

EKOLOGIA POLSKA (Ekol. pol.)	31	3	535-537	1983
---------------------------------	----	---	---------	------

## PREFACE

The ecosystem-watershed concept introduced into modern ecology by Likens's and Borman's (1977, 1979) remarkable studies on the Hubbard Brook watershed has been used with an ever-increasing frequency as an object and aim of ecological research (Drabkova and Sorokin 1979). O'Sullivan (1979) stresses the manifold cognitive importance of such studies, and above all (1) a identification of all energetic and material links in specific terrestrial-aquatic systems including several spatially interlinked ecosystems, and (2) an integration of studies that have hitherto been conducted separately by sciences such as ecology, hydrology, meteorology, through their cooperation in a natural unit as represented by the watershed and the ecosystems associated with it.

According to Fortescue (1980), an ecosystem-watershed unit represents a local, i.e., hierarchically the lowest system (besides the regional and global) of matter cycling and transformation in the landscape, hence it has become the object of interest for landscape ecology as a modern ecological specialization.

The ecosystem-watershed concept also lay at the basis of the choice of the object for study, and carrying out an interdisciplinary research programme on the watershed of the Jorka river and its lake system.

The r. Jorka watershed with its system of chained lakes (a kind of lake cascade) is a typical, elementary component of a mosaic-like, hilly lakeland landscape as represented by the Masurian Lakeland situated at the north-eastern edge of the central-European lowland. It is a small, close system of several lakes hydrologically interconnected, relatively small (under 170 ha), with low or medium

values of average depth (3.7-11.8 m), and with a topographically distinct watershed. In the Masurian Lakeland landscape systems of this type dominate over the water regions of larger and deeper lakes, e.g., those belonging to the Masurian Great Lakes. For this reason the knowledge of their functioning becomes important in connection with the water relations and quality of the water in the whole region.

As a result of several years' studies (1975-1979), the following have been identified in detail: land use and land form in the watershed, hydrological conditions and the hydraulic budget of lakes for two successive years (B a j k i e w i c z - G r a b o w s k a - in press), the changes in the watershed caused by climatic conditions and man's activity in the past (S t a s i a k and T a t u r - in press), an assessment of the input in terms of  $P_{tot}$ ,  $N_{tot}$  or  $N$  ( $NH_4 + N_{org}$ ) and  $C_{org}$  from the atmospheric source, i.e., precipitation (G o s z c z y ń s k a and P l a n t e r 1981), and from point sources, including rainbow trout cage aquaculture (P e n - c z a k et al. 1982, and in press). Habitat features have also been identified of the lake system under study, therein variation of nutrient contents in the water and sediments (P l a n t e r, Ł a - w a c z and T a t u r 1983), phytoplankton productivity (W o - r o n i e c k a - d e W a c h t e r 1983), structure and dynamics of individual biota, such as the phytoplankton (S p o d n i e w - s k a 1983), zooplankton, including protozoa (W ę g l e ń s k a, B o w n i k - D y l i ń s k a, E j s m o n t - K a r a b i n 1983), bacterioplankton (G o d l e w s k a - L i p o w a 1983), benthos (D u s o g e 1983), molluscs with particular attention given to Dreissena polymorpha (Pall.) (S t a ń c z y k o w s k a, L e w a n - d o w s k i and E j s m o n t - K a r a b i n 1983). The distribution, biomass and composition have been identified of emergent (S z a j n o w s k i 1983) and submerged (O z i m e k 1983) vegetation. Some aspects were also evaluated of nutrient management in lakes, including the limiting role of phosphorus and nitrogen via in situ enrichment experiments (W o r o n i e c k a - d e W a c h t e r 1979), sorption-release mechanism of the bottom sediments (P l a n t e r and W i ń n i e w s k i - in press) and nutrient regeneration by zooplankton (E j s m o n t - K a - r a b i n 1983).

On the basis of the above specialist researches two synthetic or summarizing papers have been prepared: H i l l b r i c h t - I l -

k o w s k a and Ł a w a c z (1983) have evaluated the loading rates and analysed the relationship between lakes and the watershed, the impact of man and the role of water movements in the dynamics and content of nutrients, whereas H i l l b r i c h t - I l k o w s k a (1983) has summed up differences and similarities in the biological structure of the lakes under study and compared them with other lakes of a similar origin in the Masurian Lakeland. In preparation is a further study and analysis of the nutrient budget in lakes, with a particular emphasis on phosphorus retention.

Note: The references cited in Preface are included in the first paper of the volume (H i l l b r i c h t - I l k o w s k a and Ł a w a c z 1983).

Anna Hillbricht-Ilkowska