



Brook restoration in The Netherlands

Mission to Estonia & Russia; Joint fieldwork; 20-27 June 2005



The Netherlands:

**Luc Jans (Rijkswaterstaat RIZA)
Roel Doef (RWS IJsselmeergebied)
Hans den Hollander (RWS-AGI)
Gerard Manshanden (Fisherman)**

Estonia:

**Andres Kuresoo (IZB-EAU)
Leho Luigujoe (IZB-EAU)**

Russia:

Vladimir Borisov

Mission brook restoration Estonia & Russia; Joint fieldwork; 20-27 June 2005

The Netherlands: Luc Jans (RWS-RIZA), Roel Doef (RWS IJsselmeergebied), Hans den Hollander (RWS-AGI) and Gerard Manshanden (Fisherman)

Estonia: Andres Kuresoo and Leho Luigujoe (IZB-EAU)

Russia: Vladimir Borisov

Gerard Manshanden didn't get a visa for Russia; so he had a separate programme from 23 to 26 of June. He visited lake Peipsi lake and the river Narva. He had talks with local fisherman.

Aim

The aim of the mission was to gather in the Peipsi area ideas and principles about brooks and brook restoration in order to evaluate the feasibility of brook restoration along the Veluwe border lakes. The information from the brooks and rivers in the lake Peipsi area will help to focus on the right topics and targets.

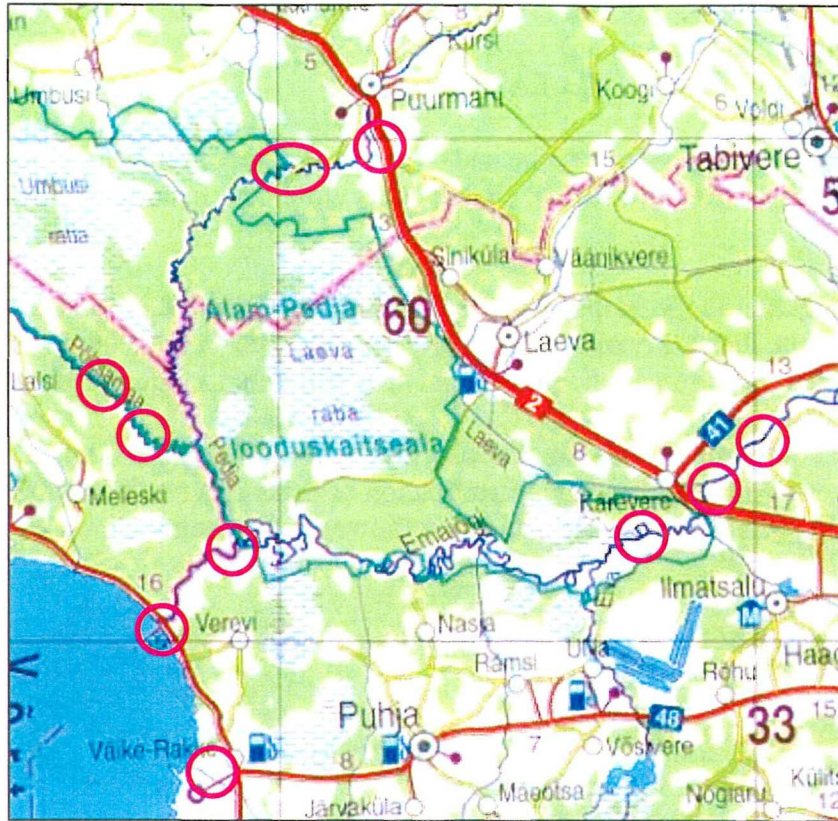
In order to have information about dimensions of the brooks, rivers, floodplains, inundation zonation, etc. satellite images were ordered. For the classification of these images (IKONOS) fielddata are required. So during this field mission data about the vegetation composition were also gathered.

This report is only a mission report; at the end of 2005 a report on the possibilities for the brooks of the Lake Veluwemeer area will be written.

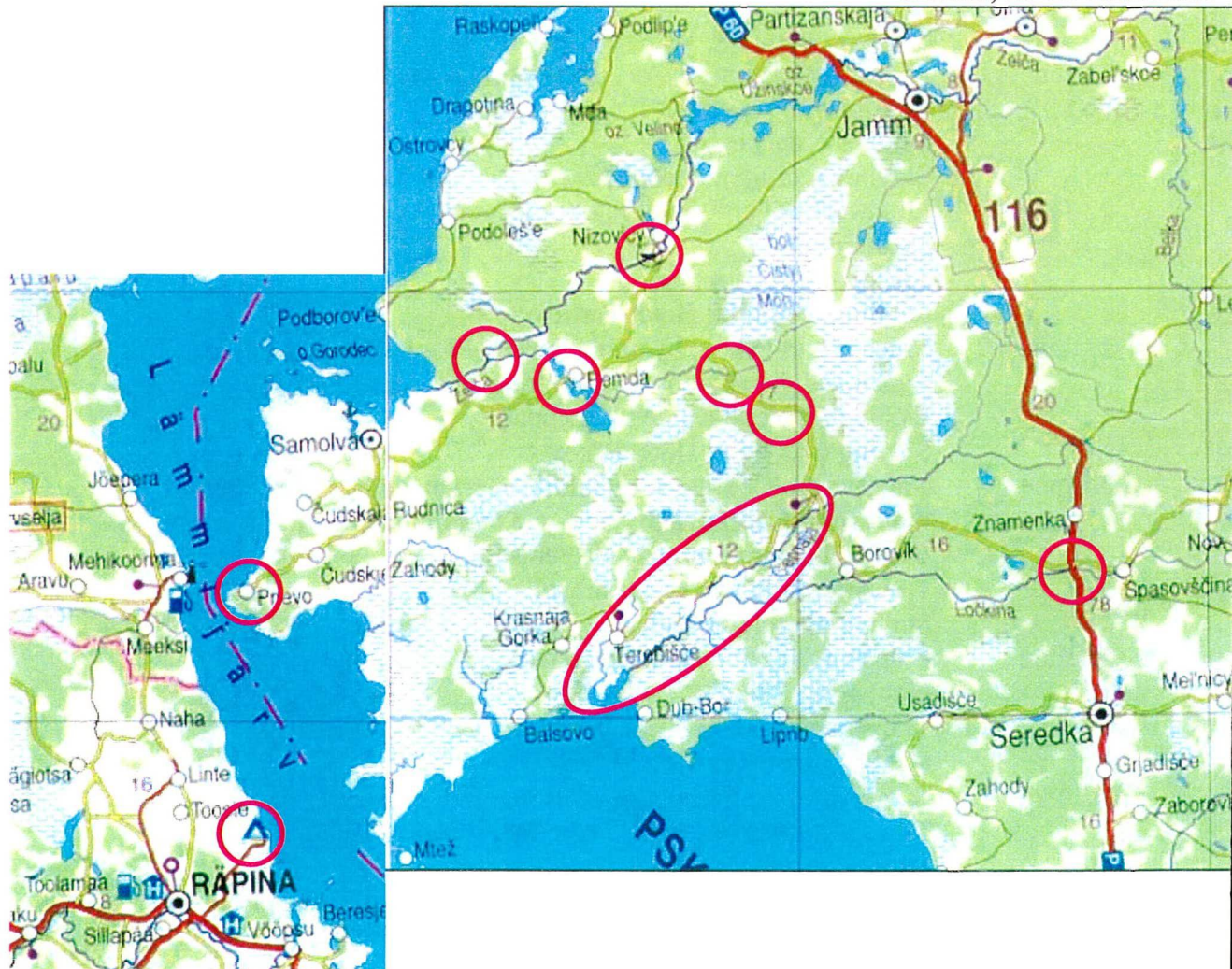
Programme:

