

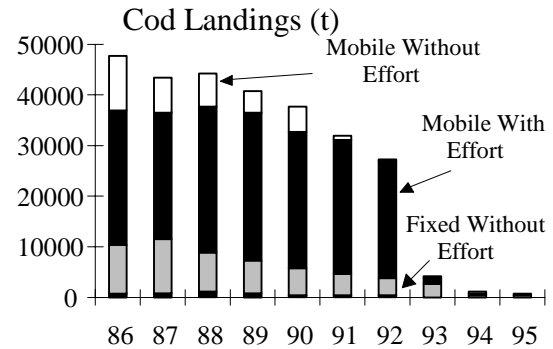
## Mobile Gear Fishing Effort Trends in 4T

Fishing effort and fishing mortality (F) are linked. The main management strategy used for groundfish is to control F at  $F_{0.1}$ . Indirect control tactics in the form of total allowable catches (TAC) were used to implement the strategy and little attention was paid to fishing effort. However, in the years leading up the collapse of several groundfish stocks, fishing effort (and fishing mortality) actually increased as stocks declined.

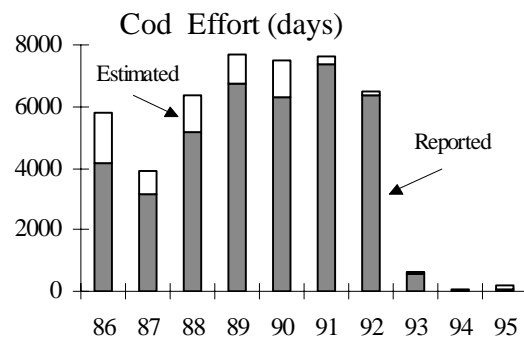
This is a first attempt at an area wide analysis of trends in groundfish fishing effort in 4T. The basic data were obtained from DFO catch and effort statistics for the years 1986-95. Days fished was used as a measure of fishing effort. It has several advantages over other measures, such as hours fished or the number of fishing set, such as; it is reported by most fishing fleets, there is a direct relationship between days fished and F for southern Gulf cod, and days fished may be easier to monitor. Fishing effort was broken down by directed species to reflect the multispecies nature of the 4T groundfish fisheries. Directed species was determined by the main species landed in a trip. Data were examined by gear type as well, however, the level of effort reporting by fixed gears was insufficient to follow trends, and therefore only mobile gear results are presented here. Not all reported mobile gear landings had fishing effort, and therefore it was necessary to estimate unreported effort. This was done by calculating annual reported catch rates by gear and directed species, and using this catch rate to estimate the amount of effort required to take the landings which had no reported effort. Further study is required to determine an appropriate effort unit for fixed gear, possibly a fishing trip. Additional study of other ways to allocate effort to catches which are reported without associated effort is also warranted.

### Cod

Most of the cod landings in 4T during this period were made by mobile gears, and the fixed gear landings declined steadily. However, less than 10% of the fixed gear landings (by weight) had information on days fished. By contrast, over 80% of the mobile gear landings (by weight) had days fished information.

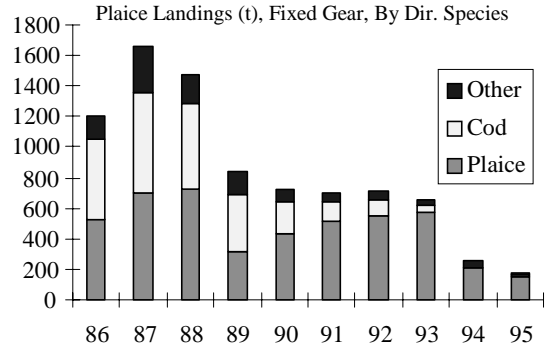
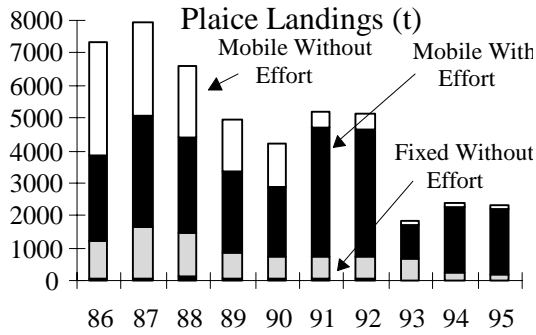


The total estimated cod directed fishing effort was slightly under 6,000 days in 1986. This declined to 4,000 days in 1987, then increased to about 8,000 days in 1989-91. There was a slight decline in 1992, then a substantial reduction to 600 days in 1993, the year the fishery was closed. Effort remained low in 1994 and 1995, coming primarily from sentinel fisheries.

