According to the EU WFD, there is a need to develop methodological instructions to fulfill the harmonised sampling and surveying processes of all EU countries. Among the biological characteristics of the EU WFD, results of the ETS-test will be used since they can be connected to the NTPI qualifying system.
Periphyton has been defined as assemblages of organisms on solid substrates in the water column. Aquatic plants and their periphyton in shallow lakes offer an ideal biological monitor to track environmental state and water quality since sampling is relatively easy and the plants reliably prognosticate rapid changes. The composition and stand structure of aquatic plants have a primary role in determining the state of a given habitat, and the taxonomically diverse periphytic algae, through their short life cycle and extensive occurrence, allow comparisons among larger sets of habitats. Periphyton of aquatic plants can be analysed by taxonomic composition and related aspects as well as non-taxonomic attributes. Non-taxonomic analyses like ash-free dry weight (AFDW) or chlorophyll-a concentration are suitable for detecting effects indiscernible by taxonomic analysis. The ETS-test is widely applied to measure the metabolic, enzymatic processes of aquatic organisms, while oxygen consumption rates can be calculated from a predetermined conversion factor. The occurrence of any material inducing or inhibiting the cytochrome system can be detected by the ETS-test. The investigations involved the ETS- (Electron Transport System) activity of the samples, which indicated the maximal intensity of respiratory metabolism, because the periphyton can be regarded as a cornerstone of assessing the ecological–state of waters and to carry out biomonitoring work in the future.

Ternjej I., A. Plenkoviæ-Moraj, M. Kerovec, M. Gligora, K. Kralj & P. Mustafiæ. *Seasonal changes of plankton in Butoniga reservoir* .

Phytoplankton was investigated seasonally during 1999-2003 in Butoniga reservoir (Average depth, 5m) situated in central Istria, Croatia. Plankton was sampled in the deepest part of the reservoir near the floodgate by filtering 10 L of the lake water through plankton net (25 µm). Simultaneously samples were taken for chemical analysis. Diatoms were the most prominent group, with *Cyclotella* being the most common genus. Accompanying groups were Dinophyta, Euglenophyta, Chlorophyta and Chrysophyta. Cladocerans were the abundant among zooplankton , especially species *Bosmina longirostris,* and copepod nauplii. Cladoceran densities correlated with high abundance of centric diatoms. Most significant correlation was observed during springtime between *Ceriodaphnia* sp. and *Cyclotella* sp. Most copepods occurred during warmer part of the year when also Dinophyta and Chlorophyta were abundant. Multidimensional scaling ordination conducted on abundance data sets for both phyto- and zooplankton revealed similar seasonal grouping.

Ternjej I., A. Popijaè, Z. Mihaljeviæ, A. Previšiæ, K. Žganec & M. Kerovec.
Macrozooplankton and macrozoobenthos communities of four shallow urban lakes.

The macrozoobenthos and macrozooplankton communities of four shallow urban lakes in the centre of Zagreb were investigated from March to December 2003. The lakes are influenced by human activity because they are a part of a big recreational park Maksimir. All lakes share the same drainage area, but three of them are directly connected through the feeding stream Bliznec. Macrozooplankton was collected in each lake, at the deepest point with pulling the plankton net (80 µm) in vertical haul from the bottom to the surface. Abundance and biomass were calculated from these quantitative samples. Quantitative samples of macrozoobenthos were collected at two stations in each lake using an Ekman grab (sampling area 0.01 m^2). Physico-chemical parameters (dissolved oxygen, oxygen saturation, biological oxygen demand, temperature, pH, total dissolved solids, conductivity, nitrate, nitrite, ammonium, orthophosphate, chlorophyll a and transparency) were also measured. Bliznec stream flows through populated village and city area collecting untreated wastewater from the households. That makes Bliznec the main source of organic and inorganic pollution, which influence benthos and plankton community, especially in two shallower lakes (Maximum depth, ca. 2 m). Species *Bosmina longirostris* and some small detritivorous cladocerans dominate macrozooplankton. They are most abundant during summer. Macrozoobenthos is at the same time characterized by large numbers of Tubificidae (70-90% of macroinvertebrate community), especially species *Limnodrilus hoffmeisteri, Potamothrix bavaricus*, and *P. hammoniensis*. The other two lakes are deeper (Maximum depth, ca. 5-7 m). Copepod

