

# Annual status report

## Queensland Finfish (Stout Whiting) Trawl Fishery

2007



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

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## Introduction

The Queensland Finfish (Stout Whiting) Trawl Fishery (FTF) is a demersal otter trawl fishery. The FTF is permitted to target stout whiting (*Sillago robusta*) and red spot whiting (*Sillago flindersi*) and retain other permitted by-product species off southern Queensland, from Sandy Cape south to Caloundra (see Figure 1). Stout whiting also constitute a proportion of the bycatch from the Queensland East Coast Otter Trawl Fishery (ECOTF) and a proportion of retained catch in the New South Wales Ocean Prawn Trawl Fishery (NSW OPTF).

There are a range of legislative and voluntary management arrangements in place for the fishery, with high levels of licence holder involvement in the management and monitoring processes.

This report covers the fishing period from April to December 2006.

### Fishery profile 2006

**Total FTF harvest (all species):** 44 752 t

**Queensland stout whiting harvest:** 936 t

**Recreational harvest in 2005:** no estimate available but considered negligible

**Indigenous harvest in 2000–01:** no estimate available but considered negligible

**Charter harvest:** no estimate available but considered negligible

**Commercial Gross Value of Production (GVP):** \$2.15–2.30 million (for stout whiting only)

**Number of licences:** five

**Commercial fishing boats accessing the fishery:** five

**Fishery season:** 1 April – 31 December (excluding 20 September – 1 November)

## Description of the fishery

### Fishing methods

The FTF employs otter trawl methods, where single multi-filament nets pass over the seabed to harvest stout whiting. Total net length (combined length of head rope, bottom rope and all other rope attached to the net) is restricted to a length of 88 m, sweep length is restricted to a maximum of 128 m each and mesh size is regulated, with a minimum of 38 mm and a maximum of 60 mm.<sup>1</sup> Commercial fishers with a T4 fishery symbol are authorised to operate in the fishery.

The Department of Primary Industries and Fisheries (DPI&F) also issued a permit to an existing operator allowing the use of a Danish seine net to target stout and red spot whiting within the area of the FTF towards the end of the 2006 fishing season. The Danish seine gear has the same mesh size and is made from the same material as the traditional otter trawl gear, but no otter boards are used and two long haul ropes (approximately 2.5 km each) are attached to the haul net and used to retrieve the gear.

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<sup>1</sup> Schedule 14, section 4(2) and (4) of the Fisheries Regulation 1995.

## Fishing area

Stout whiting are endemic to Australia, occurring between Shark Bay and Fremantle in Western Australia and between Bustard Head and northern New South Wales along the east coast.<sup>2</sup>

The FTF fishery area, known as the T4 fishery region, is defined in legislation as the area between the 20 and 50 fathom (36 and 90 m) depth contours from Sandy Cape (24°42' S, 153°15' E) to Caloundra (26°40' S, 153°08' E).<sup>3</sup> The T4 designated area has an inshore boundary at 20 fathoms in order to protect juvenile stout whiting in these inshore habitats from being trawled by the FTF.

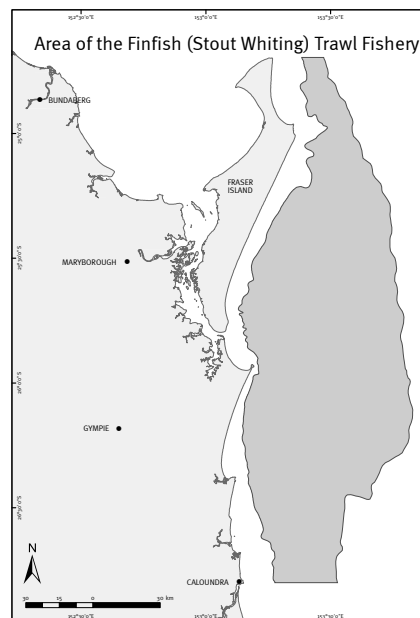


Figure 1: Finfish Trawl Fishery region.

## Main management methods used

The FTF is managed under the Queensland *Fisheries Act 1994* and in accordance with the Queensland Fisheries Regulation 1995. Management of the T4 fishery is based on a range of input and output controls to ensure the sustainable harvest of target and by-product species, while minimising impacts on bycatch and the environment.

The input and output controls are a combination of voluntary agreements, permits and legislation. Controls in the FTF include:

- limited entry to the fishery, with a maximum of five licence holders
- vessel and gear restrictions, including restrictions on boat length, net length, sweep length and mesh size
- an annually reviewed voluntary commercial total allowable catch (TAC) based on a regular stock assessment
- a combination of mandatory and voluntary seasonal closures
- a restricted fishery area to ensure that the FTF does not have access to the entire distribution of stout whiting
- in-possession limits on by-product (permitted) species to ensure that these species are not being actively targeted
- prevention of interactions with endangered species through the enforcement of closed waters and the introduction of mandatory use of turtle exclusion devices (TEDs) in otter trawl and Danish seine gear.

Licence holders in the FTF contribute significantly to the management of the fishery through voluntary closures, provision of biological samples for assessment purposes and compliance with the voluntary commercial TAC.

