

# Annual status report 2005 and *Fisheries Regulation 1995* biennial review

## East Coast Spanish Mackerel Fishery



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The Department of Primary Industries and Fisheries (DPI&F) seeks to maximise the economic potential of Queensland's primary industries on a sustainable basis.

This publication provides information on the East Coast Spanish Mackerel Fishery.

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## Introduction

The East Coast Spanish Mackerel Fishery (ECSMF) is a line fishery targeting the largest of the mackerel species in Queensland—*Scomberomorus commerson*. Spanish mackerel are highly sought after by both commercial and recreational fishers.

This annual status report also forms the basis of the Department of Primary Industries and Fisheries' (DPI&F) biennial review of the Spanish mackerel fishery, which is required under Queensland legislation.

## Description of the fishery

### Fishing methods

The ECSMF is a line-only fishery in which both commercial and recreational fishers are permitted to use a maximum of three lines and up to six hooks. Spanish mackerel are generally caught while trolling.

### Fishing area

Commercial operators with a Spanish mackerel (SM) fishery symbol and who possess a line fishing endorsement in the form of an 'L' fishery symbol (i.e. L1, L2, L3, L6, L7 and L8), are permitted to take Spanish mackerel in east coast Queensland waters. The line symbol they are operating under dictates the area in which they can fish (see Figure 1).

The harvest of Spanish mackerel in the Gulf of Carpentaria is managed separately to the east coast.

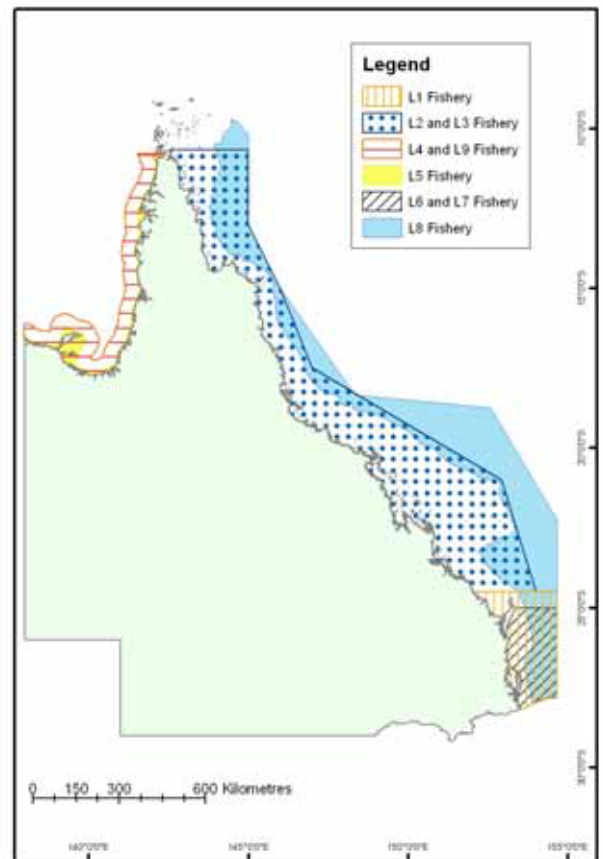


Figure 1: Fishery areas

### Main management methods used

Management of the ECSMF is the responsibility of DPI&F. A range of input and output controls are set out in the Fisheries Regulation 1995 and are used to manage the harvest of Spanish mackerel. These controls include:

- a total allowable catch (TAC) for the commercial sector, shared through individual transferable quotas
- a minimum size limit of 75 cm
- a recreational in-possession limit of three fish

- total closures to the take of Spanish mackerel in certain areas
- permits to commercially fish for Spanish mackerel in grey nurse shark designated areas in southern Queensland
- a mandatory requirement for recreational fishers to remove a pectoral fin from a retained fish
- restrictions on the maximum size of boat permitted in the commercial fishery.

### **Approximate allocation between sectors**

The Spanish mackerel resource has historically been shared almost equally between the commercial and recreational sectors. However, the catch share has shifted towards the recreational sector as a result of the TAC not being met during the 2004–05 year.

### **Fishery accreditation under EPBC Act**

A Wildlife Trade Operation (WTO) approval was granted in December 2004 under Parts 13 and 13A of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). This WTO approval acknowledges that the fishery was being managed in an ecologically sustainable manner and allows the continued export of Spanish mackerel caught on the east coast of Queensland. This approval expires in December 2007.

## **Fishery profile**

**Total harvest from all sectors:** approximately 781 t

**Commercial harvest 2004–05 quota year:** approximately 326 t

**Recreational harvest 2002:** approximately 425 t

**Indigenous harvest:** uncertain, but considered negligible

**Charter harvest 2004:** approximately 30 t

**Commercial Gross Value of Production (GVP) for 2004–05 quota year:** between \$2.4–\$3.5 million

**Number of licences:** 298 (including 38 held by the Commonwealth Department of Environment and Heritage under the Great Barrier Reef Marine Park Structural Adjustment Package) as of January 2006

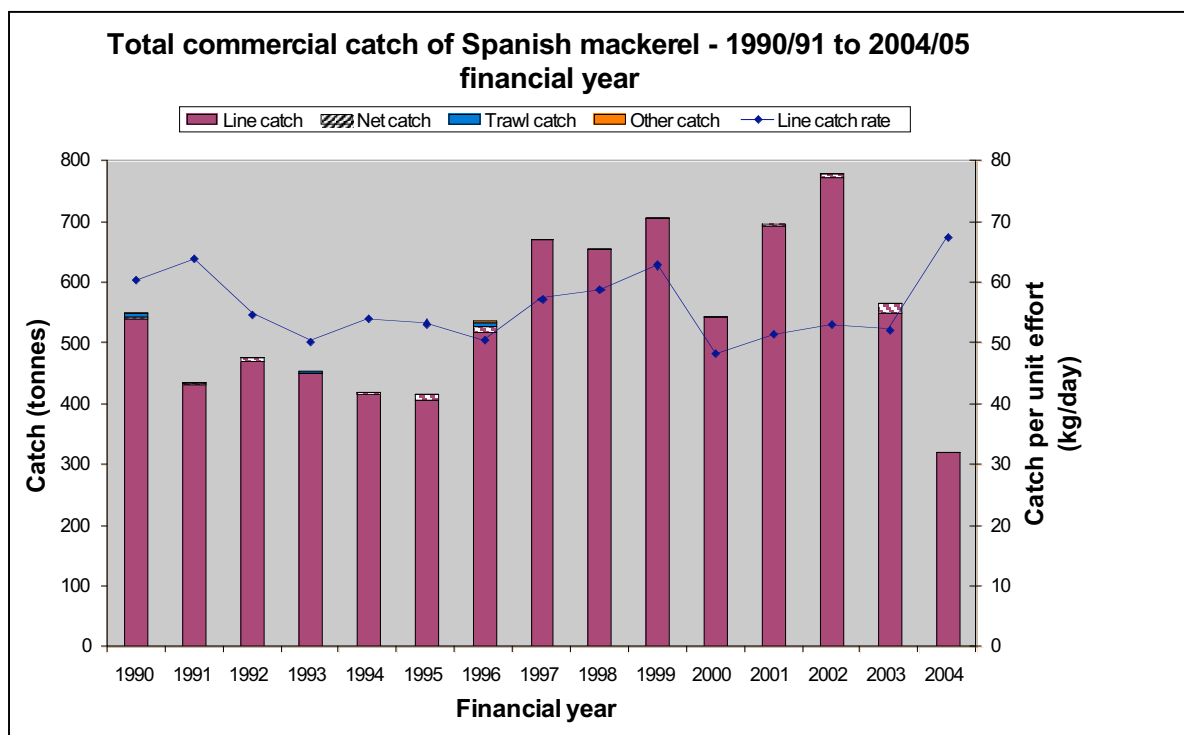
**Commercial fishing boats accessing the fishery in 2004–05:** 185

