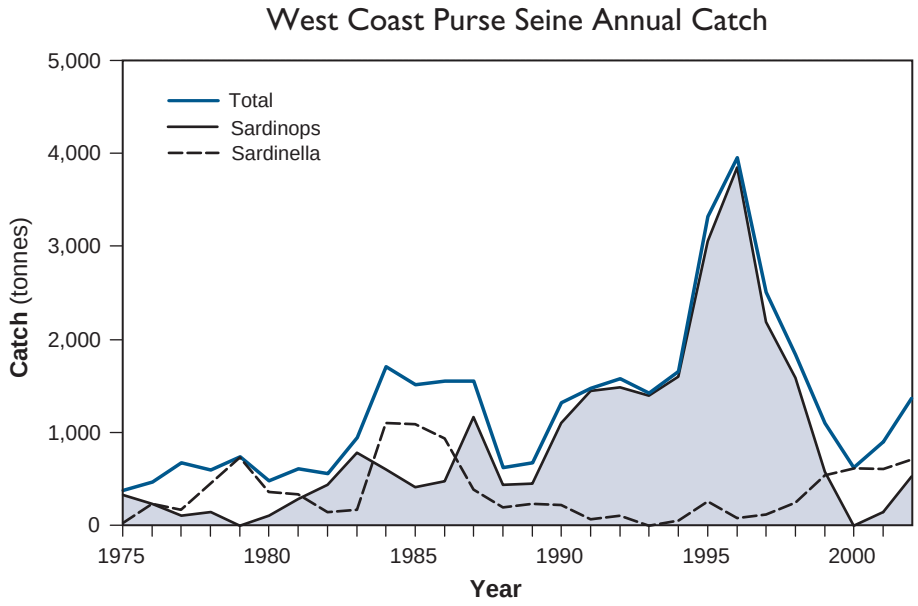
FISHERY GOVERNANCE

Acceptable catch (or effort) range: Not available

Management arrangements are currently based on limited entry with controls on gear and boat size; however, it has been accepted for some time that the fishery should be managed under a catch quota arrangement. The framework of arrangements that would see the change to quota management has been developed following consultation with stakeholders but has yet to be legislated. This situation remains unchanged from last year due to uncertainty about the recovery of the pilchard stocks. Until this issue is addressed, an acceptable catch range cannot be provided.

EXTERNAL FACTORS

The major factor influencing the pilchard stock has been the impact of the virus epidemic in 1998/99. The fishery is also heavily influenced by the contribution of the two dominant pelagic species, which dictates the make-up of the catch in any one year. The influences of environmental factors on the two species are not yet well understood, but oceanographic variability appears to affect the distribution and availability of both species.



WEST COAST PURSE SEINE FIGURE 1

Annual catches of pilchards and sardinella along the lower west coast.

West Coast Demersal Scalefish Fishery

Management Summary

The 'west coast demersal scalefish fishery' describes the most important subset of the State's wetline fishery that has access to species or fishing methods not currently subject to a management plan. The wetline fleet comprises both 'wetline only' vessels and vessels with other managed fishery licences, and is only limited by the overall ceiling on fishing boat licences. Wetline fishing targets mainly demersal finfish using handlines and droplines. The major areas for wetline catches within the west coast bioregion are the Abrolhos Islands, mid-west coast, Perth metropolitan area and the south-west coast.

The west coast demersal scalefish fishery focuses primarily on West Australian dhufish (*Glaucosoma hebraicum*) and pink snapper (*Pagrus auratus*), but also takes baldchin groper (*Choerodon rubescens*) and a range of other species. These species are also caught in the demersal gillnet and longline fishery and by the recreational sector, including charter boats.

Widespread community concern over the unrestricted access of the wetline vessels to a wide range of species led to a study of the fishing activity of wetliners published as Fisheries Research Report no. 118 (Crowe et al. 1999). This document took a 'snapshot' of the fleet at 30 June 1998 and examined its seven-year fishing history (six years for the Abrolhos Islands). The report summarised catch data of dhufish, pink snapper and baldchin groper.