- 20 June Amsterdam - Tallinn (KL 1327; 9.50 – 13.10)
Transport: public bus to Tartu (16.30)
Diner and discussions on field trips logistics in Tartu
Transport from Tartu to Vehendi (by minibus; arranged by IZB-EAU)
Staying overnight: Vehendi
- 21 June Fieldwork: rivers/brooks Alam pedja, river Poltsamaa and river Emajõgi
Transport: by minibus
Diner at Vehendi
Staying overnight: Vehendi
- 22 June Fieldwork: river Emajõgi near Kärevere and river Pedja near Puurmani (Kirna Matkarada)
Transport: by minibus
Staying overnight: Hotel Tartu
- 23 June Transport to Pskov: by public bus (8.40 – 14.00)
Lunch and discussions on field trips logistics in Pskov
Fieldwork: Velikaya delta (by boat)
Staying overnight: Hotel Pskov
- 24 June Transport to Chornaya: by minibus (arranged by Russians)
Fieldwork: Chornaya (by boat and by minibus)
Boat and diner arranged at Terebisce
Transport to Pnevno (by minibus)
Staying overnight: Pnevno
- 25 June Transport to Zhelcha: by minibus
Fieldwork: Zhelcha
Transport to Pskov
Staying overnight: Hotel Pskov
- 26 June Transport from Pskov to border: by minibus (9.00 – 10.00)
Transport from border to Tartu: by hired car (10.00 – 12.00)
Staying overnight: Hotel Tartu
- 27 June Transport from Tartu to Tallinn: by public bus (9.00 – 11.30)
Tallinn – Amsterdam (KL 1328; 13.50 - 15.20 uur)

Estonia; 21 and 22 June 2005



Russia; 23-25 June 2005



21 June; River and floodplain Poltsamaa and Emajõgi

Luc Jans, Roel Doef, Hans den Hollander, Gerard Manshanden, Andres Kuresoo and Leho Luigujõe

A1

50 m NE of river Poltsamaa

clay

velocity: < 1 dm/s

left bank steep; right bank gentle

2 m above level of the water of the river; yearly inundation
dark brown water

width: 30 m; with reed and water lily; forest on the banks

Hayland: 80 cm high vegetation

a lot of dragonflies



A2

100 m NE of river Poltsamaa

2-3 m above level of the water of the river; less
inundation than A1

Hay land (partly old agricultural fields): 60 cm high
vegetation

Farm house is located about 50 cm higher

Anthriscus sylvestris only at the borders of the field

Field surrounded by oaks



A3

5-10 m NE of river Poltsamaa

clay; no sand; much organic material

velocity: 2 dm/s

left bank (outer curve) steep; right bank (inner
curve) gentle

2 m above level of the water of the river; yearly
inundation (april/may)

brown water

width: 40 m; with reed and water lily; forest on the
banks

(former) Hayland on the higher banks: 80 cm high
vegetation; shrubs and trees are coming; ash and
ulmus

a lot of dragonflies (beekjuffers)

In the water of the river: *Potamogeton lucens*,

Nuphar lutea

On the banks: *Caltha palustris*, *Lychnis flos-cuculi*, *Symphytum officinale*, *Phragmites australis*,
Cicuta virosa, *Sparganium*

White stork



A4

10 m NE of river Poltsamaa
clay; no sand; much organic material
velocity: < 1 dm/s
both banks are steep
2 m above level of the water of the river; yearly
inundation
width: 30 m; with reed
(former) Hayland on the higher banks: plot of 80 to
60 m
In the water of the river: no vegetation
Surrounded by willows
Banks of the river: reed



A5

800 m SW of river Poltsamaa
Hayland surrounded by spruce trees
Vegetation: 60 cm high
Coocook

A6

10 m SW of river Poltsamaa
old one-side connected meander of the river
clay
right bank steep
1-2 m above level of the water of the river
width: 30 m; with reed
Banks of the river: reed (partly very high; 3 m)
Young pike and other young fish



The river Poltsamaa with forest on the banks and reed in part of the river
River Poltsamaa: on an average approximately 5% is covered by aquatic vegetation

Põltsamaa river is right tributary of Pedja river

length 135 km

basin 1,310 km²

decline 71 m

average capacity 13.4 m³/s



Outlet of lake Vortsjärv into the Emajõgi river

A7

Dense, monotonous, reed land 10 m north of the Emajõgi river, close to lake Vortsjärv

Hydrodynamics are completely set by the lake dynamics, not by river dynamics

velocity: 3 dm/s

30-50 cm above level of the water of the river;

partly at the same level

width: 40 m

light brown water

Level of the lake is quit high this year

Reed: 1,5 m high

No reed in the river itself; only on the banks and in the floodplain

The floodplain is more than 2 km wide;

completely filled with dense reed land

Reported fish (local fisherman): *Abramis brama*, *Esox lucius* and *Stizostedion licioperca* are dominant; *Gymnocephalus cernua*, *Lota lota*, *Cyprinus carpio*, *Anquilla anquilla* (little bit), *Salmo trutta fario* (little bit), *Leuciscus idus*, *Osmerus eperlanus*, *Coregonus albula*, *Blicca bjoerkna*

In Pedja river also *Cottus gobio*



A8

SE of Emajõgi river; close to the outlet of the Pedja river

Dense reed land in the outer curve/floodplain

Incredible amount of flies

Width: 35 m

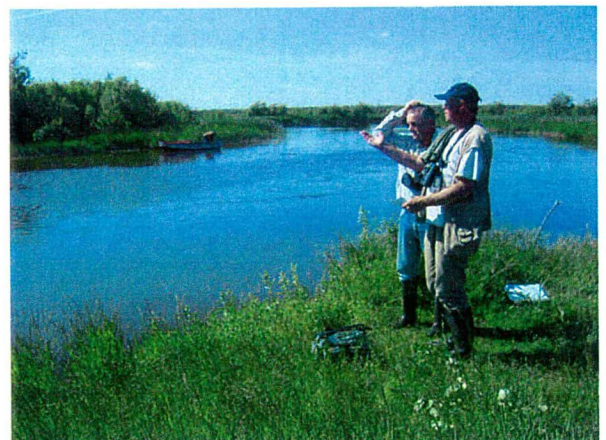
Light brown water

Reed in the floodplain and on the banks; not in the water

Scirpus in the inner curve; pioneer vegetation

A lot of shrubs are coming; 10-15 years old; 5 m high

Less and less hay making



Visit of the Vaike-Rakke polder

Old polder of which the pumping station doesn't work anymore.

The polder ditches have low banks on both sides (5-10 m broad); this gives a lot of opportunities for marsh vegetation (mainly carex).

also Great snipes

100 % hayland; extensively used



Emajõgi river

length 101 km

width 20 – 145 m

decline 3.7 m

basin 9,740 km²

maximum depth 11 m

average capacity 70.1 m³/s

22 June; River and floodplain Emajõgi and Pedja

Luc Jans, Roel Doef, Hans den Hollander, Gerard Manshanden, Andres Kuresoo and Leho Luigujoe

B1

400 m SE of Emajõgi river; north of Kärevere

Clay with some peat

Dense carex hay land (haying every year)

Inundation: 2-5 weeks in april/may

Ditches every 100 m perpendicular to the river

Carex: 50 cm high

The field is about 500 m long; the first 300 m is relatively dry en open with low carex (50 cm); the last 200 m is more dense carex and is wet

Last 50 m before the river is grown with bushes (willow, reed, Iris, etc.) (plot B2)



B2

20 m SE of Emajõgi river; north of Kärevere

Bank of the river with bushes

0,5 m above level of the water of the river

Fisherman: *Perca fluviati*; *Lota lota*

On the other site of the river bushes are increasing



B3

Hayland 150 m east of the river Emajõgi; near Kärevere

Not inundated; short grassland; no carex

Good area for Great snipes



B4

Hayland 100 m east of the river Emajõgi; near Kärevere

Inundated for two months a year (march-may); a lot of ducks and swans; Good area for Great snipes (20 pairs)

Vegetation 50 cm high

Clay with some peat; relatively dry

IZB-EAU has a detailed vegetation map of this area

B5

Large open floodplain of the Emajõgi river

500 m north of the river

Vegetation 30 cm high

According to Andres, the beavers can really keep the floodplain open. They eat the trees.