### **Catch and effort**

#### **Commercial**

The commercial catch of Spanish mackerel (Figure 2) has historically exhibited a stable catch per unit effort trend, despite inter-annual variability in total catch. Because Spanish mackerel are a schooling species, there is some potential for hyperstability in the fishery. That is, it's possible that the index of abundance (catch per unit effort) can remain stable while a decline in abundance actually occurs. For this reason, age-structured stock assessments have been undertaken.

Ryan (2004)<sup>1</sup> considered the catch history to consist of two clear periods (pre- and post-1997) with the increase in catch post-1997 corresponding to speculative fishing following the 1997 investment warning for the Coral Reef Fin Fish Fishery. This increase in catch was followed by a sharp reduction between 2002–03 and 2003–04 (Figure 2). This is likely to be a result of the introduction of the SM fishery symbol in the second part of the financial year (February 2004) and the associated decrease in the number of boats accessing the fishery. Figure 3 shows the decline in both boat numbers (432 in 2003–04, down from 531 in 2002–03) and days fished.

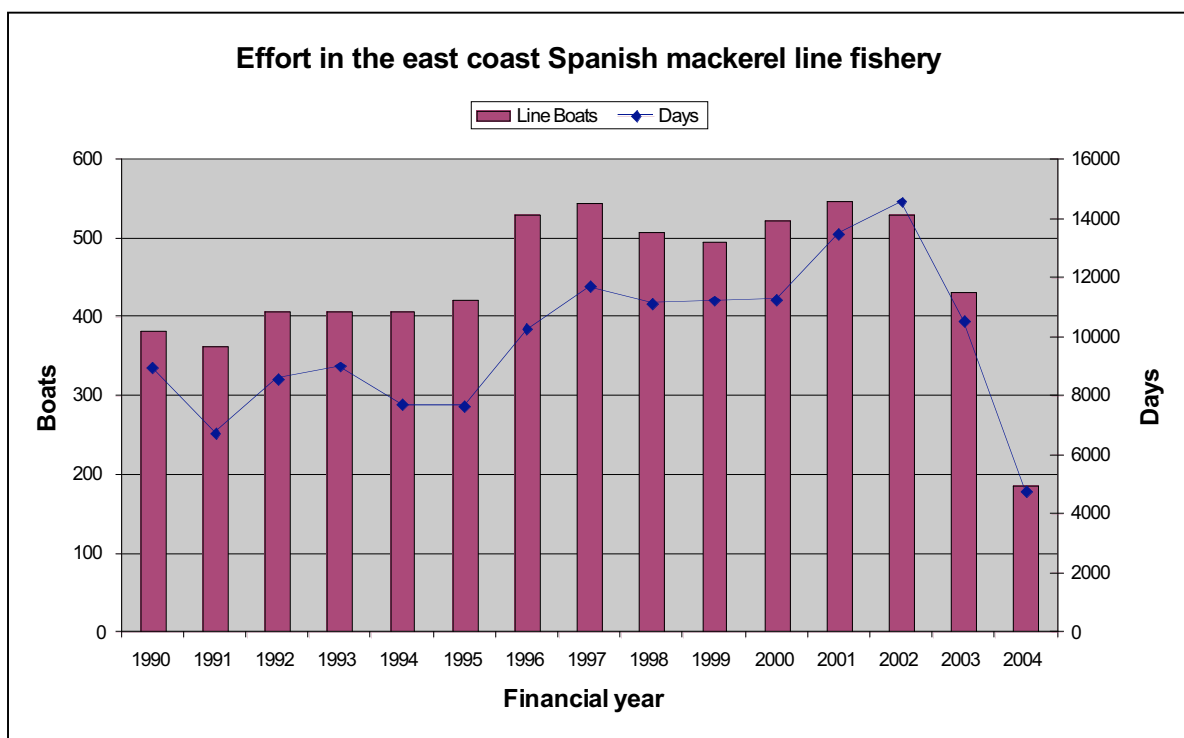


**Figure 2:** Total commercial catch and effort of Spanish mackerel—1990–91 to 2004–05 financial year.

The catch declined further during the first quota year, from 567 t in 2003–04 to 326 t in 2004–05 (Figure 2). Effort also declined by more than half, from 10 550 days in 2003–04 to 4780 in 2004–05 (Figure 3). The number of boats accessing the fishery also continued to decline to an historic low of 185 in 2004–05 (Figure 3). Concurrent with decreases in effort, there has been a sharp increase in catch per unit effort (67.4 kg/day compared to 52.3 kg/day in 2003–04). It is likely that this increase in catch per unit effort is a result of the most active and efficient operators remaining in the fishery, following the introduction of new management arrangements in early 2004 and the removal of less efficient Spanish mackerel fishers (e.g. see Figure 4).

The distribution in effort in the fishery is described further in the ‘Protection of spawning aggregations’ section. The largest area of effort is focused around Rib Reef, off Townsville, where Spanish mackerel aggregate in large numbers.

<sup>1</sup> Ryan, S. 2004. *Ecological assessment of the Queensland east coast Spanish mackerel fishery*. Department of Primary Industries and Fisheries, Brisbane, Australia.



**Figure 3:** Effort in the east coast Spanish mackerel line fishery—1990–91 to 2004–05 financial year.

Figure 4 shows the characteristics of the Spanish mackerel fleet over time. In general, the ECSMF exhibits a similar pattern to other fisheries in Queensland, in that a significant proportion of the operators in the fishery only harvest a small amount of product.

Figure 4 also reflects the reduction in fishing days across the fishery in 2004, compared to earlier years. Notwithstanding this, in 2004–05 a 50% reduction was apparent in the number of operators who harvest smaller quantities of Spanish mackerel (i.e. less than 50 kg a day). This is predominantly a result of the allocation of SM fishery symbols and associated line units and the subsequent removal of operators who could not demonstrate a significant history in the fishery.

