

Public Abstract

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Title:Assemblage structure and shallow-water habitat use by small-bodied fishes at lower Missouri River sandbars

Native small-bodied fishes increase biodiversity in larger rivers, are an important component of large-river trophic ecology, and age-0 fishes have narrow habitat tolerances making them good bioindicators of ecological integrity. Channelization and flow regulation on lower Missouri River (LMOR) have contributed to losses of shallow, slow-velocity habitat important to many native small-bodied and age-0 fluvial fishes. Existing sandbars represent a potentially important source of shallow, slow water velocity habitat to fishes during early ontogeny within the main channel of LMOR. My objectives were to determine (1) whether the small-bodied fish assemblage was composed of taxonomic, habitat guild, or body length subgroups, and (2) the temporal and spatial distribution of these subgroups relative to a suite of environmental factors. Fishes and environmental factors were quantitatively sampled under a hierarchical spatial design at point and wingdike sandbars ($N=8$) during July-October, 2005. Samples yielded 49 species from 13 families in depths 0.0-0.5 m; seven species were federal or state listed as imperiled. Fish mean length increased but abundance decreased from July (31.3 ± 1.9 mm TL; 73.4 ± 27.4 CPUE) to October (47.9 ± 1.7 mm TL; 19.8 ± 27.5 CPUE). Ordination analysis revealed that the assemblage was organized into body-length subgroups. Fishes did not differentiate (body length, $P=0.13$; CPUE, $P=0.26$) between point and wing-dike sandbars; instead, the small-bodied fish assemblage (10-105 mm TL) aligned along a depth-velocity gradient relative to body length. Smaller fishes (10-35-mm TL) were abundant and dispersed in the shallow, slow water near-shore while fewer but larger fishes (75-105 mm TL) occurred in clusters in deeper, faster water offshore during the day. However, larger fishes moved near-shore at night indicating a terrestrial-aquatic predator-prey interaction may play an important role in the ecology of large-river small-bodied fishes. This research provides strong evidence that shallow-water habitat adjacent to sandbars is used by many small-bodied and age-0 fishes (i.e., nursery) and it should be a focus of fisheries and habitat restoration management in large degraded rivers. Specifically, the shallow water, slow velocity near-shore zone of main-channel sandbars may be an important flow and predation-competition refuge to many fluvial fishes during early ontogeny.