B6

Clear cut with new trees growing (\pm 8 years)

Flat area 1000 NW of the river Emajõgi, near Kärevere

Visit of the Kirna Matkarada area; river Pedja near Puurmani

Pedja river; 15 m width; 1-2 m deep

Steep banks; 2-3 meters above water level

At some places scirpus in the inner curve

In the old meanders, carex dominate (100%; 70 cm)

A lot of young fish in the on-side connected waters

On the higher meadows; Anthriscus sylvestris, Achillea millefolium, Filipendula ulmaria; grass (60%)

Hardly any reed; only sometimes in the inner curves and in old meanders



Pedja river is left tributary of Emajõgi

length 122 km

basin 2,710 km²

decline 67 m

average capacity 21.8 m³/s

Area with Great snipes

Directly along the road between Tallinn and Tartu; near Puurmani

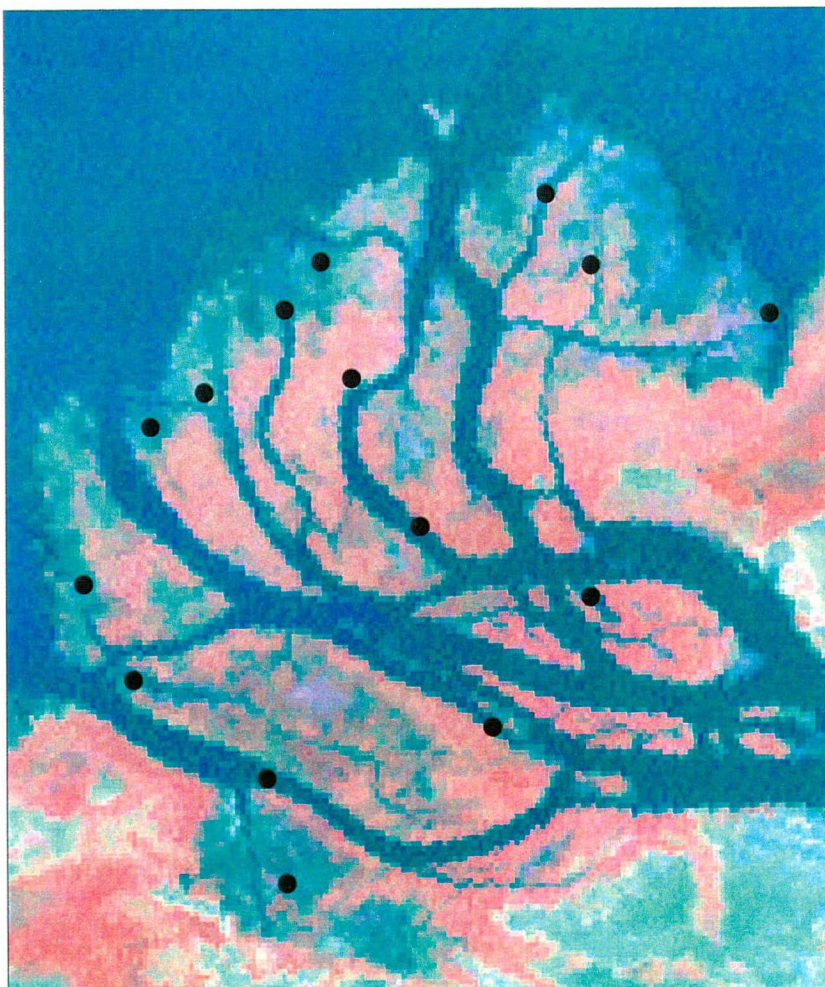
Grassland with bushes (10%)



23 June; Velikaya delta

Luc Jans, Roel Doef, Hans den Hollander, Vladimir Borisov

Visiting the same plots (15) as have been visited during the visit of Mennobart van Eerden (may 2005)



Map with the 15 visited plots.



During the fieldwork an interview by the Pskov television

C1

Velikaya delta

Reed/Scirpus at the end of the delta

Vegetation: reed (100%); some parts very thin reed, some willows, narrow scirpus border

Water: clear; dark bottom

Birds: Black tern, Bittern



C2

Velikaya delta

At the end of the delta

Vegetation:

Zonation: first *Stratiotes aloides* and/or *Equisetum*, than scirpus and than reed

Water: dark bottom; 2 m deep



C3

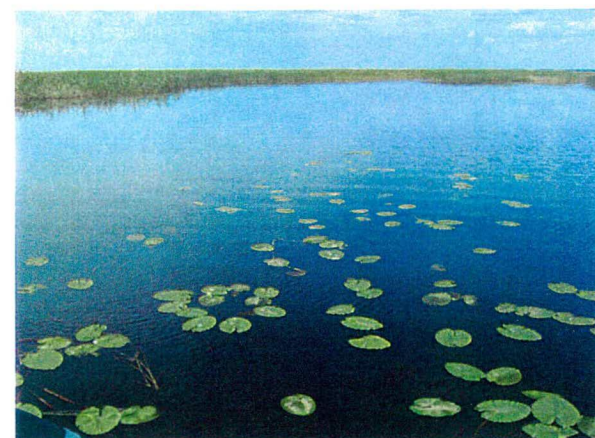
Velikaya delta

Reed/Nuphar lutea at the end of the delta

Vegetation: some reed with *Nuphar lutea*

Reasonable amount of willows within the 'island'

Birds: Black tern



C4

Velikaya delta
Scirpus and Nuphar lutea at the end of the delta
Vegetation: large Scirpus field
Many young fish



C5

Velikaya delta
Reed and Nuphar lutea at the end of the delta; end of narrow channel
Vegetation: Nuphar lutea (20%); willows at/on the borders of the 'islands'

C6

Velikaya delta
Typha at left and right bank; at the end of the delta



C7

Velikaya delta
Scirpus at the end of the delta
Vegetation: scirpus



C8

Velikaya delta
Scirpus and Nuphar lutea at the end of the delta
Vegetation: vegetation only 0,5 m above water level
Reed very thin
Scirpus in small spots



C9

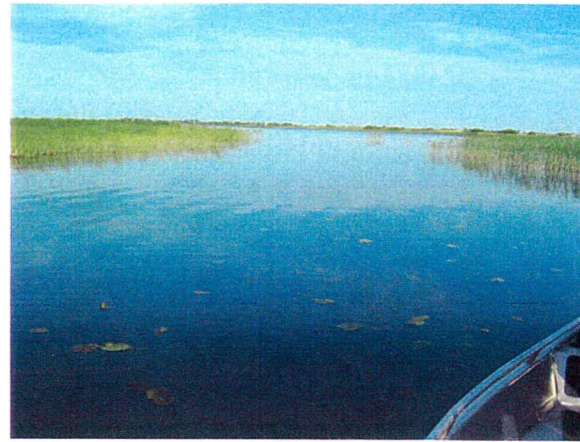
Velikaya delta

Reed/Scirpus at the end of the delta

Inside the 'island' there is still hardly any vegetation

Vegetation: reed very thin

Birds: Black tern colony (40 pairs); 0564551; 6413964

**C10**

Velikaya delta; open broad channel

Reed at the banks in the middle of the delta

Vegetation: aquatic vegetation only at 1 m out of the banks

Some willows on the banks

C11

Velikaya delta

Nuphar lutea and Scirpus in the middle of the delta

Vegetation: Scirpus and Nuphar lutea

Water: clear; 75 cm view; 2 m deep

Birds: Black tern

**C12**

Velikaya delta

At the beginning of the delta

Vegetation: reed and willows on the banks; Scirpus and Nuphar lutea; hardly any aquatic vegetation