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<sup>2</sup> M O'Neill, K Yeomans, I Breddin, E Jebreen & A Butcher, *The Queensland Stout Whiting Fishery 1991 to 2002*, Department of Primary Industries, Brisbane, Australia, 2003.

<sup>3</sup> Schedule 14, section 2 of the Fisheries Regulation 1995.

## Approximate allocation between sectors

The FTF is predominantly a commercial fishery.<sup>4</sup> Stout whiting are not known to take baited hooks and are generally not large enough to be targeted by recreational or Indigenous fishers. Therefore the harvest of stout whiting by recreational, charter and Indigenous sectors is considered negligible.

## Fishery accreditation under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)

The FTF was granted a Wildlife Trade Operation approval on 16 November 2004 under Part 13A of the Australian Government EPBC Act. This accreditation acknowledges that the FTF is being managed in an ecologically sustainable manner and allows the export of landed catch. This approval expires on 24 November 2007. This Annual Status Report forms part of the documentation submitted to the Department of the Environment and Water Resources (DEW) for reassessment.

## Catch statistics

### Commercial

#### Principal species

Approximately 936 t of stout whiting were landed and retained in the FTF during 2006<sup>5</sup> and a further 37 t of stout whiting were discarded, most likely as being unmarketable because of their size.

The annual catch increased in 2001 and has remained relatively constant up to 2006, with the exception of 2003, when market pressures lowered prices and operators elected not to fish (Figure 2).

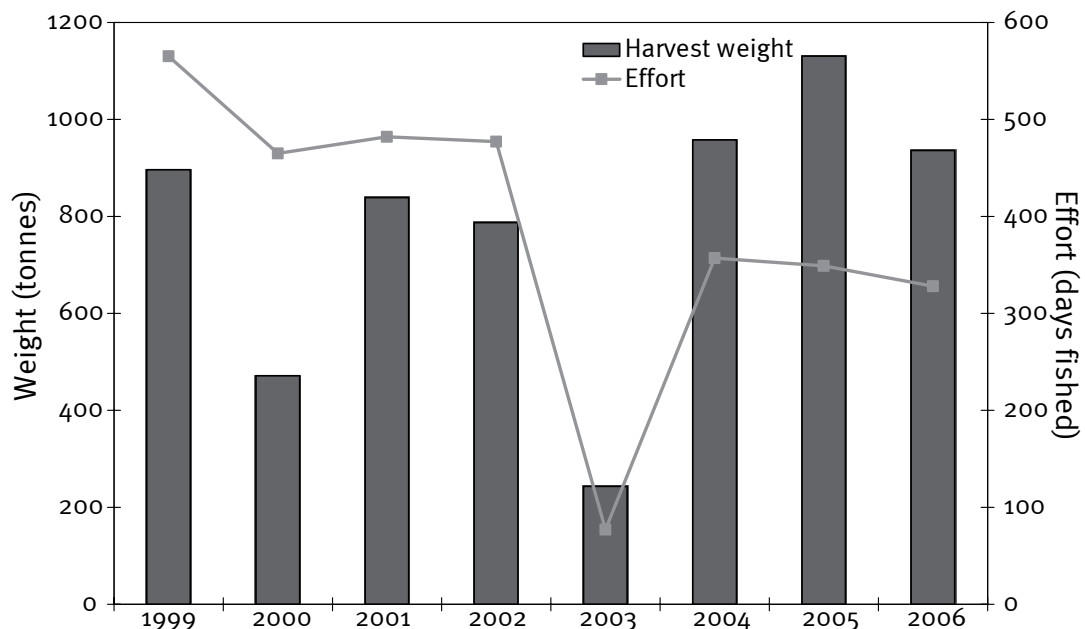


Figure 2: Catch (t) and effort (days) in the FTF 1999–2006 (Source: DPI&F CFISH database, February 2007).

<sup>4</sup> S O'Sullivan & E Jebreen, in draft, 'Fisheries Long Term Monitoring Program—Summary of stout whiting survey results: 1991–2006', Department of Primary Industries and Fisheries, Brisbane, Australia.

<sup>5</sup> This figure includes around 11 t taken on one trip by an operator using Danish seine gear late in the season.

A general decline in effort has been observed since 1999, consistent with a general increase in biomass as estimated from annual stock assessments. The large decline in 2003 is attributed to low prices and low demand, which led to only two vessels operating for the season. There has been a slight decline in effort from 2004 to 2006.

### Permitted fish catches

Licence holders are required to apply for a General Fisheries Permit each year, which allows them to harvest a variety of permitted species (Table 1). Permitted fish catch limits in the FTF are reviewed annually as part of the application process and often vary between operators, depending on the amount of product they apply to take. The limits for each operator are included as a permit condition.

Table 1: FTF permitted species and associated annual limits per vessel, 2002–06.

