What is a 'normal' fishing year?

The 1993/94 game fishing season off the southeast coast is now over, and it is worth looking back to make some observations and draw some conclusions. When the season kicked off, it looked like being a 'typical' year in that blue and mako sharks were caught early, followed by some pre-Christmas striped marlin. Yellowtail kingfish turned up at The Peak and large striped tuna appeared on cue. After some 'unusual' seasons, this one had all the makings of being normal, except ... no one told the fish. As it eventuated, the latter half of the season did not go according to the book, with very few small black marlin appearing (after three excellent years), no yellowfin tuna at all, no wahoo, but an incredible run of huge dolphin fish, record numbers of striped marlin, and an influx of baby broadbill swordfish. And then, to top it off, after a drought of yellowfin tuna, large schools of big fish appeared wide of the shelf in April, ranging up to a whopping 91 kg.

These and other chains of equally unpredictable events in previous years caused me to reflect on whether there is indeed such a thing as a 'normal' year in fishing, not only for pelagic fishes but in fishing generally.

It seems a very human trait to think of the seasons and nature as fitting into a comfortable, annual cycle of events. Seasons come and go in sequence, flowers bloom, birds and bees do their things, and all is as it should be in the great chronological machine of creation. With that sort of mindset, we tend to look for order, for repetition and prediction about natural events. And so with fishing. We grow up with expectations that fish too follow set seasonal patterns, and yes, sometimes they do. But of course, often, they don't. And they don't because of the inherent variability of the environment in which they live.

To gain some idea of the immense potential for variability within marine ecosystems, consider the incredible fecundity of most oceanic fish, that is, the number of eggs they produce. A mature female tailor, flathead or bream may liberate over one million eggs in a spawning session, while a giant bluefin tuna or marlin will produce as many as 100 million or even 200 million eggs at a time. Skipjack (striped) tuna spawn several hundred thousand eggs every day or so for months on end! In all of these cases the eggs themselves are no more than one millimetre in diameter. They are fertilized externally, and float in midwater or on the surface for a few days before hatching into tiny larvae. Images of the ocean filled with a writhing mass of larvae come to mind, but obviously, the mortality of eggs and larvae must be massive in these early stages of life, and this is a crucial aspect in studying and understanding the dynamics of fish populations and their fisheries. The numbers of surviving juvenile fishes at any time will fluctuate enormously depending on a whole range of factors such as spawning success, food availability for the larvae, predation (a major factor), weather (such as El Nino), and success of settlement of larvae into suitably protective and nourishing habitat. All of these virtually unpredictable variables mean that, even if human beings had never existed on this planet, the numbers of fish in a given population would fluctuate over wide ranges, in an apparently random fashion.

Scientists have tried to grapple with these problems for many years in their attempts to predict fish numbers and therefore, to manage catches. In the U.S., striped bass catches in several years time are predicted on the basis of the abundance of larvae, but what are the main causes of larval survival or mortality? As mentioned, factors such as temperature, rainfall, prevailing currents and plankton concentrations all can and do play a part, often interacting in complex ways. Other less obvious environmental

conditions may also come into play. One such factor may well be wind, and scientists at CSIRO Division of Fisheries laboratories in Hobart have recently been investigating possible effects of prevailing winds on recruitment (ie survival) of larval fish. By plotting the abundance of various species such as gemfish each year against the number of days of strong west winds, they have found strong correlations between the two. Periods of strong winds seem to be also correlated with good years for survival of juvenile scallops and lobsters in Tasmania, leading to a general conclusion that this is a widespread effect. While the correlation is strong, the scientists are yet to come up with any proof of how the wind might affect recruitment. It is possible that the winds carry the surface floating eggs and larvae to favourable locations, but it is also possible that whatever causes the winds to be strong in a particular year might also affect recruitment in some way. Whatever the mechanism, fisheries managers would still be able to use the fact to better predict availability of fish in the future.

One of the problems with these types of studies in which environmental variables are matched with strong and weak 'year classes' of fish is that the data usually only go back in time for 20 or 30 years, sometimes a lot less. These time frames simply may not be long enough to explain the whole picture in many cases, especially for long lived species.

My own observations of the changes in the distribution and abundance of pelagic fish off eastern Australia only span two decades, and because I am still not sure what constitutes a so-called 'normal' year, it looks like I may have to be around for many more decades before I can answer that question!