

ENV Report 56 – Evaluation of Towboat Propeller-Induced Mortality of Juvenile and Adult Fishes by Jack Killgore, Catherine Murphy, Douglas Wolff, and Thomas Keevin.

ABSTRACT

The number and species of fish potentially entrained through an operating towboat propeller were determined in Pool 26, Mississippi River and lower Illinois River. Fish were collected with a specially designed net deployed from a twin-screw river towboat to filter the propeller wash while withstanding turbulent forces. A total of 139, 10-min trawls were taken during four seasonal sampling periods. The mean (\pm SE) speed (km/h) and distance (km) traveled per trawl were 7.7 ± 0.1 and 0.82 ± 0.01 , respectively. A total of 4,567 individuals, comprised of 15 species, were collected. *Clupeidae* was the dominant family, and gizzard shad (*Dorosoma cepedianum*) was the dominant species (96 percent of total catch) collected. Catches were highest in the summer, particularly in the Illinois River (13.8 ± 4.3 and 132.7 ± 44.8 fish/km in Pool 26 and Illinois River, respectively). The most common visible injuries were decapitation (80.2 percent) and ventral laceration from the anal fin to the spinal column (11.0 percent). With one exception, all injured or killed fish had visible net marks on their bodies. A 400-mm TL skipjack herring (*Alosa chrysochloris*) was decapitated, and the skull was partially crushed, suggesting it had been struck by the rotating propeller. The entrainment mortality rate is equivalent to 0.01 fish/km of towboat travel. Mortality rate of all killed or injured fish, including obvious net-induced injuries, was 0.5 and 1.0 fish/km of towboat travel for Pool 26 and Illinois River, respectively. Gizzard shad comprised the majority of dead fish, and mortality was highest during the summer sampling period. Towboat propeller mortality of juvenile and adult pelagic fish in Pool 26, Mississippi River and the lower Illinois River was low. Additional studies—using larger tows (i.e., number of barges to increase resistance) in smaller navigable channels and a smaller mesh size to avoid entrapment of fish in the webbing—are recommended to evaluate system-wide effects of mortality caused by towboat propeller entrainment.