Water: clear; 75 cm view

Birds: Black tern; Osprey

C13

Velikaya delta

in the middle of the delta

Vegetation: reed and willows on the banks



C14

Velikaya delta

At the end of the delta

Willows on the banks



C15

Velikaya delta

At the beginning of the delta

Water: clear; 75 cm view

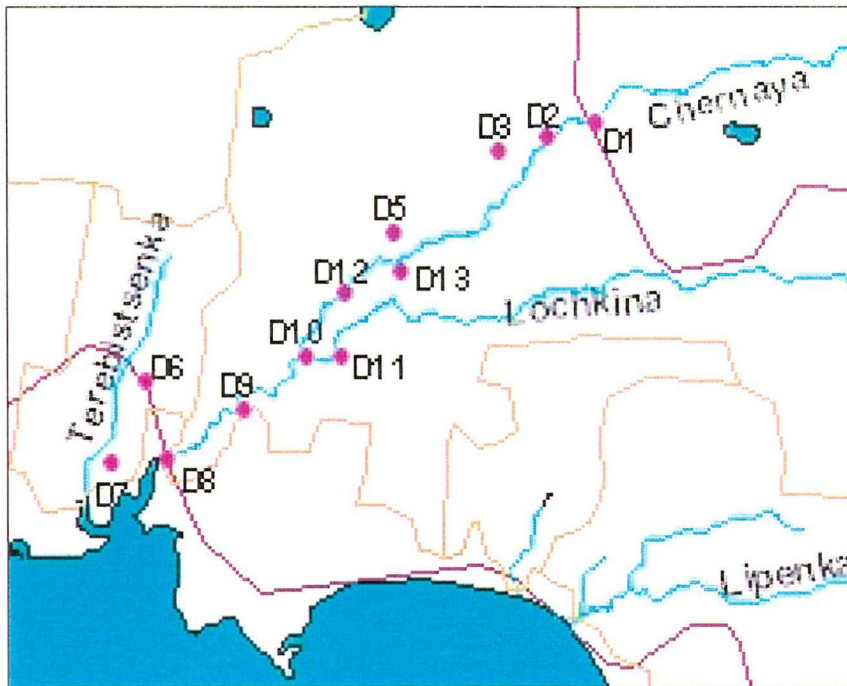
Vegetation: Mainly reed; some Typha

No aquatic vegetation

24 June; Chornaya river and floodplain

Luc Jans, Roel Doef, Hans den Hollander, Vladimir Borisov

Visiting the same plots (12) along the Chornaya as have been visited during a bird counting mission of Andres Kuresoo and Leho Luigujoe (may 2005)



Short stops at the river Tolba (near Elizarovo) and at the river Lochkina (near Znamenka)

D1

Chornaya

Carex-floodplain

Width: 20 m; everywhere the same width

Depth: > 1m

Velocity: 1 dm/s

Clay/peat; Black water

Banks 0,5 m above the water level

Floodplain: about 20 m width inundated

Spotted crane



Plot between D1 and D2

Small brook;

Width: 3 m

Carex floodplain (width 20 m)

Willows at the border of the floodplain



D2

Chornaya

Carex-floodplain

Floodplain: about 70 m width inundated

Birch woodland at the border of the floodplain; also some willows and ashes



D3

Chornaya

Carex-floodplain

Width: 4 m

Depth: 0,5 m

Velocity: < 1 dm/s

Floodplain: about 100 m width inundated



D5

Chornaya

Carex-floodplain

Width: 7-8 m

Many curves

Black water

Floodplain: about 200 m width inundated

Birch woodland at the border of the floodplain



Visit peat bogs near Terebisce

In some bogs the trees/shrubs are absent; in other bogs there are small trees (mainly Pine and Birch)



D6

Chornaya

Carex-floodplain near Terebisce bridge

Width: 25 m

Floodplain: about 100 m width inundated

D7

Chornaya-area

Carex-floodplain along Terebisceka

D8

Chornaya

Carex-floodplain

Width: 60 m

D9

Chornaya

Carex-floodplain

Small reed zone on the banks

White-tailed eagle

D10

Chornaya

Carex-floodplain at the outlet of the Lochkina in the Chornaya

Shallow part where the Lochkina flows into the Chornaya; on the most shallow parts, the most aquatic vegetation

Limosa limosa



D11

Chornaya

Carex floodplain

Spotted crane

D12

Chornaya

Carex floodplain

Colony of Black tern (15 pair)



D13

Chornaya

Carex floodplain



Beaver home

Chornaya river

The water level during this mission (June 2005) was 2-3 dm lower than the flooding level. Normally in June the water level was already much lower. Normally you can walk in/over these Carex fields in June. Now (June 2005) at least 30-40 cm of water.

length 65 km

basin 530 km²

average capacity 2.9 m³/s



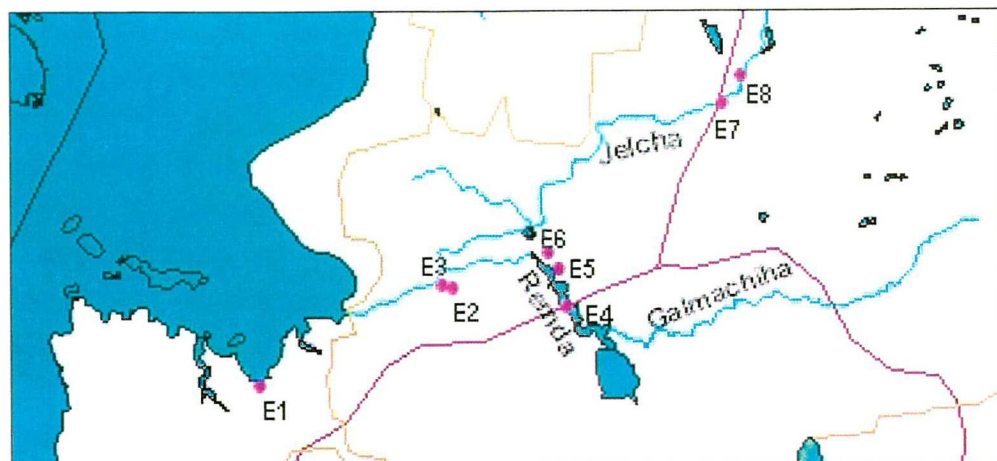
Short stop at the dry forest with lichens and open drifting sand (between Terebisce and Remda)



Short stop at a tributary of the Zhelcha river (between Terebisce and Remda)

25 June; Zhelcha river and floodplain

Luc Jans, Roel Doef, Hans den Hollander, Vladimir Borisov



Visit banks of Lake Peipsi near Pnevõ



Lake Peipsi near Pnevõ with reed in the water and with a view on Estonia.

E1

Zhelcha region

Banks of Lake Peipsi, near the outlet of the Zhelcha river

Sand

Reed and Scirpus in the water

Reed and willows on the banks; higher on the banks: ashes

Colony of sand martin

A lot of washed ashore reed



E2

Zhelcha

Carex and Glyceria maxima (5-10 m) close to the open water

Width river: 50 m

Black water

South bank: grasses; North bank: reed (100m) and somewhat higher Birch woodland

A lot of abandoned hay fields



E3

Zhelcha

Width river: 60 m

Zonation: open water – Carex and Glyceria maxima – reed(30%)/Carex(60%) - woodland

Floodplain: 80 m width each side

No willows or birch



E4

Tributary of the Zhelcha, near Remda

Very broad river

Small spots of Scirpus

Small zone of carex and Glyceria maxima along the open water



E5

Zhelcha

Carex zone: width of 80 m

E6

Zhelcha

Dry hay land

E7

Zhelcha; bridge near Nizovicy

Width floodplain: 300 m

With river/open water: 50 m

Zonation forest: willow – Ash - Birch



E8

Zhelcha

Width floodplain: 500 m

Several streams in one floodplain; braided pattern

Zone with *Glyceria maxima* (width 2 m)



Zeltsa river

length 107 km

basin 1,220 km²

average capacity 8.2 m³/s

26 June; Visit Rääpina polder; Estonia

Short stop.

