NSW GOVERNMENT | Department of Primary Industries

DANISH SEINING IN NSW

A PRELIMINARY REVIEW OF ISSUES RAISED BY COMMERCIAL FISHERS CONCERNING DANISH SEINING IN NSW

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2. Executive summary

This detailed review into the *San Antone's* Danish seining activities and Danish seining generally was initiated in response to concerted lobbying by concerned commercial fishers, the large number of issues raised and the potential seriousness of some of those issues. An inclusive rather than exclusive approach was pursued resulting in a comprehensive and transparent review of the issues raised with particular focus on identifying the need for actions in the short, medium and/or long term to ensure that the objects of the *Fisheries Management Act 1994* (the Act) and the Ocean Trawl Fishery's export approvals under the *Environmental Protection and Biodiversity Conservation Act 1999* (the EPBC Act) are not compromised.

Danish seining in NSW has been around since the mid 1930's and has come and gone (and obviously come again) in response to changing target species, socio-economics and technology – flexibility that the NSW commercial fishing industry continues to enjoy and that is likely to have helped the fishery through sometimes challenging times. With increasing input costs, particularly fuel, and challenging market conditions, Danish seining appears to present some benefits over the more popular, in recent times, otter board trawling. The reduced fuel use, apparent fishing efficiency and premium quality product that Danish seining appears to provide for are just some of the key strategies that the NSW Ocean Trawl Fishery needs to pursue more rigorously, within sustainable limits, if profitability in the fishery is to be improved.

With respect to initial industry suggestions to prohibit Danish seining in NSW or otherwise restrict the efficiency of Danish seine nets under the auspices of sustainability, it was determined early in the review that such action could not be justified. Not only is there no evidence of any imminent or emerging sustainability issues as a result of the *San Antone* alone or, more importantly, catch and effort in the fishery as a whole, but it would have been incorrect for government to stop what is ultimately a lawful commercial fishing enterprise based on the views of a small group of fishers without a proper analysis of the issues – indeed, industry has been critical of governments taking such approaches in the past. It was also determined early on that the risk of additional boats gearing up for Danish seining is just that, a risk, and no different to the risks posed by the high levels of surplus capacity that exists in both the fish and prawn trawl sectors of the fishery generally.

The above conclusions relating to sustainability should not, however, be taken to mean that there are no other issues that need to be resolved within the fishery or that the stocks the fishery exploits remain free from the risk of future overfishing. At the very least the primary and key secondary species taken in the fishery must continue to be monitored pursuant to the DPI Resource Assessment Framework in place and the performance monitoring program set out in the Ocean Trawl Fishery Management Strategy.

The one major issue evident from the outset is that some fishers are clearly concerned about 'resource sharing' in the Ocean Trawl Fishery, which is understandable given the competitive nature of the industry, the apparent efficiency of the *San Antone's* Danish seining activities and the absence of clearly defined fine scale (e.g. species specific) access rights in the fishery. Shareholders and DPI will need to discuss the true extent of this issue further and develop strategies to address it if deemed necessary.

Shareholders and DPI will also need to discuss and progress a raft of other issues identified during this review including whether a new 'whiting codend' is required for the fish trawl and Danish seine sectors and, if so, its design, improved management and enforcement relating to use of the *less selective* 'whiting codend' (whether the current design or a new design), expediting and expanding the observer program proposed for the Ocean Trawl Fishery, updating various regulations including the description of the Danish seine net and refining the 'designated whiting grounds' south of Smoky Cape and extending them to the Danish seine and potentially prawn trawl sectors.

Progressing these reforms will be somewhat challenging for industry and DPI given the range of interrelated issues that will require concurrent consideration and the broader reform program recently announced. In progressing reform in this sector, consideration should be given to the outcomes of the Independent Review of NSW Commercial Fisheries Policy, Management and Administration (including imminent changes to the current consultative arrangements) and the package of broader fishery reforms that members of the former OTMAC are in the final stages of preparing for consultation with shareholders and other stakeholder groups.

3. Purpose of the review

The purpose of the review is to investigate various issues raised by a small group of shareholders from the Nelson Bay region concerning recent Danish seining activities in NSW. In particular, this review needs to inform whether action is required in the short, medium and/or long term to deliver on the objects of the *Fisheries Management Act 1994* (the Act) and to maintain the Ocean Trawl Fishery's export approvals under the *Environmental Protection and Biodiversity Conservation Act 1999* (the EPBC Act). For transparency, this report outlines in detail the issues raised, the consideration given to each and the outcomes of that consideration.

4. Issues raised

The following DPI representatives, shareholders and other interested persons attended an industry initiated meeting at the Port Stephens Research Institute on Tuesday 19 April 2011 (the Port Stephens meeting) to discuss Danish seining in NSW:

Darren Hale (DPI, Management)
Warren Winter (DPI, Compliance)
Wayne Bennett (DPI, Compliance)
Leo Lukin (Shareholder; prawn trawl and fish trawl)
Miro and Elio Mislov (Shareholders; prawn trawl and fish trawl)
Bruce Korner (Shareholder; prawn trawl and fish trawl)
Steven Moncrieff (Shareholder; prawn trawl and fish trawl)
Warren Burnes (Shareholder; prawn trawl and fish trawl)
John Skoljarev (Ex-shareholder)
Miro Milanja (Shareholder; prawn trawl and fish trawl)
Dennis (Crew)
John Clark (Recreational fisher).

Apologies were received from Mr Greg Parker and Mr Jock Sutherland, both of whom are shareholders in the OT Fishery.

The issues raised at the meeting concerning recent Danish seining activities in NSW are summarised as follows:

- The **selectivity** of the codend used, in particular:
  - the use of ropes around the codend and the circumference of the codend; and,
  - alleged discarding of significant quantities of small fish.

- The **sustainability** of school whiting and bluespotted flathead as a result of the size classes harvested and the quantities taken and landed.

- **Competition** between fishers for access to school whiting and bluespotted flathead and allegations of significant reductions in other fishers' catches.

- The **risk of additional boats** (local or interstate) gearing up for Danish seining in NSW.

- Today's Danish seining not being as **'environmentally friendly'** (compared to otterboard trawling) as many people think, particularly given:
  - the large weights used these days (as heavy if not heavier than otterboards);
  - the use of combination ropes as opposed to hemp rope as in the days of old;
  - the use of winches and rope drums.

- The **Danish seine regulation being deficient** in terms of detail.

Shareholders attending the Port Stephens meeting recommended an immediate ban on Danish seining in NSW or, at the very least, the immediate removal of any ropes or straps from Danish seine codends and the introduction of restrictions to limit the efficiency of Danish seine nets. These potential approaches and their value in terms of addressing relevant issues of concern are discussed in greater detail in this report.

DPI representatives provided advice on the reason for returning a codend recently seized from a Danish seiner and presented detailed information on effort trends in the fishery and catch, effort and biological information pertaining to eastern school whiting and bluespotted flathead - the two main species of interest.

Various other shareholders who did not attend the meeting have since expressed similar or in some cases alternate views to those expressed at the Port Stephens meeting. These views have also been considered in this review.

With respect to general concerns that the Danish seine regulation (i.e. clause 7C of the *Fisheries Management (Ocean Trawl Share Management Plan) Regulation 2006* (the OTSMP) is deficient in detail, the outcomes of this review will be used to determine if that regulation and any others need to be amended and if so how.

5. Background

Trawling for fish in ocean waters off NSW commenced just after the First World War when the New South Wales government commissioned three steam trawlers to develop a commercial fishery on grounds discovered by the research vessel *Endeavour*. The fishery developed rapidly following sale of the trawlers to commercial interests in 1923, with the fleet expanding to seventeen large (200 to 300 tonne) steam powered trawlers concentrating on stocks of tiger flathead in waters between Crowdy Head and Gabo Island by 1929. By 1935 only thirteen remained (DPI 2004; Rowling 1976).

Danish seiners began operating in the fishery in 1936 with numbers increasing rapidly immediately after World War II. The Danish seiners were much smaller vessels than the steam trawlers, ranging from twelve to twenty metres in length and twenty to fifty tonnes. They needed fewer crew and were consequently more economical than the trawlers, which were progressively phased out resulting in a fleet exclusively of Danish seiners (Rowling 1976). By the mid 1940's about 60 Danish seiners operated from NSW coastal ports (DPI 2004).

During the 1960s, 70s and 80s the fishery went through another period of change. The fleet progressively converted from steam to diesel power and from Danish seining to otter board

trawling, allowing the fishery to expand into deeper waters along the edge of the continental shelf to target gemfish, redfish, mirror dory, ling, ocean perch and several species of sharks etc. By 1980, 130 boats were operating in the fishery from ports between Crowdy Head and Eden, with 6 still using Danish seine nets (DPI 2004).

Anecdotal information indicates that a select few, such as the late John Poole of Laurieton, continued to use (or reverted back to) Danish seining in recent years, however, this and the extent of any such activity is yet to be confirmed through a review of commercial catch records. Because of the limited extent of Danish seining in NSW over the last 30 years or so there has been little focus on the development or refinement of Danish seine gear and the relevant regulations.

Danish seine nets are similar to a trawl net but more simply constructed with no otterboards or sweeps. Instead they have a long length of rope attached to each end of the net by means of short bridles. The gear is set in a large diamond or triangular shape on the bottom and the ropes are slowly retrieved closing the gear and herding the fish into the path of the oncoming net. (Figure 1).

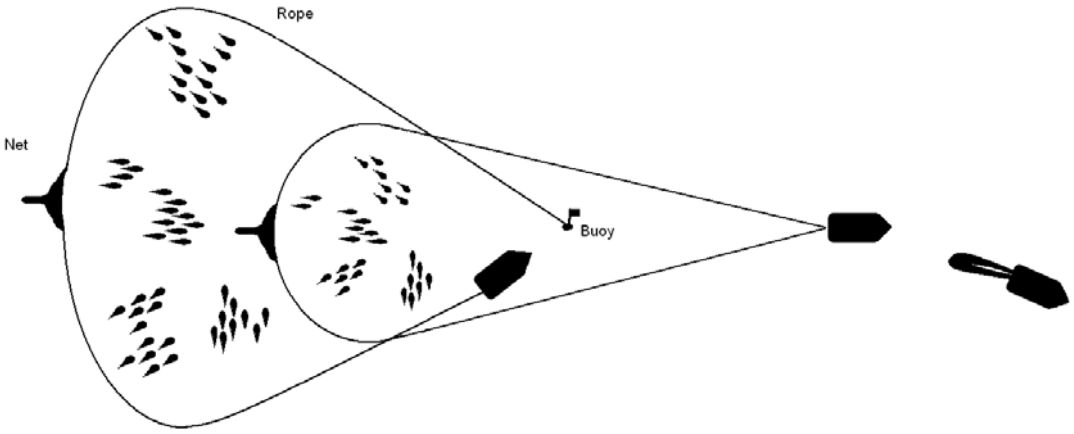

Figure 1. Typical Danish seine operation.

Danish seining also occurs in QLD and in the Commonwealth managed Southern and Eastern Scalefish and Shark Fishery (SESS Fishery). The QLD fishery is known as the Fin Fish (Stout Whiting) Trawl Fishery and is subject to a limited season, restricted access (only five operators), gear restrictions and a total allowable catch (TAC) applying to stout whiting (*Sillago robusta*) that has increased from 800 tonne to 1,500 tonne since 2003 (QDPI website). The QLD fishery is currently under review in an attempt to provide incentive for industry to invest in the "…more efficient and environmentally friendly Danish seine gear [as opposed to otterboard trawling] and for improved confidence in the management arrangements in the fishery". Changes being investigated include extending the area of the fishery, regulating for the use of Danish seine nets as opposed to authorising their use through permits and increasing the maximum boat length restriction from 20 to 25 metres to allow for boats better equipped for onboard processing (pers. comm.).

Fishers in the Commonwealth SESS Fishery use fish trawl and Danish seine nets to harvest various species including eastern school whiting (*Sillago flindersi*), western school whiting (*Sillago bassensis*) and flathead. There are around 10 Danish seiners working out of Lakes Entrance, just south of the NSW/Victorian border, and another four working from various other ports in Victoria. Danish seining remains the preferred method of fishing for Lakes Entrance fishers because of the lower overhead costs, the nature of the local sea bed and for producing high quality product suitable for export (Leftrade website). Approximately 75% of the school whiting catch taken under Commonwealth jurisdiction is taken by the Danish seine fleet working from Lakes Entrance (ShelfRAG 2010).

In NSW, Danish seine nets may be used in the Ocean Trawl Share Management Fishery (OT Fishery) and the Southern Fish Trawl Restricted Fishery (SFT Fishery). To use a Danish seine (or fish trawl) net in the OT Fishery a person must hold a 'fish northern zone endorsement'. Similarly, to use a Danish seine (or fish trawl) net in the SFT Fishery a person must hold a 'southern fish trawl endorsement'. As at June 2011 there were 42 northern fish trawl endorsements and 23 southern fish trawl endorsements in the NSW commercial fishing industry.

Mr Garry Pinzone is the owner of the *San Antone*, a purpose built commercial boat set up for activities such as purse seining and Danish seining. Mr Pinzone is a fourth generation fisher who has been fishing for 52 years in various jurisdictions including New Zealand, Tasmania, Victoria, Queensland and now New South Wales using methods including prawn trawling, fish trawling, purse seining and Danish seining. At least six months prior to commencing fishing in NSW, Mr Pinzone actively engaged DPI staff (including the author of this report) on the rules and regulations governing Danish seining in NSW. The *San Antone* could easily be perceived by local fishers to be a threat, however, the fact that it looks like a 'floating factory' has nothing to do with its catching capacity, any adverse effect on other fishers' catches or potential sustainability issues, all of which are investigated in this review.

Figure 2. The *San Antone* moored at Newcastle.

