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Predicting asp and pikeperch recruitment in a riverine reservoir

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Annotation

Recruitment of two species, asp (*Leuciscus aspius*) and pikeperch (*Sander lucioperca*), in a riverine reservoir was studied using a novel statistical approach. Both species are piscivorous and are stocked into reservoirs for biomanipulative purposes to reduce planktivore species. Long-term data series were used, but the number of potential predictors was high. Therefore, a novel informative statistical approach based on dimension reduction methods was applied. Quality of outputs was driven by sampling methods. Main factors affecting asp recruitment were zooplankton abundance, predator density and temperature. In terms of pikeperch fry measured with seine and trawls, the number of predators was the only important factor. Gillnets underestimate small fish and the data were unsuitable for statistical modelling.

Declaration [in Czech]

Prohlašuji, že svoji rigorózní práci jsem vypracoval samostatně pouze s použitím pramenů a literatury uvedených v seznamu citované literatury.

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V Českých Budějovicích 3. října 2016

Petr Blabolil

Mgr. Petr Blabolil

Author agreement

The thesis is based on the paper:

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We, the undersigned, declare that Petr Blabolil had a major contribution to the article.

He participated at collection of samples in field, conducted the statistical analyses, contributed significantly to the interpretation of the results and made major contribution to the text of the manuscript.

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Full title: Predicting asp and pikeperch recruitment in a riverine reservoir

ABSTRACT
Fish recruitment in riverine reservoirs is not fully understood because the long-term data series required for standard stock–recruitment models are often lacking. In this study, two unrelated piscivorous species with different ecologies, asp (*Leuciscus aspius*) and pikeperch (*Sander lucioperca*), were investigated over a14-year period in a reservoir in the Czech Republic using a novel informative statistical approach based on dimension reduction methods. This method is useful for situations in which potential predictors are equal to, or exceed, the length of the time series. Recruitment of asp fry was affected by zooplankton abundance, predator density and temperature. Recruitment of pikeperch fry measured with seine and trawls was only affected by the number of predators, while recruitment of pikeperch fry estimated with gillnet data was also affected by temperature and water level fluctuation. Although gillnets are commonly used sampling method, it seems to be inappropriate for developing fry predicting model. This research also highlights the use of a novel approach to dimension reduction for analysis of factors affecting recruitment using shorter time series (in our case 13 years).