A review of the wetline fishery to develop more effective management arrangements was announced by the Minister for Fisheries in September 2002. Membership of panels to conduct the review was announced in March 2003, with the first meetings held in June. The review is essential before resource-sharing issues can be addressed under an allocation framework as proposed by the Integrated Fisheries Management review.

The Minister has appointed two panels to conduct the review for the west coast and Gascoyne bioregions:

- a Commercial Access Panel, appointed to devise a fair and equitable method of determining who will have access to the fishery and their level of allocation; and
- a Management Planning Panel, appointed to develop the specific management arrangements for the fishery.

This is the first time a two-panel system has been used in a review in Western Australia. This was done to separate the task of determining the management arrangements for the fishery (which requires extensive input from commercial fishing members) from access and allocation (which may benefit from a more independent analysis of fairness and equity issues).

Key issues that will need to be considered as part of the review include:

- the best methods/controls to manage the fishery;
- how to reduce the high level of latent effort within the fishery;
- how to determine the allocation of access to the fishery;
- consideration of the 3 November 1997 benchmark date announced by the previous Minister; and
- the cost of any management models.

This process will report to the Minister for Fisheries in 2004 and is expected to result in the development of a management plan for wetline fishing.

Governing Legislation/Fishing Authority
Fish Resources Management Regulations 1995
Fishing Boat Licence

Research Summary

Two research projects, both funded by FRDC, are focusing on demersal fishes in the west coast bioregion. The first project, on release mortality of demersal fishes, comprises two parts: a tagging study examining longer-term mortality of under-size demersal fish using three methods of release (venting, shotline and simple), and a short-term mortality experiment on snapper and dhufish that has been completed.

Results from the short-term (several days) release mortality experiments indicate that depth is the major factor affecting mortality in dhufish and snapper, with an average mortality of 52% in dhufish across all depths tested. Hook damage, causing severe bleeding from the gills, accounted for 5% and swallowed hooks accounted for another 8% of all deaths in released fish. The remaining mortality was attributed to barotraumas (akin to decompression sickness in divers) which increased with depth of capture from 21% at 0–14 m to 86% at 45–59 m (West Coast Demersal Scalefish Figure 1). The mortality rates of fish returned by recreational and commercial fishers could be higher than found here if some fish also die as a result of an inability to swim back to depth due to inflated swim bladders. Removing the expanded gas from the swim bladder by venting did not affect the mortality of caged fish and therefore may assist released fish to descend easily.

The second FRDC-funded research project, commencing in July 2003, will study the stock structure of dhufish and pink snapper populations along the west coast to determine the appropriate geographical scale for management. Regional variation in age structure and timing of reproduction will be examined in populations of dhufish and pink snapper and information on the biological parameters for lower west coast pink snapper will be collected. The research project includes funding for a PhD student (Murdoch University) studying reproductive biology, age and growth of pink snapper on the lower west coast.

The preliminary assessments of major demersal species in the west coast bioregion will be refined as the commercial data set is improved and additional biological information becomes available. In the interim, the fishery will continue to be monitored annually using CAES data.

A further FRDC-funded project has also undertaken work of relevance to this fishery. An alternative method of stock assessment for dhufish has been provided by a time-series model that makes forecasts of catches from one to up to five years in advance. The model incorporates lagged interactions of CAES catch rate data measured over a specific month (November) each year and annual Southern Oscillation Index (SOI) averages. A positive correlation was found between catches and the SOI component. The dhufish fishery is only weakly seasonal. However, November is typically the month before the peak catch period and November catch rates may signify the abundance of the mature fish prior to spawning. The SOI is thought to affect the abundance of juvenile settlement.

West Coast Demersal Scalefish Stocks Status Report

Prepared by J. St John

FISHERY DESCRIPTION

Boundaries and access

The west coast bioregion encompasses the waters of the Indian Ocean south of latitude 27° S and west of longitude 115°30′ E. During 2001/02 a total of 66 ‘wetline only’ vessels, and another 189 vessels that were licensed in other fisheries, operated within this bioregion using handline and dropline to target demersal species. Wetlining for west coast demersal scalefish is not yet subject to a specific management plan.