The *San Antone* is skippered by Mr Michael Pinzone (Gary Pinzone's son) who is a fifth generation fishermen and supported by a crew of five with the retrieval of nets and the handling of product. Mr Pinzone's business supports at least five families, not including the ancillary employment and flow-on benefits to affiliated land based ventures. The *San Antone* targets

school whiting, the bulk of which is packed and snap frozen onboard, exported for filleting and re-packed and returned to Australia for sale. Larger school whiting and other byproduct species including bluespotted flathead, tiger flathead, leather jackets and calamari are sold locally.

School whiting are harvested by many fishers in the OT Fishery. Some fishers take small quantities as byproduct when targeting other species whereas others rely heavily on access to school whiting and actively target them for domestic and export markets. There are at least two other small to medium vertically integrated school whiting operations in NSW that rely heavily on access to school whiting. One is owned by the Clarence River Fishermen's Cooperative, Northern NSW, and involves the use of a filleting machine to process eastern school and stout whiting harvested using prawn trawl nets. The other is based in Tuncurry and involves hand filleting larger size classes of eastern school whiting taken predominately in fish trawl nets (pers. comm.). During the course of this review the prawn trawl sector on the north coast (through the Clarence River Fishermen's Cooperative) secured an export market for whole school whiting.

Pursuant to the industry wide 'Pyrmont Pact' process and in response to diminished profitability in the OT Fishery over a prolonged period the Ocean Trawl Management Advisory Committee (OTMAC) has been developing a package of reforms for discussion with shareholders. The draft package of reforms focuses on improving profitability through a raft of initiatives that include, first and foremost, reducing the number of participants in the fishery and providing for those who remain to maximise their profitability by acquiring more efficient boats and gear. It is therefore timely that consideration be given to the issues raised by shareholders concerning Danish seining and, ultimately, the future of Danish seining in NSW.

6. Housekeeping

References to "…commercial fishers who attended the Port Stephens meeting…" (or similar) used throughout this paper have been used for convenience and should not be taken to mean that all who attended the Port Stephens meeting share the same views in respect of all of the issues raised.

The term "school whiting" is also used extensively throughout this paper and unless otherwise indicated should be read as a reference to the following species:

Stout whiting (*Sillago robusta*); and,
Eastern school whiting (*Sillago flindersi*).

Western school whiting (*Sillago bassensis*), which is referred to in the publication "*Status of Fisheries Resources in NSW*", is not caught in NSW waters.

7. Codends and selectivity

Commercial fishers who attended the Port Stephens meeting raised a raft of issues with respect to the *San Antone's* codend in support of their claim that Danish seining poses a significant risk to the fisheries resources of NSW and the NSW commercial fishing industry generally. The issues raised, each of which is discussed in this Part, include:

- The codend being unlawful;
- Allegations of significant levels of discarding; and,
- The codend being poorly selective.

7.1 Allegations of an unlawful codend

Commercial fishers who attended the Port Stephens meeting had two main concerns with the codend used by the *San Antone*: (a) the circumference of the coded at 210 meshes and (b) the fixing of straps or ropes around the codend. Amongst other things, they are concerned that these modifications are unlawful and that DPI has erred in its duty to enforce the law.

In response to ongoing representation, for transparency and for the purpose of determining whether changes to current regulations are required, Mr Pinzone's codend configuration and the relevant legislation has been reviewed as discussed in this review.

By way of background and to put the issue into perspective, in March 2011 DPI compliance officers received advice that a fisher had trawled up[1] a fish trawl (or Danish seine) codend that appeared to be illegal. The owner was subsequently identified as Mr Garry Pinzone and the net returned to Mr Pinzone. Mr Pinzone was not prosecuted because it could not be proven that the codend was illegal and used by Mr Pinzone to take fish or otherwise in Mr Pinzone's possession in, on or adjacent to any waters – the codend was in fact in the immediate possession of another fisher.

7.1.1 Codend circumference

Commercial fishers who attended the Port Stephens meeting alleged that at 210 meshes in circumference the *San Antone's* codend is illegal.

Clause 7C of the OTSMP establishes the Danish seine net as a lawful commercial fishing method. It describes how the net must be configured and the conditions of use. Clause 7C states:

> ***"7C Danish seine trawl net (fish)***
>
> *(1) It is lawful for the holder of a fish northern zone endorsement to use a danish seine trawl net for taking fish (other than prawns, abalone and rock lobster) in the waters specified in the Table to this clause if the net complies with the description set out in relation to those waters in that Table and the net is used only by the method of danish seining.*
>
> *(2) For the purposes of this Plan or any other instrument under the Act, a net described in this clause may be referred to as a danish seine trawl net (fish) or a danish seine trawl net (fish)—ocean trawl fishery.*

[1] The loss/retrieval of the codend is a matter of contention. One party claims it was trawled up inadvertently and the other claims it was intentionally cut off by shooting away across the net. This issue is not examined in detail because it is not critical to the outcomes of this review.

Table Danish seine trawl net (fish)

1	*(a) Waters—Ocean waters that are north of a line drawn due east from Barrenjoey Head.* *(b) Description of net—Mesh not less than 83 mm throughout.*

Unlike clause 7B of the OTSMP relating to fish trawl nets, clause 7C of the OTSMP (as above) does not purport to restrict the circumference of Danish seine codends. Because of this and the fact that there are no *fishing closures* (made pursuant to section 8 of the Act) or similar in place that restrict the circumference of Danish seine codends, the *San Antone's* codend, at 210 meshes in circumference, is not unlawful.

7.1.2 Ropes and straps around the codend

Commercial fishers who attended the Port Stephens meeting alleged that the ropes and straps fixed to the *San Antone's* codend at the time were also illegal.

Clause 11E(1) of the *Fisheries Management (Supporting Plan) Regulation* 2006 (the Supporting Plan) is relevant and aims to prohibit the fixing of such material in any way that affects the selectivity of a net, whether it be a Danish seine, fish trawl, prawn trawl or other type of net. Given that clause 11E(1) is fundamental to the representations received and the decision not to prosecute, it is discussed in detail both generally and in respect of the *San Antone's* codend configuration specifically. Clause 11E(1) of the Supporting Plan states:

(1) It is unlawful for a person to use a net:
(a) in which any meshes are wholly or partly covered, or
(b) in which any string, rope, wire, cord, netting or other material is fixed to any meshes, or
(c) in which any meshes (or any bars) are twisted,
in any manner so as to reduce the effective mesh size of the meshes to less than that specified under the share management plan for a fishery as lawful.

Proper interpretation and application of clause 11E(1) requires a basic understanding of a number of concepts including, as presented in Figure 3 below, a rope fixed to the circumference of a codend, the way meshes in a net normally lay and two critically important concepts being 'mesh size' and 'lateral mesh opening'.

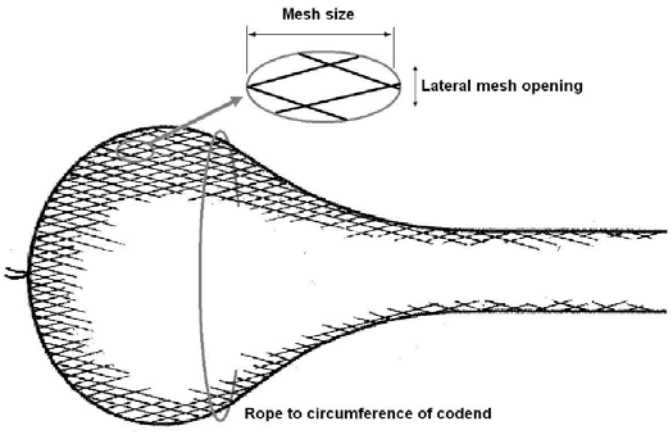

Figure 3. Codend showing (a) 'mesh size', (b) 'lateral mesh opening' and (c) a rope fixed to the circumference of a codend (potentially impacting the lateral mesh openings if too tight).

7.1.2.1 Mesh size

One of the purposes of clause 11E(1) of the Supporting Plan is to prohibit fishers fixing ropes, straps and other such material to a net in such a way that the 'mesh size' of the meshes in the net and consequently the selectivity of the net is reduced. As depicted in Figure 4 below, the mesh size of a mesh is measured using a prescribed net measuring device in the manner set out under clause 11H of the Supporting Plan.

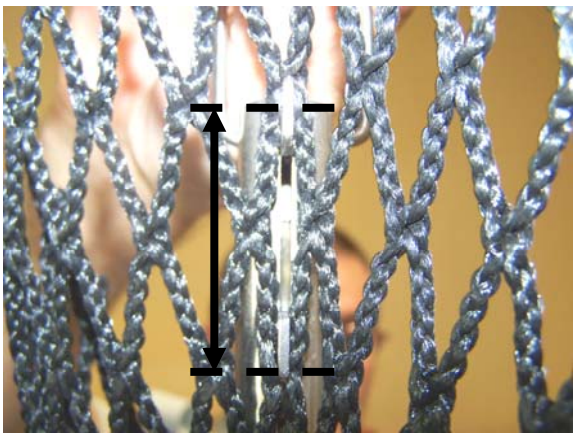

Figure 4. Measuring mesh size by prescribed means.

During early April 2011 DPI compliance officers measured the mesh size of the meshes in the *San Antone's* codend. They found that:

- The meshes without straps or ropes inserted measured 93 mm, which is significantly larger than the minimum prescribed mesh size of 83 mm for a Danish seine net;
- The meshes with straps inserted also measured 93mm – because the straps were flat and orientated the same way that the mesh size is measured; and,
- The meshes with ropes inserted measured greater than the minimum prescribed mesh size of 83 mm for a Danish seine net – because the meshes were sufficiently large enough (93 mm instead of 83 mm) to offset the reduction in mesh size caused by the small diameter rope inserted.

In the absence of any additional evidence, information or legal advice to the contrary, this review confirms that DPI compliance officers' application of clause 11E(1) of the Supporting Plan to the mesh size of the meshes in the *San Antone's* codend was appropriate under the circumstances at the time. As an aside, it is also noted that Mr Pinzone has removed the highly visible straps from the *San Antone's* codend but that the small diameter ropes remain.

7.1.2.2 Lateral mesh opening

Clause 11E(1) of the Supporting Plan also aims to stop fishers fixing ropes, straps and other such material to a net in such a way that the 'lateral mesh openings' and consequently the selectivity of the net is reduced, however, during investigations into the *San Antone's* codend in early April 2011 the DPI Compliance Branch determined that clause 11E(1) of the Supporting Plan does not achieve that purpose. This was determined on the basis that clause 11E(1) does not make reference to 'lateral mesh openings' or similar.

Advice indicates that the Compliance Branch also considered whether the reference in clause 11E(1) to "*…effective mesh size of the meshes…*" could be construed to include 'lateral mesh openings', however, the words that follow (i.e. "*…to less than that specified under the share management plan…*") and the fact the share mangement plan makes reference to "*…Mesh not less than 83 mm throughout*" only, resulted in the Compliance Branch determining that clause 11E(1) could not be interpreted to mean or otherwise encompass anything but the minimum mesh size of 83 mm explicitly referred to in the Ocean Trawl Share Management Plan (SMP).

In the absence of any evidence, information or legal advice to the contrary, this review confirms that DPI compliance officers' interpretation and application of clause 11E(1) of the Supporting Plan in respect of the lateral openings of the meshes in the *San Antone's* codend was appropriate under the circumstances at the time.

Preliminary outcome (7.1 Allegations of an unlawful codend)
It is not unreasonable for those who attended the Port Stephens meeting to believe that the *San Antone's* codend was unlawful, particularly given that restrictions apply to the circumference of fish trawl codends and the fact that some in attendance had previously received penalties for fixing ropes (or 'choker strings' as they are commonly known) around their codends.

However, this review confirms that under the current regulation, the *San Antone's* codend configuration is lawful or could not otherwise be successfully prosecuted and that DPI officers made the correct decision under the circumstances to return the codend to the owner.

The regulations, more specifically clause 11E of the Supporting Plan (and clause 42 of the *Fisheries Management (General) Regulation* 2010 (the General Regulation) which sets out the same arrangements but in respect of nets and traps used in Restricted Fisheries and by recreational fishers) should be amended as soon as practicable.

Part 7.3.2 of this report discusses the likelihood of the ropes impacting the lateral mesh openings and the selectivity of the *San Antone's* codend. If not for clause 11E of the Supporting Plan being deficient, a successful prosecution would normally require evidence to substantiate beyond reasonable doubt that the ropes, at 4 metres in length, are in fact impacting the lateral openings of the meshes in the codend.

Given ongoing comments by some fishers who attended the Port Stephens meeting, it would be remiss not to reiterate that the fixing of ropes or other such material to fish trawl codends remains prohibited and must be complied with regardless of the present situation concerning the Danish seine regulation or the use of Danish seine nets generally. Clause 7B(1)(b) of the OTSMP relating to fish trawl nets explicitly states, "…*no rope, string, wire, cord, netting or other material is fixed to the codend of the net, or to any meshes within 25 meshes of the codend…*".

7.2 Allegations of significant levels of discarding

Commercial fishers who attended the Port Stephens meeting alleged significant bycatch and discarding of small fish by the *San Antone*, in particular small school whiting and bluespotted flathead (sand flathead). No evidence, such as photos, video footage or similar, has been produced to date to substantiate these claims.

In his defence, Mr Pinzone advises that this is not the case and welcomes any other commercial fisher to witness first hand or DPI observer to study the levels of bycatch from the *San Antone's* Danish seining activities.

Some shareholders who did not attend the meeting have since commented that it would not be possible to speculate the level of bycatch from the *San Antone* unless onboard and seeing it first-hand (pers. comm.). Another commented that bycatch levels from the *San Antone* could be significantly less per kilogram of product landed than that of other boats (pers. comm.). Interestingly, DPI has not received any complaints concerning high levels of bycatch or discarding from any Newcastle based fishers, which is where the *San Antone* predominately worked during the 2010/11 season.

