

### 2005 ERA # 3. Efficiency changes

#### *Historical Research:*

Brown, 1995 produced an estimate of fishing power increases within the WRL Fishery.

#### *Current Research:*

The WRL fishery is surveyed prior to the start of every season to produce a record of the gear/equipment being used for fishing. This includes boat size and power as well as electronic equipment such as ocean mapping software ("Max Sea"). A repeat of the analysis employed by Brown (1995) using this data set is currently underway to produce an updated estimate of efficiency increases.

Wright et al. (2006) used a depletion technique to estimate overall efficiency increases in the WRL fishery for the non-migrating part of the season, March to June. The catch for the migrating part of the fishery was used to estimate the annual exploitation for the whole season. To take into account environmental effects (water temperature and swell) on catchability that affect the assumptions of the depletion technique, estimates of the changes in catchability between March and June of each year were obtained. The trends in catchability, residual biomass and exploitation for three zones of the fishery since the 1983/84 season were examined. These show that the exploitation in the north coastal zone decreased from c. 75% in the early 1990s to c. 60% in the mid 1990s as a result of a major change in management in 1993/94 (including 18% nominal effort reduction and increased protection of mature females). However, in the last 10 years exploitation has increased again to c. 75%, mainly owing to increases in catchability (e.g., efficiency increases), as there has been little change in the nominal effort.

The results from these two studies provide quantifiable measurements of changes in efficiency in the WRL fishery. Robust estimates of efficiency increases are required to adjust nominal fishing effort into effective fishing effort. Effective fishing effort is required as an input into the new WRL stock assessment model currently being developed and required to standardize stock health indices such as the Fishery Dependent Breeding Stock Index and numbers of setose females returned.