Common name	Species name	2002	2003	2004	2005	2006
Yellowtail scad*	<i>Trachurus novaezelandiae</i>	35 boxes <sup>1</sup>	20 000 kg <sup>3</sup>	20 000 kg <sup>3</sup>	20 000 kg <sup>3</sup>	20 000 kg <sup>3</sup>
Goatfish*	Family Mullidae	70 boxes <sup>2</sup>	20 000 kg <sup>3</sup>	20 000 kg <sup>3</sup>	20 000 kg <sup>3</sup>	20 000 kg <sup>3</sup>
Pinkies	Family Nemipteridae	34 boxes <sup>2</sup>	41 boxes <sup>2</sup>	41 boxes <sup>2</sup>	41 boxes <sup>2</sup>	41 boxes <sup>2</sup>
Octopus	<i>Octopus</i> sp.	17 boxes <sup>2</sup>	20 boxes <sup>2</sup>	20 boxes <sup>2</sup>	20 boxes <sup>2</sup>	20 boxes <sup>2</sup>
Cuttlefish	<i>Sepia</i> spp.	44 boxes <sup>2</sup>	52 boxes <sup>2</sup>	52 boxes <sup>2</sup>	52 boxes <sup>2</sup>	52 boxes <sup>2</sup>
Squid	<i>Nototodarus</i> spp., <i>Photololigo</i> spp. and <i>Sepioteuthis</i> spp.	0	52 boxes <sup>2</sup>	52 boxes <sup>2</sup>	52 boxes <sup>2</sup>	52 boxes <sup>2</sup>
Balmain bugs	<i>Ibacus</i> spp.	1000 individuals	no limit	no limit	no limit	no limit
Moreton Bay bugs	<i>Thenus</i> spp.	0	no limit	no limit	no limit	no limit

<sup>1</sup> Refers to the standard '10 kg' box, which may hold up to 16 kg of product.

<sup>2</sup> Refers to the standard '5 kg' box, which may hold greater than 5 kg of product.

<sup>3</sup> Refers to an annual limit, as opposed to trip limits.

\* Only two vessels operating in the FTF are permitted to take goatfish and yellowtail scad, of which the entire catch must be sold to Sea World and/or UnderWater World.

The decline in the 2003 permitted species catch (Table 2) is a result of limited activity in the fishery generally, which has been attributed to a lower market demand for the stout whiting. The increase in cuttlefish and Balmain bugs caught between 2002 and 2004 is consistent with changes to annual vessel trip limits for those species. The catch of goatfish and yellowtail scad is driven by demand from Sea World and UnderwaterWorld, which the licence holders are required to sell to. Consequently, the variability in catch is not of concern from a sustainability perspective.

In 2006, in addition to stout whiting, the FTF harvested approximately 44 t<sup>6</sup> of permitted species (Table 2).

<sup>6</sup> Includes a minor quantity of permitted species (< 50 kg) taken on one trip by an operator using Danish seine gear late in the season.

Table 2: Reported retained catch (kilograms) of permitted by-product species in the FTF, 1999–2006  
(Source: DPI&F CFISH database, 23 July 2007).

Species	1999	2000	2001	2002	2003	2004	2005	2006
Pinkies	–	–	–	902	330	852	2 113	1 711
Balmain bugs	–	–	–	205	177	462	104	1 793
Cuttlefish	–	–	–	1 943	1 992	2 953	1 362	4 372
Goatfish	5	–	13 202	19 913	1 805	17 777	10 583	9 437
Octopus	–	–	–	1 929	142	177	438	2 239
Yellowtail scad	–	–	18 685	44 470	5 429	28 111	20 085	21 785
Squid	–	–	20	12	26	–	2 019	2 359
Moreton Bay bugs	–	–	–	–	–	–	69	120
<b>Total weight</b>	<b>5</b>	<b>0</b>	<b>31 907</b>	<b>69 374</b>	<b>9 901</b>	<b>50 332</b>	<b>36 773</b>	<b>43 816</b>

### Catch in other fisheries

Stout whiting also constitute a proportion of the bycatch from the ECOTF and a proportion of retained catch in the NSW OPTF. Detailed information on the proportion of stout whiting discarded and retained in these fisheries is being incorporated into comprehensive quantitative stock assessments every five years.

Some of the permitted species in the FTF are also targeted by the ECOTF. However, because of the very small size of the fishery (five operators only), the FTF catch is small by comparison.

### Spatial issues/trends

Since 2000, a general decrease has been observed in the number of 6 nm logbook grids fished, which is consistent with decreasing fishing effort (days fished). Thirty-three 6 nm grids were fished in 2006, which is equal to the number of grids fished in 2005, and effort appears to be concentrated in roughly the same areas off the south of Fraser Island in both years.

### Socio-economic characteristics and trends

Stout whiting is principally sold for processing in Thailand, China, Vietnam, Japan or Taiwan. A portion of the processed product is re-exported back to Australian markets. In 2006, stout whiting typically sold for US\$1.75–1.85/kg<sup>7</sup> (A\$2.30–2.45/kg). In 2006, the GVP for stout whiting was A\$2.15–2.30 million.

## Fishery performance

### Appraisal of fishery in regard to sustainability

The FTF is managed through a range of input and output controls which are informed by regular stock assessments. This combination of management arrangements allows the DPI&F, with continued cooperation from FTF licence holders, to ensure that the fishery is managed in a manner that applies and balances the principles of ecologically sustainable development.