It is inevitable that some bycatch will result from the use of many forms of fishing gear, whether commercial or recreational gear. However, it is the degree (composition and quantity etc.) that can vary significantly between gear types and spatially and temporally (Kennelly 1998). Because there has been little or no Danish seining in NSW in recent years there has been no research in NSW that can be used to accurately determine the extent of bycatch by the *San Antone* or Danish seine nets generally.

Recent research by Coopman *et al* (2010) on bycatch in the Lakes Entrance Danish seine fishery and Graham *et al* (2008) on bycatch taken in the fish trawl sector off Sydney provides some insight. However, given spatial and temporal variation in bycatch composition and abundance, fundamental differences between fish trawl and Danish seine nets in terms of overall design and operation and the fact that Coopman examined bycatch from Danish seine nets with relatively small mesh sizes (around 45 mm as opposed to 90 mm), this research cannot be used to accurately determine the extent of bycatch by the *San Antone* or Danish seine nets generally in NSW. Nevertheless, bycatch is discussed in greater detail in the next part of this report in terms of the selectivity of the legislated fish trawl 'whiting codend'.

Preliminary outcome (7.2 Allegations of significant levels of discarding)
The allegations of significant levels of bycatch and discarding of small fish by the *San Antone* have not been able to be validated by DPI at this stage and, in the absence of conclusive evidence one way or the other, remain unsubstantiated at this stage.

Given the diverse views expressed by industry to date (and the possibility of some of those views being biased) and the risks that a lack of knowledge can pose, it is recommended that DPI and the OT Fishery look to improve knowledge of bycatch associated with Danish seining in NSW (composition and quantity and potentially discard mortality rates etc.). Such information would be best obtained through independent observer coverage, as intended for the fish trawl and prawn trawl sectors. The results could then be fed into the DPI Resource Assessment Framework (and the Commonwealth's TAC setting models) to better inform management decisions in the future.

Prawn trawling and fish trawling in NSW have been assessed as a high priority for observer coverage (Scandol 2005). Given that Danish seining was not considered during that assessment (because they were not in use in NSW at the time) it is recommended that DPI determine, having regard to the outcomes of this review, whether observer work in the Danish seine sector should

also be a high priority. Regardless of the urgency in which such work is conducted, it is recommended that adequate coverage occur on boats using 'whiting codends', whether attached to fish trawl nets or Danish seine nets, given that 'whiting codends' have already been demonstrated to retain more bycatch than the 'standard fish trawl codend' used in the OT Fishery (Graham 2008a, Graham 2008b).

Acknowledging the likelihood of imminent changes to gear used in the OT Fishery in response to this and another review underway, and issues that can arise if changes are implemented midway through an observer program, it is recommended that any future observer work not take place until after all proposed gear changes are 'bedded in'.

DPI notes that the *San Antone* is one of few boats in the NSW OT Fishery that is fitted with a 'hopper' (Figure 5). A 'hopper', in simple terms, is a container that is filled with sea water that the catch is emptied into. Hoppers assist in the separation of bycatch and can improve the efficiency and speed of the sorting process. Importantly, hoppers also provide an opportunity for bycatch to recover before being returned to the water and higher quality end product (Ocean Watch Australia 2004). The use of hoppers to optimise product quality and minimise discard mortality is strongly supported by DPI and it is pleasing to see that the *San Antone* uses this technology.

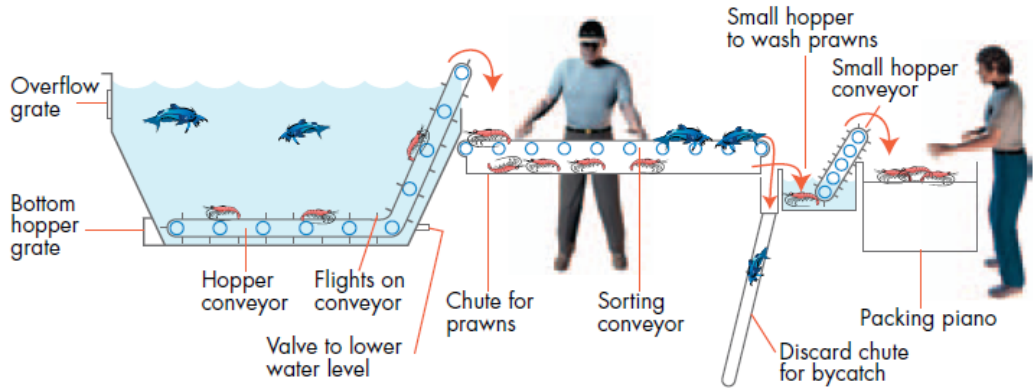

Figure 5. Hopper and conveyor belt system very similar to that onboard the *San Antone*.
Source: Ocean Watch Australia (2004).

7.3 Codend selectivity

The allegation that the *San Antone's* codend configuration is poorly selective has resulted in much discussion amongst shareholders and what appear to be two vastly different streams of thought. Because of the disparity in views and the strong sentiments expressed by some, the issue has been considered in detail in an attempt to better inform the current debate and whether changes should be made to the codends available for use in the fish trawl and Danish seine sectors of the OT Fishery for harvesting school whiting.

In simple terms, one faction (those who attended the Port Stephens meeting) allege that the *San Antone's* codend retains significant quantities of small fish and is therefore 'unselective' and that the solution to this is, if Danish seine nets are not prohibited, to require Danish seine codends to be configured as per the 'whiting codend' used by fish trawl operators. Some in attendance at the Port Stephens meeting advised that this would address their concerns with both the selectivity of the *San Antone's* codend and equitable access to school whiting.

The other faction suggests that selectivity is all about designing gear that is efficient for harvesting the species targeted while minimising bycatch of other species and that the current fish trawl 'whiting codend' does not achieve this. More specifically, this faction strongly asserts that the current fish trawl 'whiting codend' is inefficient for harvesting school whiting and that this needs to be addressed for the fish trawl sector, whether using fish trawl nets or Danish seine nets, to efficiently harvest high quality product with minimal impact on the environment.

DPI notes that neither faction has raised the fact that the NSW prawn trawl fleet, boats in the QLD stout whiting fishery and Danish seiners off Lakes Entrance, each of which harvest more school whiting than the NSW fish trawl sector alone, use codends with significantly smaller mesh sizes (i.e. around 45 mm) than the NSW fish trawl fleet.

Before examining whether Danish seine nets should be prohibited, configured as per the fish trawl 'whiting codend' or a new codend developed, a desktop review of the two aspects of the *San Antone's* codend configuration of concern to fishers who attended the Port Stephens meeting has been conducted in terms of their *potential* affect on selectivity - those aspects being the circumference of the coded at 210 meshes (as opposed to 200 meshes) and the fixing of straps and or ropes around the codend. This will, at the very least, help inform the urgency in which DPI and the OTMAC must respond to the *San Antone's* current gear configuration.

7.3.1 210 mesh circumferences

It is widely recognised that increasing the circumference of a codend can result in reduced lateral mesh openings and selectivity (Broadhurst 2006b, Graham 2008a and 2008b), however, the research located that is relevant to the east coast of Australia relates to prawn and fish trawl nets and significant variations in circumference – 100 v 150 meshes and 100 v 200 meshes in respect of prawn trawl and fish trawl nets respectively – rather than Danish seine nets and small variations in circumference in the order of 10 meshes or 5%. However, what can be gleaned from this research is that:

- School whiting across nearly all size classes escaped from codends (attached to fish trawl nets) consisting of 90 mm double twine 4 mm in diameter and 200 meshes in circumference (Graham 2008a and 2008b). In other words, codends of this configuration are very inefficient for selectively harvesting school whiting at or above the minimum agreed target size of 15 cm, including whiting marketed as 'large' and 'extra large';

- The above codend tested by Graham et al at 200 meshes in circumference resulted in an estimated L_{50} for school whiting of 18.69 cm fork length, which is almost 4 cm larger than the minimum target size agreed by DPI and the OTMAC, and at 100 meshes in circumference resulted in an estimated L_{50} of 28.77 (Graham 2008a and 2008b). Although a crude approach to the matter at hand it is postulated that all other variables aside, if the circumference of that codend had been increased to 210 meshes it may have resulted in an estimated L_{50} of around 17 to 18 cm fork length, which exceeds the minimum target size agreed to by DPI and the OTMAC;

- The above codend at 200 meshes in circumference was also determined by Graham to be unselective for bluespotted flathead, however, as indicated by Graham this may have

been because of the size classes of bluespotted flathead encountered and not necessarily a true indication of the selectivity of the codend.

For the purpose of informing the urgency in which DPI must respond to the *San Antone's* current gear configuration, having regard to the above and after applying some common sense, it is argued that, but for any fundamental differences as a result of the manner otter trawls and Danish seines are operated, the *San Antone's* codend at 210 meshes in circumference (where it joins the extension) would have no appreciable influence on the selectivity of this codend when compared to a 200-mesh codend.

Further, given that the *San Antone's* codend is constructed of 93 mm mesh (as opposed to 90 mm or 83 mm) and much of the codend is at or below 200 meshes in circumference due to the binding of meshes for attaching lifting strops and strengthening the codend (Figure 6), it is more probable than not that any negative effect as a result of the 10 extra meshes is offset.

Figure 6. *San Antone* codend with meshes bound for the purpose of attaching lifting strops and for strength.

Based on the above, it is concluded that immediately requiring the circumference of the *San Antone's* codend to be reduced to 200 meshes will not deliver the outcomes sought by those who attended the Port Stephens meeting in terms of selectivity or equitable access to the school whiting resources of NSW.

7.3.2 Choker strings

It is widely recognised that 'choker strings' (whether made of straps or rope) can be fixed in such a way that the selectivity of a codend is significantly effected, in particular the lateral mesh openings. The degree to which the selectivity is affected is, however, heavily dependant on the number, length and location of each rope. Ultimately, as per the codend circumference issue above, there is no research available to determine with a high degree of accuracy the real effect of the ropes, at 4 metres in length, on the selectivity of the *San Antone's* codend.

Without detracting from the importance of not allowing choker strings, there are a number of things that have occurred over the years that need to be borne in mind when contemplating whether the ropes are in fact having a significant impact on the selectivity of the *San Antone's* codend and whether they would render the *San Antone* codend configuration illegal if not for the clause 11(E) deficiencies discussed earlier.

The first is that fishers who have been penalised in the past for fixing choker strings typically used ropes that were much shorter than 4 metres in length (pers. comm.). This is because shorter ropes constrict the codend to a greater degree and, therefore, have a greater potential effect on the lateral opening of the meshes in the codend.

The second is that the above mentioned research by Graham et al (2008a and 2008b), which led to the introduction of the fish trawl 'whiting codend', identified that joins in the extension section of the net used during that research, similar in principal to fixing ropes or choker strings around a codend, appeared to inadvertently result in a reduction in school whiting caught. Graham speculated that this loss may have been caused by 'slack' in the net and the meshes opening up in the vicinity of the joins and noted that the skipper subsequently removed the joins after independently concluding that they provided no benefit in terms of his total catch.

The third is that at a workshop held on 22 October 2010 at the Sydney Fish Markets involving several Fisheries Officers, two Fisheries Scientists with fish trawl expertise, industry representatives and the fisheries manager at the time, it was resolved that the OTSMP should be amended to allow for 'spilling ropes' to be inserted in fish trawl 'whiting codends' for easy removal of leatherjackets, provided any such rope is inserted within 10 meshes of the codend drawstring and is no shorter than 3.4 metres total length (i.e. 1.7 m x 2 when laid flat). It was considered that ropes of this length (or greater) in or aft of the position stated would not adversely affect the selectivity of the codend. Although no changes have been formally made following this workshop, the views of the experts in attendance indicates that, subject to any issues arising as a result of the number and location of ropes around the *San Antone's* codend, at 4 metres in length they are unlikely to be having any significant impact on the selectivity of the *San Antone's* codend.

Mr Pinzone advises that the reason the ropes are fitted is to stop the codend expanding to such an extent that it cannot be winched up the ramp at the rear of his boat, which is 1.6 metres wide and critical for lifting and transferring catches direct to the hopper. He also advises that based on his observations it appears the ropes may be reducing the amount of product lost when the codend is floating on the surface, particularly when multiple lifts are required.

Figure 7. *San Antone* showing position of hopper and ramp to facilitate retrieval of the codend.

Based on the above and in the absence of any creditable information or research to substantiate otherwise, three things appear apparent at this stage:

1. The ropes are having an effect on the loss of product when the net is on the surface, particularly when multiple lifts are required;
2. There is no clear answer as to the extent of any effect that the ropes (at 4 meters in length) may be having on the selectivity of the codend when in operation; and,
3. If a codend suitable for harvesting school whiting was to be introduced to the fish trawl and Danish seine sectors, the illegal use of choker string, which allegedly still occurs today, may become a thing of the past.

7.3.3 The alternate view – the need for a new 'whiting codend'

The alternate view that the legislated fish trawl 'whiting codend' is extremely inefficient and, therefore, inappropriate for catching school whiting is supported by a number of things, summarised as follows:

- The research that led to the introduction of the fish trawl 'whiting codend' showed that whiting escaped across nearly all size ranges including whiting marketed as large and extra large and concluded that the codend was extremely inefficient for harvesting school whiting (Graham 2008a);

- There is evidence and anecdotal information substantiating that many fish, both dead and alive, escape or are lost from the 'whiting codend' (and immediately forward of the 'whiting codend') upon retrieval and to a greater extent upon splitting for multiple lifts (Graham 2008a and pers. comm. with various shareholders 2011). There is also general consensus that such loss is wasteful, particularly if the fish are already dead and counterproductive in terms of delivering the legislated secondary objective to promote a viable industry;

- The NSW prawn trawl sector, which alone takes more school whiting than the fish trawl sector, uses mesh sizes in the order of 40 to 50 mm (noting that the length of sweeps which are known to herd fish are restricted);

- The current range of mesh sizes for codends used in the QLD Stout Whiting Fishery is also relatively small at 38 to 60 mm (QLD DEEDI 2011) or around 36 to 57 mm in NSW depending on the twine diameter, noting that in QLD mesh size is measured between the centre of the knots instead of between the knots (i.e. the inside mesh measurement);

- In the Commonwealth's Danish seine sector the minimum mesh size is 38 mm, however, pursuant to a voluntary code of conduct fishers typically use mesh sizes around 44 mm for harvesting school whiting and 60 to 75 mm for harvesting flathead (Pers. comm. Fishwell Consulting. 26 May 2011);

- During the early 1980's, around the time the NSW trawl fleet moved from Danish seining to otterboard trawling, NSW Fisheries researchers observed commercial Danish seiners operating under permit and targeting school whiting. This work involved a prawn trawl

codend (around 40 mm diamond-shaped mesh) attached to a Danish seine net (pers. comm. Rowling 2011);

- The apparent widespread belief amongst shareholders that many fish trawl operators continue to fix ropes or choker strings around their codends when targeting school whiting (pers. comm. various shareholders 2011) also, if true, substantiates that the current 'whiting codend' is inefficient; and,

- Advice from a NSW shareholder that he modifies his codend to catch school whiting efficiently but in such a way that it complies with current regulation (pers. comm. 2011) further supports the notion that the current 'whiting codend' as originally intended is inefficient for harvesting school whiting.

