# Bass Strait scallops in trouble

If you are partial to seafood and enjoy the simple pleasure of Coquilles Saint Jacques served with crusty French bread, but have wondered why Bass Strait scallops, so plentiful a year or two ago, have almost disappeared from your local fishmonger's, wonder no more — they have been nearly fished out.

**The action of the dredges used by the Bass Strait fishing boats kills many uncaptured scallops, but the only alternatives are difficult to use in rough weather.**

**Commercial scallops aggregate in 'beds' and have most of their shell buried in the sediment.**

It's a pattern that has been with us a long time. Since the turn of the century, fishing for scallops in Australia has been boom and bust: rapid rises in production — as new scallop-beds were found — have been followed by equally sudden crashes as the beds were depleted (see the graph on page 26). The last major bed in Bass Strait went that way in 1986, leaving Australia with a series of impoverished fishing grounds.

### Impact of dredging

To replace the booms and busts with sustainable production will mean changing fishing practices so enough adults remain each season to produce sufficient offspring to maintain population levels in the next one.

Although this sounds a simple enough management goal, achieving it in practice is not easy. The first requirement is a thorough understanding of the relationship between recruits to scallop populations and the parent stock. But in scallop fisheries throughout the world this is so poorly understood that the maintenance of viable populations tends to be hit and miss. For Australia's southern scallop industry it's been more miss than hit.

The industry has adopted catch quotas and size restrictions together with regulations designed to limit the fishing effort by controlling gear, licensing, and restricting the fishing season. However, these moves have clearly not provided sufficient protection for the breeding stock.

After 3 years of research by the CSIRO Division of Fisheries in Hobart, we now have a better understanding of why fishing has had such a dramatic impact on the scallop populations, and are in a better position to plan for sustainable levels of fishing. The researchers are convinced that, unless the industry adopts strategies designed to ensure a minimum level of egg production and spawning, the populations will never recover.

The rapid depletion of scallop populations is linked, in part, to the habits of the shellfish. Buried in the bottom sediment with only their flat, right valve visible, commercial scallops (*Pecten fumatus*) aggregate into beds whose size and shape is determined largely by currents and the topography of the ocean floor. This aggregation has encouraged the development of fishing techniques that in many respects resemble a mining operation.

When they locate a bed, fishing vessels catch the scallops by towing dredges across the ocean floor. In the early 1900s, small dredges were towed by rowing boats, but by the mid 1960s powered fishing boats were towing dredges up to 4·9 m wide. Present regulations limit the dredge width to 3·36 m.

The CSIRO research team led by Dr Peter Young used underwater television cameras and divers' inspections to investigate the impact of one of the most commonly used dredges on experimental plots containing reseeded scallops of known size and abundance. The scientists found that the action of the dredge killed many uncaptured shellfish.

During the 1986 fishing season they also carried out direct investigations on fishing mortality in Banks Strait scallop populations. From samples of catches taken on the opening day of the fishing season, again 2 weeks later, and then at monthly intervals, they found a steady increase in mortality.

A mere 100 days after dredging began, more than 80% of the 'catch' consisted of dead shell. Follow-up samples taken a year later produced no live scallops from the Banks Strait grounds.

The surveys not only supported what the catch statistics were showing — scallops had become a rare commodity — but, worse, showed that the act of dredging was destroying the beds and killing the residual population.

### Scallop recruitment

For the researchers wishing to examine the distribution of newly recruited and juvenile scallops, sampling from standard fishing dredges had other problems.

Amateur divers who search for scallops off Australia's coast will know that the shellfish, responding to changes in light, may react to their approach by rising up off the bottom and swimming a short distance away. The research team divers noted that younger scallops seemed more prone to do so and had seen some evade capture by swimming over an approaching dredge.

This response posed a problem for scientists seeking representative samples: they solved it by adding a net above and to the rear of the dredge, which caught the swimmers and the smaller scallops that passed through the dredge mesh.

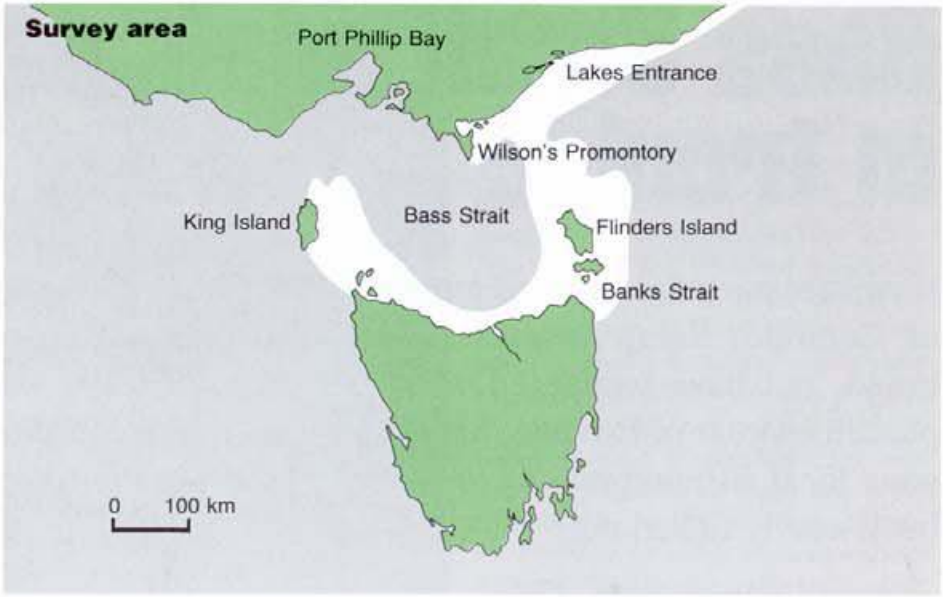
With this combined dredge/net, the research team undertook a series of surveys throughout Bass Strait in 1986, 1987, and 1988, to locate recruits from the 1985, 1986, and 1987 spring/summer spawnings respectively.