7 M Scott, Mooloolah River Fisheries Pty Ltd, email, 19 July 2007.

## Progress in implementing the Department of the Environment and Water Resources (DEW) recommendations

Recommendations	Progress	Improvements to management regime
<p>DPI&amp;F to inform DEW of any intended amendments to the management arrangements that may affect sustainability of the target species or negatively impact on byproduct, bycatch, protected species or the ecosystem.</p>	<p><i>Ongoing</i></p> <p>DPI&amp;F informed DEW of all management changes occurring in 2006, including:</p> <ul style="list-style-type: none"> <li>• an increase in the commercial TAC from 1150 t in 2005 to 1200 t in 2006, in response to an increase in the estimated available biomass of stout whiting (result of stock assessment)</li> <li>• the issuing of a permit to allow an existing operator to use Danish seine gear in the FTF for the duration of the 2007 fishing season</li> <li>• the implementation of a new TACT system (see the Research and monitoring section ) and an increase in the commercial TAC from 1200 t in 2006 to 1250 t in 2007 in response to this new system.</li> </ul>	<p>See the Changes to management arrangements section.</p>
<p>By December 2006, DPI&amp;F to develop fishery specific objectives linked to performance indicators and performance measures for target, byproduct, bycatch, protected species and impacts on the ecosystem.</p>	<p><i>Complete</i></p> <p>A performance measurement system (PMS) for the FTF was developed by DPI&amp;F in October 2006. This policy document was approved by the delegate of the Chief Executive in 2007 and is available online at <a href="http://www.dpi.qld.gov.au/fishweb/">www.dpi.qld.gov.au/fishweb/</a></p>	<p>The effectiveness of fisheries management in ensuring the sustainable use of stout whiting and permitted species stocks and minimising any impacts on the broader ecosystem is being measured.</p>
<p>DPI&amp;F to monitor the status of the fishery in relation to performance measures, once developed. Within 3 months of becoming aware of a performance measure not being met, DPI&amp;F to finalise a clear timetable for the implementation of appropriate management responses.</p>	<p><i>Ongoing</i></p> <p>Monitoring against the PMS was conducted for the first time in 2007. The performance of the fishery against each performance measure is reported below in the Management performance section.</p>	<p>As above.</p>



Recommendations	Progress	Improvements to management regime
DPI&F to formalise and make publicly available all of the management arrangements for the FTF, including the process for setting the TAC, the use of VMS, spatial and/or temporal closures and any fishery specific objectives, performance indicators and performance measures developed for the FTF.	<i>Complete</i> A Statement of Management Arrangements has been completed and is available online at <a href="http://www.dpi.qld.gov.au/fishweb/">www.dpi.qld.gov.au/fishweb/</a>	The public availability of management arrangements provides all stakeholders with up-to-date information and ensures that the fishery is managed in a transparent manner.
From 2005, DPI&F to report publicly on the status of the fishery on an annual basis, including explicit reporting against each performance measure once developed.	<i>Ongoing</i> This Annual Status Report is the third to be completed.	Annual Status Reports provide an important catalogue of historical information on the status of Queensland fisheries, demonstrate to the Australian Government that fisheries meet sustainability guidelines, and provide an assessment of management effectiveness against performance measures and the most up-to-date information on Queensland's fisheries.
DPI&F to continue to cooperate with NSW to pursue complementary management and research of shared stocks for all target and byproduct species in the FTF which may be affected by cross-jurisdictional issues.	<i>Ongoing</i> Catch data are obtained from NSW to be incorporated into a comprehensive quantitative stock assessment, which DPI&F plans to undertake on a five-yearly basis. The next assessment is scheduled for March 2011.	Information on the catch and discards of stout whiting in the NSW OPTF are incorporated into a comprehensive quantitative stock assessment undertaken on a five-yearly basis. The inclusion of this information increases DPI&F's confidence in the assessment of the stock.
DPI&F to develop and implement a robust system to validate catch and effort logbook data and the accuracy of the Species of Conservation Interest (SOI) logbook data, once the SOI logbook is implemented.	<i>Scheduled</i> The validation of logbook catch and effort data and reporting of interactions with protected species is scheduled to be completed by September 2007, using independent data collected by the Fisheries Observer Program (FOP) as well as from weighbridge landing dockets.	Validated fisher logbook data will provide greater certainty about the reliability of catch and effort information for management and monitoring and for assessment of fish stocks, and about incidental capture of protected species.
By the end of 2006, DPI&F to develop and implement a system sufficient to identify changes in the composition of bycatch in the FTF over time.	<i>In progress</i> Bycatch monitoring is being addressed in parallel with the ECOTF through the FOP (see the Fisheries Observer Program section).	N/A