Given that few if any experienced commercial fishers will dispute that the fish trawl 'whiting codend' is inefficient for harvesting school whiting, no further attempts have been made to document the myriad of other information that is available to substantiate it as fact.

It would, however, be remiss to not briefly highlight one of the findings of the recent study by Koopman *et al* (2007) on the selectivity of Danish seine nets used off Lakes Entrance. That study determined a L_{50} of 15.6 cm for eastern school whiting from a 45 mm diamond-shaped codend. This is an important finding because it not only supports the fact that the fish trawl 'whiting codend' with a minimum mesh size of 90 mm is inefficient for harvesting school whiting, but could also be used in connection with other research by DPI over the years and extensive expertise within DPI and the industry to develop a new 'whiting codend' for fish trawling and Danish seining without further potentially expensive and time consuming research.

7.3.4 Managing the use of less selective codends

Some of the issues raised by those who attended the Port Stephens meeting and additional issues identified during the course of this review highlight the importance of carefully managing the use of fishing gear that is less selective than other forms of gear. In particular, it has highlighted the fact that the OT Fishery is lagging in terms of delivering on commitments set out in Ocean Trawl Fishery Management Strategy (OTFMS) to appropriately manage the use of 'whiting codends'. Management response 5.1(c) of the OTFMS states:

> *"5.1(c) Implement suitable gear, area and operational specifications for targeting school whiting (see specific controls in Appendix 4)*
>
> ***Background:*** *The implementation of effective BRDs in ocean prawn trawl nets (see response 1.2b) is expected to significantly reduce the quantity of school whiting taken in these nets. Additionally, the introduction of appropriate gear specifications for improving the selectivity of fish trawl nets (management response 2.1d) is also expected to significantly reduce catches of school whiting in fish trawl nets. While a net designed to target both prawns and whiting at appropriate sizes has been developed for the prawn trawl sector, a single gear net (or nets) specifically designed to catch school whiting (and minimise the incidental catch of other species) should be developed to ensure an ongoing yield of school whiting to help meet local marketing and processing needs. In order to satisfy environmental assessment guidelines and maintain annual landings of school whiting at about recent levels, the use of any new gear would have to be regulated (area and times of permitted operation will be*

> *specified) and adequate reporting and observer coverage would be required to accurately assess the level of incidental catch taken. The arrangements will be reviewed on an ongoing basis and corrective action will be taken to address any problems, including consideration of implementing a separate limited entry fishery if the gear controls do not sufficiently limit the fishing capacity."*

Management response 5.1(c) together with Appendix 4 of the OTFMS envisaged that the *less selective* 'whiting codend' would be restricted to the waters where school whiting are harvested. Waters west of the 55 metre depth contour was initially chosen because research indicated that the bulk of the school whiting taken in NSW is taken from those waters and to minimise bycatch of other species such as flathead known to be taken on grounds east of the 55 metre depth contour. The OTFMS establishes a 'medium term' timeframe for implementing these arrangements with medium term described as "within 3 years of the date of approval of the strategy". The OTFMS (or "the strategy") was approved in 2007.

Since the OTFMS was approved a new codend has been implemented (i.e. the 'whiting codend'), however, the waters in which it may be used have changed over time. Initially and in accordance with the OTFMS the 'whiting codend' was restricted to waters west of the 55 metre depth contour (Gazette No. 150 of 21 November 2008; pp 11293). Then, in response to representation by the OTMAC the arrangements were changed in 2008 to allow the 'whiting codend' to be used out to the 90 metre depth contour for a limited period before automatically reverting back to the 55 metre depth contour on 1 June 2009 (Gazette No. 50 of 6 March 2009; pp 1321). This 2008/09 period of grace was agreed on the basis that industry would map specific 'whiting grounds', some of which may extend to the 90 metre depth contour but not encompass grounds identified as being important to other species such as bluespotted flathead.

The OTMAC were consulted numerous times during 2008 and 2009, including once at the Sydney Fish Markets in December 2008 and again at an OTMAC meeting in May 2009, however, failed to produce the necessary maps. Instead, OTMAC representatives again sought all waters out to the 90 metre depth contour, excluding a small area between Terrigal and Narrabeen. The only other advice received was from shareholders in the Port Stephens region who requested access to the 73 metre depth contour only.

Despite industry's failure to produce the necessary maps, new 'approvals' were gazetted on 8 April 2011 allowing fishers to use the 'whiting codend' out to the 90 metre depth contour for a period of up to five years. The objective of the latest approval is to provide DPI sufficient time to deal with other higher priority issues (such as the Pyrmont Pact process) before progressing the mapping process. There is no doubt that refining the 'designated whiting grounds' can be achieved within a reasonable timeframe and with minimal fuss if adequate resources and appropriately skilled DPI staff are assigned and industry meaningfully engages in the process.

In response to this and various other issues identified during this course of this review it is recommended that:

- The 'designated whiting ground' concept is extended to Danish seine nets also. This will require amendments to the OTSMP and the General Regulation, as per clause 7B(3) of the OTSMP relating to the fish trawl net;

- The mapping of designated whiting grounds commences in those areas where 'whiting codends' are used more extensively, in particular off Sydney, Newcastle and Nelson Bay;

- Industry and DPI ensure that the resulting designated whiting grounds do not encompass grounds particularly important to other species (such as flathead) and that some refuge for school whiting is assured as envisaged by the OTFMS;

- DPI discuss with the OTMAC (for waters south of Smoky Cape) complementary arrangements for the prawn trawl sector, such as; (a) restricting prawn trawl nets fitted with the relatively less effective Ocean square-mesh panel BRD to the same designated whiting grounds; (b) the use of more effective BRDs in all other waters south of Smoky cape (i.e. non-whiting grounds); and, together with these initiatives, (c) the potential relaxation of rules that are at times resulting in the wasteful dumping of dead fish, such as bluespotted flathead, in waters south of Smoky Cape.

This last recommendation is made on the basis that the current BRD configuration used by most fishers is less effective than all other approved BRDs, particularly in terms of species such as flathead, and in response to obvious concerns by participants in the OT Fishery over current bycatch levels. It would also address any risk of fishers converting to prawn trawling to circumvent the more rigorous restrictions in place/proposed for the fish trawl sector. Subject to the OTMAC's advice on these initiatives they would be best progressed as part of the proposed package of reforms for the OT Fishery that DPI and the (former) OTMAC are in the process of preparing.

With respect to apparent compliance issues in the OT Fishery, namely the alleged ongoing use of choker strings and the use of 'whiting codends' in waters that are not 'designated whiting grounds', it is recommended that DPI and the OTMAC discuss how to prevent this and other such non-compliance from occurring in the fishery in the future, noting that the introduction of a new codend for harvesting school whiting may help address the former issue. With respect to the latter and to otherwise bolster the integrity of this and other spatially defined management arrangements it is suggested that the DPI and the OTMAC consider the efficacy of:

- Increasing the level of on-water enforcement, noting the high costs involved, inevitable introduction of cost recovery and competing enforcement priorities;

- Introducing a Vessel Monitoring System (VMS), noting that a VMS cannot be used to identify the type of gear/codend onboard or in use;

- Increased observer coverage, again noting the costs involved, the inevitable introduction of cost recovery and the fact that observers cannot be onboard all boats all of the time;

- Introducing new restrictions on the species than may be taken when using a 'whiting codend' on 'designated whiting grounds', noting the risk of perverse outcomes such as the wasteful discarding of dead but otherwise saleable product;

- Introducing restrictions on the number and/or types of codends that may be in possession onboard a boat each trip to sea; and/or,

- Introducing a requirement for fishers to pre-report their intention to use a whiting codend through the proposed Integrated Voice Response (IVR) system, noting that such an approach would be relatively cheap to implement and maintain, not so onerous on fishers and would facilitate strategic and cost effective enforcement of spatially defined gear requirements. Such a system may be able to be integrated with the new electronic catch reporting system to pre-populate logbooks the use of whiting codends – which would help overcome issues experienced during this review interrogating catch and effort data relating to targeting fishing for school whiting and associated catch rates etc.

During any such discussions consideration should be given to current industry and government priorities for streamlined and cost effective management and the potential benefits that the above mentioned technology can provide in terms of other management and compliance needs.

Preliminary outcome (7.3 Codend selectivity)
For all intents and purposes, the 'modifications' to the *San Antone's* codend appear to be having limited, if any impact on bycatch levels, noting obvious shortfalls in evidence substantiating this conclusively one way or the other. In making this statement and for context, due consideration has been given to the fact that codends lawfully used in other fisheries to target the same species are constructed of significantly smaller mesh sizes etc. It is suggested that requiring the immediate removal of the ropes (at 4 meters in length) and a reduction in circumference will not deliver the outcome ultimately sought by those who attended the Port Stephens meeting – being reduced competition for access to school whiting and bluespotted flathead and complete confidence that the sustainability of these species is assured, both of which are discussed in detail in the following Parts of this report.

Instead of making rash and potentially unnecessary decisions with respect to the *San Antone's* current codend configuration, a more strategic and pragmatic approach is proposed. Quite simply, it involves allowing the *San Antone* to continue with the current codend configuration and engaging the OTMAC (and shareholders) as soon as practicable to deliver the following:

- A new 'whiting codend' for fish trawl and Danish seine nets; and in connection with this,

- Refined 'designated whiting grounds' for the fish trawl sector (both fish trawl nets and Danish seine nets) and potentially the prawn trawl sector south of Smoky Cape; and,

- Improved compliance with and enforcement of spatially defined gear requirements, noting that proposed or agreed arrangements may also be beneficial in terms of the sector specific gear requirements currently being contemplated by north coast fishers in response to significant bycatch of juvenile mulloway in the school prawn sector.

Given the issues raised by shareholders, in particular bycatch of, for example, small or undersize flathead in 'whiting codends', and for other obvious reasons any new 'whiting codend(s)' that may be developed should not be made available to industry until such time as the 'designated whiting grounds' south of Smoky Cape are properly defined and legislated.

Changes proposed by DPI and/or shareholders in response to these issues should be incorporated into the package of reforms that DPI and the (former) OTMAC is preparing for input by shareholders and other stakeholder groups. Although this may delay that process, it is

important that shareholders are afforded the opportunity to consider the way forward on these and all other major changes proposed at the same time.

8. Sustainability

Commercial fishers who attended the Port Stephens meeting raised various issues with respect to the sustainability of school whiting and bluespotted flathead in support their claim that Danish seining poses a risk to the fisheries resources of NSW and the NSW commercial fishing industry and should be prohibited or otherwise restricted. The issues include:

- The targeting, taking and selling of small school whiting by the *San Antone*;
- Overall risk to the sustainability of school whiting and bluespotted flathead stocks; and,
- Risks arising if more boats gear up for Danish seining.

8.1 Targeting, taking and selling small school whiting

Some who attended the Port Stephens meeting allege that the *San Antone* intentionally targets, takes and sells very small school whiting (as small as 12 cm total length) and that this poses a risk to the sustainability of the stock. In his defence, Mr Pinzone advises that the processors that fillet his whiting require fish between 30 and 60 grams and that the balance of his whiting, which are generally larger than 60 grams, are marketed through the Newcastle Fishermen's Co-operative.

Length and weight frequency data held by DPI indicates that a 30 gram eastern school whiting is approximately 15 cm in length and that a 60 gram eastern school whiting is approximately 18 to 19 cm in length. In addition, a random inspection by compliance officers on 25 March 2011 of cartons destined for processing revealed eastern school whiting estimated to be consistently 16 cm in length (Figure 8).

Figure 8. Eastern school whiting destined for processing. The phone is 110mm long and the whiting estimated by DPI compliance officers to be 16 cm in length.

With respect to the school whiting marketed through the Newcastle Fishermen's Co-operative, on 17 May 2011 a representative of the co-operative confirmed that Mr Pinzone had consigned less than one tonne of large (i.e. >22 cm) school whiting and that the co-operative has records to substantiate it.

The advice received from Mr Pinzone coupled with DPI's length and weight frequency data, inspections by DPI compliance officers (prior to any concerns being raised with DPI) and advice from the Newcastle Fishermen's Co-operative indicate that the allegations made concerning the size classes of whiting targeted, taken and sold are not true.

With respect to the size classes harvested, in the absence of any identified sustainability issues (e.g. overfishing or growth overfishing etc) DPI typically affords industry the flexibility to harvest fish at sizes to suit market demand. Having said that, it must be acknowledged that DPI and industry has previously agreed, as set out in the OTFMS, to a minimum preferred target size of 15 cm for school whiting. This size was agreed given market demand at the time, growth rates (for optimum biological yield) and the fact that both eastern school and stout whiting reach sexual maturity at about 15 cm in length.