In 1986, only an area off Tasmania's north-eastern coast showed significant concentrations (greater than 100 scallops per drag) of juvenile scallops. By February 1987, some new recruits from the 1986 spring spawning began appearing at a number of sites. But the 1988 survey produced no evidence of any significant recruitment of juveniles.

Falling catches subsequently confirmed this decline of scallop stocks. In 1988, landings were less than 60 tonnes, the lowest since the Bass Strait fishery began in 1970. They herald poor long-term prospects for the fishery that, during the 1980s, boasted the most productive grounds in the history of the Australian scallop industry.

In an attempt to help the industry develop procedures for assessing the level of recruitment, the scientists set up a program to measure spat settlement on six sites in Bass Strait. Their aim was to see whether it was possible to use the abundance of spat in artificial collectors to predict subsequent recruitment to scallop-beds.

They deployed spat-collectors at varying water depths, close to existing or previously fished scallop-beds, and monitored the settlement. They found that tidal circulation patterns and wind-induced currents may tend to keep larvae close to the parental population. And, although the commercial scallop spawns over several months, successful recruitment in any year appears to result from a relatively brief period of major spawning, which occurs several months after the start of the fishing season.




**A survey of the major Bass Strait scallop fishing grounds in 1988 found very few juveniles in the population.**

### Management options

Using the new knowledge about recruitment, the research team made a number of recommendations. Because the populations have declined so much, existing beds must be protected. It may be necessary to close some beds indefinitely to act as breeding grounds. Because scallops grow to different sizes depending on their location, zones within the fishery may need different minimum size limits.

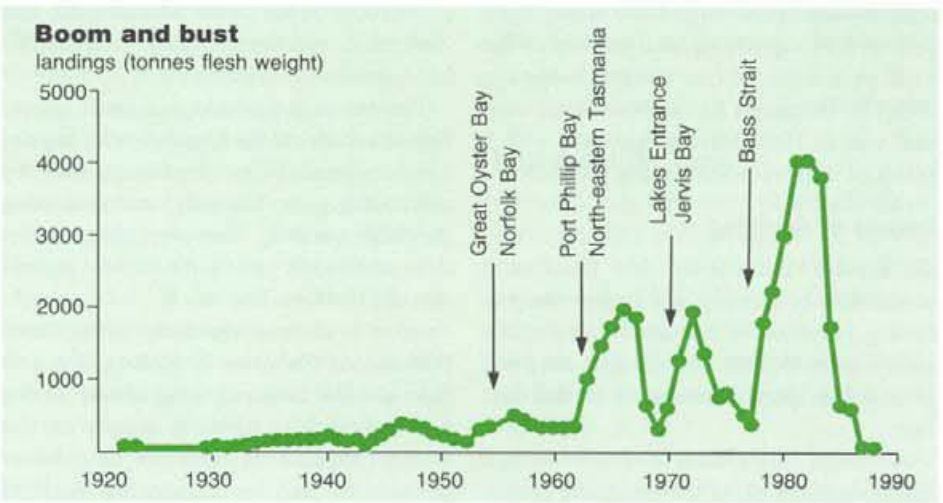
The scientists consider that substantial gains could be achieved by restricting fishing to the summer months, after the major spawning — switching the industry from a 'roe-on' to a 'roe-off' one.

However, dredging may disrupt spat settlement. Clearly, new harvesting methods need to be developed that do not damage the resource. Peter Young admits that this is easier said than done. He says that the lighter dredging gear currently available is difficult to use in rough weather conditions. He hopes that fishermen, biologists, and engineers will get together to design more appropriate equipment.

*David Brett*

### More about the topic

Bad news in Bass Strait: the results of the CSIRO's 1988 survey of Bass Strait scallops indicates the possible collapse of the commercial fishery. R.B. Martin, P.C. Young, R.J. McLoughlin, and G. West. *Australian Fisheries*, 1989, **48**, 18–19.




**Combined annual scallop catches — a tale of peaks and troughs. Arrows indicate the commencement of the various contributing fisheries.**