The buyback of SM fishery symbols by the Department of the Environment and Heritage (DEH), through the Great Barrier Reef Marine Park Structural Adjustment Package in 2004–05, has also contributed to the reduction in fishing effort. In addition, commercial operators have indicated that there has been a shift in targeting behaviour, with operators who historically targeted Spanish mackerel tending to target live coral trout in the Coral Reef Fin Fish Fishery more often due to the higher value of that species (Col Lound, commercial fisher, pers comm., 2005).

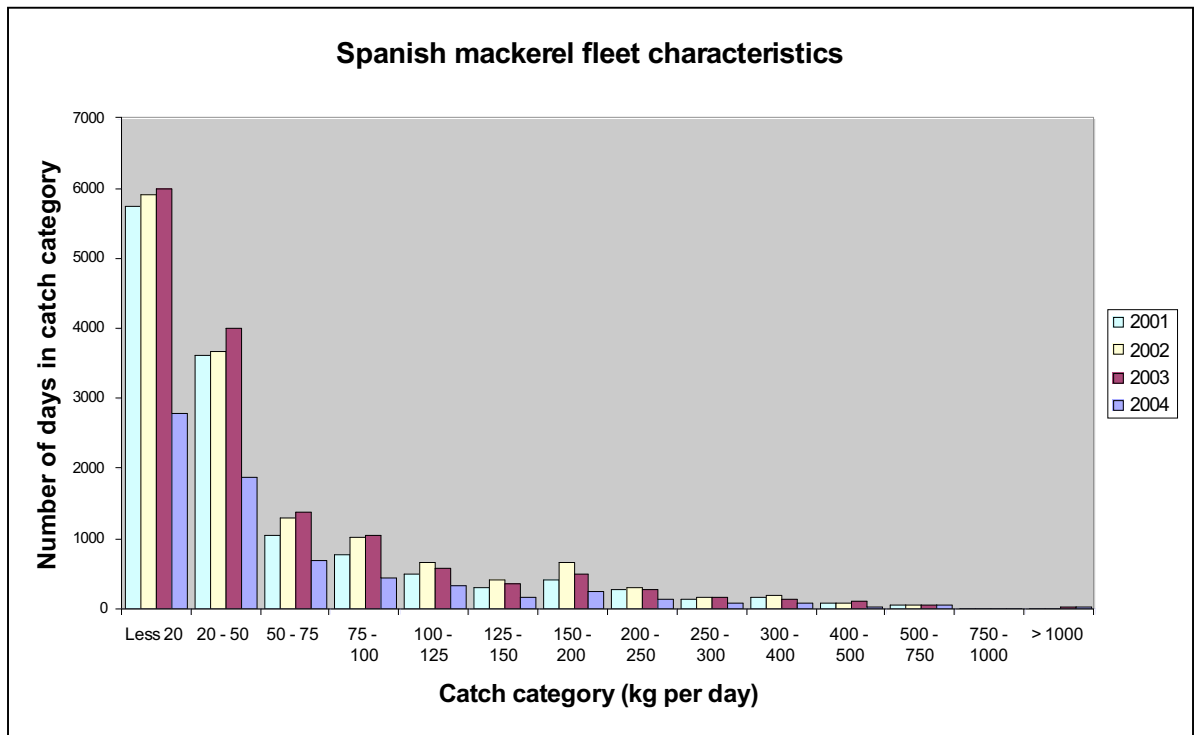


Figure 4: Spanish mackerel fleet characteristics.

#### *Under-catch of quota*

New management arrangements were introduced for the Spanish mackerel fishery based on a TAC of 620 t shared among commercial fishers through individual transferable quotas. Commercial fishers that demonstrated a previous reliance on the Spanish mackerel fishery could remain in the fishery through the allocation of an SM fishery symbol and SM units. With the introduction of the catch quota system, a quota reporting system was established that requires commercial fishers to report trip catches to DPI&F prior to landing.

There are several factors that have collectively contributed to the reduction in the total catch and effort of Spanish mackerel in the commercial fishery in 2003 and 2004, and the under-catch of quota in the first year. These include:

- fisher difficulty with the introduction of the TAC and the associated administrative requirements
- transfer of effort to the coral reef and net/crab fisheries
- further closure to areas within the Great Barrier Reef, through the rezoning of the Marine Park in 2004
- inclement weather
- rising fuel prices
- difficulty in employing and maintaining reliable crew
- increased competition from imports.

Consultation with industry during the development of new management arrangements for Spanish mackerel resulted in industry support for a catch-based quota management system. However, the introduction of the catch quota system itself generated a certain level of upheaval in the fishery. Fishers were reluctant to undertake the necessary reporting requirements when fishing for quota species, resulting in avoidance of participation in the commercial Spanish mackerel fishery.

The total number of SM units available for use in the commercial fishery has been reduced through the buyback of units by the DEH under the Great Barrier Reef Marine Park Structural Adjustment Package. The DEH structural adjustment package was offered to those fishers who demonstrated they were severely affected by the introduction of the Representative Area Program (RAP) by the Great Barrier Reef Marine Park Authority (GBRMPA). DEH now holds approximately 10% of the total number of SM units (619 520 SM units), making the TAC available to industry approximately 560 t (559 808 SM units).

The rezoning of the Great Barrier Reef Marine Park (GBRMP) was implemented at the same time as the catch quota system on 1 July 2004. The net result of the rezoning was the closure of approximately 30% of reef and shoal habitat in the GBRMP to fishing—an increase from reef closures of 21% prior to the RAP.

Figure 5 shows the reported catch for the 2004–05 and 2005–06 quota year to date. The indicative seasonal catch is calculated using the fleet average catch per month for the period between 1998 and 2002 inclusive. The TAC for Spanish mackerel was not reached in the first quota year and remained less than the indicative seasonal catch throughout the year. The current reported catch for this quota year (2005–06) is lower than the previous year, with the cumulative catch at the end of January 2006 18 t less than January 2005.