<b>Recommendations</b>	<b>Progress</b>	<b>Improvements to management regime</b>
DPI&F to conduct a risk assessment of bycatch captured in the FTF. Appropriate management responses will be developed to reduce risks to species or groups identified as high-risk.	<i>Scheduled</i> A risk assessment of bycatch is scheduled to be undertaken before the expiry of the WTO (24 November 2007).	Completion of a risk assessment is one of many aspects of DPI&F's commitment to progressing sustainable fisheries management.
DPI&F to pursue a reduction in the amount of bycatch taken in the FTF and continue to support the investigation of methods for increasing the survivability of bycatch species. Any effective and appropriate methods identified should be implemented within 18 months of identification.	<i>In progress</i> DPI&F recently made the use of TEDs mandatory in the FTF. New fishing methods (i.e. Danish seine) are also being trialled that are showing potential to reduce impacts on the benthos and the incidental capture of non-target species, including turtles. DPI&F will continue to monitor further industry trials.	N/A
DPI&F to promote research into the impact of the fishery on protected species and implement measures to reduce protected species interactions.	<i>In progress</i> DPI&F collects information through SOCI logbooks. DPI&F is also undertaking research into the vulnerability of sea snakes to trawl fisheries, and the associated rates of survival after capture.	Any outcomes of this sea snake research relating to the development of better handling techniques for trawl-caught sea snakes will also have application in the FTF.
The spatial management system in the ECOTF is to be reviewed by DPI&F. Should this review identify any ECOTF areas that overlap with the FTF for closure, DPI&F to consider also closing those areas to the FTF.	<i>Scheduled</i> A review of trawl closures has been undertaken in consultation with industry. A number of proposed changes will be outlined in a Regulatory Impact Statement at the next available opportunity. This will include closures that apply to stout whiting fishers.	N/A

## Management performance

Performance Measurement Systems (PMS) are designed to measure the effectiveness of management in ensuring the sustainable use of fish stocks and minimising any impacts on the broader ecosystem.

A PMS for the FTF was developed by DPI&F in October 2006. Views of fishery managers, researchers and assessment and monitoring staff, as well as those of industry, were sought to ensure that the PMS was meaningful, defensible and precautionary, taking into account data limitations but incorporating the most appropriate information available.

The resulting PMS was implemented in April 2007, with the performance of the fishery monitored for the first time in this Annual Status Report (Table 3). A summary of this PMS is available online at [www.dpi.qld.gov.au/fishweb/18740](http://www.dpi.qld.gov.au/fishweb/18740)

Table 3: Performance of the FTF against performance measures in 2006.

<b>Performance measure</b>	<b>Measured/not measured</b>	<b>Performance</b>
Total Allowable Catch Table (TACT) recommends a reduction of 100 t in any year.	Measured	<i>Not triggered</i> TACT recommended an increase of 50 t in the T <sub>4</sub> stout whiting quota for 2007 to 1250 t.
If the proportion of the set commercial TAC used in a season falls below 60%.	Measured	<i>Not triggered</i> The total catch of stout whiting was 936 t (78% of the set commercial TAC).
Reported catch of permitted species in any one year is 10% greater than the highest historical catch recorded for the years 2002 to 2005.	Measured	<i>Triggered</i> The reported catches of Balmain bugs, cuttlefish, octopus, squid and Moreton Bay bugs in 2006 were all more than 10% greater than the highest historical catches recorded for the years 2002 to 2005 (Table 2). Management will review the risk to sustainability of increasing levels of permitted species catch, taking into account existing information about catch of retained/discarded species in the T <sub>1</sub> fishery and discards in the T <sub>4</sub> fishery. Within three months, DPI&F will finalise a clear timetable for implementation of appropriate management responses.
Average annual catch rate of indicator species (top ten species and recreationally/commercially important species) (weight/shot) across all observer trips does not increase or decrease by 10% (preliminary figure) from the 2006 level over a three-year period.	Not measured This performance measure will be reported against in the 2009 Annual Status Report once three years of data from 2006 have been collected. The 2006 levels are reported in the Fisheries Observer Program section below.	N/A
Interactions with protected species do not exceed highest historical (2005 and 2006) number of interactions reported through SOCI logbooks by 10% annually.	Not measured This performance measure will be reported against in the 2008 Annual Status Report once 2007 has been collected to compare against 2005 and 2006 levels. The number of interactions with protected species in 2006 is reported in the Interactions with protected species section.	N/A
Average annual estimated total bycatch weight per shot increases over a three-year period by greater than 10%.	Not measured This performance measure will be reported against in the 2010 Annual Status Report once three years of data from the observer program have been collected.	
A greater than 25% change in the relative abundance of the 'top ten' bycatch species over a three-year period.	Not measured As above.	

Performance measure	Measured/not measured	Performance
Percentage area of total fishery region trawled (measured by the number of 6 nm grids) where > 100 kg of catch is reported in fishers' logbooks increases by 25% over a three-year period.	Measured	Not triggered
Observed decreases in the total number of species recorded in the Observer Bycatch Monitoring Program exceed 10% over a three-year period.	Not measured As above.	

## Resource concerns

To assist in reducing resource concerns, an annual review of the commercial TAC for the target species is undertaken. This process ensures that the harvest rate in the FTF remains sustainable and allows the stock to remain at a level above that which supports maximum sustainable yield (see the Research and monitoring section).