At this side of the Rääpina polder the pumping station is still working

Conclusions

- The Emajõgi river is a very special river between two lakes; The hydro-dynamics of the river are very much influenced by the lakes; more stable water level than the real rivers
- Partly connected water bodies are very important for the fish species (especially for Pike). This can be old meanders but also inundation areas. They must be connected to the main stream for at least 1 a 2 months.
- The zonation of the vegetation and the inundation zones was less clear than expected on forehand; more variation depending on the lake influence, the natural morphology, etc. Some rivers/brooks were really meandering rivers, others had a much more braided pattern
- Less and less intensive cultivation of the floodplains (stopping of haying); in Estonia as well as in Russia. So more and more bush and forest regrowth.
- Large water level fluctuations (lakes > 1m); within the year as well over the years. The water levels during the field mission (at the end of June 2005) were still very high. The water level of lake Vortsjärvi was only 25 cm lower than the highest level of 2005. The same for the river Chornaya. So, the floodplains were still very, very wet.
- Essentially the Veluwe (lake) area is very much the same; high(er) sandy soils with forest; brooks and rivers which rise from these forests (and bogs/peatlands) flow into large lakes. A large difference is the absence of (large) inundation areas. It would be valuable to create inundation areas between the higher Veluwe forests and the low lake Veluwemeer. In the Netherlands this area is used for agricultural purposes at the moment.
- In nearly all the brooks and rivers seen, black (peat)water was flowing. The basins of the rivers were formed by peat areas, bogs, forests (and agricultural fields).
- We have seen rivers (for example the Poltsamaa river) with high banks directly along the river. Others, like the Emajõgi, Chornaya and Zhelcha, have shown low 'banks'; the inundation zones of these rivers were much longer inundated than the inundation zones of the Poltsamaa river. This is partly related to the rate of dependence on the lakes. A hydrology which is strongly determined by the lake, has different consequences as a hydrology which is only based on its own 'river'hydrology.

Forest/Trees

Forest/trees are very important for a complete ecosystem; many animals migrate between the forest and the open floodplains. When the hydrology and/or the management of a floodplain changes, an open floodplain can be overgrown by forest. This can cause a decrease of biodiversity. Trees along the banks of the rivers will create woody debris in the water, which will increase the natural values of the aquatic system. Beavers have a large influence on the forest development of the banks. They can really limit the amount of trees on those banks. Simultaneously they create woody debris in the river/brook.

Fish (impressions of Gerard Manshanden)

- Peipsi: < 100 kg/ha fish total biomass
- The lake has been fished empty; Fish has gone to lake Phikva, because of the higher nutrient availability. The fish still spawn on the Estonian side of lake Peipsi.
- Fish stock decreased because of the fast decrease of nutrient availability and because of the high fishing activity.

- Vortsjärv: more eutrophic; more than 150 kg/ha total biomass; Hardly any fisheries
- The areas were the fish spawn need to be connected to the river for at least 1 or 2 months; that period is needed for the young fish to reach a certain length to be able to swim away actively
- Smelt and Bream are decreasing rapidly the last few years.

Birds

- Spotted crane; mainly in rough growth
- Black tern colony; also in small spots
- Hot spots Great reed warbler can be small
- Eagles prefer combination of both types of land use; nature and agriculture
- Great snipes: like gradients on mineral soil (earth worms); optimal area has about 10% forest/bush; no problems with disturbance by traffic

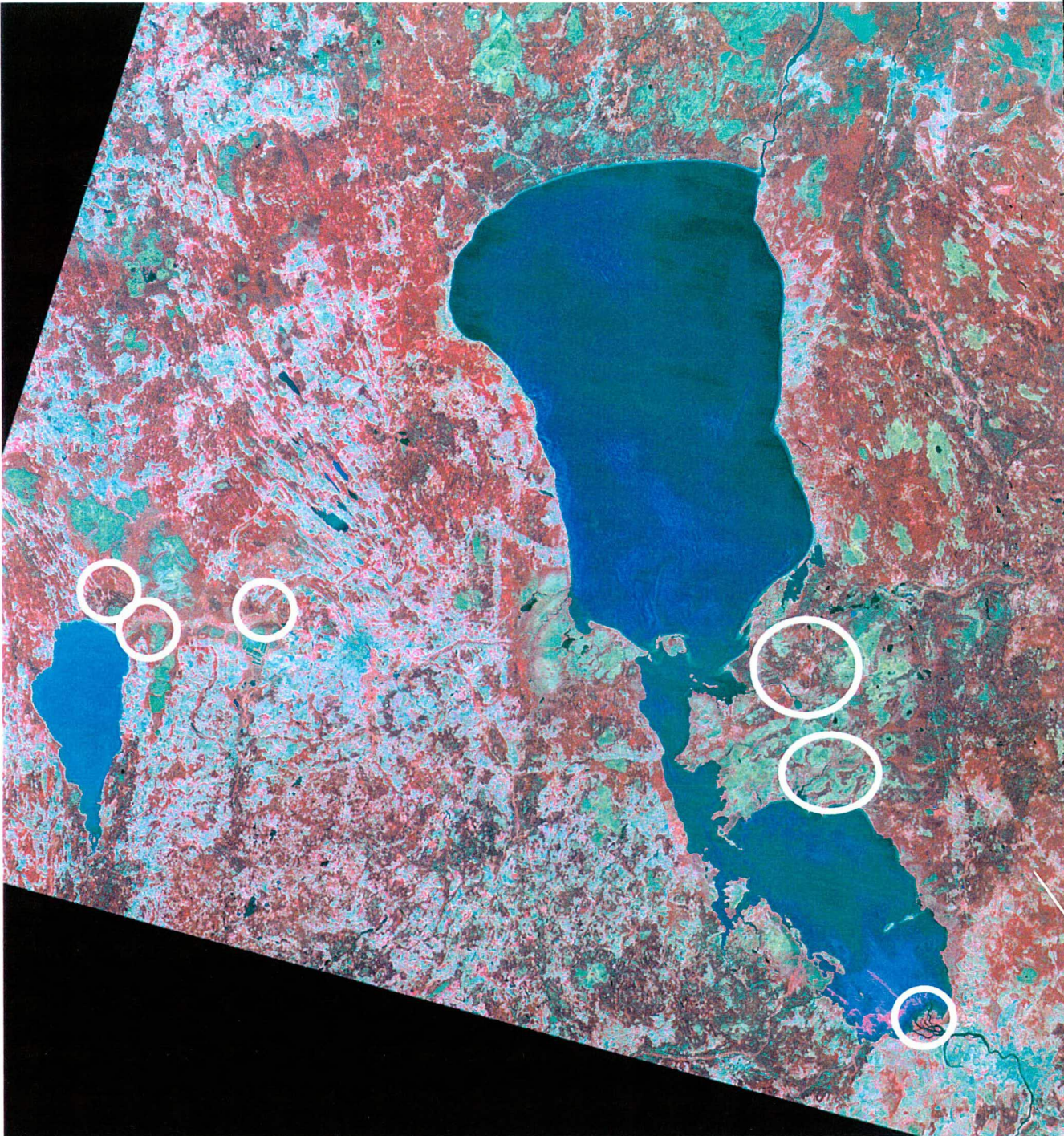
Ideas brooks near the lake Veluwemeer

- Create inundation zones
- Create partly, periodically, connected water bodies
- Create an island in the brook; layer of sand, layer of branches from trees, layer of sand, etc.
- Create a wet zone
- Lowering of the immediate banks of the brook (zone of 3 meters on both sides). This creates an inundation zone
- Retention of water in a inundation area which is connected to the brook through a narrow opening (which can be regulated)



Recreation is growing in the area (especially on the Estonia side)

Appendix A. Satellite image



Satellite image (Landsat) August 1996. False colour image: red means more biomass
White circles: field plots during Brooks mission

