2005 Louisiana's Red Drum Escapement Rate Update

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Louisiana's red drum stock assessment was updated by incorporating recreational harvest estimates through 2004 and fishery independent trammel net samples through 2005. Recreational harvest estimates are typically available in May for the preceding year but final 2005 recreational harvest data were not available in time to be incorporated into this update. The assessment uses historic commercial and recreational harvest and length frequency data along with a red drum growth equation to develop a catch-at-age matrix. The catch-at-age matrix is used in a forward simulation anchored by a recruitment index (trammel net CPUE) to provide F (annual fishing mortality rate) at age. Escapement is calculated to age 5 for each year by the following equation:

$$\text{Escapement (\%)} = \exp -(F_0 + F_1 + F_2 + F_3 + F_4)$$

The results are as follows:

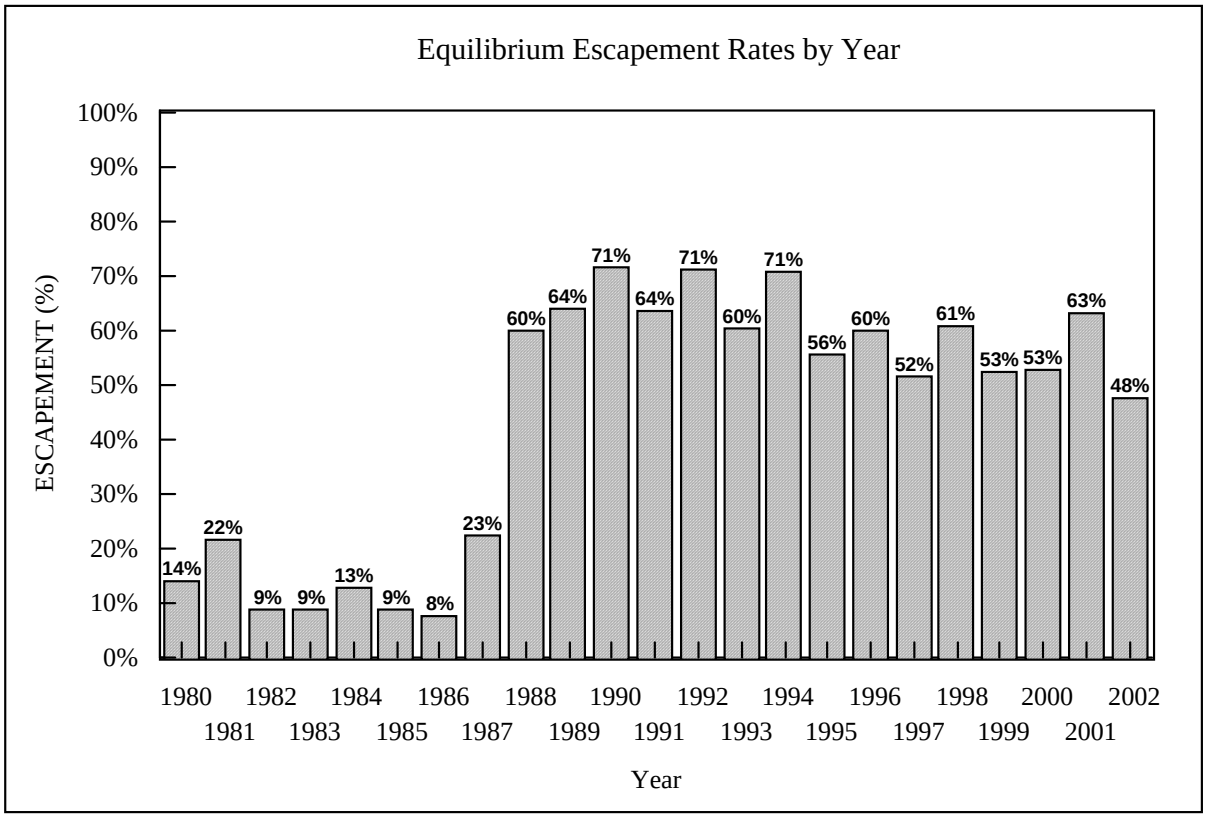

Figure 1. Equilibrium escapement rates for red drum from Louisiana waters.

Recruitment to the Louisiana red drum stock is estimated from fishery-independent trammel net samples that have been taken since 1986, providing an index of abundance of age-1 fish near the time of recruitment to the recreational fishery.

Estimates of recruitment for the 2001 through 2004 cohorts were lower than levels seen for the 1997 through 2000 cohorts (Figure 2, below). However, it was only in the harvest numbers for 2004 that there was a noticeable decline in the total numbers of red drum of those ages that were harvested (Figure 3). Under current regulations, red drum are recruited into the recreational fishery approximately one year after their birth, with highest fishing mortality rates (F) on ages 1 and 2. Since spawning occurs in the fall of the year, the 2001 cohort would enter these high-F ages in 2003, and contribute most to harvest in 2003 and 2004. During 2003, the continued high numbers harvested seems to have been at least supported by the stronger cohorts prior to 2001, especially the 2000 cohort.

Estimates of escapement in the most recent cohorts is the most subject to variation as future information becomes available on the actual harvest at age, as opposed to the predicted harvest rates used in this report. While F at age declines after age-2, there is still substantial harvest after that age, which will influence estimates of total fishing mortality, and thereby influence estimates of escapement. We cannot reasonably estimate F for cohorts beyond the 2002 cohort (and even that has some additional estimation on F at ages beyond age-2), so estimates of escapement (Fig. 1) do not contain information beyond that cohort.