Preliminary outcome (8.1 Targeting, taking and selling small school whiting)
In the absence of any direct evidence to the contrary (which has not been provided to date), the allegation that the *San Antone* targets, takes and sells very small eastern school whiting, as small as 12 cm at times, remains unsubstantiated. There are also no sustainability concerns with respect to the size classes of school whiting actively targeted and taken by the *San Antone*.

8.2 Risk to eastern school whiting and bluespotted flathead

Fishers who attended the Port Stephens meeting suggest that the efficiency of Danish seine nets (generally and because of the codend configuration) poses a significant risk to the sustainability of the school whiting and bluespotted flathead.

Others looking at the issue from a more holistic perspective correctly suggest that despite the efficiencies that Danish seining may present, it is the cumulative catch of each species across all methods and stakeholder groups that is important. They also suggest that there is significant refuge for school whiting and bluespotted flathead (e.g. natural refuge in rocky reef areas that trawlers cannot access, Marine Parks, the Telecommunication Cable Exclusion Zones off Sydney and the many fishery specific closures that exist) and that this, coupled with the relatively large catches taken by the *San Antone,* helps or may otherwise be an indicator that the eastern school whiting stock is in a healthy state and may be significantly larger than currently thought.

Ultimately, and regardless of how individual fishers' feel about Danish seining, all tend to agree that sustainability of the stock is paramount. In addition, some, particularly those who rely heavily on access to school whiting, have alluded to the potential benefits of investing in additional research to determine the maximum sustainable yield (MSY) and ultimately the maximum economic yield (MEY) for eastern school whiting.

Given the many hundreds of species harvested commercially or taken by recreational fishers in NSW, the commercial fishing industry's relatively low GVP and limited industry financial contribution, the NSW State Government focuses its limited resources on delivering the primary object of the Act, being the conservation of fisheries resources and habitat. With additional funding, however, whether it is sourced from the commercial sector, recreational sector, Government or otherwise, there may be scope in the future to pursue additional research into MSY and MEY (for some species anyway), with a view to providing for increased total

commercial production. In the meantime, NSW must continue the current conservative approach to stock sustainability and continue investing in the systems that are currently in place to achieve this.

Fundamental to the conservation of fisheries resources in NSW is DPI's Resource Assessment Framework. This framework provides for the consideration of a wide variety of information through a practical, accountable and transparent process that culminates in exploitation statuses for over 100 of the State's key species and the periodically updated publication 'Status of Fisheries Resources in NSW' (refer to Rowling 2010; NSW DPI 2006; and the DPI website for further information). Much of the following information on school whiting and bluespotted flathead is taken from this publication and DPIs internal Resource Assessment System, which is a fundamental component of the Resource Assessment Framework. Isolated observations by individuals, no matter how well intentioned, are no substitute for the rigorous Resource Assessment Framework in place.

8.2.1 Eastern school whiting

Eastern school whiting occur in ocean waters to a depth of about 100 metres, from southern Queensland to eastern Victoria (Westernport Bay) and north-eastern Tasmania. Although there is some evidence suggesting that there may be two stocks in this range with the division between the two in the Sydney/Jervis Bay area, current stock assessments and management arrangements assume a single stock.

Generally speaking, eastern school whiting have life history characteristics that make the stock reasonably resilient to high levels of fishing mortality. They are reported to attain a length of 32 cm, mature at about 2 years of age and 15 cm in length and reach a length of about 25 cm after 7 years.

Eastern school whiting are taken almost exclusively by trawling (fish trawl and prawn trawl) or Danish seining (predominately off Victoria). Historical landings of eastern school whiting across all NSW commercial fisheries ranged between approximately 300 tonne and 1,200 tonne over the period 1984/85 to 2009/10 (Figure 9), with catch rates in the ocean prawn trawl sector, which takes the bulk of the catch, increasing over the period 1998/99 to 2009/10 (Figure 10).

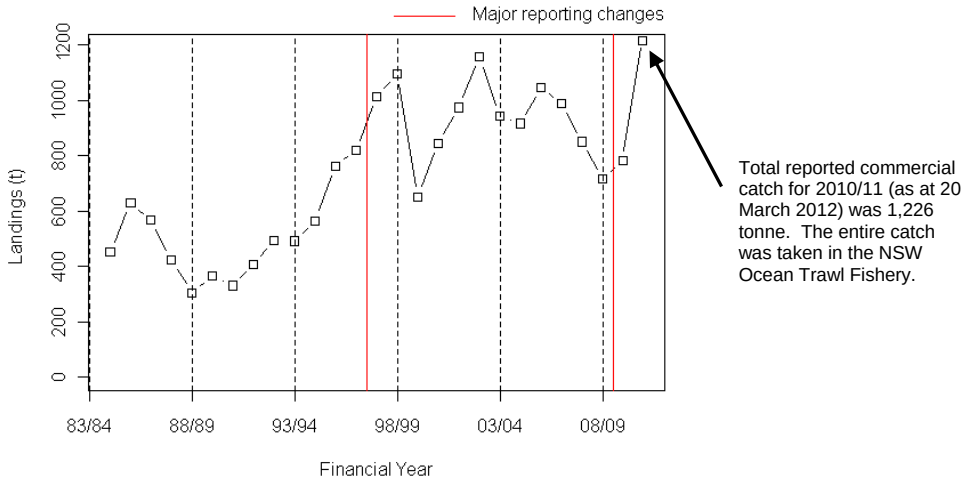

Figure 9. Reported commercial landings (including available historical information) of eastern school whiting for NSW from 1984/85 to 2010/11 for all fishing methods. (Source: DPI Resource Assessment System).

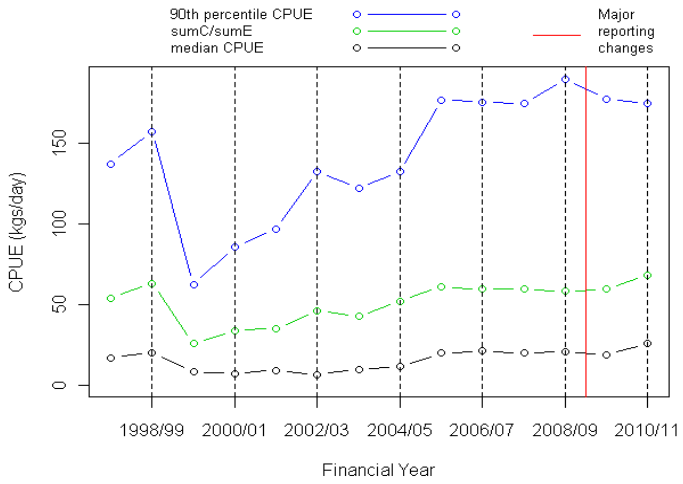

Figure 10. Catch rates of eastern school whiting harvested using prawn trawl nets in the NSW OT Fishery (Source: DPI Resource Assessment System).

There is substantial information available on eastern school whiting (which has a Resource Assessment Class (RAC) of 1 being the highest possible class because it is the subject of a full population model in the Commonwealth assessment process) including for example, time series estimates of biomass from dynamic models, time series estimates of total, natural and fishing mortality from dynamic models, biological reference points, local (NSW) information on growth, mortality and maturity and credible indicators of abundance to name a few (refer Appendix 2 for further information on the criteria for each of the five Resource Assessment Classes). The NSW exploitation status for eastern school whiting is described as 'fully fished', consistent with the exploitation status attributed by the Commonwealth. Stocks classified as fully fished have the following characteristics:

- Fishing mortality is approximately the same as natural mortality;
- Estimates of the biomass are greater than 30% of the estimated unfished biomass;
- Catch rates have been steady for 5-10 years and/or catch rates are greater than 30% of initial catch rates;
- Length and age distributions are stable; and,
- Species are fished throughout their entire geographic range.

For the purpose of assessing whether the catches taken by the *San Antone* pose an unacceptable risk to eastern school whiting and the OT Fishery's environmental accreditations a five pronged approach has been pursued. It involves:

- Comparing recent total catches to historical total catches in the OT Fishery;
- Investigating whether the sustainability performance indicators that form part of the OTFMS performance monitoring program have been triggered;
- Investigating whether the 1,400 tonne upper catch trigger for school whiting (eastern, western and stout whiting) set out in the OTFMS has been triggered;
- Investigating the potential for cumulative impacts given that eastern school whiting are also harvested in the Commonwealth's SESS Fishery; and,

- Investigating, as recently raised by one shareholder, the potential for sustainability to be compromised as a result of high rates of harvest over short time periods.

8.2.1.1 Comparison of past and present total catches in NSW

The delay releasing this report (because of other higher order priorities) has fortuitously provided opportunity for fishers' to submit their catch records and for reasonably accurate estimates of total production for 2010/11. For the 2010/11 season the total reported catch of eastern school whiting taken by the OT Fishery (as at 20 March 2012) was approximately 1,226 tonnes.

A comparison of the reported catch for 2010/11 against the 14 years prior (1996/97 to 2009/10) revealed that the 2010/11 catch is the largest catch taken. For perspective, it is noted that in four of the last 14 years the total reported catch in the OT Fishery was over 1,000 tonne. Those years being 1997/97 (1,014 tonne), 1998/99 (1,096 tonne), 2002/03 (1,159 tonne) and 2005/06 (1,047 tonne).

This assessment, therefore, indicates that the estimated total catch of eastern school whiting for 2010/11 is the highest for the past 14 years but still within 60 to 200 tonnes of the four next highest years as mentioned above. Noteworthy is that if the *San Antone's* catches for 2010/11 were excluded, the total catch by the balance of the fishery for 2010/11 would have been the fourth highest over the last 14 years.

8.2.1.2 Assessment against the OTFMS performance monitoring program

All commercial fisheries in NSW, including the OT Fishery, are subject to commitments made during recent environmental assessment processes pursuant to State and Federal legislation that aims to ensure the ongoing sustainability of fisheries resources. These commitments are set out in the Fishery Management Strategies (FMS) and statutory Share Management Plans (SMP) for each of the state's major commercial fisheries.

Given the diversity of species taken in NSW, fundamental to the performance monitoring program is a monitor-and-respond type approach with a focus on the health of stocks over the long term.

The Resource Assessment Framework in place provides the data/information necessary for the performance monitoring program and if the exploitation status for a species changes to 'overfished' or 'recruitment overfished' the FMS and SMP performance monitoring programs trigger the development of a recovery program, including a review of current management arrangements across all relevant stakeholder groups.

Given the long term focus and resource intensive nature of this program, it is not possible to determine – in the short term for the purpose of informing this review – whether the exploitation status for eastern school whiting has or is likely to change as a result of the *San Antone's* catches or, more importantly, total exploitation across all stakeholder groups. Further, and in any event, increased catches by a particular boat or the NSW fleet as a whole are unlikely to result in the status of a species changing – a set of biological indicators (e.g. spawning biomass and age class distribution etc.) would need to change before the status attributed to a stock is affected.

It was noted during the 2011 NSW Resource Assessment Workshop that the Commonwealth assessment that eastern school whiting was not overfished or experiencing overfishing was adopted despite significant localised pressure in some areas in recent years, including off Lakes Entrance and the Sydney/Newcastle region.

Ultimately, the observations from the 2011 Resource Assessment Workshop (including consideration of the Commonwealth's assessment) do not support the inference that the eastern school whiting stock is at imminent risk. Consistent with current practice, any concerning trends that may emerge or potential changes to the exploitation status identified through the Resource Assessment Framework will be communicated to relevant stakeholder groups and in the event the latter is realised trigger a review of current management arrangements.

8.2.1.3 Assessment against the OTFMS 1,400 tonne catch trigger

The OTFMS is the only strategy that includes a second species-specific catch monitoring program – specific for school whiting (eastern school and stout).

The program is described in detail in Appendix 4 of the OTFMS and includes a 'catch target range' of 1,110 to 1,400 tonnes of school whiting per year. This program was established in recognition of the fact that some fishers rely heavily on access to school whiting (in some cases to support ancillary land based value-adding ventures etc) and the risks posed by:

(a) Proposals on the table at the time to improve the selectivity of fish trawl and prawn trawl nets (which were expected to impact school whiting catches); and,

(b) Increased total catches, in particular the risk of increased targeting by additional fishers and the impact that could have on the sustainability of the stock and the viability of those who rely heavily on access to it.

The OTFMS states that if the upper catch trigger limit of 1,400 tonnes per annum is exceeded, the arrangements for harvesting school whiting will be reviewed, including consideration of implementing more stringent controls and potentially a separate limited access school whiting fishery.

Again, the delay releasing this report has fortuitously provided opportunity for reasonably accurate estimates of total production by the OT Fishery for 2010/11 to be obtained. For the 2010/11 season the total reported catches of eastern school and stout whiting combined for the NSW OT Fishery (as at 20 March 2012) was approximately 1,291 tonnes – approximately 110 tonnes below the upper catch trigger level of 1,400 tonnes for the purpose of triggering a review of the harvesting of school whiting in the NSW OT Fishery.

8.2.1.4 Assessment of the cumulative jurisdictional impact

Given that eastern school whiting are also harvested in significant quantities in the Commonwealth's SESS Fishery, consideration has been given to the cumulative impact that the two jurisdictions together may pose to this important stock.

NSW and the Commonwealth both contribute information towards a joint stock assessment for eastern school whiting, which is then used along with other information to determine the exploitation status for the stock. The Commonwealth does, however, also go one step further by feeding this and other information into a sophisticated model for the purpose of determining a Recommended Biological Catch (RBC) for eastern school whiting.

The RBC is basically the total estimate of sustainable catch across all stakeholder groups and is used as a basis for setting a Total Allowable Catch (TAC) for the Commonwealth SESS Fishery. More specifically, once the RBC is determined AFMA subtracts the annual catches taken in other jurisdictions plus an estimate of discards to determine the TAC available to the Commonwealth SESS Fishery. The TAC is then distributed amongst Commonwealth fishers annually as quota proportional to their Statutory Fishing Rights (SFRs).

