circinatus	4	-	rs	-
Spirodela polyrhiza	1	-	ap	-

Location, characterization of the sampling points and the sampling methods:

A 500 m long 30-40 m wide muddy, stagnant water body inside the dikes, which is being at a later phase of silting up. In the autumn of 1992 its connection with the branches of the flood-plain ceased. Since 1993 it gets some leaking water supply from the Zátonyi-Duna.

Sampling method as above.

MACROPHYTON

Map code : 20
Location : Dunasziget (Csákányi-Duna)

Location, characterization of the sampling points and the sampling methods:

The main branch of the Cikola braided channel system, which is separated from the Danube by a dam. Prior to the diversion of the Danube when the water level was higher than 440 cms at Dunaremete, the water from the main channel could flow over this dam. This branch-system was characterised by 1-5 m depth and gravelly bottom.

Sampling method as above.

As a consequence of the continuous high water regimes macrophyte stands were not ever formed.

MACROPHYTON

Map code : 23
Location : Dunasziget

List of species	Kohler-index 08.08.	09.14	life form 08.08.	09.14
Ceratophyllum demersum	1	-	mp	-
Cladophora sp.	1	1	mp	mp
Hippuris vulgaris f. fluviatilis	2	2	rs	rs
Hydrocharis morsus-ranae	1	1	ap	ap
Lemna minor	1	1	ap	ap
Lemna trisulca	1	-	mp	-
Nuphar lutea	3	3	rf	rf
Nymphaea alba	1	3	rf	rf
Nymphoides peltata	2	3	rf	rf
Polygonum aphibium f. aquaticum	2	2	rf	rf
Potamogeton pectinatus	1	-	rs	-
Potamogeton pusillus agg.	1	-	ap	-
Salvinia natans	1	-	ap	-

Location, characterization of the sampling points and the sampling methods:

A former dead branch, a 100 ha reed covered marshland area with some open waters. Presently water is recharged via a recharge canal.

Sampling method as above.

MACROPHYTON

Map code : 25
Location : Kisbodak

List of species	Kohler-index 09.13	life form 09.13
Ceratophyllum demersum	4	mp
Cladophora sp.	2	mp
Lemna minor	1	ap
Potamogeton nodosus	2	rf

Location, characterization of the sampling points and the sampling methods:

It was formerly the mouth of the Bodak side-branch system, nowadays it is one of the most silted up sections of the former main branch. In the dry main branch very fast spreading of willow shrub (Salicetum triandrae) and bog vegetation (Scirpo-Fragmitetum) was observed. In the holes of the former river bed small isolated ponds were formed.

Sampling method as above.

MACROPHYTON

Map code : 30
Location : Dunasziget (Gazfűi-Duna) 28 rkm

List of species	Kohler-index		life form	
	08.08	09.13	08.08.	09.13
Ceratophyllum demersum	-	1	-	mp
Hydrocharis morsus-ranae	1	1	ap	ap
Nuphar lutea	2	2	rf	rf
Nymphaea alba	3	2	rf	rf
Polygonum amphibium f. aquaticum	2	2	rf	rf
Potamogeton lucens	2	4	rs	rs
Sagittaria sagittifolia f. vallisneriifolia	-	1	-	rs

Location, characterization of the sampling points and the sampling methods:

A dead branch like river section characterised by constant water, little changes of water level, muddy bottom. After 1993 it received direct water supply, the branch was filled up to the rim. Current velocity and water depth increased considerably.

Sampling method as above.