Main fishing method

Handline and dropline.

RETAINED SPECIES

Commercial production (season 2001/02): 1,094 tonnes

Landings

During 2001/02, 243 of the 255 boats in the west coast bioregion wetlined for demersal finfish, an additional 39 boats compared to last year. Of these, 227 boats reported catching West Australian dhufish, 214 boats caught pink snapper and 141 boats caught baldchin groper. Landings of pink snapper were highest at 250 t, followed by dhufish at 219 t. Among the other demersal species, baldchin groper was in the top four with 34 t. In the northern area of the west coast off Geraldton, major demersal species in the catch included the two lethrinid species, *Lethrinus nebulosus* and *Lethrinus miniatus* (variously reported as spangled emperor, sweetlip emperor, large nor-west snapper and nor-west snapper), with 124 t caught by 86 boats. Also, 56 boats caught 14 t of coral trout (*Plectropomus maculatus*). These six major demersal species comprised almost 60% of the total catch of all species caught by handline and dropline in the fishery.

The remainder of the catch included around 75 other scalefish species, 17 species of sharks and rays and three invertebrate groups. Samson fish (*Seriola hippos*), redfish (correctly Bight redfish, *Centroberyx gerrardi*) and sharks (copper whaler, *Carcharinus brachyurus*, and wobbegong, Orectolobidae) ranked highly, with catches of 72, 40 and 74 t respectively (sharks combined).

In 2001/02 the catch of the entire fishery was 1,094 t, an increase of 198 t (22%) over the previous year.

Catches of demersal scalefish taken under other managed fishery licences are not included in the above catches. The West Coast Demersal Gillnet and Demersal Longline (Interim) Managed Fishery (WCDGDLF) landed 87 t of scalefish in 2001/02, including 16 t of dhufish and 14 t of pink snapper (see demersal gillnet and longline fisheries status report on pp. 132–136). The Cockburn Sound finfish fishery also lands small quantities of large mature pink snapper, which are likely to form part of an oceanic stock.

Dhufish: The reported total catches of dhufish along the west coast over the last 10 years reflect general trends in fishing effort (West Coast Demersal Scalefish Figure 2). The wetline catch of 219 t during 2001/02 was the highest ever reported and continues the trend for escalating catch of this species. (By contrast, the catch of dhufish in the WCDGDLF for 2001/02 was 16 t, which was the same as the previous year.)

This year's reported catch is 41% above the 155 t of the 10-year mean up to 1999/2000. Moreover, for the second consecutive year, it is above the upper limit of the acceptable range of 125–179 t, this time by 22%. Highest monthly catches of over 20 t were recorded in both April and May 2002.

Pink snapper: The trend to increasing catches of pink snapper continues in 2001/02 with landings of 250 t, an increase of 46 t over the previous year. The catch this year was also above the 10-year average of 204 t, however it is well below the last peak catch of 309 t in 1995/96 (West Coast Demersal Scalefish Figure 3). The higher catch appears to fit a general cyclical pattern of snapper catches in this region reflecting large natural annual fluctuations in recruitment to the stock, particularly in the north of the bioregion. Thus, it is likely that pink snapper stocks were more abundant this year because the pink snapper catch in gillnets of the WCDGDLF rose from 7 t in 2000/01 to 14 t in 2001/02 without any significant increase in effort.

Similarly to last year, catches greater than 20 t occurred from January to June 2002, with the highest catch of nearly 36 t in April.

Baldchin groper: The catch of baldchin groper in 2001/02 was 34 t, which is close to the 10-year average of 31.8 t. Compared to dhufish and snapper, the catch of baldchin groper has remained relatively consistent over the last 10 years (West Coast Demersal Scalefish Figure 4). Monthly catches ranged from 1.7 t to a high 5.1 t in April, with catches greater than 3 t reported from March to June.

Fishing effort

Throughout 2001/02, 243 boats fished a total of 12,118 days in the west coast demersal scalefish fishery. Compared to the previous year, effort in this fishery increased 30% and the number of active boats increased by 18%. Throughout the bioregion, fishing effort for pink snapper and baldchin groper reached their highest levels yet at 9,635 and 5,999 days respectively, whereas fishing effort for dhufish was at its second highest for the decade. Even though these increases are substantial, they only represent the mobilisation of a small fraction of the latent effort possible in this fishery. These effort levels have also not been adjusted to reflect changes in efficiency.