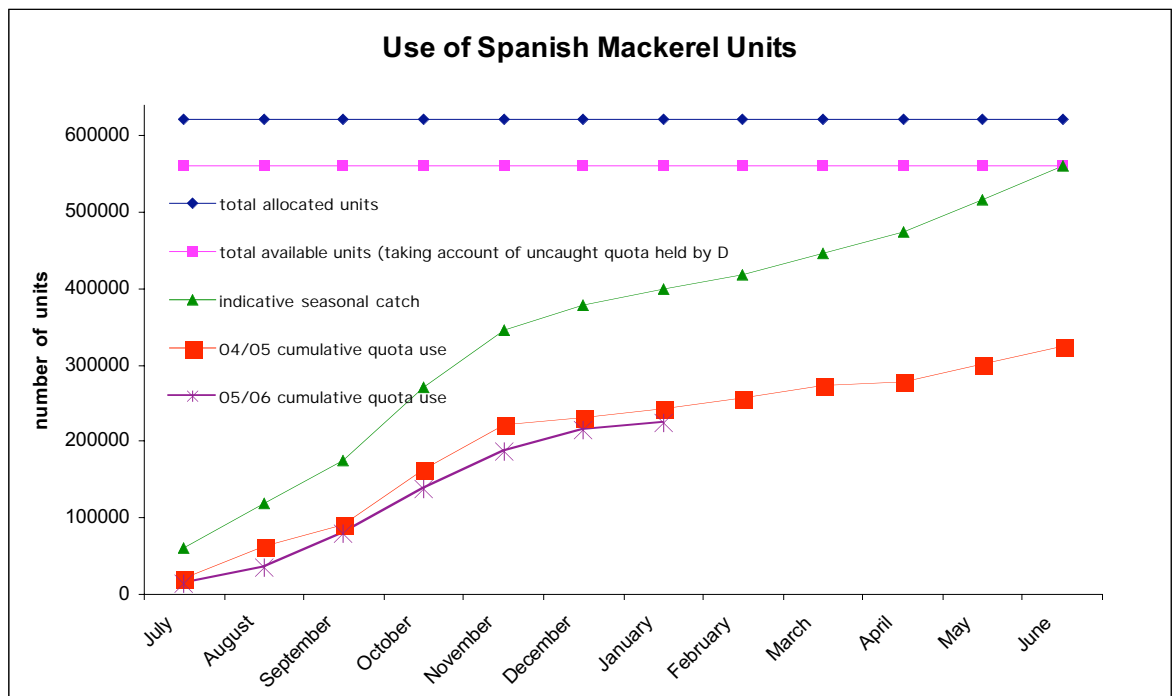


Figure 5: Use of Spanish mackerel units

The under-catch of quota species in the first quota year may also be partially explained by high variability in recruitment. Tobin and Mapleston (2003)<sup>2</sup> reported high recruitment variability in the Spanish mackerel fishery, evidenced by more than 75% of both the recreational and commercial catches collected between July 2001 and January 2003 consisting of mackerel in the 1 to 4 year classes.

Results from the research indicate that the commercial sector target fish of a specific size range with 28.3% of the total sample being 1 year old. Conversely, the recreational sector tend to catch more larger and smaller sized fish compared with the commercial sector, with 46.6% of the sample being 1–year-old fish. Tobin and Mapleston (2003) state that “the distinct bimodal peaks observed in the age-structures of both sector samples suggests that the success of the annual harvests taken by both sectors is largely driven by years of good and bad recruitment”.

Weather is also thought to have influenced the under-catch of quota in the first year. A large proportion of the commercial catch of Spanish mackerel is obtained between October and November in northern Queensland. It was reported that during the 2005–06 quota year bad weather around Lucinda in north Queensland reduced the available fishing time particularly in the peak fishing month of October. Commercial operators with smaller boats (25–30ft), conducting day or overnight trips and catching an average of 600–700 kg of Spanish mackerel per trip were particularly negatively influenced by the inclement weather.

DPI&F are also initiating an analysis to determine the effect of rising fuel prices on the Spanish mackerel fishery.

### **Recreational**

Estimates of the recreational catch of Spanish mackerel are available through DPI&F's Recreational Fishing Information System (RFISH) program and the National Recreational and Indigenous Fishing Survey (NRIFS)<sup>3</sup>.

The initial RFISH survey conducted in Queensland in 1997 and the NRIFS, estimated catches of all mackerel species combined. Consequently, it is difficult to accurately determine the Spanish mackerel catch. However, Begg *et al*<sup>4</sup> estimated the catch of Spanish mackerel by looking at the proportion of the different mackerel species reported in subsequent RFISH surveys.

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<sup>2</sup> Tobin, A. and Mapleston, A. 2003. *Exploitation dynamics and biological characteristics of the Queensland East Coast Spanish mackerel (Scomberomorus commerson) fishery*. FRDC Report No 2001/109. CRC Reef Research Centre, Townsville, Australia.

<sup>3</sup> Henry, G.W. and Lyle, J.M. 2003. *The National Recreational and Indigenous Fishing Survey*. FRDC Project No. 99/158. NSW Fisheries.

<sup>4</sup> Begg, G. A., O'Neill, M. F., Cadrin, S. X. and Bergenius, M. A. J. 2005. *Stock assessment of the Australian east coast spotted mackerel fishery*. CRC Reef Research Centre Technical Report No. 58. CRC Reef Research Centre, Townsville. 159 pp.

The RFISH survey was expanded in 1999 and 2002 to capture information on a range of different mackerel species, including Spanish mackerel. DPI&F's most recent RFISH diary survey, conducted in 2002, indicated that approximately 38 000 ( $\pm$  4 500) Spanish mackerel were harvested by recreational fishers in Queensland (Table 1). This signifies a reduction from the catch of 56 000 ( $\pm$  10 000) estimated in 1999. The reported catch and release rate also appears to have reduced slightly from approximately 32% to 26% between 1999 and 2002.

The weight of the recreational catch in 1997 and 1999 was estimated from regional estimates derived from Tobin and Mapleston's research. A weight estimate was not available from Tobin and Mapleston for 2002 catch data. Consequently, an average weight of 12.2 kg was used to estimate the total catch weight, based on an average of the 1997 and 1999 total catch weights that were calculated using Tobin and Mapleston's regional estimates.

Sampling undertaken through the DPI&F Long Term Monitoring Program (LTMP) may result in development of a length–weight relationship which will allow for more accurate conversion of RFISH figures in the future, through the use of better estimates of the average weight of fish caught.

A decrease was evident in the estimated recreational catch from 1999 to 2002. It is possible that the decline in catch may reflect decreasing participation rates in the fishery. A survey has been undertaken by DPI&F as part of the RFISH program to establish why participation may have fallen (e.g. whether increasing fuel prices and other costs have influenced people's offshore fishing activities).

**Table 1:** Recreational catch estimates for Spanish mackerel from the RFISH program.

	1997	1999	2002
<b>Number caught</b>	-	82 436	50 997
<b>Number released</b>	-	26 155 (31.7%)	13 211 (25.9%)
<b>Total estimated harvest</b>	34 816 <sup>5</sup>	56 281	37 786
<b>Estimated weight of total harvest<sup>#</sup></b>	424 t <sup>5</sup>	687 t	460 t

# Weight factors used to convert numbers of fish caught to total weight of harvest were sourced from regional data collected by Tobin and Mapleston<sup>6</sup>.

The NRIFS estimated that 339 445 mackerel were caught in Queensland in 2000. This was estimated to be approximately 1 160 902 kg (around 1100 t). The national survey only estimated the catch of a group of species including Spanish mackerel, school mackerel, spotted mackerel, shark mackerel, grey mackerel and wahoo.