Because of the way that the Commonwealth sets its TAC, in particular taking account of NSW catches from year to year and offsetting those catches by increasing or decreasing the Commonwealth TAC, there is reduced risk of cumulative catches across both jurisdictions exceeding the RBC over prolonged periods. Whilst this may be fortuitous for NSW in terms of sustaining eastern school whiting, the absence of strict catch controls in NSW creates risk of a significant resource sharing issue that has the potential to impact the Commonwealth TAC and the quota allocated to Commonwealth fishers, an issue that is discussed in greater detail in the next section of this report.

This assessment concludes that given the way the Commonwealth sets its TACs, fluctuating total catches of eastern school whiting in NSW alone is not expected to result in the overexploitation of the eastern school whiting stock.

8.2.1.5 High rates of harvest over short time periods

In response to concerns recently raised by a shareholder in the OT Fishery, an attempt has been made to locate research on the potential for high harvest rates over short periods to adversely the eastern school whiting stock.

No such research has ever been conducted in NSW and no research could be located relating to similar stocks such as stout whiting (which is taken predominately in QLD) or western school whiting (which is commercially harvested in Western Bass Strait, South Australia and Western Australia).

Consideration has also been given whether such research should be pursued and how the outcomes of any such research could be used to manage the commercial harvest of eastern school whiting in NSW. While such research may be interesting, it would by no means be high on the current list of priorities for the NSW OT Fishery. It is also questionable whether, in the absence of programs, strategies, technology or commitments from industry to spatially and temporarily manage access (whether for sustainability or economic reasons) the results of such research would translate into meaningful management action.

The fact is, for the trawl fishery anyway, fishers are currently enjoying the flexibility to exploit stocks where (in a general sense) and when they so choose and has not yet demonstrated the

interest, capacity or maturity to delve into what would ultimately be a potentially complex harvest strategy.

The NSW Rock Lobster Fishery is one of the most advanced fisheries in NSW, yet it also has only recently starting contemplating the concept of MEY and how to integrate it into the management of that fishery – the trawl fishery still has a while to go and many hard decisions to make before moving down this path of managing access temporally and spatial for the purpose of enhancing fishery wide MEY from any one (or some) of the species the fishery currently exploits.

8.2.2 Bluespotted flathead

The bluespotted or sand flathead (*Platycephalus caeruleopunctatus)* is a coastal species living in deep estuarine and ocean waters to depths of about 100 m between southern Queensland and northeastern Victoria. Preliminary results from current work show that bluespotted flathead grow relatively quickly, reaching a length of 30 cm after 2 to 3 years and mature at a length of 20-30 cm off northern NSW and 25-35 cm in the south. Spawning occurs over an extended period through late winter, spring and summer.

Historical commercial landings for NSW have been as high as 200 tonnes and have been generally stable at around 120 to150 tonnes over the past decade (Figure 11). The size composition of commercial catches has also been relatively stable since the 1970's and length-based monitoring of commercial catches is continuing at the Sydney Fish Market. Catch rates in the fish trawl sector appear to have increased in recent years (Figure 12). Recreational landings are estimated to be many times larger than the current commercial catch and likely to lie somewhere between 320 and 450 tonnes per year (Rowling 2010).

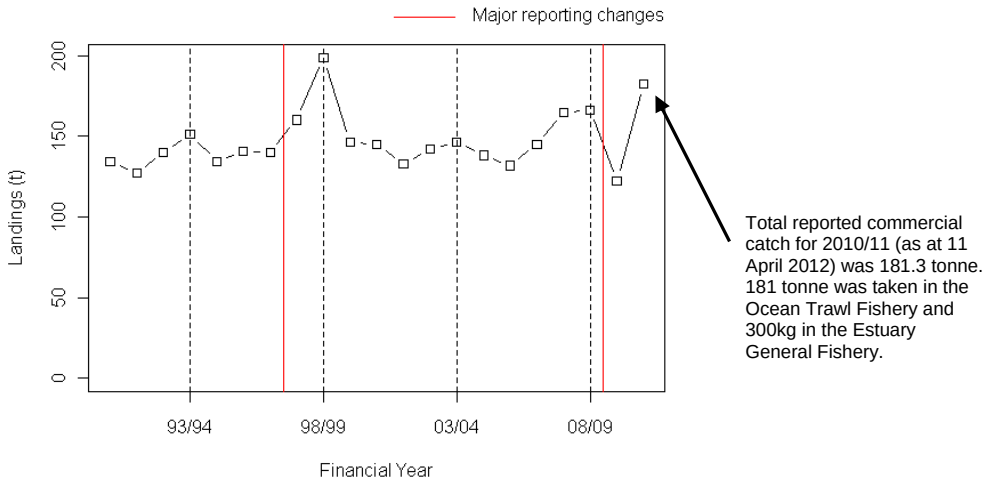

Figure 11. Reported commercial landings (including available historical information) of bluespotted flathead for NSW from 1990/91 to 2010/11 for all fishing methods (Source: DPI Resource Assessment System).

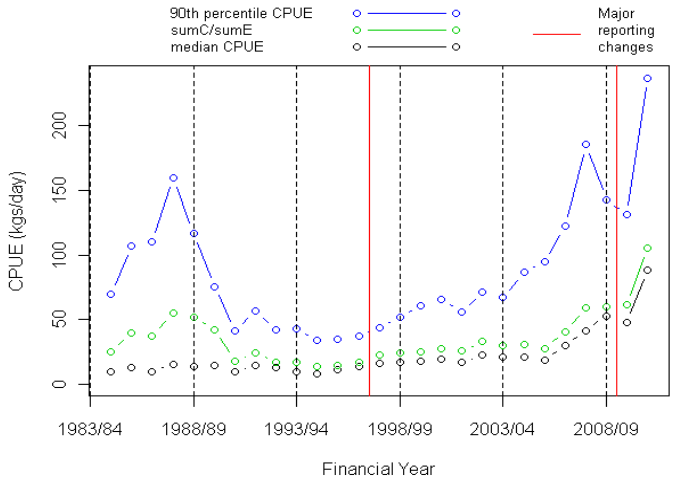

Figure 12. Catch rates of bluespotted flathead harvested using fish trawl nets in the NSW OT Fishery. (Source: DPI Resource Assessment System).

Bluespotted flathead has a Resource Assessment Class (RAC) of 3 and a target RAC of 2, which means that there is some information available on the species but more is ultimately desired (refer Appendix 2 for further information on the criteria for each of the five RACs). The bulk of the information on bluespotted flathead comes from commercial catch reporting and other sources such as market monitoring. The NSW exploitation status for bluespotted flathead is described as 'fully fished', the characteristics of which were outlined above in respect of eastern school whiting.

For the purpose of assessing whether the catches taken by the *San Antone* pose an unacceptable risk to the bluespotted flathead stock and the OT Fishery's environmental accreditations a three pronged approach was pursued. It involved:

- Comparing recent total catches to historical catches in the OT Fishery;
- Investigating whether the performance indicators forming part of the OTFMS performance monitoring program have been triggered; and,
- Investigating the potential for cumulative impacts given that bluespotted flathead are also harvested by recreational fishers and in the Commonwealth SESS Fishery.

The OTFMS does not have a species specific monitoring program with upper and lower catch trigger levels as per that for eastern school whiting described above and the Commonwealth does not manage the total harvest of bluespotted flathead through a species specific TAC. The Commonwealth's TAC for flathead applies across five different species of flathead, including tiger flathead (*Platycephalus richardsoni*), sand flathead (*Platycephalus bassensis*), southern or 'yank' flathead (*Platycephalus speculator*), bluespotted flathead (*Platycephalus caeruleopunctatus*) and gold-spot/toothy flathead (*Neoplatycephalus aurimaculatus*).

8.2.2.1 Comparison of past and present total catches

The delay releasing this report (because of other higher order priorities) has fortuitously provided opportunity for fishers' to submit their catch records and for reasonably accurate estimates of total production for 2010/11. For the 2010/11 season the total reported catch of bluespotted flathead taken by the OT Fishery (as at 11 April 2012) was 181 tonnes.

A comparison of the reported catch for 2010/11 against the 13 years prior (1997/98 to 2009/10) revealed that the 2010/11 catch is the equal largest catch taken – equal to the reported catch for 1998/99 of 181 tonne. For perspective, it is noted that in two other years over the last 13 years the total reported catch in the OT Fishery was also over 150 tonne. Those years being 2007/08 (152 tonne) and 2008/09 (159 tonne).

This assessment, therefore, indicates that the estimated total catch of bluespotted flathead for 2010/11 is one of the two highest for the past 13 years and within approximately 30 tonnes of the two next highest years as mentioned above. Noteworthy is that if the *San Antone's* catches for 2010/11 were excluded, the total catch by the balance of the fishery for 2010/11 would have been the second highest over the last 13 years.

8.2.2.2 Assessment against the OTFMS performance monitoring program

Bluespotted flathead has an exploitation status of 'fully fished' (as per eastern school whiting) and as outlined above with respect to eastern school whiting, the impact of the *San Antone* on this important stock, or more specifically the cumulative impact across all stakeholder groups, will need to be kept under review as part of the ongoing Resource Assessment Framework. In the meantime, it needs to be borne in mind that ultimately the total catch by the *San Antone* for 2010/11 was a very small proportion of the total estimated catch across all stakeholder groups.

8.2.2.3 Assessment of the cumulative impact

An assessment of the potential cumulative impact has not been pursued for a number of reasons, the most important being that there is no evidence that the total NSW commercial catch has increased significantly and there are no up to date estimates for the recreational sector, which takes the majority of the catch. With respect to the Commonwealth, the Commonwealth manages the take of bluespotted flathead under a combined TAC/quota applying across a number of flathead species. As above, the exploitation status for bluespotted flathead should be kept under review as part of the Resource Assessment Framework and commercial fishery performance monitoring program.

8.2.3 Risks arising if more boats gear up for Danish seining

Commercial fishers who attended the Port Stephens meeting pointed out that any potential sustainability risks will be compounded if additional boats, whether owned by an existing fisher or a new entrant to the NSW commercial fishing industry, are set up for Danish seining.

All shareholders who have been in contact with DPI appear to acknowledge the risk of additional boats setting up for Danish seining. While some suggest the risk is significant and imminent, others suggest that it is not or that it will be short lived unless new markets for the product harvested are established to make it profitable into the longer term. Given that Danish seine is predominately an inshore method and suitable for some species only, this latter view may have some merit given that fishers in the NSW trawl fishery are more often than not opportunistic in terms of the species that they target.

A review of catch records for 2010/11 indicates that since these concerns were raised (i.e. over 12 months ago) only one business has reported use of a Danish seine net for a total annual catch of less than 5 tonne of school whiting. This particular business also harvests eastern school whiting using fish trawl nets. It has also been confirmed that one existing NSW fisher (who already targets whiting) has invested in gear for Danish seining (Pers. comm. 10/6/11).

Like most other commercial fisheries in NSW (and the recreational sector for that matter), the OT Fishery has always been vulnerable to the risk of increased fishing effort, whether directed at a particular species or generally, whether it be in the prawn trawl or fish trawl sector, the result of an existing fishers or a new entrant to the industry or by one very efficient operator or an influx of many. This is, ultimately, to be expected given that the OT Fishery along with most other fisheries in NSW are managed through input controls and have significant surplus capacity (i.e. excess endorsements) and the fact that technology, for example improved electronics and gear design etc, can alone contribute significantly towards increased effort (or 'effort creep' as it is commonly referred to).

For all intents and purposes it must be considered that the risk of increased effort and or catch across the entire OT Fishery remains an issue, as it has in the past, and that effort and catch must continue to be closely monitored as it is now. Moving to potentially complex and costly management arrangements should not be pursued until such time as the need for change is clearly demonstrated and the desired objectives are clearly identified. To do otherwise could potentially result in unnecessary perverse short and or long term outcomes not only in respect of the individuals that may be directly affected but the fishery as a whole.

Preliminary outcome (8.2 Risk to eastern school whiting and bluespotted flathead)
With respect to eastern school whiting four different approaches were pursued to ascertain the risk that the *San Antone's* activities during 2010/11 posed to the sustainability of this important stock. For each approach it could not be concluded that the stock was or is at imminent risk. In particular, it was determined that: (a) although the total reported catch for the OT Fishery for 2010/11 (including that taken by the *San Antone*) is the highest for the last 14 years, it was only marginally higher than some; (b) there is no evidence to substantiate that the exploitation status for eastern school whiting has or will change from fully fished to overfished or recruitment overfished as a result of the *San Antone's* activities during 2010/11; (c) the 1,400 tonne catch trigger (which applies across all three species of school whiting) was not breached during 2010/11; and (d) the way the Commonwealth sets its TACs provides some safeguards in terms of ongoing over exploitation of eastern school whiting over consecutive years. There is also no concern at this stage with respect to the size classes of eastern/western school whiting harvested by the *San Antone*.

With respect to bluespotted flathead, a similar conclusion was reached. That is, the *San Antone's* activities during 2010/11 could not possibly pose a significant risk to the sustainability of this important commercial and recreational species. Not only was the total harvest by the *San Antone* insignificant compared to the balance of the fishery (and even more insignificant when compared to estimates of total take across all stakeholder groups), but the total production by the OT Fishery was equal to that of 1989/99 (i.e. 181 tonne) and within 30 tonne of the next two highest years for the OT Fishery over the preceding 13 years. There is also no other evidence to suggest or substantiate that the exploitation status for bluespotted flathead has or is likely to

change from fully fished to overfished or recruitment overfished as a result of the *San Antone's* activities during 2010/11.

With respect to the OT Fishery's legal and environmental obligations relating to the long term sustainability of eastern school whiting and bluespotted flathead, this review has determined that the OTFMS and OTSMP trigger points have not been breached and that the OT Fishery is not under any obligation, mandatory or otherwise, to review or otherwise modify the management arrangements that apply to the taking of school whiting and bluespotted flathead in the OT Fishery at this stage.