Catch rate

To examine the catch rates of individual species caught throughout the bioregion, catch and fishing effort from boats that targeted these species were examined in two areas (Geraldton and Fremantle) which have different levels of fishing pressure. Annual catch rates have been calculated using the top 10 boats with reliable data for each year in each region. This system allows for the frequent changes in boat ownership or skippers that are common in the wetline sector. Average catch rates, and standard errors depicting variability of catch rates among boats, were calculated for dhufish and snapper in both regions and for baldchin groper in the Geraldton region only (West Coast Demersal Scalefish Figures 2, 3 and 4). Furthermore, the nominal effort of each boat used to calculate dhufish CPUE was adjusted upwards by 5% in 1992/93, 10% in 1993/94 and by 15% from 1994/95 onwards to the present, to account for increases in fishing efficiency due to technological improvements.

Recreational component: > 30%

Results of the national telephone survey of recreational fishing conducted from May 2000 to April 2001 provide an update of the recreational catch for Western Australia and all Australia (Henry and Lyle 2003). The only analyses of

these data currently available report on the statewide estimates of catch for the main target species. Of the species important in the west coast demersal scalefish fishery, the statewide catch figures for only two species, pink snapper and dhufish, were reported.

The analyses to provide estimates of the catch of the main species on a bioregional basis are currently under way. Preliminary analyses indicate that the recreational catch of dhufish and snapper may be much greater than was found in the previous estimates for this region in 1996/97 using boat ramp surveys (Sumner and Williamson 1999). These data indicated that the recreational catch shares in 1996/97 were dhufish 46%, snapper 10.5% and baldchin groper 44% (see *State of Fisheries Report 2000/2001* for more details). Consequently, the new information is likely to show that the recreational component is now significantly higher than the previously reported 30% of the total catch of demersal finfish in this region.

Stock assessment completed: Yes

In the absence of representative age structures for fish populations, stock assessments are generally restricted to the use of catch rates to provide a relative measure of abundance. Such assessments assume that the relationship between catch rate and abundance remains constant, yet the fishing efficiency of this fleet has increased with technological improvements over the last 10 years (see above) which affects this relationship. To assess trends in the major demersal stocks targeted by this fishery, standardised catch rates and overall catch and effort data are monitored. Unless stated otherwise, all dhufish catch rates are adjusted for fishing efficiency.

Research to generate the regional age structures of dhufish and pink snapper populations within the west coast bioregion has been initiated to enable more sophisticated stock assessment techniques to be used in the future.

Dhufish: Catch rates of dhufish in the Geraldton area may be a relatively reliable measure of stock abundance because fishers in this area target a suite of high-value species including coral trout, baldchin groper and lethrinid species. In Fremantle, dhufish is the most valuable species and highly targeted, with fishers attempting to maximise their catch rates of this species, potentially making them a less robust indicator.

The catch rates of dhufish around Fremantle have risen for the first time since the exceptionally high rates in 1997/98 (West Coast Demersal Scalefish Figure 2). At 42 kg/day, current catch rates are higher than the 10-year average of 37 kg/day but not as high as the previous peak of 58 kg/day in 1997/98. Catch rates of dhufish in Geraldton have risen consistently throughout the decade to their current level of 44 kg/day, which is significantly higher than the 10-year average of 32 kg/day. The average catch rates in the two regions are very similar, with significant differences in two years only, 1996/97 and 1997/98.

The WCDGDLF uses gillnets, which are a passive form of fishing that does not target dhufish directly. Therefore, the gillnet catch rates (kg fish/ km of net/ day of standardised effort at 19 hours = 1 day) provide an alternative and arguably better index of abundance. The CPUE of dhufish caught by the WCDGDLF rose by 18% over the last three years, from 5.72 in 1999/2000 and 6.11 in 2000/01 to 6.76 in 2001/02.