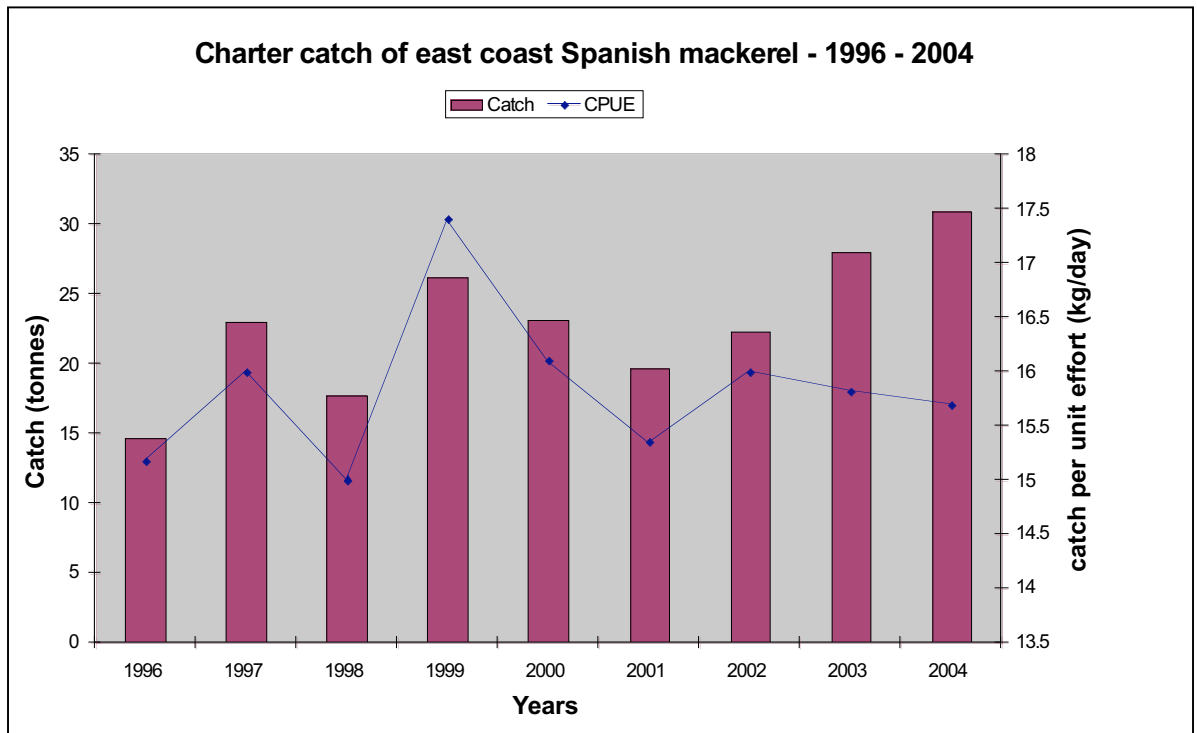
<sup>5</sup> Begg, G. A., O'Neill, M. F., Cadrin, S. X. and Bergenius, M. A. J. 2005. *Stock assessment of the Australian east coast spotted mackerel fishery*. CRC Reef Research Centre Technical Report No. 58. CRC Reef Research Centre, Townsville. 159 pp.

<sup>6</sup> Tobin, A. and Mapleston, A. 2003. *Exploitation dynamics and biological characteristics of the Queensland East Coast Spanish mackerel (*Scomberomorus commerson*) fishery*. FRDC Report No 2001/109. CRC Reef Research Centre. Townsville.

## Charter

Annual charter catches of Spanish mackerel on the east coast have continued to increase between 2002 (22 t) and 2004 (31 t), while CPUE has decreased slightly over the same period (Figure 6).

Some of the increase in reported catches could be due to fishers being more diligent in the completion of their logbooks, i.e. recording each species of mackerel rather than 'mackerel—unspecified'. The increase in total catch, however, is interesting given the decrease in recreational bag limits from 10 fish to three (six on extended overnight charter trips) which came into effect in December 2003. It would appear that the decrease in bag limit has had little impact on total charter catches.



**Figure 6:** East coast charter catch and effort of Spanish mackerel—1996 to 2004.

### *Indigenous*

The NRIFS estimated that 2382 mackerel (equivalent to approximately 29 t) were harvested by indigenous fishers in northern Australia in 2000. This estimate includes all species of mackerel, not just Spanish mackerel. Further work is required to include all Queensland indigenous fishers and provide more detail on catches of individual species.

### **Non-retained species/bycatch**

The level of bycatch in the fishery is considered to be low and mainly comprised of undersized mackerel. A large proportion of the other species caught whilst targeting Spanish mackerel are retained as byproduct for sale and consumption.

A bycatch and byproduct risk assessment workshop with key stakeholders was recently held in Townsville to formally assess the level of risk to bycatch and byproduct species associated with the fishery. The risk assessment results indicated that the ECSMF poses only a low risk to the majority of the bycatch or byproduct species identified.

Sharks caught incidentally, but not retained, were the only species identified as moderate risk, in recognition that they are highly vulnerable to overexploitation as a result of their life history traits<sup>7</sup>. The risk assessment helped confirm a number of assumptions about the targeted nature of the fishery and also highlighted changing market demands as a result of a quota system being introduced.

### **Interactions with protected species**

Spanish mackerel commercial fishers are required to record interactions with protected species in their Species of Conservation Interest (SOCI) logbook. No interactions have been recorded since the introduction of the logbook in late 2003. Results of the risk assessment indicated that the risk to protected species associated with the fishery is low as a result of the targeted nature of the fishery and the constant attendance of lines while fishing.

### **Fishery impacts on the ecosystem**

It is unlikely that there is any significant physical impact on the ecosystem from the fishery due to the relatively benign line fishing method used (i.e. surface trolling).

### **General ecosystem health**

Juvenile Spanish mackerel have been known to inhabit inshore areas in both the north and south of the state. Population expansion and urban development that can have an influence on the health of inshore and estuarine areas may therefore also influence the health of Spanish mackerel populations.

### **Spatial issues/trends**

The northern region of the east coast fishery has historically dominated the commercial catch, and has consistently exhibited higher (although variable) catch rates. Conversely, more than half of the recreational catch is estimated to come from south-east Queensland. It should be noted, however, that these estimates are based on where anglers live, as opposed to where the fish were caught. The estimates therefore reflect the fact that a large proportion of the population resides in south-east Queensland. DPI&F is in the process of converting RFISH estimates from where anglers live to where fish are caught, in order to more accurately depict regional catch statistics.

### **Socio-economic characteristics and trends**

The price for Spanish mackerel has remained relatively stable at between \$7 and \$10/kg, but varies depending on availability and product form (e.g., whole, trunk or fillet), and time of year.

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<sup>7</sup> DPI&F. 2006. *East Coast Spanish Mackerel Fishery—Bycatch and byproduct risk assessment*. Department of Primary Industries and Fisheries, Brisbane, Australia.

