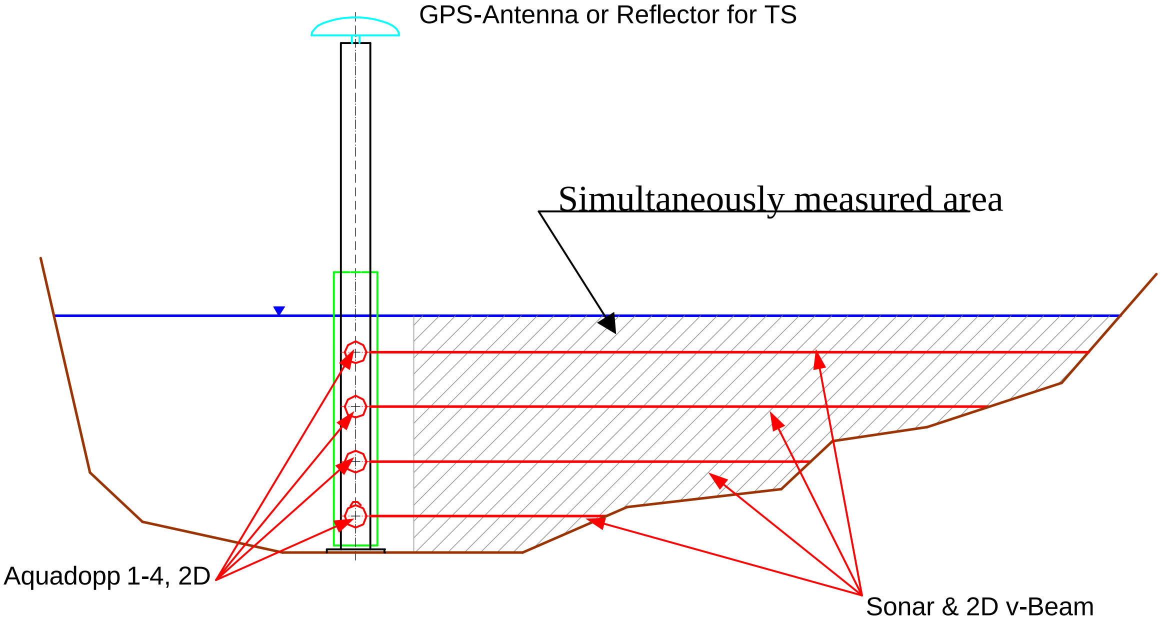
WG1a "Raw Data" Sub-group

"Physical Habitat and Instrumentation"



- Electromagnetic Current Meters (1 D, 2 D, 3 D) – laboratory & field use
- Single-point Doppler current meter (2 D, 3 D) – laboratory & field use
- Acoustic Doppler Current Profilers (2 D, 3 D) – laboratory & field use
- Ultrasonic Current Meters
- Laser Doppler Current Meters (3 D) – laboratory use only

I&M for further use (definition)

	Instrumentation	Resolution	Handling	Costs	Result
Velocity	Propeller	- -	+ +	+ +	+ -
	Electromagnetic Current Meters	+ +	+	-	+
	Single Point Acoustic Doppler Current Meter	+	+	-	+ -
	Acoustic Doppler Current Profiler	+ +	+ +	-	+
	Ultrasonic Current Meters	+	+ -	- -	+ -
	Laser Doppler Current Meters	+ +	- -	- -	-
Shear Stress	FST	- -	+ +	+ +	+ -
	Calculation from Current	+	+	+ +	+
Water Depth	Deepstick	+	+ +	+ +	+ +
	Echo Sounding Units	+ +	+	- -	+ -
	Pressure Transducers	-	+ +	+ +	+
Discharge	Dilution Gauging	+	+ +	+ +	+ +
	Velocity Area Integration Method	+	+ +	+	+
	Measuring Weirs	+	-	+	+ -
Morphology	Tape/Deepstick	- -	+	+ +	+
	TS	+	+	+ -	+
	GPS/DGPS	+ -	+ -	-	+ -
	DGPS/Echo Sounder	+	+ +	- -	+
Substrate	Sieving Tower	+ +	+ -	+ -	+ -
	Line Counting Method	+	+ +	+ +	+ +
	Morphology Mapping	-	+ +	+ +	+
	Visualy Estimating	+ -	+ +	+ +	+
	Freece Core	+ +	-	- -	-
Suspended Load	IWHW Suspended Load Sampler	+	+ +	+ +	+ +
	Laser Optic Sensors	+ +	+ +	- -	+
	Turbidity Sensors	- -	-	+	-
	Suspended Load Sampler	+ +	+	-	+
Bed Load	IWHW Helley Smith Sampler	+	+	+ +	+ +
	Helley Smith Bed Load Sampler BfG Koblenz	+	+	?	+