Although these increasing catch rates should signify healthy dhufish stocks, there are a number of precautionary elements that need to be considered, as set out below, and close scrutiny of the fishery is required to ensure that it does not become over-exploited.

- The escalating commercial catch of dhufish in recent years, with the record catch in 2001/02, shows that this species is under increasing fishing pressure. Furthermore, the dhufish is an icon species that is targeted by recreational fishers in increasing numbers and is distributed across Western Australia's most populated area, Perth and surrounds.
- Whilst corrections have been used to account for the increases in fishing efficiency due to the introduction of global positioning systems (GPS), these are difficult to measure and the impact of increasing fisher knowledge remains unquantified.
- The increased fishing effort is only a small proportion of the potentially high level of latent effort available in this fishery.

Pink snapper: Most of the pink snapper caught in this fishery come from the north of the bioregion, with the Geraldton-based boats dominating the annual trends in the total snapper catch (West Coast Demersal Scalefish Figure 3). The two areas have very different patterns of average catch rates of pink snapper over the decade. Within areas, variability in catch rates was higher among boats in Geraldton than in Fremantle.

In Fremantle average catch rates are relatively low and stable (ranging from 15 kg/day to 32 kg/day), whereas average catch rates in Geraldton have varied annually from 67 kg/day to 174 kg/day (West Coast Demersal Scalefish Figure 3). In 2001/02, despite the increasing catch, the average catch rate at Geraldton was lower than the previous year, though still relatively high. The large differences in both the magnitude and the annual trends of average catch rates between the two areas suggest that the population of pink snapper in Fremantle is probably not influenced by recruitment events occurring in the Geraldton region.

The catch of pink snapper in 2001/02 by other fisheries in this region suggests that there was an increased abundance of pink snapper stocks. For example, pink snapper caught by the WCDGDLF rose from 7 t in 2000/01 to 14 t in 2001/02 and the CPUE increased from 2.67 to 6.06 (kg/ km net/ day). As already discussed, this apparent increase in abundance is likely to be a peak in the cyclical pattern. Therefore, if high levels of fishing effort on pink snapper by the wetline fishery continue, this may be of concern in the future.

Baldchin groper: Catch and catch rates of baldchin groper have been the least variable of the major species in the west coast demersal scalefish fishery. The average CPUE for

baldchin groper by the top 10 boats at Geraldton has remained steady around 15 kg/day over the last decade; however, in 2001/02 the CPUE (approximately 12 kg/day) has declined slightly to its 1992/93 level (West Coast Demersal Scalefish Figure 4). At the same time, total fishing effort for baldchin groper increased 16% to reach a record level (9,635 fishing days), but total catch only increased 2%. If this pattern of increasing fishing effort with decreasing catch rates continues, then the fishery may be showing signs of over-exploitation, particularly as these catches have not been adjusted for the inevitable increase in fishing efficiency over the past decade.

Exploitation status: **Fully exploited**

Breeding stock levels: **Adequate**

The adjusted catch rates for the three main target species provide an indication of spawning biomass, which does not suggest that breeding stock levels are currently affecting subsequent recruitment. Direct measurements of current breeding stock levels against estimated virgin biomass would be needed to confirm this assessment. Fish species that aggregate to spawn are, however, more vulnerable to over-exploitation because these aggregations may be predictable in time and/or space. Of the main target species, pink snapper are known to form large spawning aggregations and dhufish are suspected of aggregating to spawn; however, very little is known about dhufish spawning behaviour.

NON-RETAINED SPECIES

Bycatch species impact: **Low**

Line fishing is a highly selective fishing method that targets demersal fishes using baited hooks. Bycatch therefore comprises only a small proportion of the overall catch, and includes small numbers of inedible species (e.g. silver toadfish) or small fishes (e.g. wrasses), which are discarded.

Protected species interaction: **Not applicable**

ECOSYSTEM EFFECTS

Food chain effects: **Not assessed**

Habitat effects: **Negligible**

The fishing methods used in the wetline fishery to target demersal fishes (baited handlines and droplines) have little physical impact on the benthic environment.