Eudiaptomus gracilis and cladoceran *Daphnia longispina* dominate the plankton community. Portion of Tubificidae family in benthos community is reduced (35-50%). Diversity of Naididae family increased from one to six species, and dipteran families Chironomidae and Chaoboridae make a large part of macroinvertebrate community (28-40%). Chemical parameters, especially nitrate and phosphate had high values in two shallower lakes confirming their higher trophic state. These lakes surround the city ZOO, and large flocks of waterfowls are living there and feeding on food thrown by visitors. The other two, deeper lakes, are slightly isolated deeper in the park and surrounded by forest, as an additional source of organic matter.

Trigal C. & C. Fernández-Aláezand. *Influence of environmental factors on the macroinvertebrate community structure in Mediterranean ponds*

A good knowledge about the factors conditioning the distribution of macroinvertebrates is essential in lake bio-assessment, especially after the approval of the European Water Framework Directive. This knowledge should be used not only to assess the ecological quality of sites, but also as an aid in developing a classification system of lakes with biological meaning. Features such as area, habitat characteristics (heterogeneity, macrophyte coverage or composition, etc.), salinity, hydric regime and trophic status have often been deemed to explain the distribution of macroinvertebrates in shallow lakes. In spite of its importance, little is known about the factors responsible for the macroinvertebrate community structure in Mediterranean ponds. This is a serious handicap for the implementation of the WFD in such systems. As a preliminary approach to this issue, twenty-two ponds from the North Iberian Plateau were sampled in summer 2003. They are shallow ponds (max. depth below 2 m.) ranging from 0.2 to 23 ha, with varying macrophyte composition and covering a wide trophic range (total phosphorus from <50 to >1500 μgL^{-1}). Each pond was sampled with a hand net for three to five minutes. This sampling time was shared among the main habitats of the pond proportionally to the surface they occupied. The aim was to analyze the influence of pond surface, habitat characteristics and trophic status on the structure of the macroinvertebrate community. The relative abundance of taxa and the total richness of the pond seemed to be related to macrophyte composition and trophic status

Vuorio, K., A. -M. Ventelä, M.Tarvainen & J.Sarvala. *Does size matter? Effect of lake size on food web structure as deduced from stable carbon and nitrogen isotopes*

Stable carbon and nitrogen isotopes are potentially useful tools in studying food web structure. The approach assumes a stepwise enrichment in heavier isotope from one trophic level to the next, 0-1 ‰ in δ^{13C} and 3-4 ‰ in δ15N. We studied the food web structure in four lakes of different sizes in SW Finland: Pyhäjärvi (15400 ha), Köyliönjärvi (1250 ha), Kirkkojärvi (42 ha), and Kuralanjärvi (13 ha). Stable isotope signatures were determined for the major components of the pelagic food web, and compared with those of sediment and unionid mussels as well as periphyton, submerged plants and helophytes. The data collection period covered 4 to 5 years from 2000 to 2004. In all lakes 13C enrichment between putative trophic levels was higher, and that of 15N enrichment lower, than expected. The food web structure, as indicated by the stable isotopes, was clearly more regular in the larger lakes. In all lakes 13C enrichment from herbivorous zooplankton to planktivorous fish was much higher than expected (around 3 ‰) while 15N enrichment varied from 1 to3 ‰, which is within the range observed in earlier studies. In the two larger lakes the isotopic difference between planktivorous and piscivorous fish was 0.5 ‰ for 13C and 1.5 – 2 ‰ for 15N, consistent with expectations. In contrast, in the two smaller lakes the corresponding differences were –2.5 – +3 ‰ for 13C and –1.5 – +3 ‰ for 15N. In the same vein, the isotope signatures of the other food web components showed highly irregular variation in the small lakes. The apparent irregularities of the food web structure observed in the small lakes may partly arise from the more prominent role of the littoral zone, i.e. in small basins even pelagic fish may use littoral food resources with aberrant isotope signatures. Moreover, in small lakes a larger part of the carbon may originate from anoxic sediment, detritus particles or the surrounding terrestrial environment, complicating the comparisons between lake ecosystems.

Wang G.X., Q. Li H. Chua, X. D. Li & P. M. Pu. *A Mosaic Community of Macrophytes for the Ecological Remediation of Eutrophic Shallow Lakes*.