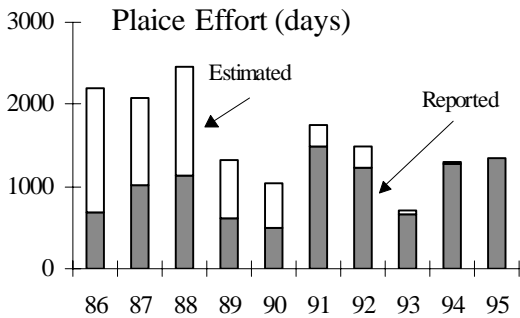
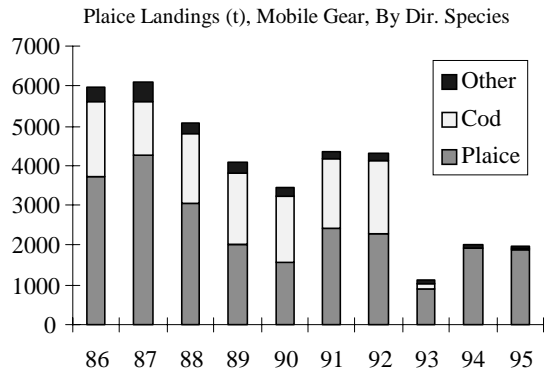


### Plaice

Plaice landings in 4T were dominated by mobile gears. The effort reporting rate by fixed gear was lower than those for cod. The mobile gear effort reporting rate increased through the time period, from about 30% (by weight) in 1986, to over 90% in 1993-95.



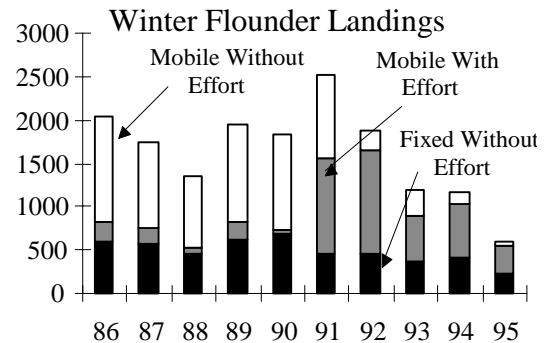
Plaice directed fishing effort varied between 1,000 - 2,500 days in 1986-92. The lowest fishing effort was about 700 days in 1993, the year the cod fishery was closed. The total reported and estimated effort in 1994 and 1995 was about 1,000 days, below the average for the period of 1,570 days.



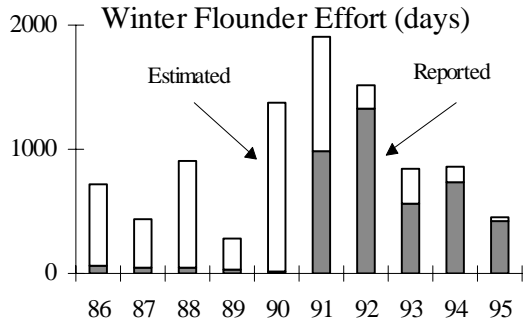
**Winter Flounder**

Winter flounder are landed mainly by mobile gear vessels. The effort reporting rate by this gear sector was very low in 1986-90, less than 15% annually. This increased substantially in 1991 (52%) and was 95% in 1995. Consequently, there is considerable uncertainty associated with the mobile gear effort estimates in this earlier period.

Plaice has been an important by-catch species in the cod directed fishery. About one third of the fixed gear landings of plaice came from cod directed fisheries in 1986-88. This declined as the cod fixed gear fishery declined. Similarly, about half of the mobile gear landings of plaice came from cod directed fisheries in 1988-92. This declined to nearly zero with the closure of the cod fishery in 1993. This means that in several years, a substantial fraction of the plaice fishing mortality came from fisheries directed towards cod. Since the cod fishery was closed, the mobile gear plaice directed effort has not increased. Consequently, one would expect that the mobile gear plaice fishing mortality has declined.



Total estimated winter flounder mobile gear fishing effort reached a peak of 1,900 days in 1991, then declined to about 450 days in 1995.



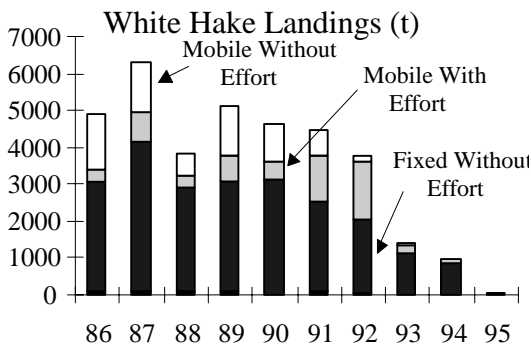
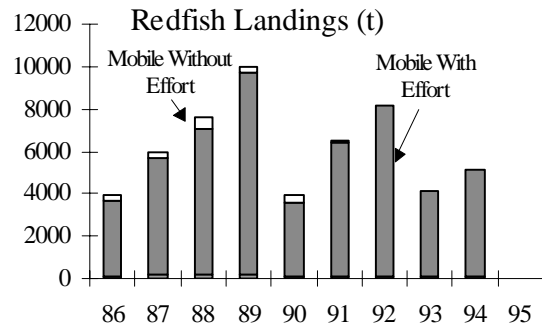
### Redfish

Only a relatively small portion of the Gulf of St. Lawrence redfish management unit (Unit 1) falls within 4T. The redfish directed fishing effort is presented here only for completeness as far as 4T total mobile gear effort is concerned.