## Ecosystem

### Non-retained species/bycatch

According to fishers' logbooks, the FTF discarded approximately 37 t of stout whiting in 2006 (Table 4). This is an increase from 2004 and 2005 levels (approximately 27 t and 24 t respectively). Discards in 2003 were much lower because of the reduced effort and the small number of boats operating in the fishery. It is difficult to establish exactly why discards have increased from previous levels, but a likely scenario is that a pulse in recruitment increased the number of undersized fish in the area. The industry actively seeks to reduce its catch of undersized whiting by moving out of areas where large numbers of undersized fish are taken. DPI&F will raise this issue with industry at the next annual TAC setting meeting.

Overall, the fishery discarded approximately 152 t (Table 4) of bycatch species in 2006—a decrease compared with 2005 (228 t). Interpreting the trends in these data is difficult as logbook reporting methods and vessel owners have changed over the years. The reported weights of non-retained and permitted species have varied over recent years because of changes in trip limits, reporting requirements, market prices and effort levels. Discards of cuttlefish have continued to decrease, which is a reflection of the increase in trip limits from 2003 (Table 1).

Table 4: Reported non-retained FTF species weight (kilograms) (Source: DPI&F CFISH database, 14 August 2007).

Species	1999	2000	2001	2002	2003	2004	2005	2006
Stout whiting	7 359	224	2 662	28 419	13 949	26 817	23 513	37 278
Pinkies				4 932	17 885	35 997	87 512	58 883
Yellowtail scad			19 909	56 478	3 162	68 033	100 275	44 118
Goatfish	8 929		14 620	7 585	510	12 253	2 916	3 455
Octopus			5 467	2 751	238	830	66	159
Cuttlefish			16 298	2 535	121	1 681	299	130
Balmain bugs				5		56	60	168
Moreton Bay bugs				16	120	995	136	262
Squid			20 696	6 198	1 850	6 720	672	48
Prawns			3 956	6 260	1 850	6 720	3 545	2 782
Bugs unspecified			1 471	730	10	285		
Pipefish						5*	77*	110*
Blue swimmer crabs	3 482		914	3 356	1 264	15 653	4 642	2 882
Whiptail			72 075	80 937	2 364	34 730	580	244
Shark			3 312	42	66	352	3 255	1 189
Three spot crabs							20	
<b>Total</b>	<b>19 770</b>	<b>224</b>	<b>161 380</b>	<b>200 244</b>	<b>42 348</b>	<b>207 794</b>	<b>227 566</b>	<b>151 598</b>

\* pipefish are reported by number of individuals not weight.

## Interactions with protected species

All fishers operating within the FTF also hold a T1 trawl licence. All T1 operators were issued with a SOCI logbook in January 2003, for recording interactions with protected species occurring as a result of fishing with T1 gear. In 2004, FTF fishers were also asked to use the SOCI01 logbook in conjunction with the FTF logbook (SW03) to record SOCI interactions occurring as a result of stout whiting gear operations.

Over the 2006 season, fishers reported catching and discarding 110 individual pipefish (Table 4). During the four trips on which DPI&F fishery observers were present, four interactions with sea snakes were observed which were not recorded in the logbooks.

To reduce the level of impact of stout whiting trawling on turtles and to reduce interactions with other large bycatch species, FTF operators are required (as part of their licence conditions) to have TEDs fitted to their nets.

## Fishery impacts on the ecosystem

To reduce the impact of trawl fisheries, bycatch reduction devices (BRDs) have been introduced and have, to some extent, been demonstrated to be effective in prawn trawl fisheries. It is difficult to implement BRDs in the FTF without research targeted at separating the stout whiting being targeted from other fish species (such as flatfishes).

Overseas experience suggests that separating fish species is possible,<sup>8</sup> but the relatively small size of stout whiting compared with the target species of finfish trawl fisheries elsewhere will most likely complicate the identification of an effective BRD.

<sup>8</sup> M Boudreau, *The performance of a horizontal split level trawl in the Gulf of St Lawrence segregating cod from flatfish*, Fishery and Aquatic Science and Technology, Ancona, 1991.

New fishing methods (namely the Danish seine) are being trialled in the fishery for the duration of the 2007 fishing season. Danish seine fishing operations have a significantly shorter haul duration and slower hauling speed than traditional fish trawling methods. This has several potential flow-on benefits to ecological sustainability of the fishery, including:

- reduced distance and time the net is towed across the seafloor, thereby reducing any impact on benthos; and
- reduced incidental capture of non-target species, including turtles.

## Research and monitoring

### Recent research and implications

#### Regular stock assessment

Annual quotas in the FTF were previously set based on annual quantitative stock assessments. An age-structured model was used to estimate the size (biomass) of the stout whiting population and the sustainable exploitation levels to determine the voluntary commercial TAC for the FTF. A stock assessment was undertaken in 2005, resulting in an increase in the commercial TAC from 1150 t in 2005 to 1200 t for the 2006 fishing season. The observed increase in commercial TAC is a reflection of the estimated increasing stock. The estimated increases in stock size relate to estimates of declining discards by the ECOTF and the NSW OPTF.<sup>9</sup>

For the last two years, T<sub>4</sub> operators have expressed concern about the assessment process because of the uncertainty of bycatch estimates for the Queensland and NSW prawn fleets and the perceived large stock of stout whiting in Gold Coast offshore waters (for which there are no data).

