

**ENV Report 58 – Adult Fish Mortality During Lockage of Commercial Navigation Traffic at Lock and Dam 25, Upper Mississippi River** by Thomas M. Keevin, Brian L. Johnson, Eric A. Laux, Thixton B. Miller, and Kevin P. Slattery.

**ABSTRACT**

Although lock chambers do not provide suitable aquatic habitat to support resident fish populations, dead fish are sometimes observed in the lock after passage of a towboat. In order to determine the magnitude of fish mortality, locking mortality was monitored during 2002-03 at Lock and Dam 25 on the Mississippi River following 80 lockages during the following months: June - 11 lockages; August - 10 lockages; October - 21 lockages; December - 18 lockages; April - 20 lockages.

There were 361 fish killed during the 80 lockages. Gizzard shad (*Dorosoma cepedianum*) (n = 279, 77 percent of total mortality) and freshwater drum (*Aplodinotus grunniens*) (n = 47, 13 percent) accounted for the majority of the observed mortality. The remaining mortality (n = 35, 10 percent) was spread among 10 species. A single towboat lockage was responsible for 17 percent of the total observed mortality; another four towboats accounted for 46 percent of the total mortality. Thirty-two (40 percent) of the lockages resulted in no observed mortality. The highest mortality per lockage (mean = 9.1) occurred in both in August, when the highest density of fish occurred in the lock (2,059 - 20,251), and in December when fish densities were low (0 - 59). High August mortality reflects the large numbers of fish in the lock; high December mortality possibly reflects the inability of the fish in the lock to avoid entrainment because of reduced swimming capabilities. Poisson regression showed that mortality was related to water temperature, depth of water in the lock, horsepower of the tow, number of barges, and time of year. A potential mitigation measure to reduce locking mortality is to close the lock gates between lockages, especially during the spring fish migration.