SOCIAL EFFECTS

Employment in this fishery is difficult to assess because 74% of the boats (189) in the wetline fleet are associated with other licensed fisheries. Only 66 boats in the wetline fleet hold no other licences and thus are 'wetline only'. On average, the entire wetline fleet fished 47 days each employing around 168 skippers and crew to take demersal finfish during 2001/02.

ECONOMIC EFFECTS

Estimated annual value (to fishers) for year (2001/02): $5.3 million

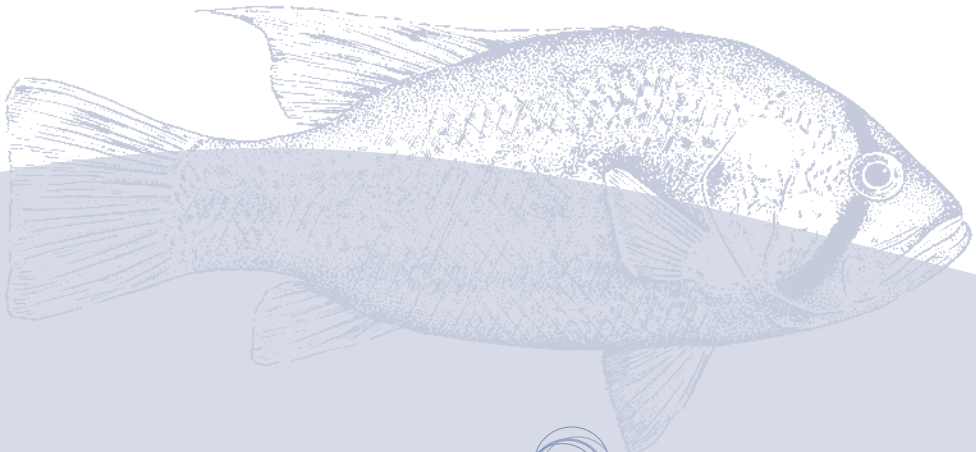
The estimated value of the fishery in 2001/02 includes all species caught by handlines and droplines on the west coast of Western Australia. More than 108 species or groups of seafood were recorded as catch and sold for an estimated $5.3 million. The highest-valued catch was dhufish at 37% of the total value, followed by pink snapper (22%), the lethrinids (11%), baldchin groper (4%) and coral trout (3%). Catch of all other species combined was 23% of the value of this fishery. Based on 2000/01 prices, dhufish, pink snapper and baldchin groper sold on average for $9.41/kg, $5.24/kg and $6.72/kg respectively and, at $10.54/kg, coral trout commanded the highest average price of all species in the fishery.

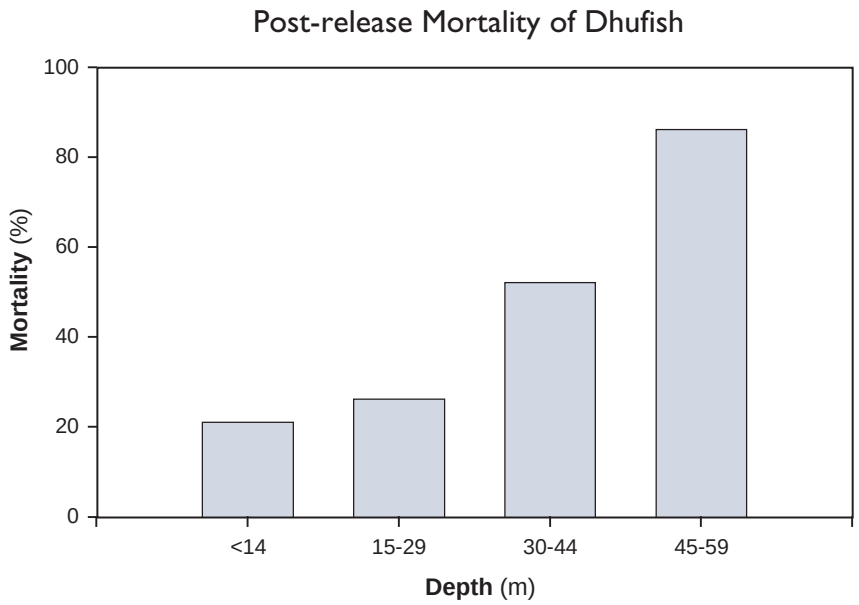
FISHERY GOVERNANCE

Acceptable catch range: **558–798 tonnes**

The acceptable catch range is based on the mean from catches in the decade 1990/91 to 1999/2000 using 80% confidence limits around that 10-year mean. For the entire fishery, the acceptable catch range is 558–798 t. Acceptable catch ranges for individual species are 125–179 t for dhufish, 153–254 t for pink snapper and 27.5–35.5 t for baldchin groper.