Appendix B. Coordinates (UTM 35) of sample plots

	X	Y	F. north	F. east	F. south	F. west
A1	447400	6481369	1025	1026	1027	1028
A2	447582	6481476	1029	1030	1031	1032
A3	447570	6481237	1033	1034	1035	1036
A4	447960	6480851	1039	1040	1041	1042
A5	448469	6478639	1043	1044	1045	1046
A6	449136	6478964	1045	1046	1047	1048
A7	449542	6471988	1051	1052	1053	1054
A8	452669	6474277	1056	1057	1058	1059
B1	472982	6477794	1061	1062	1063	1064
B2	472843	6477980	1065	1066	1067	1068
B3	471729	6476112	1069	1070	1071	1072
B4	471640	6476204	1073	1074	1075	1076
B5	469585	6475098	1077	1078	1079	1080
B6	472045	6478228	1082	1083	1084	1085
C1	567450	6415943	1093	1094	1095	1096
C2	566712	6416627	1102	1103	1104	1105
C3	566464	6416821	1106	1107	1108	1109
C4	565182	6416417	1110	1111	1112	1113
C5	564946	6415906	1140	1141	1142	1143
C6	564587	6415671	1144	1145	1146	1147
C7	564225	6415477	1148	1149	1150	1151
C8	563737	6414592	1136	1137	1138	1139
C9	563990	6414144	1130	1131	1132	1134
C10	564897	6413517	1122	1123	1124	1125
C11	564970	6412917	1126	1127	1128	1129
C12	566130	6413854	1118	1119	1120	1121
C13	565605	6415062	1152	1153	1154	1155
C14	565280	6415667	1156	1157	1158	1159
C15	566721	6414532	1114	1115	1116	1117
D1	557263	6457104	1166	1167	1168	1169
D2	556228	6456783	1170	1171	1172	1173
D3	555187	6456518	1174	1175	1176	1177
D5	552976	6454792	1178	1179	1180	1181
D6	547635	6451654	1182	1183	1184	1185
D7	546888	6449973	1216	1217	1218	1219
D8	548116	6450013	1186	1187	1188	1189
D9	549706	6451104	1192	1193	1194	1195
D10	551104	6452197	1196	1197	1198	1199
D11	551804	6452184	1200	1201	1202	1203
D12	551887	6453494	1204	1205	1206	1207
D13	553099	6454013	1212	1213	1214	1215
E1	537119	6461571	1223	1224	1225	1226
E2	542558	6464287	1227	1228	1229	1230
E3	542272	6464375	1231	1232	1233	1234
E4	545781	6463746	1235	1236	1237	1238
E5	545574	6464789	1239	1240	1241	1242
E6	545259	6465227	1243	1244	1245	1246
E7	550205	6469360	1247	1248	1249	1250
E8	550694	6470083	1251	1252	1253	1254

Appendix C. Flora Brooks mission Estonia and Russia; 20-27 June 2005

Estonia: Emajõgi and Alam pedja

Scientific name	Dutch name	A1	A2	A3	A4	A5	A6	A7	A8	B1	B2	B3	B4	B5	B6
<i>Acorus calamus</i>	Kalmoes														
<i>Agrostemma githago</i>	Bolderik					+									
<i>Agrostis stolonifera</i>	Fioringras														
<i>Alopecurus pratensis</i>	Grote vossenstaart														
<i>Anthriscus sylvestris</i>	Fluitekruid	5	2	10	40	+									
<i>Berula</i> sp.	Watereppe														
<i>Betula pubescens</i>	Zachte berk														+
<i>Butomus umbellatus</i>	Zwanebloem						+								
<i>Caltha palustris</i>	Dotterbloem	+					+				+			+	
<i>Calystegia sepium</i>	Haagwinde										+				
<i>Campanula</i> sp.	Klokje	+										+			
<i>Carex</i> sp.	Zeggen	5								95		0	60	90	
<i>Ceratophyllum demersum</i>	Gedoornd hoornblad														
<i>Chamerion angustifolium</i>	Wilgenroosje														+
<i>Dactylis glomerata</i>	Kropaar											+			
<i>Elodea nuttallii</i>	Kleine waterpest														
<i>Equisetum arvense</i>	Heermoes														
<i>Equisetum</i> sp.	Paardestaart														
<i>Eriophorum angustifolium</i>	Veenpluis														
<i>Eriophorum</i> sp.	Wollegras	+													1
<i>Eupatorium purpureum</i>	Koninginnekruid													+	
<i>Filipendula ulmaria</i>	Moerasspirea	3		5	5	+		+		+				+	
<i>Fraxinus excelsior</i>	Els														
<i>Galium</i> sp.	'Witte' walstro	+													+
<i>Geum urbanum</i>	Nagelkruid	+				+									
<i>Glyceria maxima</i>	Liesgras														
<i>Hottonia palustris</i>	Waterviolier														
<i>Hydrocharis morsus-ranae</i>	Kikkerbeet														
<i>Iris pseudacorus</i>	Gele lis										+				
<i>Juncus</i> sp.	Rus														
<i>Lathyrus</i> sp.	Lathyrus														
<i>Lemna minor</i>	Klein kroos														
<i>Lemna trisulca</i>	Puntkroos														
<i>Lychnis flos-cuculi</i>	Echte koekoeksbloem	+		3		+		+			+		10	+	
<i>Lysimachia vulgaris</i>	Grote wederik														
<i>Menyanthes trifoliata</i>	Waterdrieblad														+
<i>Myosotis palustris</i>	Moerasvergeetmenietje				5					+	+				
<i>Myriophyllum spicatum</i>	Aarvederkruid														
<i>Nuphar lutea</i>	Gele plomp						+								
<i>Nymphaea alba</i>	Witte waterlelie														
Orchid	Orchidee (paars)	+													+
<i>Pedicularis palustris</i>	Moeraskartelblad														+
<i>Phalaris arundinaceae</i>	Rietgras							+							
<i>Phragmites australis</i>	Riet						+	90	100		70				
<i>Picea</i> sp.	Spar														+
<i>Plantago media</i>	Ruige weegbree												+		
<i>Poa</i>	Gras	90	90	90		+	+					100	15	3	
<i>Polygonum amphibium</i>	Veenwortel														
<i>Potamogeton lucens</i>	Glanzig fonteinkruid														
<i>Potamogeton natans</i>	Drijvend fonteinkruid						+								

Potamogeton nodosus	Rivierfonteinkruid																	
Potamogeton perfoliatus	Doorgroeid fonteinkruid																	+
Potamogeton sp.	Fonteinkruid																	
Potentilla palustris	Wateraardbei																	+
Potentilla sp.	Ganzerik																	+
Ranunculus sp.	Boterbloem	10	2															+
Rorippa amphibia	Gele waterkers																	
Rubus sp.	Braam																	+
Rumex sp.	Zuring	+																+
Sagittaria sagittifolia	Pijlkruid																	
Salix alba	Schietwilg																	30
Salix sp.	Wilg																	+
Scirpus sp.	Bies																	
Sorbus aucuparia	Lijsterbes																	+
Spirodela polyrhiza	Veelwortelig kroos																	
Stratiotes aloides	Krabbescheer																	
Symphytum officinale	Smeerwortel																	+
Trifolium sp.	Klaver	10																+
Typha angustifolia	Kleine lisdodde																	
Urtica dioica	Brandnetel																	+
Valeriana sp.	Valeriaan																	+
Veronica sp.	Ereprijs																	

Velikaya delta (C)

Scientific name	Dutch name	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	
<i>Acorus calamus</i>	Kalmoes																
<i>Agrostemma githago</i>	Bolderik																
<i>Agrostis stolonifera</i>	Fioringras																
<i>Alopecurus pratensis</i>	Grote vossenstaart																
<i>Anthriscus sylvestris</i>	Fluitekruid																
<i>Berula sp.</i>	Watereppe																
<i>Betula pubescens</i>	Zachte berk																
<i>Butomus umbellatus</i>	Zwanebloem					20											
<i>Caltha palustris</i>	Dotterbloem																
<i>Calystegia sepium</i>	Haagwinde																
<i>Campanula sp.</i>	Klokje																
<i>Carex sp.</i>	Zeggen								+				+			+	
<i>Ceratophyllum demersum</i>	Gedoornd hoornblad	+										+					
<i>Chamerion angustifolium</i>	Wilgenroosje																
<i>Dactylis glomerata</i>	Kropaar																
<i>Elodea nuttallii</i>	Kleine waterpest																
<i>Equisetum arvense</i>	Heermoes																
<i>Equisetum sp.</i>	Paardestaart				+										+		
<i>Eriophorum angustifolium</i>	Veenpluis																
<i>Eriophorum sp.</i>	Wollegras																
<i>Eupatorium purpureum</i>	Koninginnekruid																
<i>Filipendula ulmaria</i>	Moerasspirea																
<i>Fraxinus excelsior</i>	Els																
<i>Galium sp.</i>	'Witte' walstro																
<i>Geum urbanum</i>	Nagelkruid																
<i>Glyceria maxima</i>	Liesgras																
<i>Hottonia palustris</i>	Waterviolier																
<i>Hydrocharis morsus-ranae</i>	Kikkerbeet																+
<i>Iris pseudacorus</i>	Gele lis																

