6 GENERAL DISCUSSION

6.1 Synthesis of broad-scale trends

The dynamics of the Marine Scalefish fishing fleet has changed in recent years and many of these changes appear to be stimulated by management arrangements. The most obvious change has been the continuous decline in fishing effort which has been perpetuated by the licence amalgamation scheme implemented in 1994 and, more recently, the voluntary net buy-back scheme implemented in 2005. Since their implementation, these two management arrangements have successfully reduced the number of licence holders by 43%, which has translated to a 52% reduction in total fishing effort. Consequently, there has been an overwhelming spatial contraction of effort across the State, with fishing intensity virtually disappearing from most regional centres outside of the gulfs and the fishery becoming almost exclusively confined to gulf waters. Most (>85%) of the fishing effort within the Marine Scalefish Fishery is targeted. Collectively the five priority species considered in this report accounted for the greatest proportion (~75%) of targeted effort of which King George whiting has historically dominated (40%), followed by calamary (13%), snapper (11%), southern garfish (8%) and yellowfin whiting (2%). Over the past 24 years, substantial declines in targeted effort were evident for snapper (40%), yellowfin whiting (45%), King George whiting (60%) and garfish (70%) as a consequence of the two management arrangements, with those species that have been heavily targeted by commercial net fishers being affected the most. Calamary was the only species in which targeted effort increased (50%) and this was attributed to their increase in popularity amongst consumers since the early 1990’s, their year-round availability and cost-effectiveness to catch.

Half of the Marine Scalefish Fishery consists of specialist fishers who have expended at least 70% of their time targeting one particular species. However, the relative proportion of these fishers has consistently declined at a rate of 0.5 % year\(^{-1}\). This slow decline indicates that contemporary marine scalefish fishers have become slightly more generalist in nature by spreading their targeted effort more evenly across at least two of the priority species. This level of diversification by specialist fishers generally exhibits clear seasonality in their alternate target species. Snapper and garfish are typically targeted during the summer, whereas King George whiting constitute a staple ‘winter’ alternate target. As calamary are abundant throughout the
year and are easy to catch they have, in recent years, become an established year-round ‘opportunist’ target for specialist fishers. Switching between snapper, King George whiting and calamary is a relatively simple process for handline fishers as only minor gear modifications are required. Similarly, only minor gear changes are required for haul net fishers to switch their targeted effort from King George whiting to garfish and vice versa.

The level of detail in the reporting of catch and effort information has improved as there has been a significant reduction (~ 71%) in the number of fisher days reported in the “any target” category. This improvement may be a result of two underlying dynamics. The first relates to the disappearance of those fishers who were routinely non-specific in their targeted species. Given that approximately 90% of the “any target” fishers used haul nets and that there have been numerous management arrangements directed specifically to the haul net sector, most notably the net-buy back scheme, it is likely that many of these non-specific fishers have voluntarily relinquished their net endorsements and left the fishery. Alternately, they have remained within the fishery and have simply changed their reporting habits to be more specific when documenting their targeted catch. This may have been facilitated by changes in the commercial logbooks and increased level of mandatory reporting which as of July 2003 required fishers to document daily, rather than monthly, fishing activity.

For each of the five priority species there was strong evidence that the total catch was disproportionately distributed amongst fishers, with the bulk of the catch being harvested by a relatively small group of ‘specialist’ fishers. This trend was consistent throughout the 24-year history of the fishery, however, with the exception of the calamary fishery, the ‘efficiency’ of these ‘specialist’ fishers has improved with time. This was most clearly evident in the snapper fishery, where initially the top ten fishers harvested approximately 15% of the total catch, but by 2007 the top ten fishers were contributing ~80% of the total catch. It is likely that advancement in fishing technology coupled with an improved understanding of the distribution and abundance patterns of target species has contributed to the efficiency of specialist fishers. Contemporary fishing vessels are now routinely fitted out with modern fishing equipment, such as Global Positioning Satellite (GPS) units and high-resolution, bathymetric echo sounders that can be used to accurately locate schools of fish. Some fishers have also invested in automatic reels and light-weight gear to maximise their fishing efficiency once they have identified a productive area. This
gradual increase in the efficiency of fishing gear and methods is often referred to as ‘technology creep’ and is inherent within all fisheries, especially those where the total catch is not restricted (King 1996). Such innovations in fishing technology clearly lead to increases in catch and profitability in the short term. However, if these technological advancements go undetected there is a risk that catches and profitability will decrease in the longer term as stocks become depleted, as the relative value of each unit of fishing effort becomes more efficient as the fishery evolves (King 1996).