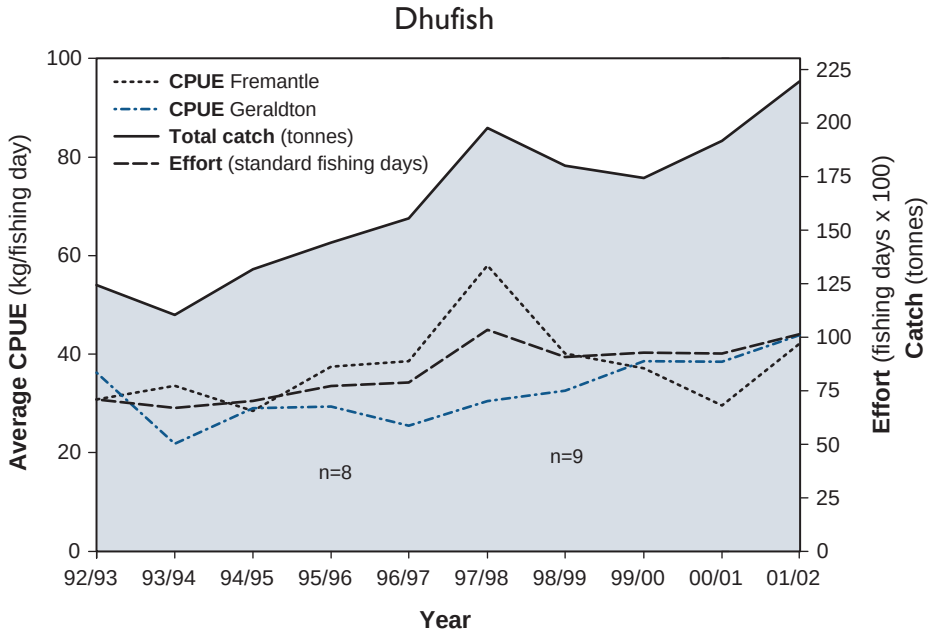
For the second consecutive year, the catch of the entire fishery at 1,094 t is well above the acceptable range. This range was exceeded by 12% in 2000/01 and 37% in 2001/02. Although catches of pink snapper and baldchin groper in 2001/02 were both within the acceptable range based on 1990s catches, the record catch of dhufish, at 219 t, was well above the acceptable range for the second consecutive year. Until specific management arrangements are implemented for this sector the levels of exploitation, particularly for dhufish, can be expected to continue to rise as market demand remains favourable. A review of the management arrangements for this fishery is currently under way as part of the 'wetline review'.