# Research and monitoring

## Recent research and implications

In 2004, a review of the monitoring requirements of the Spanish mackerel fishery in Queensland was conducted to determine the best sampling strategy required to assess the status of the resource<sup>8</sup>. All available data on east coast Spanish mackerel from DPI&F (LTMP) and CRC Reef research projects<sup>9</sup> were used in the review.

The review of the sampling program recommended that:

- samples be collected from both recreational and commercial landings
- samples be collected from four regions (Townsville, Mackay, Rockhampton and south-east Queensland)
- sampling effort be weighted by region and sector, based on the proportion of the total catch (in weight) attributed to each
- length and age data be collected for each gender separately.

The LTMP Spanish mackerel sampling strategy was expanded in late 2004 to incorporate these recommendations.

## Monitoring programs and results

An overview of the Spanish mackerel LTMP is available at:

<http://www.dpi.qld.gov.au/fisheriesmonitoringprogram/>.

Specifically, the objectives of the program are to develop a time-series of data on the ECSMF comprising:

- age- and size-structured catch data from the commercial fisheries and recreational anglers
- sex-structure and spawning extent.

The current monitoring arrangements involve fishery-dependent sampling on major fishing grounds along the Queensland east coast. Representative age, length and sex structure information is collected from both the recreational and commercial sectors for four regions along the Queensland east coast each year. Detailed instructions for the collection of this information are available in *Fisheries Long Term Monitoring Program Sampling Protocol—Narrow Barred Spanish Mackerel: (2004 onwards) Section 1* (in preparation).

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<sup>8</sup> Sumpton, W. and O'Neil, M. 2004. *Monitoring Requirements for the Management of Spanish mackerel (Scomberomorus commerson) in Queensland*. Department of Primary Industries (QI04026), Brisbane.

<sup>9</sup> Tobin, A. and Mapleston, A. 2003. *Exploitation dynamics and biological characteristics of the Queensland East Coast Spanish mackerel (Scomberomorus commerson) fishery*. FRDC Report No 2001/109. CRC Reef Research Centre, Townsville.

The program reports on monitoring survey data on a regular basis through summary reports. These data are available for use in stock assessments which assists in measuring the performance of fisheries management arrangements. The Spanish mackerel summary report, which includes data collected during the 2004–05 financial year, is currently being prepared for release in early 2006.



### **Collaborative research**

The east coast Spanish mackerel fishery is considered to harvest a separate genetic stock to the Torres Strait and Gulf of Carpentaria Spanish mackerel stocks. DPI&F researchers work closely with CRC Reef and James Cook University researchers in continuing research and assessment of the east coast stock of Spanish mackerel. DPI&F researchers are also collaborating with Northern Territory Fisheries on the FRDC 'Genetag' project, which is evaluating alternative monitoring strategies and developing techniques to directly estimate harvest rates through tag recapture.

## **Fishery management**

### **Compliance report**

A new Compliance Activity System has been developed by DPI&F that will record detailed information on Queensland Boating and Fisheries Patrol (QBFP) activities. The new system will include:

1. breach reports issued (including offences and court outcomes)
2. unattended breach reports
3. fisheries infringement notices (FINS) issued
4. all field activities (from new field occurrence logs)
5. complaints made via the Fishwatch hotline (including follow-up actions).

The location of offences and field activities will also be recorded to six by six nautical mile Commercial Fisheries Information System (CFISH) grids. This will allow enforcement activities and offences to be represented spatially. Progress to date includes the development of the new system to record breach reports, unattended breach reports and FINS. The new field occurrence logs were trialled in Cairns and released to the rest of QBFP in July 2005.

### **Changes to management arrangements in the reporting year**

One change to management arrangements occurred on 1 March 2005, requiring recreational fishers to clip a pectoral fin of a retained fish in order to deter black marketing of recreational catch.

## **Consultation, communication and education**

Promotion of regulations applying to both commercial and recreational fishers, including those relating to Spanish mackerel, is an ongoing role of DPI&F. Approximately 160 000 recreational fishing brochures containing size and possession limit information were distributed in 2004. In addition, approximately 500 stakeholders were sent copies of the fisheries newsletter 'Fish' four times during 2004. The newsletter highlights recent achievements, the latest research and proposed changes to management arrangements. DPI&F also introduced 'FishFlash' in February 2004, an email based newsletter with links to the latest fisheries news. Approximately 300 stakeholders subscribe to FishFlash.

Consultation also occurs through the Reef Management Advisory Committee (ReefMAC) and it's associated Scientific Advisory Group (SAG)<sup>10</sup>. ReefMAC provides an opportunity for stakeholders to provide advice to DPI&F on management measures in place for Spanish mackerel stocks.

## **Complementary management**

Discussion was held with the New South Wales Department of Primary Industries (DPI) in August 2005 on complementary management arrangements for Spanish mackerel. There is currently no size limit for Spanish mackerel in New South Wales. New South Wales DPI released a discussion paper in July 2005 reviewing recreational freshwater and salt water rules. The introduction of a 75 cm minimum legal length is proposed for Spanish mackerel to provide a minimum legal size equivalent to Queensland's. The recreational catch of Spanish mackerel in New South Wales consists primarily of fish larger than 75 cm so discards of undersized fish from the recreational sector are expected to be minimal. There is currently no in-possession limit for Spanish mackerel in New South Wales.

## **Fishery performance**

### **Appraisal of fishery in regard to sustainability**

The ECSMF is currently in a state of adjustment following the introduction of the SM fishery symbol in early 2004 and the subsequent allocation of SM line units, as well as the rezoning of the GBRMP in July 2004. This adjustment is evidenced by the fact that the quota has not been met in the first quota year.

The recent stock assessment for this fishery concluded that, at 2001 levels of fishing effort, the fishery is sustainable. Current catch and effort levels are significantly below this level. The age-structure stock assessment model will be re-run in 2007 when additional data are available and will inform reviews of the TAC and other management measures.

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<sup>10</sup> The SAG includes representatives from DPI&F, the commercial fishing industry, Sunfish, research (i.e., CRC Reef, James Cook University), GBRMPA, the charter fishing sector, and a social scientist.

## Progress in implementing DEH recommendations

The recommendations made by DEH in regard to addressing any uncertainties or risks that were identified for the fishery can be found at:

<http://www.deh.gov.au/coasts/fisheries/qld/east-coast-spanish-mackerel/decision.html>.

