INUNDATION PATTERNS AND FISH PRODUCTION IN THE VOLGA-AKHTUBA FLOODPLAIN (RUSSIA)

Middelkoop, H.[1], Van de Wolfshaar, K.E.[1,2], Addink, E.[1], Winter, H.V.[3], **Nagelkerke, L.A.J.**[2]

[1] *Department of Physical Geography, Utrecht University, Utrecht, The Netherlands*

[2] *Aquaculture and Fisheries group, Wageningen University, Wageningen, The Netherlands*

[3] *IMARES, Institute for Marine Resources and Ecosystem Studies, Wageningen University and Research, IJmuiden, The Netherlands*

Numerous fish species use floodplains for spawning, as nursery and as foraging habitat. Here, we explored the relationship between flow regime and ecological response of fish in the large river-floodplain of the Lower Volga-Akhtuba (Russian Federation). First, we determined the relationship between river discharge and floodplain inundation patterns, with emphasis on spatial and temporal patterns in floodplain lake connectivity, using satellite image analyses. We studied this connectivity in terms of distance to the main river, seasonal duration of the connection, and we related the spatial patterns of connectivity to floodplain topography. Secondly, we related variations in annual fish catches to flood magnitude, thereby discriminating between fish catch from the main river and from floodplain water bodies. The results show a positive relationship between fish abundance and floodplain inundation extent. Long low floods are better than short high floods in promoting floodplain inundation and fish production. In large floodplain areas, such as the Volga-Akhtuba floodplain, the geographical (Euclidean) distance to the river channel, and the peak flow magnitude are inadequate indicators for estimating the annual connectivity of floodplain lakes. Instead, the floodplain topography and flood volume are required to determine this characteristic. The flood volume positively correlates with commercial floodplain fish catch but shows no correlation with river catch, suggesting that there is a clear added value of flooding for the production of floodplain fish, but not for river fish. River management of the upstream reservoir aiming at fish production should promote prolonged inundation rather than focusing on the height of the peak flow.