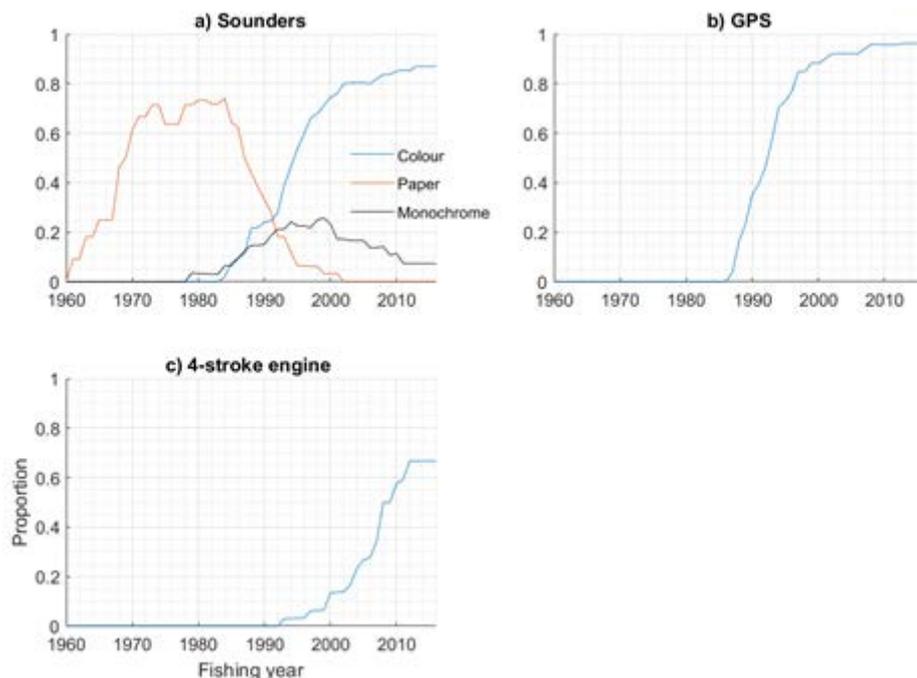


IMPACT OF ADVANCES IN FISHING TECHNOLOGY ON THE SNAPPER FISHERY

Increasing fishing power is a feature of virtually all fisheries around the world. It is caused by improvements in fishing technologies making it easier to catch fish nowadays compared with earlier times (if stock biomass had not changed over time). It is common scientific practise for stock assessments to take into account the effect that these changes have had over time. The best way to think about fishing power as it relates to the snapper fishery may be to think about heading out on an offshore fishing trip today with a paper sounder, monofilament line and a paternoster fishing rig (without a plotter, colour sounder, braid etc). Few would argue that a plotter alone has enabled fishers to check many more fishing spots compared with decades ago and greatly improve the chance of fishing success. Before GPS/Plotter technology, considerable time would be spent in locating areas from landmarks or following depth contours and reef structure on sounders, whereas most fishers these days have 100's of fishing locations stored in their plotters.

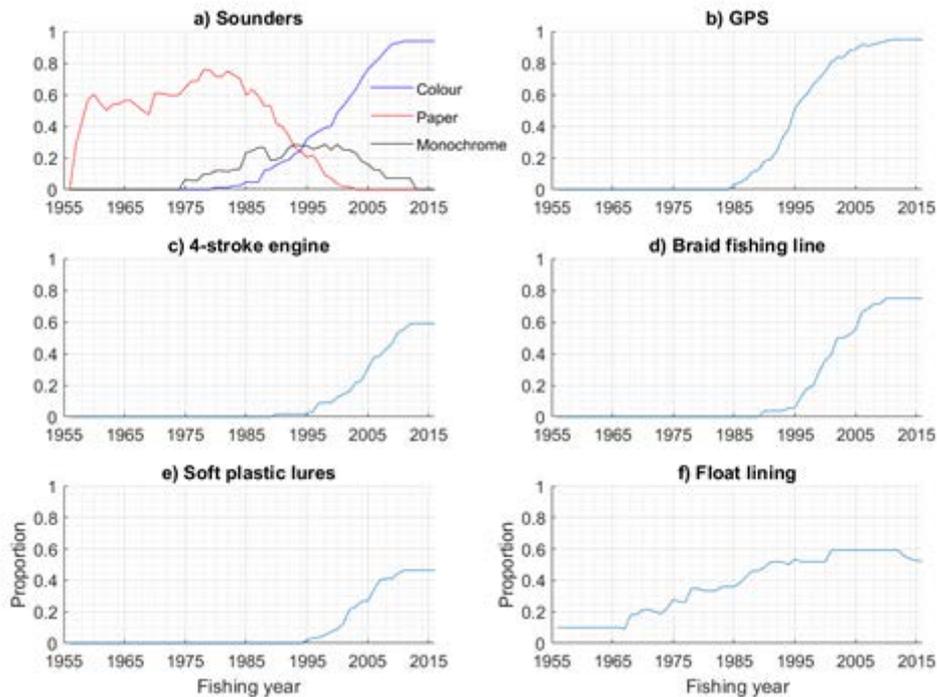
Current research sponsored by the FRDC and earlier related research have interviewed experienced fishers to estimate the rate of uptake of various fishing technology by commercial, recreational and charter line fishers and have gathered information on the fishers' perceptions of the impact of these technologies on catch rates.

Figure 1. Rate of uptake of various fishing technologies based on interviews with experienced (>10years) commercial line fishers in Queensland and NSW.



The technology uptake curves shown in Figures 1 and 2 provide an indication of the timing, as well as the speed of uptake, of a range of fishing technologies by commercial (Figure 1) and recreational (Figure 2) line fishers. These were derived by interviewing fishers with more than 10 years fishing experience and asking when they first started using, and discontinued use, of technologies such as plotters and colour sounders.