DPI&F has made significant progress on a number of recommendations and is developing a range of implementation strategies for other recommendations. For example:

- A comprehensive protected species education program for commercial and recreational fishers has been developed and materials were distributed to commercial and recreational fishers in late 2005.
- A bycatch and byproduct risk assessment was held on 16 November 2005 to help address a number of DEH recommendations relating to bycatch. The risk assessment demonstrated that the fishery poses generally only a low risk to most bycatch or byproduct species. It also highlighted the highly targeted nature of the fishery and that the proportion of undersize fish caught by fishers is extremely low (this was also supported by data). It also demonstrated that the discard of large Spanish mackerel out of concern about ciguatera toxicity, which was previously thought to be significant, is actually rare.
- Based on the results of the risk assessment and research previously undertaken, ReefMAC's SAG resolved further research into gear selectivity would be of little value given that a reasonable amount of information suggests that there is limited catch of undersize fish. The SAG noted that there was a small proportion (LTMP data indicates 3%) of Spanish mackerel taken which are immature (< 90 cm) but still above the minimum legal size limit (> 75 cm), but that in general the fishery is highly selective for mature fish.
- DPI&F, with advice from ReefMAC, has made a commitment to developing management objectives, performance indicators and performance measures for line fisheries it is responsible for. Preliminary measures relating to Spanish mackerel bycatch and byproduct have been developed as part of the bycatch risk assessment process and are outlined in the risk assessment report<sup>11</sup>.
- The DPI&F LTMP continues to collect information from commercially caught Spanish mackerel to monitor the size composition of the commercial catch and allow DPI&F to ensure the proportion of pre-mature fish does not increase above 5% of the total allowable catch. The minimum size at which female fish mature and spawn is 790 mm (fork length)<sup>12</sup>. The proportion of fish caught by the commercial sector during the 2004–05 financial year that were between the legal minimum size of 750 mm (total length) and the size at maturity (790 mm fork length) was 3%. The SAG noted that the results from the risk assessment workshop and the LTMP data indicate that there are relatively few undersized Spanish mackerel that are caught. Because Spanish

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<sup>11</sup> DPI&F. 2006. *East Coast Spanish Mackerel Fishery—Bycatch and byproduct risk assessment*. Department of Primary Industries and Fisheries, Brisbane, Australia.

<sup>12</sup> Estimated by McPherson, G. 1993. *Reproductive Biology of the narrow barred Spanish mackerel (Scomberomorus commerson) in Queensland waters*. *Asian Fisheries Science* 6:169-182

mackerel tend to form size related schools, commercial fishers in particular tend to move away from the fishing grounds if they are catching undersized Spanish mackerel.

A number of other DEH recommendations that were to be considered as part of the biennial review are addressed below.

### **Biennial review**

Under the *Fisheries Regulation 1995*:

(1) The Chief Executive must conduct reviews about the level of commercial and recreational fishing for Spanish mackerel.

(2) A review under subsection (1) must—

(a) be conducted every second year after 2004; and

(b) end before 1 March in the year of the review.

(3) However, the chief executive may conduct a review at an earlier time as the chief executive considers appropriate.

DEH have also recommended that as part of the biennial review:

- a fishery assessment process be developed
- protection of spawning aggregations be considered
- DPI&F review the way in which the recreational harvest of Spanish mackerel is controlled.

### **Fishery assessment process**

DEH has recommended that DPI&F develop a robust and regular fishery assessment process that provides a basis for management decisions which are precautionary and recognise the uncertainty and level of risk. The assessment process is to examine the ecological sustainability of the target species using robust stock assessments.

An age-structured stock assessment model has been developed to assess the status of the fishery. The last published stock assessment to be completed for Spanish mackerel was in 2002<sup>13</sup>, with a Management Strategy Evaluation<sup>14</sup> updated in 2003. Those assessments concluded that the probability that the Spanish mackerel stock was overfished at the time was low. The assessments recommended that a TAC set at average catch levels between 1992–93 and 2000–01 should be sustainable, subject to ongoing monitoring and amendment.

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<sup>13</sup> Welch, D., Hoyle, S., Gribble, N. and McPherson, G. 2002. *Preliminary assessment of the east coast Spanish mackerel fishery in Queensland*. QDPI, Brisbane.

<sup>14</sup> Hoyle, S. 2002. *2003 Update: Management Strategy Evaluation for the Queensland East Coast Spanish Mackerel Fishery*, Information Series QI 03021. Department of Primary Industries and Fisheries, Brisbane.

If the recommended TAC (640 t) is broadly considered to be a sustainable harvest level, then the current quota available to the commercial fishery (560 t) is equivalent to slightly less than 90% of this. Further, the actual catch of the commercial fishery in 2004–05 (185 t) is approximately 30% of the TAC. Even accounting for the uncertainties in the stock assessment models, the actual fishing mortality currently being imposed on the stock is below that which is considered likely to result in overfishing.

The model is to be re-run again in 2007 with additional data, including two full years of age-structure data from the enhanced LTMP surveys. Assessment of all available data will be undertaken in early 2007. It is anticipated that the results of the assessment will be available for the next biennial review in March 2008.

The continual refinement and updating of the age-structured model constitutes the basis of DPI&F's fishery assessment process. DPI&F considers the stock assessment to be robust, particularly given that data collected through the LTMP is to be added to the model. The stock assessment is also supplemented by results of research where available and summary reports from the Spanish mackerel LTMP.

### **Protection of spawning aggregations**

DPI&F, with advice from ReefMAC, intends to assess the effectiveness of the spawning season closure measures in place for coral reef finfish in context of all spatial and temporal closures in place that impact upon the ECSMF. The objectives of the spawning season closures, including biological, economic and social objectives, will be clearly established as part of the process of examining the effectiveness of the closure measures. ReefMAC intends to consider the potential protection of spawning aggregations for the ECSMF at that time for consistency and efficiency.

Spawning of Spanish mackerel has been reported to be highly variable in a given region from year to year. Anecdotal information from the commercial fishing sector was provided to the ReefMAC SAG in 2005, describing the timing and location of spawning events in the east coast Spanish mackerel fishery.

The following information was provided:

- Princess Charlotte Bay—Spanish mackerel are larger in size and spawn from August to January
- Cairns—September to early December
- Lucinda—September to early December
- Bustard Heads—July and October to November—half spent fish are caught during March/April north of Round Hill Head
- Sandy Cape shoals (out wide) to Lady Elliot/Musgrave region—July to mid September
- Bundaberg—Spanish mackerel school in November through to February and appear to spawn up until May in inshore areas
- Northern New South Wales—February to March/April.

Further interviews with other fishers, as well as LTMP sampling in the future, will provide more information on spawning locations. The SAG has acknowledged the importance of gathering further historical information before the long term operators leave the fishery.

The SAG considers that Rib Reef is a major aggregation site. Anecdotal information has been provided to suggest that there may be significant aggregations further north, for example in Princess Charlotte Bay. Further investigation is to focus on confirming other aggregation sites and determining the importance of those aggregations in contributing to the east coast stocks. Quantification of the contribution made by the Rib Reef aggregation to the fishery would be advantageous to further understanding the stock–recruitment relationship in this species. In the 2004–05 financial year, the distribution of commercial fishing effort displayed a similar pattern to previous years<sup>15</sup> with effort concentrated mainly north of Mackay (Figure 7).