WG1b “Raw Data” subgroup

Data collection concerning macrobenthos

CONTENTS

3.2. Identification costs

4. RELATIONS BETWEEN PHYSICAL AND BIOLOGICAL COMPONENTS

5. QUALITY ASSURANCE AND QUALITY CONTROL (QA/QC)

5.1 Training and accreditation

5.2. Data base set-up and maintenance

6. 1.1.1. CONCLUSIONS

7. 1.1.2. REFERENCES

8. 1.1.3. APPENDIX

8.1 Identification literature

8.2 European projects

8.3 Information and databases

8.4 Results of the COST 626 questionnaire on macroinvertebrates

8.4.1 Aim of the questionaire

8.4.2 Feedback classified per member state

8.4.3 Question 1: Objectives of the macrobenthos data collection

WG1c “Raw Data” subgroup

Fish data collection

1. **Fish data sampling**
    - **Microhabitat modelling**
    - **Mesohabitat modelling**
2. **Single species/life stage versus community modelling**
3. **Habitat supply based fish population modelling**
4. **Experimental channels**
5. **Measurement of physical habitat from a fish perspective**
    - **Microhabitat modelling including bioenergetic models**
    - **Mesohabitat modelling**
6. **Questionnaire results**

Data of 28 questionnaires were analysed covering the following topics:

- Fish sampling methods
- Characteristics of river types and study sites
- Investigated species and life stages
- Fish sampling design
- Parameters defined at fish sites
- Habitat availability sampling design
- Parameters defined at availability sites.

Table 1. Summary of methods used for collection of fish habitat use data for riverine habitat criteria development.

Method	Scale of fish positioning	River type, where generally used	Temporal scale	Species used for	Common practise	Main advantages	Main limitations	Mainly European reference examples
2. Direct								
Snorkeling Scuba	Micro/meso	Small and mid-sized clear water streams	Day and night; All seasons	Most of lotic fish species and their life stages	Observer moves along a predetermined path and looks for fish and marks their position with anchor and float	Most suitable for solitary, territorial fish; precise data on micro-scale holding position;	Not effective in deep water, fast flowing water, turbulent or turbid water, vegetated areas, icy winter conditions; observer bias	Gardiner 1984 Heggenes & Saltveit 1990 Heggenes et al. 1990 Greenberg et al. 1994 Bremset 1999 Mallet et al. 2000
Visually from above water	Micro	Small and mid-sized clear water streams	Day and night; Ice-free period	Salmonids, Cyprinids, hiding species excluded	Observer looks for fish from the river bank or elevated vantage points, or wades in the stream	Simple	Not effective in deep water, fast flowing water, turbulent or turbid water, vegetated areas; determining species may be difficult; fright bias; observer bias	Heggenes et al. 1990 Sempeski & Gaudin 1995 Garner et al. 1998