These conclusions should not, however, be taken to mean that there are no resource sharing issues or concerns evident (which is discussed in detail in the next Part of this report) or that these important stocks remain free from the risk of future overfishing. Although not yet formally assessed, anecdotal information coupled with evidence of relatively high annual catches of inshore species in recent years (i.e. flathead and whiting as identified in this review) lend support to the theory advocated by some industry leaders that the NSW fleet has been focussing on inshore waters in recent years not only because of good catches but because of high fuel costs.

With respect to the prospect of increased Danish seining or more importantly the risk of increased catches of eastern school whiting and bluespotted flathead, it is concluded that the potential risks remain real (as they has been in the past) and should continue to be monitored into the future. In this regard, it is critical for all stakeholder groups to recognise that the real issue is not the *San Antone* or Danish seining alone, but the cumulative impact or mortality across all relevant stakeholder groups. Supporting this is the fact that the school whiting stock has been under some pressure in recent years (e.g. off Sydney to Newcastle) and the fact that another stakeholder group, namely the north coast prawn trawl sector, has recently secured a new export market and will potentially step up production. These changes in market demand/production could not possible have been foreseen, but nonetheless are all contributors to potential future sustainability issues that may arise.

In the absence of any evidence substantiating that the eastern school whiting and bluespotted flathead stocks are at imminent risk because of the *San Antone* or Danish seining specifically, it would be inappropriate to make any rash decisions concerning the future of Danish seining in NSW or more broadly the total commercial, charter and or recreational catches of these important species – to do so in the absence of creditable information substantiating the need would be highly unpalatable for the individuals or stakeholder groups that would be adversely affected. Instead, a more pragmatic and strategic approach is recommended as follows.

Given that school whiting are one of the most important species by weight harvested in the OTF (Rowling 2010) and evidence of increased demand for school whiting, a two pronged approach is proposed spanning both the short and long term. The short term approach involves ongoing monitoring of the total annual catches of school whiting taken by the OT Fishery in the coming years against the 1,400 tonnes catch trigger. Supporting this as an appropriate short term response is the fact there is no evidence to substantiate that the total catch by the OT Fishery during 2010/11 has resulted in any sustainability issues, the next few years catch by the OT Fishery cannot be accurately predicted at this stage and the proposed monitoring can be done at no extra cost to DPI or industry. If the 1,400 catch trigger is breached, a review will be initiated

and changes to the management arrangements that apply to the harvesting of school whiting in the NSW OT Fishery will be contemplated.

Adopting this approach will also provide opportunity to monitor for increased catch as a result of the export market secured by the north coast prawn trawl sector, consideration of the inter-jurisdictional and intra-fishery resource sharing issues identified in the next Part of this report and the impact that a new 'whiting codend' (if introduced) may have on total catches in the fishery. It will also provide opportunity for informal industry discussion on potential strategies for managing total catch in the fishery should it become necessary – a discussion that the OTMAC must be engaged in given their management expertise developed over recent years and to ensure consistency with the objects of and strategies underpinning the proposed OT Fishery package of reforms that is currently being developed.

The longer term approach, applicable to both eastern school whiting and bluespotted flathead, is to continue using the Resource Assessment Framework to further our knowledge of these important species and the exploitation status based performance monitoring programs set out in the Fishery Management Strategies to monitor for emerging sustainability issues. Supporting this as an appropriate longer tem approach is the fact that these programs are designed for longer term monitoring of fisheries resources, they encompass school whiting and bluespotted flathead and they take account of the cumulative impacts across all stakeholder groups including the charter and recreational sectors. These programs have also been heavily scrutinised by relevant Commonwealth and State agencies as part of the environmental assessment of NSW's commercial fisheries and, in effect, determined to be appropriate for the purpose of monitoring and responding to emerging sustainability issues in what is ultimately a species rich and data poor industry.

9. Resource sharing

9.1 Allegations of reduced catch

Two fishers who attended the Port Stephens meeting advised that they regularly trawl the waters between Broughton Island and Seal Rocks and alleged significant reductions in catches, particularly eastern school whiting and bluespotted flathead, during and immediately after the *San Antone* worked there. Interestingly, there have been no such allegations made by fishers working off Newcastle, which is where the *San Antone* focussed most of its effort throughout 2010/11.

A review of the catch records for the *San Antone* indicates that prior to the Port Stephens meeting the *San Antone* worked between Broughton Island and Seal Rocks for a total of six days over a seven day period between 4 and 10 March 2011 inclusive. Catch records for the 'other boat' have been examined in an attempt to confirm or otherwise the alleged reductions in catch, however, no such reductions directly attributable to the *San Antone* could be identified (refer Appendix 1 *[Note: this Appendix extracted from publicly released document for privacy reasons]*).

Preliminary outcome (9.1 Allegations of reduced catch)
DPI has not been able to confirm beyond reasonable doubt that other fishers' catches have been significantly and directly affected by the *San Antone* (or whether their profitability has in fact been affected). It is advisable that in the future, such allegations be supported by strong evidence supplied by the complainants before being entertained by DPI. Not only will this reduce the risk of frivolous verbal complaints but it will alleviate wasted time and effort by the department investigating such matters.

9.2 Unfair competition for access to fisheries resources

Some of the those who attended the Port Stephens meeting believe that the *San Antone's* Danish seining activities are much more efficient than fish trawling (for school whiting anyway) and, therefore, establish an unfair advantage in terms of access to the fisheries resources of NSW. Some also suggest that the targeting of *smaller* size class eastern school whiting establishes a further unfair advantage. Such concerns were not raised by commercial fishers from the Newcastle area who worked alongside the *San Antone* in 2010/11, however, have been eluded to in recent times by a select few further to the north.

It is noted with interest that the *San Antone's* activities have also been a topic of conversation amongst some recreational fishers and raised at recent meetings of the NSW Advisory Council of Recreational Fishing (ACoRF). Representations received to date indicate that recreational fishers are more likely to be concerned about bluespotted flathead and sustainability generally rather than school whiting, which is taken almost exclusively by the commercial sector.

DPI has also received representation from the Chief Executive Officer of the South East Trawl Fishing Industry Association (SETFIA) concerning the "potential erosion of the Commonwealth's Total Allowable Catch (TAC) for school whiting" and the impact that would have on the quota allocated to Commonwealth fishers.

Given that resource sharing can be an extremely emotive issue, particularly where pecuniary interests are at stake, it is critical to turn first and foremost to any existing formal resource sharing arrangements or in the absence of any such arrangements, commitments that have been made by one or more of the sectors involved. Changes in total catches by sector is also sometimes useful to consider.

9.2.1 Resource sharing with the recreational sector

With respect to the NSW commercial and recreational sectors, there are no formal resource sharing arrangements in place either generally or in respect of school whiting or bluespotted flathead specifically. The OT Fishery along with all other commercial fisheries in NSW has, however, established commitments to monitor and respond to large shifts in catch between sectors. These commitments are set out on the Fishery Management Strategies (FMS) for each of the state's major commercial fisheries and are underpinned by the Resource Assessment Framework in place.

In the event that the FMS trigger point is breached a review is to be undertaken in consultation with the relevant Management Advisory Committees and in the case of issues impacting multiple stakeholder groups relevant Ministerial Advisory Bodies. A review report is to be prepared within six months of the trigger point being breached and any remedial action that may be required is required to be implemented within specified timeframes.

For the purpose of detecting large shifts in catch between the commercial and recreational sectors, a review is triggered if the maximum absolute difference in the distribution of landings of a particular species by the commercial and recreational sectors exceeds 25 percentage points when compared every five years (refer Appendix 3). For the purpose of the OT Fishery this program applies to all species designated as 'primary species', which includes eastern school whiting and bluespotted flathead.

This indicator was established in 2006/07 and is due for assessment in 2012/13. Further, the OTFMS correctly points out that "…this indicator can only be measured if updated estimates of non-commercial catch become available between comparison years". It is noted that the no such updated estimates exist. The reason why updated recreational catch estimates are required is because the trigger point relies on maximum absolute differences in the distribution of landings over time for each relevant stakeholder group.

Given that ACoRF has supported allocation of $5M over a three year period to complete a statewide survey of recreational fishing in NSW and preliminary work has recently commenced, this performance indicator should be able to be re-assessed in 2014/15 or sometime soon after.

9.2.2 Resource sharing between NSW and the Commonwealth

As outlined earlier, DPI acknowledges that under the Commonwealth's TAC setting arrangements fluctuating State catches can have a direct impact on Commonwealth TACs and the quota allocated to Commonwealth fishers. More specifically with respect to the issue at hand, increased catches of school whiting in NSW can lead to a commensurate reduction in the Commonwealth TAC for school whiting and quota allocated to Commonwealth fishers (and vice versa). This *phenomenon* was clearly evident to NSW licensed fishers when the Bateman's Bay Marine Park was introduced, NSW fishing businesses were bought-out, production of silver trevally in NSW declined and in response the Commonwealth TAC for silver trevally increased.

Over the last few years, DPI and the Australian Fisheries Management Authority (AFMA) have stepped up efforts to develop a formal resource sharing framework and resource sharing arrangements for each of the Commonwealth's quota managed species (which would help deal with the issue at hand), however, as pointed out by SETFIA progress has been slow. Some of the reasons for this, but by no means the only reasons, include staff movements, the higher priority reform programs underway in NSW, and the myriad of other day to day issues (including this review) that arise from time to time.

It is noted that for the purpose of setting TACs for school whiting in the Commonwealth SESS Fishery for the 2012/13 season the Commonwealth rolled over the 2011/12 TAC of 641 tonne following a risk assessment. This approach was adopted pending further research into the

structure of the school whiting stock and ultimately redetermination of the Recommended Biological Catch (RBC) for school whiting.

The situation for bluespotted flathead is not so clear cut given that, amongst other things, it is one of a number of species of flathead covered by a single TAC.

Although ultimately a matter for AFMA, in the interest of working collaboratively DPI could discuss with AFMA the introduction of an interim resource sharing arrangement for school whiting pending the development and implementation of a resource sharing framework and resolution of issues with the Commonwealth's stock assessment for eastern school whiting. Such an approach would give both jurisdictions an opportunity to consider the issues at hand, whether NSW can assist in improving the information that is fed into the Commonwealth's model, stake its claim (and consider the cumulative impact) and deliver the certainty that SETFIA seeks and that the NSW commercial fishing industry also deserves. Any such interim arrangements would need to be implemented without prejudice to any future resource sharing framework or arrangements.

The best alternative approach identified to date, pending the development of a formal resource sharing framework and resource sharing arrangements, would be for NSW to retain its current upper catch trigger of 1,400 tonne across all species of school whiting taken in NSW and for AFMA to determine its own response to this and any issues that Commonwealth fishers or SETFIA may raise. In any event, this should also be discussed with AFMA.

9.2.3 Resource sharing in the NSW Ocean Trawl Fishery

There is a long history of representation from fishers in the OT Fishery concerning boats from other ports (or even interstate) moving into 'their patch'. In some cases local fishers have raised many issues in support of their concerns, however, in most cases competition for access to the same fisheries resources is the primary issue.

The OTFMS includes a performance indicator for detecting large shifts in catch between the three gear types permitted in the fishery, being prawn trawl, fish trawl and Danish seine nets. For the purpose of detecting such shifts, a review is triggered if the maximum absolute difference in the distribution of landings between the assessment and reference years exceeds 25 percentage points. This indicator was established in 2006/07 and because it is assessed every 5 years is due to be assessed in 2012/13.

Despite the fact that the OTFMS performance monitoring program has not been triggered (i.e. because it is not yet due to be assessed), it is suggested that the OTMAC start discussing the recent shifts in catch between the prawn trawl, fish trawl and Danish seine sectors for a number of reasons:

- Some fishers in the OT Fishery are already clearly concerned about the issue albeit in respect of only a few important species, namely school whiting and bluespotted flathead;

- The OTFMS intra-fishery resource sharing performance indicator is likely to be triggered when it is next assessed in 2012/13 (because the Danish seine catch has increased from virtually nil in 2006/07 to reasonable levels in recent times);

- The possibility that DPI may need to actively cap the total catch of eastern school whiting taken in NSW in response to the resource sharing and TAC related issues raised by SETFIA;

- The possibility of increased catch rates and total catches if a new 'whiting codend' is implemented for the fish trawl and Danish seine sectors;

- The possibility, although low and as has always been the case, that the total catch of school whiting in NSW will exceed the 1,400 tonne catch trigger set out in the OTFMS in any event; and,

- For security of access for those with investment (or those who intend to invest) in the targeting and value-adding of school whiting, noting significant such investment already evident in various regional areas including Sydney, Newcastle, Forster and the Clarence.

When it comes to resource sharing within a fishery, DPI generally affords shareholders scope to determine for themselves how access to the available fisheries resources of NSW is shared. However, given the objects of the Act and the fact that allocation decisions are more often than not very difficult to make particularly where pecuniary interests are at stake, DPI can if needed determine on behalf of industry the preferred way forward.

For the purpose of informing the current debate and to encourage shareholders (and others) to take a more holistic perspective of the issues at hand, Appendix 4 and 5 contain information on historical landings (not including discarded fish which can be significant) of eastern school whiting and bluespotted flathead in the OT Fishery. Importantly with respect to the representations received, it shows that the distribution of catches of bluespotted flathead and eastern school whiting in the OT Fishery have changed considerably over the years spatially, temporarily, between the prawn and fish trawl sectors and between participants within each. With respect to eastern school whiting it also shows that during some years total catches from individual ocean zones (e.g. of the Clarence, Sydney and Crowdy Head to Newcastle in particular) in the order to 300 to 400 tonnes, which is significantly greater than that believed to have been taken off the Newcastle/Nelson Bay region in 2010/11.

In the event that it is decided that the recent redistribution in catch between gear types in the OT Fishery needs to be redressed, Appendix 6 outlines some of the strategies that could potentially be adopted. These strategies are provided to stimulate discussion amongst shareholders and are by no means the preferred or only options that may be available.