This improvement in fishing efficiency may also be a consequence of various management strategies that had effectively removed some of the less efficient fishers from the fishery. Although a fishery consists of a broad range of participants with vastly different motivation and interests it can be generally sub-divided into ‘full-time’ and ‘part-time’ fishers and within this context represents a distinction between those that are highly efficient and those that are not (see Ota and Just 2008). It has been suggested that less efficient fishers are more likely to either succumb to financial pressures and sell their licences or accept a lower return for their labour (Hilborn 1985; Ota and Just 2008). Given that the licence amalgamation scheme requires new entrants to purchase two existing licences and the voluntary net buy-back initiative offered an incentive to commercial netters to relinquish their licences, it is possible that many ‘part-time’ fishers exited the fishery and indirectly accelerated its the overall performance and collective fishing efficiency.

6.2 Implications for management

The main purpose of this report was to describe the temporal and spatial patterns of fishing activity in the Marine Scalefish Fishery and, in doing so, explore the ramifications of some of the management arrangements that have been implemented over the past 24 years to provide a basis for predicting species-specific management changes. Results indicated that the fishery is not static and patterns of effort have changed, either directly or indirectly, by management arrangements. The reduction of targeted effort in the net sector of the garfish fishery and its contraction into the northern gulf waters was a clear, direct, consequence of a series of strategic management decisions.

The Marine Scalefish Fishery’s licence amalgamation scheme has proven to be a highly efficient, and cost-effective, means of reducing effort in this fishery. Over time,
the fishery has evolved to consist of fishers that are slightly more diversified in their targeted species and are capable of catching comparatively more fish whilst expending less effort. Although some of these changes can be ascribed to technological advancements, they can also be attributed to the ‘natural selective’ process of the licence amalgamation and net buy-back schemes which have potentially removed some of the ‘least productive’ fishers from the fishery. Contemporary fishers have also demonstrated a greater capacity to spread their effort more evenly across a range of species and have logically synchronised it with the species’ patterns of seasonal abundance. The development of any new species-specific management arrangements needs to acknowledge this level of diversification within the fishery and consider potential, flow-on, effects that may be transferred to other species.

A simple estimate of latent effort in the Marine Scalefish Fishery indicated that the fishery had the potential to expand a further 15% in 2007, an amount that is likely to be more realistic than the traditional unconstrained calculations of latent effort (King 1996) as it was based on the average number of days fished per year by a sub-set of commercial licence holders as well as the average number of additional agents employed to assist in fishing activity. Given that fishing activity was also found to be impeded by periods of poor weather and inversely correlated with market price, it is unlikely that the fishery’s full effort potential will ever be fulfilled.

6.3 Data limitations and future directions

This report relied exclusively on fishery-dependent, commercial catch and effort data. Although ideally these data should represent every fishing activity that has taken place within the fishery, logbook information generally incorporates some degree of uncertainty. This uncertainty has been acknowledged by fisheries management and it has been recommended that a system be established to validate logbook data in the future (Anon 2008). Minor inconsistencies were detected in some of the earlier (1980s) catch returns that related to the net sector. These returns typically exaggerated estimates of targeted effort by identifying multiple species caught in a single net shot as being specifically targeted instead of either nominating a single target species or indicating that “any species” was the target. This level of exaggeration was, however, considered negligible as such erroneous catch returns were estimated to constitute <1% of all returns (Tsolos pers. comm.).
Anecdotal reports have suggested that there have been changes in the level of recreational fishing intensity which have directly influenced the fishing behaviour of some of the commercial fishers. Although there have been two valuable recreational fishing surveys that substantially enhanced understanding of recreational catch and effort in the Marine Scalefish Fishery (McGlennon and Kinloch 1997; Henry and Lyle 2003) there has not been any on-going monitoring. Consequently, it is not known whether there have been any substantial changes in recreational catch and effort over the years, or whether trends in recreational effort have influenced that of the commercial fishery. It is anticipated, that updated estimates of recreational catch and effort data will be available by 2010 (Jones pers. comm.).
7 Reference list