<i>Caltha palustris</i>	Dotterbloem	+					+			+				+					
<i>Calystegia sepium</i>	Haagwinde																		
<i>Campanula</i> sp.	Klokje																		
<i>Carex</i> sp.	Zeggen	40	80	60	60	60	100	80	90	90	70	90	100	+	60	+	100	+	+
<i>Ceratophyllum demersum</i>	Gedoornd hoornblad																		
<i>Chamerion angustifolium</i>	Wilgenroosje																		
<i>Dactylis glomerata</i>	Kropaar																		
<i>Elodea nuttallii</i>	Kleine waterpest														+				
<i>Equisetum arvense</i>	Heermoes																	+	
<i>Equisetum</i> sp.	Paardestaart	+		+															
<i>Eriophorum angustifolium</i>	Veenpluis			+															
<i>Eriophorum</i> sp.	Wollegras							+											
<i>Eupatorium purpureum</i>	Koninginnekruid																		
<i>Filipendula ulmaria</i>	Moerasspirea																		
<i>Fraxinus excelsior</i>	Els																	+	
<i>Galium</i> sp.	'Witte' walstro			+															
<i>Geum urbanum</i>	Nagelkruid																		
<i>Glyceria maxima</i>	Liesgras	+														+		+	
<i>Hottonia palustris</i>	Waterviolier	+																	
<i>Hydrocharis morsus-ranae</i>	Kikkerbeet				+											+	+		
<i>Iris pseudacorus</i>	Gele lis		+	+		+		+				+							
<i>Juncus</i> sp.	Rus				+														
<i>Lathyrus</i> sp.	Lathyrus																	+	
<i>Lemna minor</i>	Klein kroos	+															+		
<i>Lemna trisulca</i>	Puntkroos												+						
<i>Lychnis flos-cuculi</i>	Echte koekoeksbloem	+																	
<i>Lysimachia vulgaris</i>	Grote wederik			+															
<i>Menyanthes trifoliata</i>	Waterdrieblad		+	+															
<i>Myosotis palustris</i>	Moerasvergeetmenietje															+			
<i>Myriophyllum spicatum</i>	Aarvederkruid								+										
<i>Nuphar lutea</i>	Gele plomp			+	+								+					+	+
<i>Nymphaea alba</i>	Witte waterlelie								+			+						+	
Orchid	Orchidee (paars)	+																	
<i>Pedicularis palustris</i>	Moeraskartelblad																		
<i>Phalaris arundinaceae</i>	Rietgras															+	+		
<i>Phragmites australis</i>	Riet	+				+			+	30			+	+	30			+	+
<i>Picea</i> sp.	Spar																		
<i>Plantago media</i>	Ruige weegbree																		
<i>Poa</i>	Gras		10		20	10	10	10		10		+	3		+		5	80	
<i>Polygonum amphibium</i>	Veenwortel																		
<i>Potamogeton lucens</i>	Glanzig fonteinkruid								+										
<i>Potamogeton natans</i>	Drijvend fonteinkruid			+	+	+			+				+			+		+	
<i>Potamogeton nodosus</i>	Rivierfonteinkruid								+										
<i>Potamogeton perfoliatus</i>	Doorgroeid fonteinkruid													+					
<i>Potamogeton</i> sp.	Fonteinkruid				+							+	+						
<i>Potentilla palustris</i>	Wateraardbei	+	5								+								
<i>Potentilla</i> sp.	Ganzerik																		
<i>Ranunculus</i> sp.	Boterbloem																	+	
<i>Rorippa amphibia</i>	Gele waterkers															+			
<i>Rubus</i> sp.	Braam																	+	
<i>Rumex</i> sp.	Zuring																	+	
<i>Sagittaria sagittifolia</i>	Pijlkruid																		
<i>Salix alba</i>	Schietwilg																		
<i>Salix</i> sp.	Wilg	+		30	5			10				10	+			+		+	

Scirpus sp.	Bies							+			+	
Sorbus aucuparia	Lijsterbes											
Spirodela polyrhiza	Veelwortelig kroos											
Stratiotes aloides	Krabbescheer	+						+	+		+	+
Symphytum officinale	Smeerwortel						+					
Trifolium sp.	Klaver											
Typha angustifolia	Kleine lisdodde	+		10								
Urtica dioica	Brandnetel											
Valeriana sp.	Valeriaan											
Veronica sp.	Ereprijs											+

Appendix D. Bird counts Brooks mission Russia; 23-25 June 2005

Bird counts June C=23-6, D=24-6 and E=25-6 2005 brook Mission Russian site Roel Doef and Vladimir Borisov

Velikaya delta (C)

Dutch name	Latin name	English name	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15
Boerenwaluw	<i>Hirundo rustica</i>	Barn swallow															
Zwarte stern	<i>Chlidonias niger</i>	Black tern	3	4	10	10	20	10		5	1	10	20	1		2	2
Zwarte specht	<i>Dryocopus martius</i>	Black woodpecker															
Ekster	<i>Pica pica</i>	Black-billed magpie															
Kokmeeuw	<i>Larus ridibundus</i>	Black-headed Gull	2	1						1	1	7	35			1	175
Vink	<i>Fringilla coelebs</i>	Chaffinch			1												
Merel	<i>Turdus merula</i>	Common blackbird															
Tjif-tjaf	<i>Phylloscopus collybita</i>	Common chiffchaff															
Kraanvogel	<i>Grus grus</i>	Common crane															
Koekoek	<i>Cuculus canorus</i>	Common cuckoo															
Brielduiker	<i>Bucephala clangula</i>	Common goldeneye					1										
Roodmus	<i>Carpodacus erythrinus</i>	Common rosefinch												1			
Watersnip	<i>Gallinago gallinago</i>	Common snipe															
Spreeuw	<i>Sturnus vulgaris</i>	Common starling				40	30	3									
Grasmus	<i>Sylvia communis</i>	Common whitethroat															
Kwartelkoning	<i>Crex crex</i>	Corn crake															
Bastaardarend?		Eagle															1
Meerkoet	<i>Fulica atra</i>	Eurasian coot	1	1	1			1	2	1							1
Wielewaal	<i>Oriolus oriolus</i>	Eurasian golden oriole															
Bruine kiekendief	<i>Circus aeruginosus</i>	Eurasian marsh harrier	1				1				1	1					
Zilvermeeuw	<i>Larus argentatus</i>	European herring gull												1			
Tuinfluter	<i>Sylvia borin</i>	Gardin warbler															
Roerdomp	<i>Botaurus stellaris</i>	Great bittern	1				1	1	1	1	1	2		1	1		
Fuut	<i>Podiceps cristatus</i>	Great crested grebe													1		
Grote karakiet	<i>Acrocephalus arundinaceus</i>	Great reed warbler	1	4	4	5	2	3			3	2	1		2	2	2
Koolmees	<i>Parus major</i>	Great tit															
Blauwe reiger	<i>Area cinerea</i>	Grey heron		2	1	3		1	1	3	1						
Bonte kraai	<i>Corvus corone cornix</i>	Hooded crow	2							3	3						
Huiswaluw	<i>Delichon urbica</i>	House martin															
Spotvogel	<i>Hippolais icterina</i>	Icterine warbler															
Kievit	<i>Vanellus vanellus</i>	Lapwing															
Dwergmeeuw	<i>Larus minutus</i>	Little gull															
Wilde eend	<i>Anas platyrhynchos</i>	Mallard			3						1			6			
Stormmeeuw	<i>Larus canus</i>	Mew gull															
Visarend	<i>Pandion haliaetus</i>	Osprey	1														
Rietgors	<i>Emberiza schoeniclus</i>	Reed bunting							1	1				1	2		
Kleine karakiet	<i>Acrocephalus scirpaceus</i>	Reed warbler															1
Oeverwaluw	<i>Riparia riparia</i>	Sand martin															
Veldleeuwerik	<i>Alauda arvensis</i>	Skylark	1														
Porseleinhoen	<i>Porzana porzana</i>	Spotted crane															
Witte kwikstaart	<i>Motacilla alba</i>	White wagtail															
Zeearend	<i>Haliaeetus albicilla</i>	White-tailed eagle															
Fitus	<i>Phylloscopus trochilus</i>	Willow warbler															1

between c12 and c10 6 Mallard, 1 Great crested grebe and 2 Grey heron

between c9 and c8 colony Black tern 60, Little gull 1, Great reed warbler 1 and Great bittern x0564551, y6413964