Based on research and analysis undertaken in late 2006, fisheries managers, researchers and fishers agreed to use a new framework for setting the stout whiting quota for 2007 and future years. The Total Allowable Catch Table (TACT)<sup>10</sup> provides for an agreed change to the quota annually (upwards or downwards) in response to annual standardised catch-rates from logbook records and mortality estimates from fish catch-at-age frequencies (annual catch curves). Under TACT, the T<sub>4</sub> stout whiting quota for 2007 was recommended to increase by 50 t to 1250 t.<sup>11</sup>

The new TACT system simplifies the quota-setting procedure for stout whiting, while acknowledging some of the uncertainties in stock assessments previously raised by researchers and industry. Detailed data on discards of stout whiting by the ECOTF (numbers, lengths and age) are being collected through the Fisheries Observer Program. These bycatch data will complement retained catch and effort estimates collected through the compulsory logbook program in the FTF and will be incorporated into a more comprehensive quantitative stock assessment to be undertaken on a five-yearly basis. The five-yearly assessments will also take into account estimates of the catches and discards of stout whiting made by the NSW OPTF.

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<sup>9</sup> M O'Neill & R Officer, *TACT: A simple system for quota setting in Queensland's T<sub>4</sub> stout whiting fishery*, Department of Primary Industries and Fisheries, Brisbane, Australia, 2007.

<sup>10</sup> *ibid.*

<sup>11</sup> M O'Neill, R Officer & S O'Sullivan, *TACT: Results for setting the 2007 T<sub>4</sub> stout whiting quota*, report to the Stout Whiting Industry meeting, Department of Primary Industries and Fisheries, Brisbane, Australia, 2007.

## **FRDC Project 2005/053: Reducing the impact of trawl fisheries on protected sea snakes**

In July 2005, DPI&F began work on a three-year research project intended to measure the impact of trawling on sea snake<sup>12</sup> in the ECOTF. The principal aim of this research is to reduce the incidence of sea snake trawl interactions in the ECOTF<sup>13</sup> through the documentation of post-capture mortality and development of improved handling techniques.

Overall, from the four trips undertaken, the Fisheries Observer Program recorded only four interactions with sea snakes in two shots on one trip during August 2006, and all but one snake were released alive.

Despite the apparently low interaction levels with sea snakes in the FTF, this research, although focused on the ECOTF, has potential to be applied to operations within the FTF and will aid in addressing the DEW recommendation to promote research into the impact of the fishery on protected species and implement measures to reduce protected species interactions.

## **Monitoring programs and results**

### **Compulsory logbook program**

Catch and effort information for the FTF continues to be monitored through the compulsory daily logbook program. A new FTF logbook (SW03), introduced in 2000, has improved DPI&F's ability to monitor catch and effort as well as discards in the fishery.

### **Long Term Monitoring Program**

DPI&F, through its Long Term Monitoring Program (LTMP), monitors long-term changes in the length, sex and age distribution of stout whiting in the FTF for incorporation into stock assessment models. Each vessel operating within the fishery donates two 5 kg boxes from each trip in order to provide information on lengths, weights, gonad weights and sex. Otoliths are also taken and used to determine the age of the fish.

In 2006, a new quality assurance/quality control protocol for fish ageing was implemented to ensure consistency in the age estimates through time.<sup>14</sup>

The 'Fisheries Long Term Monitoring Program summary of stout whiting (*Sillago robusta*) survey results: 1991–2006'<sup>15</sup> reports the following major findings:

- Stout whiting in the fishery ranged from 70 mm to 245 mm in fork length and from 3.17 g to 129.4 g in weight across all years.
- Ages ranged from zero to eight years across all years.

This report is due to be published in late 2007 and will be made available on the DPI&F website.

LTMP age data are incorporated into the new TACT system to set the T<sub>4</sub> quota each year. TACT uses standardised catch rates and the most recent estimate of total mortality derived from the catch curve of fish catch-at-age frequencies, and applies a set of decision rules which result in an increase or decrease (or no change) in quota.

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<sup>12</sup> Sea snakes are listed marine species protected in Commonwealth waters under the *Environment Protection and Biodiversity Conservation Act 1999*.

<sup>13</sup> B Schemel, Department of Primary Industries and Fisheries, email, March 2006.

<sup>14</sup> S O'Sullivan, Department of Primary Industries and Fisheries, pers. comm., June 2006.

<sup>15</sup> S O'Sullivan & E Jebreen, in draft, 'Fisheries Long Term Monitoring Program—Summary of stout whiting survey results: 1991–2006', Department of Primary Industries and Fisheries, Brisbane, Australia.

## **Fisheries Observer Program**

The Fisheries Observer Program (FOP) conducted 27 sea days over four trips in the FTF during 2006–07. Each trip involved two observers, allowing for continuous (24-hour) observation of fishing operations over a total of 24 days. The primary focus of these trips was the collection and analysis of bycatch data to establish baseline information from which to measure changes over time. Three of the trips were conducted on standard otter trawl vessels, and one trip was conducted with a Danish seine operator.

