Meta-Data description

Monitoring of fish community composition of Lake Müggelsee (Berlin, Germany)

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Regular annual surveys of the fish community in Lake Müggelsee have started in October 2015. The lake is fished in an alternate way from year to year. In odd years (2015, 2017 and so on), the survey is conducted my multi-mesh gillnets, following the European standard for the EU Water Framework Directive. A similar survey has been conducted in 2001, and these data have been added. In even years (2016, 2018 and so on), the lake is fished by pelagic trawling and shoreline electrofishing.

Gillnet fishing

Fish sampling is conducted in the benthic and pelagic area by gillnetting. Stratified random sampling with benthic Nordic multi-mesh gillnets (length 30 m, height 1.5 m; 12 mesh-size panels each being 2.5 m long with 5, 6.25, 8, 10, 12.5, 16, 19.5, 24, 29, 35, 43, and 55 mm) is used according to (Appelberg, 2000). The total set of benthic gillnets as defined by lake maximum depth (8 m) and area (730 ha) encompasses 32 individual gillnets, set sequentially over several subsequent days, between end of September and mid October. Benthic gillnets are randomly distributed over the whole lake area and in different depth layers (11 nets in the zone 0-3 m, 11 nets in the zone 3-6 m, 10 nets in the zone 6 m to max depth). Three additional pelagic Nordic multi-mesh gillnets (length 27.5 m, height 3 m; 11 mesh-sizes from 6.25 – 55 mm as given above) are set stepwise from the surface to the bottom over the deepest point of the lake. All gillnets are set before dusk and rised after dawn to assure fishing during the likely activity periods for all fish species.

For fish caught by gillnets, species, number, total length (LT, mathematically rounded up or down to nearest cm), and wet weight (1 g) were determined. Catch per unit effort (CPUE) for gillnet catch was determined as number per unit effort (NPUE, number of fish net^{-1} night^{-1}) or weight per unit effort (WPUE, total mass of fish net^{-1} night^{-1}), both standardized with respect to gillnet numbers set. Pelagic and benthic gillnet catches are summed. Relative proportions of species numbers and biomass in the total catch are expressed in percent (%).

Fish are determined to species. Within cyprinids, hybrids were frequently found, usually originating from hybridization between bream and roach.

Trawl fishing

Fish are sampled in the pelagic area of Müggelsee during daytime in September or October. Sampling is conducted by towing a demersal trawl with otter boards (8 m long, 1.5 m wide, cod end: mesh size 10 mm, opening width area: 1.5 m²) over 500-1500 m distance with an average speed of 1.5 to 2.0 m·s^{-1} at six stations in the central area of the lake. The exact orientation and length of trawling transects is supported by GPS recordings.

After capture, fish are identified to species, counted, measured to nearest mm and weighed to nearest 1 gram wet mass (wm). Fish abundance (ind ha^{-1}) and biomass (kg wm ha^{-1}) are calculated

from each sampling haul (towed distance x net width). Relative proportions of species numbers and biomass in the total catch are expressed in percent (%).

Shoreline electrofishing

In the littoral (defined here as nearshore benthic areas with less than 1.5 m water depth), fish data are obtained using electrofishing with about 200 – 400 volt DC current (4 – 8 ampere electrofishing aggregates EFG 4000, EFGI 4000; Bretschneider Spezialelektronik, Breitenbrunn, Germany) with anodic handnets (4 – 4.5 m long, 40 cm diameter, 6 mm mesh size) and a copper cathode (length 5 m). Electrofishing is performed by at least a two-person crew using a boat at daytime. Before fishing, electric current is adjusted to be as low as possible (usually 200 volt) depending on conductivity, but still yielding positive fish galvanotaxis. Fish communities in littoral areas are evaluated at about 20-40 locations per lake representing the largest typical natural shoreline structures (for example reed belts, submerged macrophytes, coarse woody debris; repeated sampling of the same type possible). Each of the six locations is sampled by a minimum of 15 dips, with one dip meaning dipping the activated anode for about 15 seconds into water, or until fish displays positive galvanotaxis. The spatial distance between dips is approximately 10 m. Between locations, the boat is moved by engine, whereas during fishing, the engine is stopped and moved by punting. For fish caught by electrofishing, species, number, and length (usually nearest cm) are measured. NPUE for electrofishing catch is calculated as number of fish per dip. The majority of fish is released alive after electrofishing, and hence only a part of the catch (few individuals per species) is weighed in the laboratory.