

UNDERSTANDING SNAPPER MOVEMENTS – OTOLITH MICROCHEMISTRY

Principal researchers: Paul Hamer & Dr. Greg Jenkins

The Port Phillip Bay snapper fishery has seen a major long-term decline in the catch of large mature fish over the past 20 years. Despite this decline, there are still large numbers of juvenile snapper in the bay, indicating that successful spawning does occur. The movement of snapper between the bay and offshore waters may be one factor contributing to the decline in large snapper numbers.

MAFRI scientists are investigating this migratory behaviour of snapper in Victorian waters by using an innovative technique, otolith (fish ear bone) microchemistry. This method is very versatile and can be used to analyse the "fingerprint" or chemical makeup of just about any solid material, such as rocks, sea shells, metals and plastics. This is the first time that it has been used to analyse fish otoliths in Victoria. A range of chemical elements from a fish's environment are incorporated into the otoliths in tiny quantities. Since otoliths grow continuously throughout the life of the fish, they can provide a permanent record of the chemical environment experienced by the fish over its life.

An important part of this project is to determine whether snapper living in specific areas along the Victorian coast develop unique chemical "fingerprints" on their otoliths. The project is already showing promising results. The scientists have found that juvenile snapper, generally less than 6 months old, caught in Port Phillip Bay have significantly higher levels of the element Barium (Ba) in their otoliths than snapper caught in other areas. These differences in Barium levels may provide a means of determining whether the large snapper living in Port Phillip Bay were actually spawned in Port Phillip Bay or whether they came from other areas.

The early results also suggest that barium concentration within otoliths may vary on an annual basis. This may provide information on the number of times that adult snapper move between the bay and coastal waters. In the future, the scientists hope to use the technique to determine the importance of the bay as a snapper nursery area and producer of snapper for both the coastal and the bay fisheries. This information is valuable in helping to understand the variations in snapper numbers in the bay and will assist in the management of this important fishery. The project is funded by Fisheries Victoria and the Fisheries Research and Development Corporation.