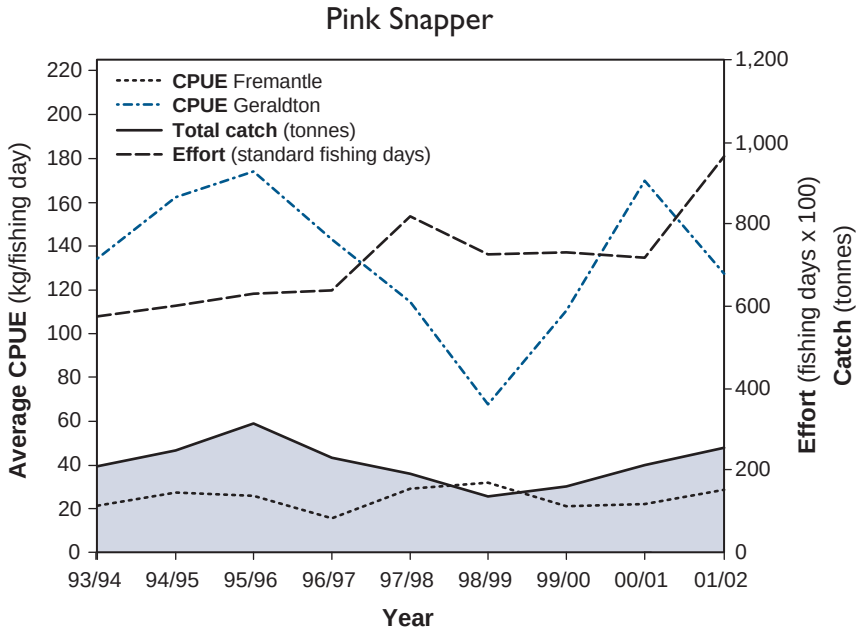
WEST COAST DEMERSAL SCALEFISH FIGURE 1

Post-release mortality of dhufish (Glaucosoma hebraicum) in experimental cages at four depths of capture: 0–14 m (n = 19), 15–29 m (n = 19), 30–44 m (n = 23) and 45–59 m (n = 23).



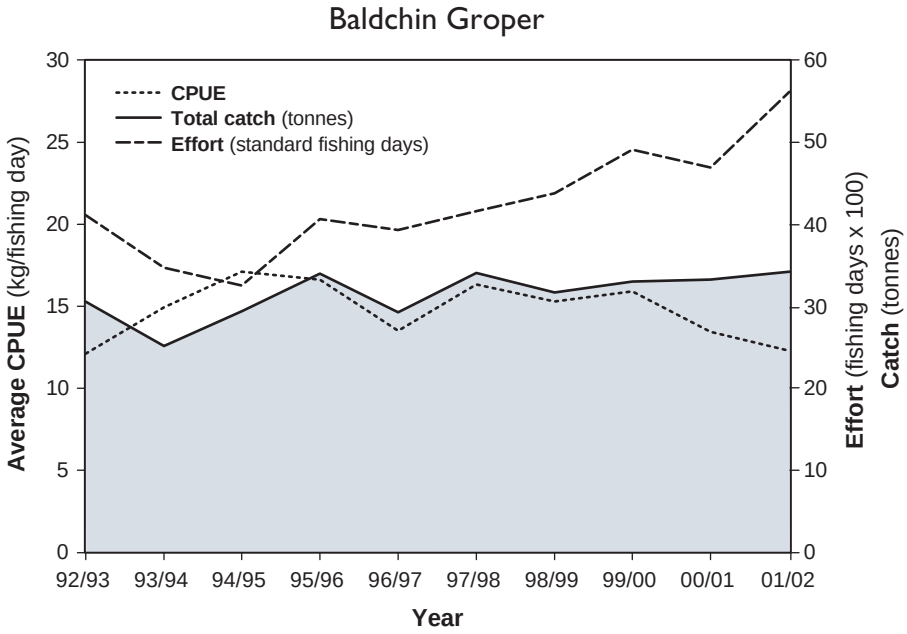
WEST COAST DEMERSAL SCALEFISH FIGURE 2

Annual catch and adjusted effort for dhufish in the west coast demersal scalefish fishery over the decade from 1992/93 to 2001/02. Catch per unit effort (CPUE, kg/adjusted fishing day) is shown for dhufish caught by the top 10 boats (unless indicated otherwise) each year in two regions, Fremantle and Geraldton.



WEST COAST DEMERSAL SCALEFISH FIGURE 3

Annual catch and effort for pink snapper in the west coast demersal scalefish fishery over the decade from 1992/93 to 2001/02. Catch per unit effort (CPUE, kg/standard fishing day) is shown for pink snapper caught by the top 10 boats each year in two regions, Fremantle and Geraldton.



WEST COAST DEMERSAL SCALEFISH FIGURE 4

Annual catch and effort for baldchin groper in the west coast demersal scalefish fishery over the decade from 1992/93 to 2001/02. Catch per unit effort (CPUE, kg/standard fishing day) is shown for baldchin groper caught by the top 10 boats each year off Geraldton.