Ten kilogram (10 kg) samples of bycatch (discards) were collected from each shot across six high-effort grid sites (6 nm grids) and species composition was determined through analysis in the laboratory. No low-effort sites were sampled because of the lack of vessel effort in those areas.

Bycatch differences between day and night operations, and bycatch differences between standard otter trawl and the Danish seine operations, were analysed.

Catch per unit effort of stout whiting during observed trips was, on average, substantially lower for otter trawl vessels than on the Danish seine vessel (193 kg/hour and 418 kg/hour respectively). From the same trips, discards were higher for otter trawlers (51.2% of the catch for day shots and 52.0% at night) than for the Danish seine (25.1% during the day and 24.5% at night).

On otter trawl vessels, 96 species were observed from the 135 kg of representative bycatch samples during daylight fishing and 99 species from 85 kg during night fishing. From the Danish seine vessel, there were 44 species observed from 17 kg of day samples and 52 species from 40 kg of night samples.

The FOP also recorded four interactions with sea snakes over two shots on one trip during August 2006. All but one snake were released alive.

It should be noted that there was considerable variation in species composition between samples taken from a similar location, three months apart. The analysis concentrated on the ten most abundant species in the bycatch to meet the requirements of the PMS for the fishery. These bycatch species included finfish, crustaceans and cephalopods. Future bycatch analyses will focus on 'indicator' species to provide an indication of any changes in the ecosystem. The baseline data collected by observers will provide an opportunity to identify these indicator species.

## **Collaborative research**

The sea snake research discussed earlier in this report (see Recent research and implications) is a Fisheries Research and Development Corporation collaborative research project between DPI&F and the Commonwealth Scientific and Industrial Research Organisation (CSIRO). Although sea snakes appear to be caught in very low numbers in the FTF, improved handling techniques resulting from this research may also have the capacity to reduce the FTF's impact on sea snakes.

## **Fishery management**

### **Compliance report**

During the 2006–07 financial year (up to and including 31 May 2007), five commercial vessels were inspected and three offences were detected in the FTF.



## Offences

Offences are reported as either a Fisheries Infringement Notice (FIN); Caution (FIN Caution or official caution issued by DPI&F legal officers); or a Prosecution (to proceed by complaint summons) (Table 5).

Table 5: Offences recorded in the Queensland Finfish (Stout Whiting) Trawl Fishery (July 2006 – May 2007).

Offence	FIN	Prosecution	Caution
<b>s. 232(1) Fisheries (East Coast Trawl) Management Plan 1999</b> Possess on board a boat bugs with the carapace removed	1	–	–
<b>s. 173(2) Fisheries Act 1994</b> Fail to have a document required to be available for immediate inspection	1	–	–
<b>s. 85 Fisheries Regulation 1995</b> Contravened a condition of an authority. Take prawns in contravention of the authority	–	–	1
<b>Total</b>	<b>2</b>	<b>-</b>	<b>1</b>

A compliance risk assessment was completed for Queensland's trawl fisheries in 2005. The risk assessment identified compliance with BRD provisions and closed water provisions as the highest priorities for enforcement and compliance for the trawl fisheries. There were also a number of activities rated as having a moderate risk, which are also being addressed, but at a lower priority.

## Changes to management arrangements in the reporting year

The voluntary commercial TAC increased from 1150 t in 2005 to 1200 t in 2006, based on the stock assessment undertaken for the fishery. For 2007, the commercial TAC has been set at 1250 t, based on decision rules in the new TACT system (see the Recent research and implications section).

### Use of Danish seine

In late 2006, DPI&F issued a permit to an existing T4 licence holder allowing the use of a Danish seine to target stout and red spot whiting within the area of the FTF for 2006 and 2007.

A review of the available information collected through logbooks and at-sea observers was undertaken to assess any sustainability issues associated with this fishing method.

In assessing the permit application and based on independent observations of trial operations, DPI&F determined that the method does not pose any greater impact on the sustainability of the stout whiting stock or other by-product or bycatch species than the current methods permitted under the Fisheries Regulation 1995.

Information collected through the FOP suggests that the Danish seine gear results in a lower bycatch:stout whiting ratio compared with otter trawl gear (~ 25% compared with ~ 50%).

## Consultation/communication/education

DPI&F fishery managers and researchers met with licence holders in late 2006 to discuss the use of the TACT to set the following year's voluntary TAC. These meetings are held on an annual basis to set the TAC for the coming year. Licence holders agreed to the use of the new model, recognising that it would lead to less variability in TACs from year to year and help stabilise the stout whiting biomass. The Trawl Management Advisory Committee (Trawl MAC) met three times in 2006. The Trawl MAC provides advice to DPI&F on management measures for the fishery.

## **Complementary management**

DPI&F is continuing its efforts to collaborate with NSW scientists to enable a more complete assessment of the east coast stout whiting fishery stocks. Detailed information on the discarded portion of stout whiting from the ECOTF and retained and discarded catches in the NSW OPTF will be incorporated into a more comprehensive stock assessment every five years.

### **Information compiled by**

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### **Image**

Stout whiting (*Sillago robusta*)