Viewing box	Micro	Small and mid-sized clear water streams	Day and night All seasons (under ice with special applications)	Salmonids, cyprinids	Observer wades in the stream or in winter use holes in icecover to look periscopicly under ice	Simple	Not effective in deep water, fast flowing water, turbulent or turbid water, vegetated areas; determining species may be difficult: observer bias	Leif Lillehammer, pers.comm.. (Norway) Olle Calles, pers.comm. (Sweden)
Video camera	Micro/meso	Up to large rivers	Day and night; All seasons	Most of lotic fish species and their life stages	Stationary or hand held by observer or moved with the aid of boat or ropes etc. Observations can be recorded on tape.	Most suitable for detailed observations (e.g. behaviour); can sample habitat inaccessible to other methods; can add time dimension to fish habitat use	Camera positioning problems; when stationary relies on fish moving into viewing range; not effective in poor visibility.	Vehanen et al. 2000
3. Indirect								
Electrofishing: Backback ‘shockers’ Shore based units Electofishing boats Pre-positioned units	Micro/meso	Up to large rivers (several applications for different stream sizes)	Day and night; Ice-free period	Most of lotic fish species and their life stages	Team wades in stream and operator moves anode pole in a sweeping mode or use fixed position placement …stunned fish are located.	Most suitable for many conditions; wide variety of techniques and applications;	Electrotaxis biases observing true fish location; fright bias problems; species specific catchability; less efficient in low conductivity, deep, turbulent and turbid waters.	Bain et al. 1985 Heggenes et al. 1990 Copp & Garner 1995 Capra 1995 Baras et al.1995 Baran et al. 1997 Mäki-Petäys et al. 1999

								Thevenet & Statzner 1999

Table 1 continued

Method	Scale of fish positioning	River type, where generally used	Temporal scale	Species and life stages used for	Common practise	Main advantages	Main limitations	Mainly European reference examples
Radiotelemetry Acoustic telemetry	Micro/meso	Up to large rivers	Day and night; All seasons	Most of lotic fish species	Radio transmitters are attached to fish, which are re-released into study area. Later fish are tracked with receivers and antennae	Usable when other methods are unsuited (poor visibility, high flows, turbulence, icy conditions etc); repeated observations on same individual fish provides time dimensions to habitat use;	Possible negative effects of transmitter attachment and antennae on fish; observer bias for precise location; present transmitter sizes rules out small fish from studies.	Matthews 1996 Clough et al. 1998 Baras & Philippart 1996 Ovidio et al. 2000 Nykänen et al. 2001
PIT-tagging	Micro/meso	Small and mid sized streams	Day and night; All seasons	Most of lotic fish species	PIT-tags are attached to fish, which are re-released into study area. Later fish are tracked with antennae and receivers	PIT-tags are smaller than radio transmitters … better suitability for young fish; no battery restrictions; usable when other methods are unsuited (poor	Possible negative effects of tag attachment on fish; requires small distance between tagged fish and antenna to get a signal;	Greenberg & Giller 2000 Roussel et al. 2000

						visibility, high flows, turbulence, icy conditions etc); repeated observations on same individual fish provides time dimensions to habitat use.		
Echo-sounding	Micro/meso	From deep small streams to large rivers	Day and night; All seasons	All but bottom dwelling fish	Downward or upward looking or side scanning acoustic beams to identify targets, either from fixed station or from boat etc.	Best applicable to large rivers; useful for total fish density etc. at coarse level assessments.	Difficult to discern species from acoustic data; not usable in shallow water;	Rakowitz & Zweimuller 2000
Seines, traps, drop nets etc gears Explosives	Meso	Up to large rivers	Day and night; All seasons	Most of lotic fish species, difficulties with bottom dwelling fish	Fish are caught by placing passive gear into different habitat types or carrying out e.g. seining	Useful for fish density (or catch-per-unit-effort) etc. at coarse level assessments; complementary data for other methods (e.g. echo-sounding)	Not for microhabitat studies; catchability varies by gears, habitats and fish species; when stationary relies on fish moving into the gear	Casselman et al. 1990 Vadas 1992 Bremset & Berg 1997 Bischoff & Freyhof 1999