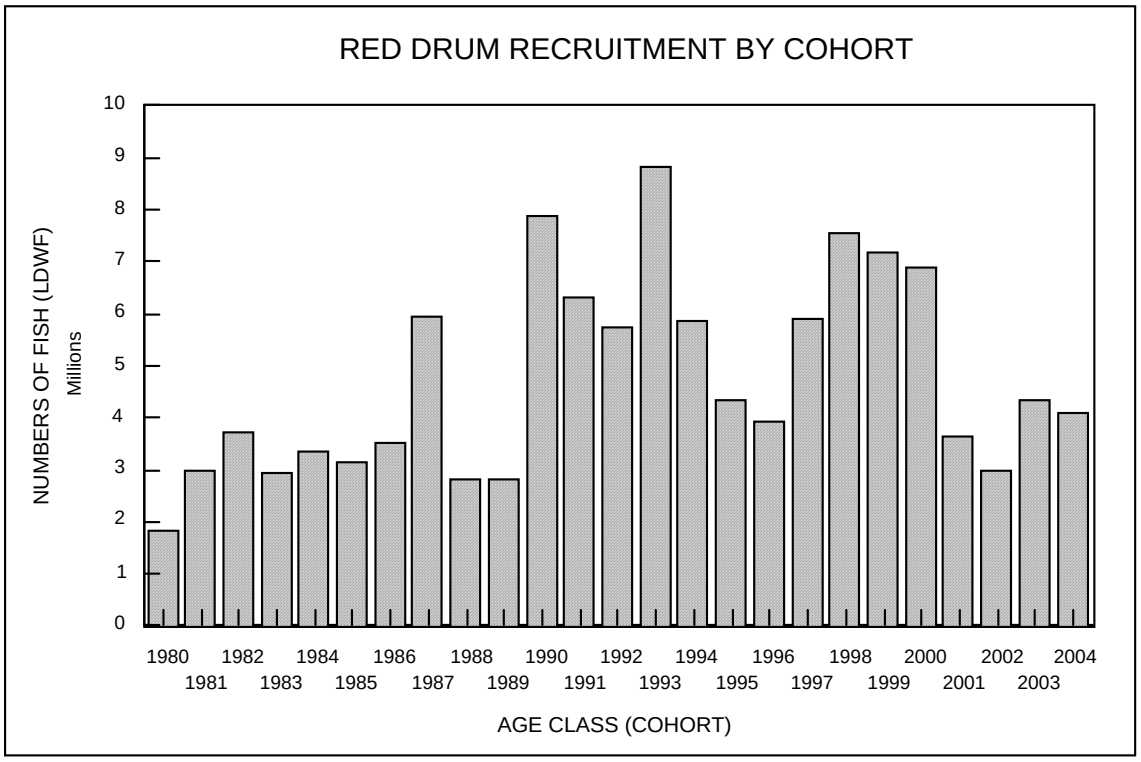

Figure 2. Estimates of recruitment of age-0 red drum by year class, 1980-2004. 1980-86 estimates based on VPA of harvest at age, 1987-2004 based on estimates of recruitment from fishery-independent trammel net indices related to 1986 VPA estimates.

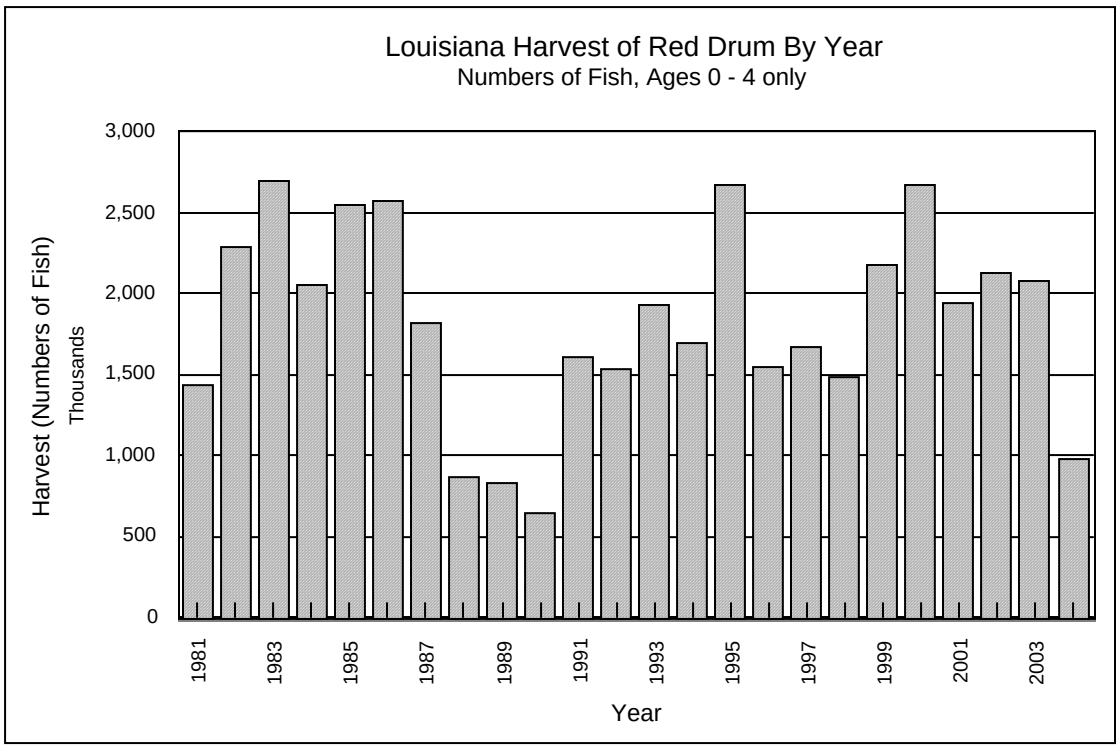

Figure 3. Estimates of numbers of ages 0-4 red drum harvested by all sources, 1981-2004.