Highest fishing effort (511 days) was concentrated around Rib Reef confirming its status as a known aggregation site for Spanish mackerel. Effort in Princess Charlotte Bay remains at a low level.

A position paper on quota usage in 2004–05 was prepared for ReefMAC at its meeting held on 28 September 2005, to discuss the shortfall in quota usage for coral reef fin fish and Spanish mackerel in the first quota year. In addition to the reasons given previously for the under-catch of quota, it was noted that for the Spanish mackerel fishery there was a marked absence of commercial boats fishing Rib Reef during the peak fishing period in the first quota year between October and November 2004.

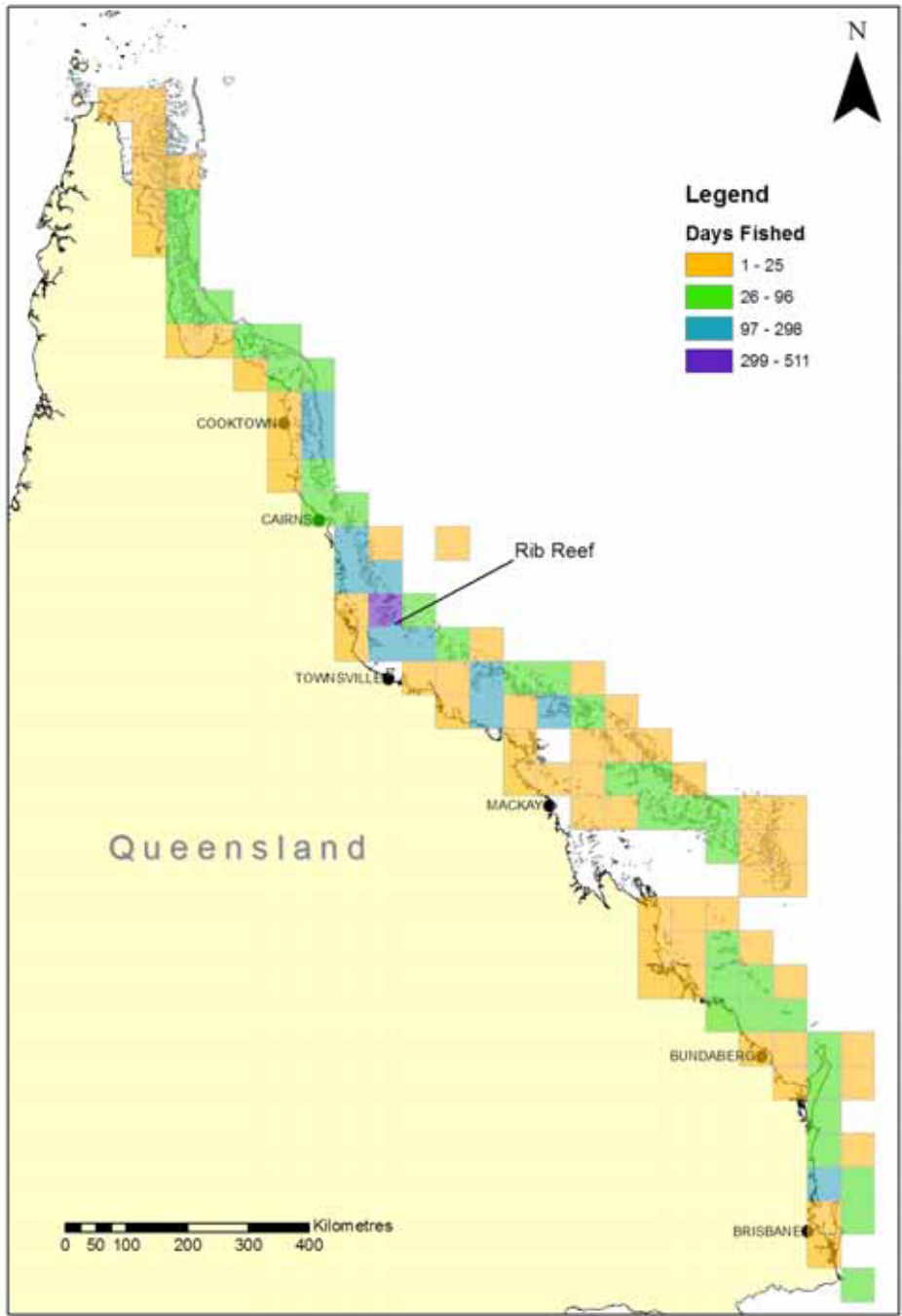
It is believed that apathy and loss of faith in the whole industry has resulted in participants wanting to exit the fishery. It was also reported to ReefMAC that those commercial fishers that did fish Rib Reef started later than usual.

The SAG agreed in November 2005 that the current impacts on Spanish mackerel spawning aggregations are probably low in context of the significant under-catch of quota and the reduced fishing pressure on the stock in general. As such, it is considered that the Spanish mackerel spawning aggregations have been afforded adequate protection at the lower levels of fishing effort, both in the 2004–05 quota year and extending into the 2005–06 quota year.

It is considered that the content of this annual status report will provide adequate information to address the recommendation from DEH as part of the biennial review to consider the status of the spawning aggregations of Spanish mackerel. Notwithstanding this, DPI&F, with ReefMAC, intends to review the closures in context of all spatial and temporal closures in place that impact upon the ECSMF.

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<sup>15</sup> For historic information on effort distribution see Ryan, S. 2004. *Ecological assessment of the Queensland east coast Spanish mackerel fishery*. Department of Primary Industries and Fisheries, Queensland.



**Figure 7:** Spatial distribution of effort in the 2004–05 financial year. Each grid represents 30 by 30 nautical miles.

### **Recreational harvest**

SAG members have noted that there may be no measurable impact from the reduction of the in-possession limit to three fish, as many recreational fishers were not achieving the bag limit of 10 fish prior to the changes to management arrangements. ReefMAC SAG will review the estimates of recreational harvest when figures are available from the 2005 RFISH diary round later in 2006 and determine whether the measures in place are constraining the recreational catch at a sustainable level.

### **Management performance**

Performance measures and/or reference points have not yet been developed for the fishery. DPI&F intends to develop these measures by the end of 2006 in consultation with ReefMAC. Preliminary measures relating to Spanish mackerel bycatch and byproduct have been developed as part of the bycatch risk assessment process.

### **Resource concerns**

Some concern has been expressed that spawning aggregations have contracted over time and that further protection should be afforded to these aggregations. The ReefMAC SAG has identified the need to locate historically important spawning areas to help determine whether any contraction may have occurred and preliminary research proposals are being developed. Based on the current level of harvest in the fishery, DPI&F considers that the ECSMF is managed in a sustainable and precautionary manner.

### **Information compiled by**

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### **Front cover image**

Spanish mackerel (*Scomberomorus commerson*)