Figure 2. Rate of uptake of various fishing technologies based on interviews with experienced (>10years) recreational line fishers in Queensland and NSW.



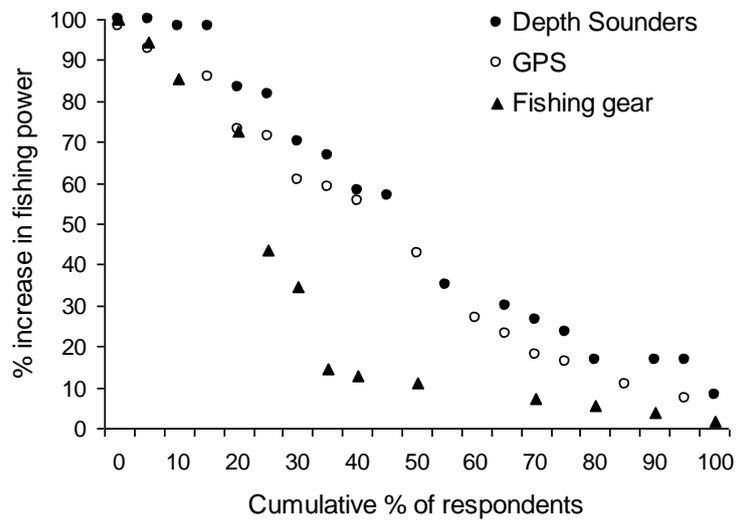
As an example of the differing rates of uptake, commercial line fishers began using GPS technology during the early 1980s but the cost of this technology was initially prohibitive for most recreational fishers. However, their use became more widespread in the mid-1990s before plotters began to replace the less sophisticated GPS units, and by early 2000s GPS or plotters were almost universally used by offshore recreational anglers. The introduction of affordable colour sounders over the last 30 years resulted in the virtual total replacement of the older paper and monochrome equipment. High resolution, bottom discriminating colour sounders were a further advance in sonar technology and these have been further developed into the modern three dimensional high resolution sonars that are in widespread use today by all sectors. GPS and sounders are believed to have had a lesser effect on commercial trap fisheries in NSW compared with line fisheries due to the better established patterns of setting traps and experience of operators.

Almost eighty percent of the offshore recreational fishers surveyed had used braided fishing line, some as early as the early 1990's when it first became available. Other fishing techniques and technologies have had a more differential uptake based more on individual fishers' particular fishing preference. For example, use of soft plastics and float lining are widespread, but not as widely used as plotters and modern sounders (which are almost universally used by offshore line fishers). Fishers also highlighted other advances that were not addressed by the interview questions. The most important of these technologies identified by fishers were graphite rods, "glow" beads and "spot-lock".

The effect of depth sounders and GPS on fishing power were basically equally weighted by our respondents with over 50% of surveyed anglers believing that these two technologies were each at least responsible for a 40% increase in fishing power (Figure 3). The general question on the power of

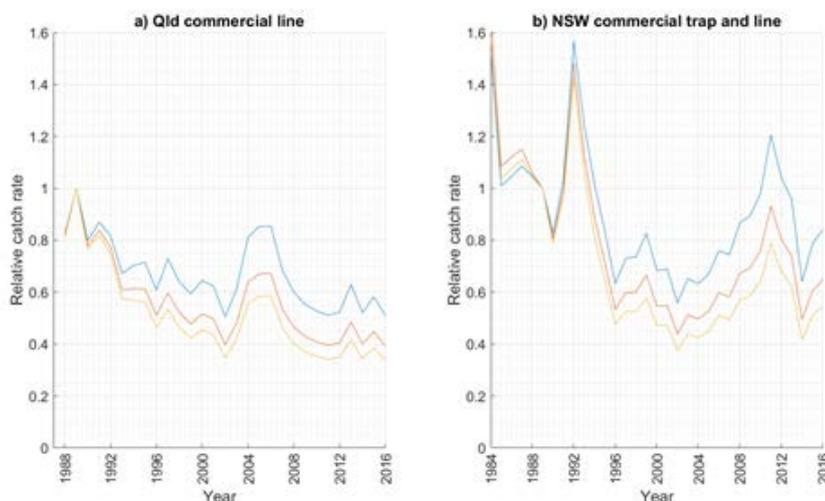
fishing gear (soft plastics, braid, jigs, electric reels etc) showed an approximate 25% increase in fishing power for the main categories of braid, lures, chemically sharpened hooks etc. The variation in the response of recreational fishers in particular to questions posed in the surveys was large, reflecting the wide variation in motivations, fishing practises and abilities.

Figure 3. Cumulative percentage of survey respondents who rated the effects that various fishing technologies had on their abilities to catch fish.



What was clear from interviews was the general view that technology had dramatically increased the ability of line fishers to catch fish. There were still some people who had changed their activities little over the years but this was only a small proportion of those interviewed. The fact that many fishers attributed such a high level of technological impact on their fishing power has important implications for the catch data that are used in stock assessments. Catch rate trends that do not account for the impact of these technologies will present overly optimistic views of stock status. Figure 4 shows the effect that including technological effects has on catch rates in the Queensland and NSW commercial fisheries.

Figure 4. Standardised commercial catch rates adjusted for fishing power effects. Yellow line assumes 100% increase in fishing power, red line 70% increase and blue line 0% increase.



The trends in the lines are the important considerations as they are all adjusted to a reference level of 1988. As expected, the greater the presumed level of impact of fishing power, the more dramatic effect there is on catch rates, as technology is adopted over time.