

Relations of Reach Scale Channel Configuration to the Lentic Habitat Conditions and Abundance of Bitterling and Mussels in the Kizu River

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The Kizu River ecosystem is characterized by lentic habitats such as pools and wando on the floodplain, providing habitats to *Acheilognathus* bitterlings and freshwater unionid mussels. In the last decade, however, these habitat conditions have been degraded by reduction of connectivity with main channels owing to degradation of riverbed and increase of relative height to the channel water level. In order to restore the Kizu River ecosystem, it is necessary to understand relationships among reach scale channel configuration (RSCC), habitat conditions and abundance of the species. This paper aims to show appropriate channel configuration for bitterling and mussels as their habitats, and to estimate historical changes in potential habitat suitability using aerial photos and field survey data.

Suitability index (SI) of bitterling and mussels were analyzed in relations with habitat conditions (flooding frequency, physical parameters, *e.g.* relative height, water level, depth of mud, water surface area and ratio of vegetation, and water quality) from 2007 to 2011. RSCC parameters of channel width, the number of channels, sinuosity, floodplain vertical shape index (FVSI; >0 concave, =0 straight, <0 convex) and landscape composition were measured using aerial photos from 1948 to 2012.

The SI of mussels resulted in the maximum values under flood frequency between 8 and 22 day/year (Fig 1). These suitable habitats significantly increased in number under FVSI between -0.2 and 0 (Fig 2). Based on these results, RSCC of the Kiz River from 1970's to 1990's estimated to have higher potential habitat

suitability for bitterlings and mussels in the Kizu River (Fig 3).

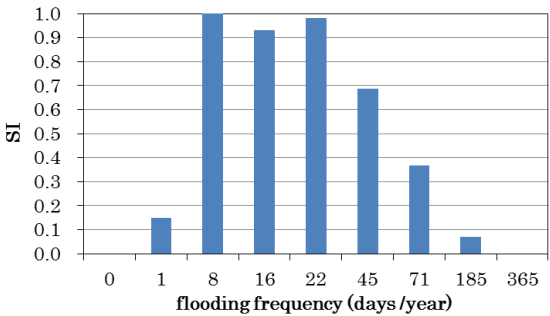


Figure 1. Relations of SI of mussels to flood frequency of pools

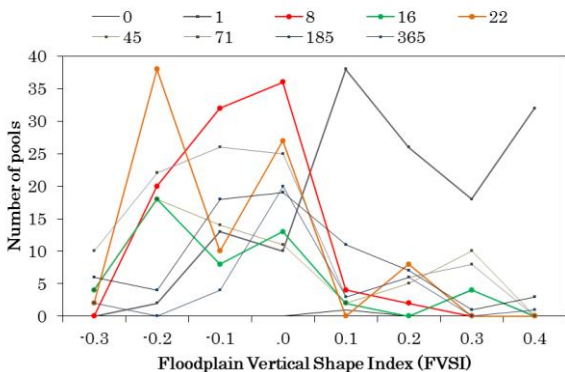


Figure 2. Relations of number of pools with different flood frequency to floodplain vertical shape index (FVSI)

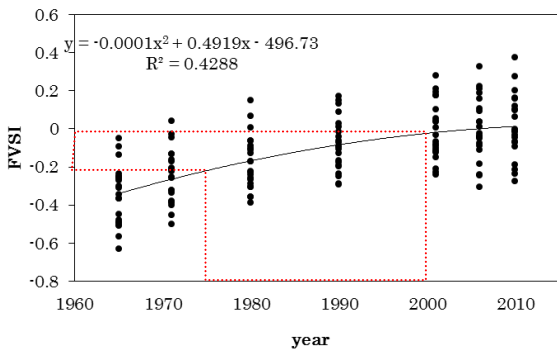


Fig 3. Historical changes of FVSI from 1961 to 2010