Virtually all of the 4T redfish landings were reported by mobile gears. The effort reporting rate was also high, with well over 90% of the landings having fishing effort.

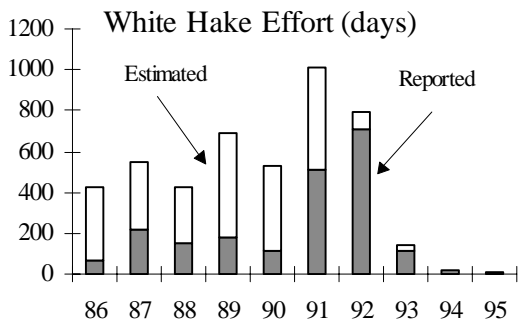
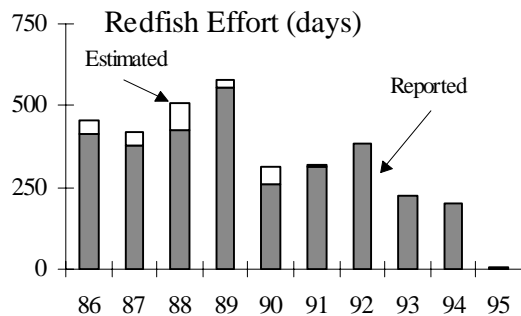
### White Hake

White hake landings have been dominated by fixed gears in this period. Effort data for these vessels is very sparse. The effort reporting rate by mobile gears has also been low, varying between 16% - 42% in 1986-90, then increasing to between 55% - 91% in 1991-94. As with winter flounder, there is considerable uncertainty associated with the estimated total mobile gear white hake directed fishing effort.



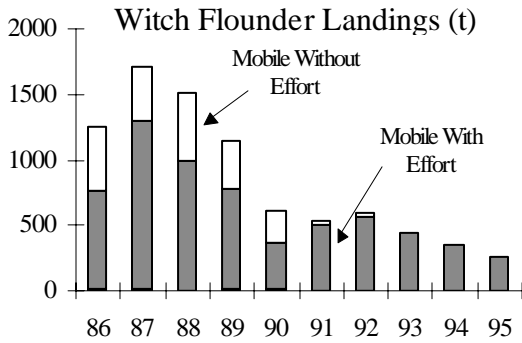
Redfish fishing effort in 4T averaged around 500 days in 1986-89, declined to about 300 days in 1990-92, declined again to about 200 days in 1993-94, then to virtually 0 days in 1995 with the closure of the Unit 1 fishery.

The mobile gear effort was close to 400 days in 1986 - 88, then this increased to about 1,000 days in 1991. Mobile effort declined in 1993 and 1994, and the directed fishery was closed in 1995.



### Witch

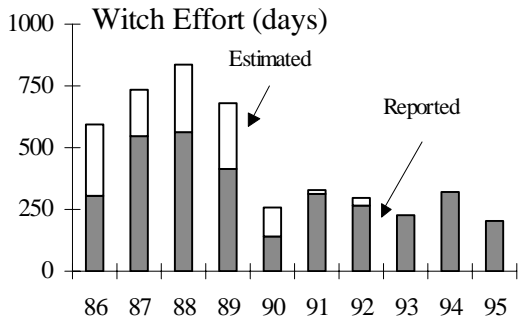
Witch flounder were landed mainly by mobile gear vessels in 1986-95 in 4T. The effort reporting rate varied between 41% - 65% in 1986-90, then increased to over 90%. A relatively small portion of the Gulf of St. Lawrence witch management unit (4RST) falls within 4T. The witch directed fishing effort is presented here only for completeness as far as 4T total mobile gear effort is concerned.



**For More Information**

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Witch directed mobile gear fishing effort peaked at slightly over 750 days in 1988, then it declined and has varied around 250 days without trend in the period 1990-1995.



**All Species**

The effort reporting rate increased during this time period as more and more of the inshore fleet submitted logbooks with fishing effort data. Cod directed fishing dominated the total mobile gear fishing effort until the fishery was closed in 1993. The total effort peaked at approximately 13,000 days in 1991, but this declined to about 3,000 days in 1993-95.