Chornaya (D) and Zhelcha (E)

Dutch name	Latin name	English name	D1	D2	D3	D5	D6	D7	D8	D9	D10	D11	D12	D13	E1	E2	E3	E4	E5	E6	E7	E8	Total	
Boerenzwaluw	<i>Hirundo rustica</i>	Barn swallow				1	5								10	1		6	2			3	28	
Zwarte stern	<i>Chlidonias niger</i>	Black tern					1	3			20		20	5	2	2					6	20	177	
Zwarte specht	<i>Dryocopus martius</i>	Black woodpecker	1																				1	
Ekster	<i>Pica pica</i>	Black-billed magpie														1			2				3	
Kokmeeuw	<i>Larus ridibundus</i>	Black-headed Gull							10						5								238	
Vink	<i>Fringilla coelebs</i>	Chaffinch		1		1										1					1		5	
Merel	<i>Turdus merula</i>	Common blackbird																				1	1	
Tjif-tjaf	<i>Phylloscopus collybita</i>	Common chiffchaff	1																				1	
Kraanvogel	<i>Grus grus</i>	Common crane												3									3	
Koekoek	<i>Cuculus canorus</i>	Common cuckoo														1					1		2	
Brielduiker	<i>Bucephala clangula</i>	Common goldeneye								2													3	
Roodmus	<i>Carpodacus erythrinus</i>	Common rosefinch																					1	
Watersnip	<i>Gallinago gallinago</i>	Common snipe										1											1	
Spreeuw	<i>Sturnus vulgaris</i>	Common starling												30									103	
Grasmus	<i>Sylvia communis</i>	Common whitethroat																	2				2	
Kwartelkoning	<i>Crex crex</i>	Corn crake																			1		1	
Bastaardarend?		Eagle																					1	
Meerkoet	<i>Fulica atra</i>	Eurasian coot																8					16	
Wielewaal	<i>Oriolus oriolus</i>	Eurasian golden oriole																				1	1	
Bruine kiekendief	<i>Circus aeruginosus</i>	Eurasian marsh harrier												1								1	6	
Zilvermeeuw	<i>Larus argentatus</i>	European herring gull							12														17	
Tuinfluitier	<i>Sylvia borin</i>	Gardin warbler	1	1		1									1		1		1				6	
Roerdomp	<i>Botaurus stellaris</i>	Great bittern								1													11	
Fuut	<i>Podiceps cristatus</i>	Great crested grebe														1							2	
Grote karakiet	<i>Acrocephalus arundinaceus</i>	Great reed warbler						1			1		2			1	1					1	2	40
Koolmees	<i>Parus major</i>	Great tit					1																1	
Blauwe reiger	<i>Area cinerea</i>	Grey heron					2		1														15	
Bonte kraai	<i>Corvus corone comix</i>	Hooded crow						1					2					1					12	
Huiszwaluw	<i>Delichon urbica</i>	House martin																10				6	1	17
Spotvogel	<i>Hippolais icterina</i>	Icterine warbler															1						1	
Kievit	<i>Vanellus vanellus</i>	Lapwing											1										1	
Dwergmeeuw	<i>Larus minutus</i>	Little gull						2	10														12	
Wilde eend	<i>Anas platyrhynchos</i>	Mallard																				2	12	
Stormmeeuw	<i>Larus canus</i>	Mew gull						1		2					1		1						5	
Visarend	<i>Pandion haliaetus</i>	Osprey																					1	
Rietgors	<i>Emberiza schoeniclus</i>	Reed bunting	1					1	1			1					1				1	1	12	
Kleine karakiet	<i>Acrocephalus scirpaceus</i>	Reed warbler					1											1					3	
Oeverzwaluw	<i>Riparia riparia</i>	Sand martin													15								15	
Veldleeuwerik	<i>Alauda arvensis</i>	Skylark																					1	
Porseleinhoen	<i>Porzana porzana</i>	Spotted crane	1			1						1											3	
Witte kwikstaart	<i>Motacilla alba</i>	White wagtail													1			2			1		4	
Zeearend	<i>Haliaeetus albicilla</i>	White-tailed eagle							1			1				1							3	
Fitus	<i>Phylloscopus trochilus</i>	Willow warbler				1	1		1								1				4	1	10	

between D1 and D2 Coocook and Willow warbler

between D10 and D11 3 Black-tailed Godwit and 3 Mallard

Appendix E. Report of Gerard Manshanden on fish and fisheries in Lake Peipsi

(in dutch)

Op bezoek geweest bij vissers tussen Varnja en Mustvee aan het Peipsi meer.

Het water was helder ongeveer een meter doorzicht met een klein beetje blauwalg.

De visser die ik daar over sprak was blij met de blauwalg, want als er veel blauwalg was, was er ook veel vis. Nu was er in de hele omgeving niks.

Over het algemeen wordt er met verouderd materiaal gevestigd, het vangstpercentage zal dus ook lang niet zo hoog zijn per vangtuig als op het IJsselmeer.

Een veel toegepaste manier van vissen is een manier die veel lijkt op het Deense snurrevissen op de Noordzee. De vis wordt met vele honderden meters los netwerk wat in een grote cirkel over de bodem wordt uitgevierd en vervolgens door middel van lieren over 2 kanten weer wordt ingehaald. Aan het eind een soort zegen met een fuikconstructie waar de vis in wordt gedreven, zo heb ik het begrepen van de visser.

De vissoorten waarop wordt gevestigd zijn brasem, snoekbaars, blankvoorn, baars, spiering en snoek.

Net als in het IJsselmeer is volgens de vissers (meest Russen) de spieringstand ingestort.

Ook de brasem is kleiner (max. 2-3 kg) dan vroeger (tot 6 kg). Ook is het bestand de laatste jaren volgens een visser fors afgenomen.

Volgens de vissers is de vis naar de andere kant van het meer getrokken, wat goed zou kunnen omdat die kant waarschijnlijk veel nutriëntenrijker is.

Ook de snoekbaarsvangsten lopen terug, ook omdat die massaal volgens de vissers de rivier op trekken en dan door de hengelsporters worden gevestigd.

Het zou dus kunnen dat de rivieren nu ze weer schoner zijn meer prooivis bevatten vooral door nalevering en dus voor de snoekbaars aantrekkelijk zijn.

In het voorjaar komt de brasem massaal terug om te paaien, maar er mag dan niet op worden gevestigd. Ik heb wel begrepen dat er tussen de Esten en Russen een overeenkomst bestaat over de hoeveelheid te vangen vis.

Toch lijkt het er op dat er overbevestiging is (doorzicht > 1mtr. en een visstand waarschijnlijk <100 kg/ha).

Spiering en blankvoorn worden wel in de paaitijd gevestigd met fuiken.

Vissoorten die werden herkend waren brasem, snoek, snoekbaars, aal, ruis, blankvoorn, spiering, winde, kwabaal, rivierdonderpad, pos, kolblei, baars en meerval.

De visserij richt zich vooral op snoekbaars, snoek, brasem, baars en blankvoorn.

Aal wordt er bijna niet gevestigd, afgelopen jaar had een visser er drie, waarschijnlijk migranten uit Vortsjärv waar ze in het verleden als glasaal zijn uitgezet.

Een van de vissers vertelde dat de afgelopen winter daar alle aal was dood gegaan.

Kwabaal wordt op het meer ook heel weinig gevestigd.

In vergelijking met Vortsjärv is Peipsi volgens mij nutriëntenarmer en ook vis armer. Het verschil in de visserij-inspanning op beide meren zou een oorzaak kunnen zijn.

