Consequences of fluvial maintenance operations on the biodiversity and landscape in the Mareau-aux-Prés islands (National Reserve of Saint-Mesmin, Loire River, France)

Marc Villar, Sylvie Augustin, Michel Chantereau, Marie Baltzinger, Jean Menanteau, Richard Chevalier, Clemence Chaudron, Olivier Denux, Rémi Dupré, Sabine Greulich, et al.

Consequences of fluvial maintenance operations on the biodiversity and landscape in the Mareau-aux-Prés islands (National Reserve of Saint-Mesmin, Loire River, France)

CONTEXT

The Mareau-aux-Prés islands, along the Loire river are characterized by a multiple channel pattern, where natural limestone riffles influence the morphology and spatial distribution of vegetated islands and secondary channels. Within these islands, **in september 2012, fluvial management operations (FMO)** were launched. The vegetation of the central sandy-gravelly bar (3 ha area) was uprooted and the bar level lowered in order to maintain the flow capacity of the river. The FMO are equivalent to a natural important flood : a new bare mineral substrate has appeared and since spring 2013 followed the succession of geomorphic, pioneer and biogeomorphic phases in interactions between hydro-morphodynamics and Salicaceae vegetation

This sandy-gravelly bar is an ideal field support for **studying long-term ecological issues**. A **multi-disciplinary research programme** (‘**BioMareau**’ project) is currently being conducted from 2012 to 2019, focusing on interactions and feedbacks between biotic and abiotic components and, since 2017, on landscape evolution and perception. The project involves researchers and local stakeholders (national reserve, environmental group), in interaction with institutional actors.

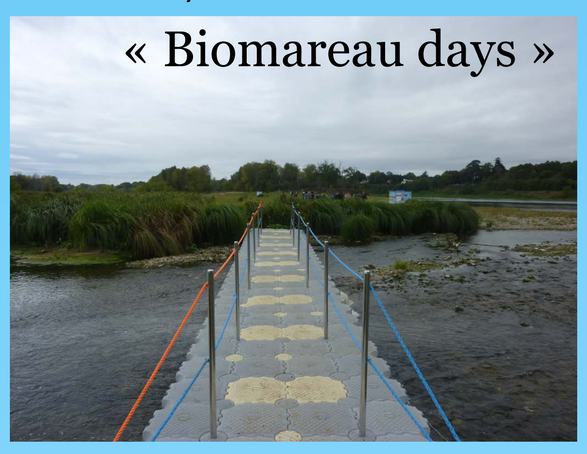
METHODS AND RESULTS

Dynamics of biodiversity were evaluated with field summer inventories of native and invasive flora. These results demonstrate an important year effect (flooding influence) on species richness and composition. Species richness gradually increased and returned to the initial level 5 years after FMO. FMO did not induced extinction of species nor apparition of new species.

The community of gravel nesting birds was not present on the vegetated island. FMO has favoured new nesting habitat on the new island, especially for the little tern *Sternula albifrons*, as they lay their eggs on bare grounds. Their presence gradually increased, with 13 breeding pairs and 11 juveniles in 2017.

The landscape approach used a method combining a field analysis, consultation of maps and planning documents, completed with interviews of different stakeholders and inhabitants. Interviews indicate that inhabitants are attached to the Loire landscape. They perceive changes in the landscape but they don’t identify the FMO.

« Biomareau days »



CONCLUSIONS

Key results: importance of biophysical and biodiversity connection; dynamics of biodiversity on the new bar (island); complexity of interactions (between biophysical environment, flora, fauna and Men); importance to take into account the points of view of stakeholders and inhabitants.

The applied objectives: production of a guide for fluvial managers in order to perform optimal useful management operations with a minimum loss of biodiversity; implementation of informations and communication measures for inhabitants, local stakeholders and institutional actors (« Biomareau days »).

M. Villar[1], S. Augustin[2], M. Chantereau[3], M.Baltzinger[4] , Menanteau[4] R. Chevalier[4], C. Chaudron[6] O. Denux[2], R. Dupré[5], S. Greulich[6], V. Guerin[1], V. Jorge[1], M. Lefebvre[1], A. Marell[4], S. Rodrigues[6], C. Wintenberger[6],, S. Servain[6] 1. INRA 0588 BioForA, LTER Zone Atelier Loire, Orléans France, [2] INRA 0633 URZF, Orléans, France, [3] Loiret Nature Environnement, Orléans, France, [4] IRSTEA, Nogent sur Vernisson, France, [5] Conservatoire Botanique National Bassin Parisien, Orléans, France, [6] UMR CITERES, University of Tours, France

Cette opération est cofinancée par l’Union européenne. L’Europe s’engage sur le bassin de la Loire avec le Fonds européen de Développement Régional.