In determining the preferred way forward shareholders in the OT Fishery (and the OTMAC) will need to make a fundamental decision before delving into the options available. That is, should the fishery revert back to the 'old days' where access was shared amongst many and fishing efficiency restricted in an attempt to sustain stocks in demand or decline, or, should the fishery break this mould and pursue new strategies more effective for delivering the dual objective of a profitable and sustainable commercial fishing industry? The (former) OTMAC has been

contemplating this issue for a few years now and is of the view that the 'old ways' do not work in what is, in effect, an ever-changing economic environment and that the fishery needs to adopt a fundamentally new direction based principally on fewer more efficient businesses and management arrangements that are sufficiently adaptable in the context of an ever-changing social, economic and biophysical environment.

Preliminary outcome (9.2 Unfair competition for access to fisheries resources)
Danish seining appears to be a very efficient method for catching some species at least, and there is evidence of increased local competition for access to two important species in particular, school whiting and bluespotted flathead. There is also the possibility of potential ramifications for Commonwealth fishers should total state catches increase significantly.

With respect to the recreational sector, in the absence of any formal resource sharing arrangements, breach of the commercial FMS performance monitoring program and lack of evidence to otherwise substantiate a significant statewide shift in catch of eastern school whiting or bluespotted flathead, there seems no reason for alarm or for any rash decisions with respect to the total commercial harvest of these species or Danish seining specifically. Instead, ongoing monitoring and reporting as per the current commercial fishery FMS reporting requirements and pursuit of the statewide survey of recreational fishing in NSW would be the most appropriate short to medium term response to the global issue of resource sharing between the commercial and recreational sectors.

With respect to the Commonwealth SESSF, it is recommended that DPI discuss with AFMA the concept of NSW continuing with its current upper catch trigger of 1,400 tonne across all species of school whiting taken in NSW pending the development of a formal resource sharing framework and species specific resource sharing arrangements. Such an arrangement should, at the very least, deliver some certainty for State and Commonwealth fishers and fisheries managers managing for viable and sustainable fisheries. Pursuing more formal interim arrangement for eastern school whiting only would not address the fact that resource sharing is ultimately a more global issue for all concerned and may also not deliver the desired interim outcome given that the Commonwealth has deviated from its standard Harvest Strategy Policy pending further research into the structure of the school whiting stock.

With respect to the NSW OT Fishery specifically, for the reasons outlined above it is recommended that shareholders, DPI and the OTMAC start discussing strategies to manage the total catch of eastern school whiting from NSW waters, the preferred gear to use and grounds to harvest from and how access to this important species should be shared amongst participants in the fishery. Consideration should also need to be given to stout whiting which is shared with QLD fishers and subject to a TAC.

In the meantime no rash decisions should be made in respect of the future of Danish seining in NSW. Supporting this is the lack of evidence to substantiate any imminent sustainability issues, the OTMAC's intention to engage shareholders soon on future directions for the fishery, the localised nature of the intra-fishery resource sharing issues raised to date, the lack of independent information substantiating direct and commensurate reductions in other fishers' catches, evidence showing that prawn trawlers and fish trawlers sometimes take quantities (on a

monthly basis) comparable to those taken by the *San Antone* (refer Appendix 4 and 5) and the fact that the OTFMS performance monitoring program has not yet been formally triggered.

10. Environmental impacts

10.1 Danish seining more "environmentally friendly" than trawling

In response to general comments that Danish seining is regarded as more "environmentally friendly" than otterboard trawling, some in attendance at the Port Stephens meeting raised objection, stating that today's Danish seining is not like the Danish seining of old and poses a greater risk to the environment than otterboard trawling. In particular, fishers cited the *San Antone's* use of large weights to keep the net on the bottom and suggested that they weigh as much if not more than otterboards and the use of combination rope, winches and rope drums instead of the hemp rope, hand retrieval and rope wells of old.

The increase in technology and the likelihood of effort creep, which is equally an issue in the prawn and fish trawl sectors, is not disputed by DPI and is ultimately not something that DPI seeks to unduly inhibit because of the socio-economic and in some cases environmental benefits that enhanced fishing efficiency can deliver.

In an attempt to understand the relative impact of trawling versus Danish seining the Ocean Trawl Environmental Impact Statement (EIS) has been reviewed and a search for other potentially useful information conducted. Interestingly, no quantitative and very little qualitative information on the relative impacts of the two forms of fishing gear on the various types of habitat off NSW (or similar to that found off NSW) could be found. It was, however, noted that otter trawling and Danish seining are typically categorised together as methods that in general terms pose a relatively high risk to some forms of benthic habitat when compared to other forms of commercial and recreational fishing gear (DPI 2004; Barrett 2001).

Given the paucity of information on the relative impacts of each gear type, approx. 80 pages of the OTEIS already devoted to risk analysis of the OT Fishery as a whole (in the context of species assemblages, species diversity and ecological processes) and the fact that the OT Fishery is already lagging in terms of progressing some of its obligations that aim to minimise the risks identified during environmental assessment of the fishery, it was decided that a better use of DPI resources would be to focus on progressing those commitments and the proposed package of reforms for the OT Fishery rather pursuing information that may not exist and perpetuating division within the fishery by attempting to compare the potential impact of two different but ultimately very similar forms of commercial fishing gear.

Having said that and for the purpose of minimising the risk of further misconception, the following information is provided on the weights used on the *San Antone's* Danish seine net. Once the ropes and net are set and prior to retrieval, the two weights, each weighing around 400 kg, are lowered into the water column using separate pulleys and suspended above the ocean floor. The objective being to keep the ropes nearer to the ocean floor than they otherwise would be when the net is under load. Mr Pinzone advises that the only alternative way for sufficient rope

to be at the depth needed to herd fish is to use, for example, twice as much rope – which would be a very costly proposition.

Advice indicates that whilst the weights may come in contact with the ocean floor from time to time the aim is to position them about two thirds of the way down the water column so that the ropes that heard the fish are at depths that optimise the herding effect. The weights are eventually winched back onboard before the net is finally retrieved.

Stainless steel coated lead weights estimated to be 400 kg. Otterboards used in the OT Fishery vary in weigh and can be anywhere from 80 to 300 kg.

Lead infused (i.e. weighted) rope. Note the slight wear as a result of contact with the bottom – this rope is 6 to 12 months old.

Critically important to the debate at hand is that the weights, evidenced by the 1 ½ to 2 mm thick stainless steel coating still being in tact after at least 6 years of use, are not towed along the ocean floor like otterboards. The only components that come in contact with the ocean floor during setting and retrieval (which takes about 1 hour to complete) are the two long ropes particularly nearer to the net, the bottom bridles, the footrope and the net itself. During retrieval the boat moves forward at about 0.8 knots and the net is winched at about 0.7 knots resulting in the net moving across the ocean floor at a speed of about 1.5 knots, slower than most trawling activities which typically range from 2 to 4 knots (pers. comm. various commercial fishers).

Preliminary outcome (10.1 Danish seining more "environmentally friendly" than trawling)
This review has not determined qualitatively or quantitatively the relative impacts of Danish seine and otterboard trawling. Instead, the OTMAC is encouraged to progress the various outstanding reforms proposed as part of the environmental assessment of the OT Fishery that aim to minimise the impact of the OT Fishery as a whole on the biophysical environment, in particular, improving the level of information on the spatial extent of effort in the fishery and promoting and potentially funding further research into ecosystem functioning and the distribution of marine habitats and the impact of the trawl fishery on each.

11. Discussion

This detailed review into the *San Antone's* Danish seining activities and Danish seining generally was initiated in response to concerted lobbying by concerned commercial fishers, the large number of issues raised and the potential seriousness of some of those issues. The actions of a few to further their cause (i.e. the removal of an efficient competitor by engaging the media, recreational sector representatives and the Marine Park Authority) only heightened the need for an objective review of the issues at hand. Given the manner in which this lobbying was played

out and the angst it caused for some, the preferred way to resolve such issues in the future is to engage relevant experts (e.g. fisheries managers, scientists and industry leaders etc.) in constructive discussion prior to making very public and personal views on an issue, the implications and individuals' preferred solutions. There is also a need for fishers with such concerns to research and substantiate their concerns before advocating them as gospel. The bottom line is that if DPI was to simply adopt the many unsubstantiated representations made under the auspices of sustainability, the commercial fishing industry would likely be far different to what it is today, the NSW public would likely be consuming more imported seafood than is currently the case and NSW regional economies may have been unnecessarily impacted.

Danish seining in NSW has been around since the mid 1930's and has come and gone in response to changing target species, socio-economics and technology – flexibility that the NSW commercial fishing industry continues to enjoy and likely to have helped the fishery through sometimes challenging times. With increasing input costs, particularly fuel, and challenging market conditions, Danish seining appears to present some benefits over the more popular, in recent times, otter board trawling. The reduced fuel use, apparent fishing efficiency and premium quality product that Danish seining appears to provide for are just some of the key strategies that the NSW Ocean Trawl Fishery needs to pursue more rigorously, within sustainable limits of course, if profitability in the fishery is to be assured into the longer term.

This review has determined that although the total catches of eastern school whiting and bluespotted flathead for the OT Fishery for 2010/11 are the highest for the past 14 years or so, there is no evidence to substantiate that these important stocks are at imminent risk ether because of the *San Antone's* Danish seining activities or more importantly total exploitation across all relevant stakeholders. It is for this reason and some of the positives that Danish seining appears to present that the initial industry suggestion to prohibit Danish seining in NSW or otherwise restrict the efficiency of Danish seine nets has not been pursued by DPI and is ultimately not recommended. Instead, shareholders and DPI are encouraged to participate in further informed discussion on the preferred fishing methods and associated management arrangements for harvesting school whiting (and other relevant species) with a view to delivering the dual objective of a viable and sustainable commercial fishing industry into the longer term.

Given ongoing representations from some quarters on the issue of sustainability and ultimately maximum sustainable and economic yields, it would be remiss not re-iterate that the NSW commercial industry is ultimately species rich and data poor (which is the basis on which the DPI Resource Assessment Framework has been designed) and that disputing the former needs to be backed by creditable science or otherwise substantiated and pursuit of the latter (i.e. MSY & MEY) will require significant industry input, commitment and potentially funding.

This review has also identified that one of the primary drivers for the representations received is the issue of 'resource sharing', which is quite simply the sharing of access to fisheries resources. This is not the first time resource sharing has been an issue in the fishery and by no means will it be the last. Shareholders and DPI are encouraged to discuss this issue further and if deemed to be a significant issue for the fishery as a whole, strategies to address it.

Shareholders and DPI will also need to discuss/progress a raft of other issues identified during the course of this review, summarised as follows.

Short term

1. DPI to **meet with Port Stephens fishers** and explain the outcomes of the review (Note: this short term action is already complete. DPI representatives of the science and research, management and compliance divisions met with concerned fishers, members of the former OTMAC and Mr Pinzone at the Port Stephens Fisheries Institute on Wednesday 14 December 2011 for detailed discussions on the issues at hand and relevant research, the finding of this review and potential future management options).

2. DPI to **meet with the OTMAC** or an alternate workshop as soon as practicable to discuss the following prior to broader consultation with shareholders (preferably in connection with the consultation process already proposed by the OTMAC on a broader package of reforms for the OT Fishery).

    a. The extent of the **resource sharing concerns** and, if significant for the fishery as a whole (whether species specific or generally), strategies to address it through for example, spatial/temporal separation, restricting the efficiency of some forms of gear or enhancing others, individually transferable quotas (ITQs) etc.

    b. Updated **specifications for Danish seine nets** and conditions of use (Note: advice was sought from fishers who attended the initial Port Stephens meeting, however, to date not a single response has been received by DPI).

    c. A new more efficient **'whiting codend'** for fish trawl and Danish seine nets. It is, however, suggested that if pursued any new codend(s) not be made available to industry until such time as the 'designated whiting grounds' are refined and implemented (see below).

    d. A process to ensure that the **'designated whiting grounds' south of Smoky Cape are appropriately refined/re-mapped** in a timely manner – potentially in the short to medium term. The mapping should commence off the Sydney, Newcastle and Nelson Bay regions. It is also critical that the newly defined grounds not encompass grounds particularly important to other species (such as flathead) for which the 'whiting codend' is known to be poorly selective.

    e. Restricting the use of 'whiting codends' attached to **Danish seine nets (whether the current codend or a new one) to the same 'designated whiting grounds'** applying to fish trawlers.

    f. For waters south of Smoky Cape **complementary gear requirements for the prawn trawl sector** as suggested in Part 7.3.4 of this report titled "Managing the use of less selective codends".

    g. The alleged ongoing use of **choker strings** and ways to prevent it from occurring in the future, noting that the introduction of a new 'whiting codend' may address this issue.

h. The risk of fishers using **'whiting codends' in waters that are not 'designated whiting grounds'** and, subject to the level of risk, strategies to reduce it.

i. Strategies to ensure **more timely reporting of catch**, particularly school whiting, for monitoring against the upper catch trigger level set out in the OTFMS.

3. DPI to amend **clause 11E of the Supporting Plan and clause 42 of the General Regulation** to prohibit the fixing of ropes etc in such a way that the lateral mesh openings of meshes in nets and traps is reduced.

Medium term

1. DPI to discuss with AFMA the need for **interim resource sharing arrangement (formal or non-formal) for school whiting** (e.g. NSW retaining the 1,400 tonne upper catch trigger) or alternatively whether focus should remain on progressing a comprehensive resource sharing framework.

2. DPI to amend the **OT Fishery logbook** system to require the use of 'whiting codends' to be reported.

3. DPI to determine priority ranking for **formal observer work** in the Danish seine sector and ensure adequate coverage of the whiting sector (fish trawl, Danish seine and prawn trawl if specific gear requirements for waters south of Smoky Cape are implemented).

4. DPI and the recreational sector to progress the **statewide survey on recreational fishing in NSW** so that the necessary estimates are available for use in monitoring the sustainability of fish stocks and current, emerging or potential resource sharing issues.

Longer term/ongoing

1. DPI to **revise the OTFMS** (post the OT reform process) and in particular include in layman's terms or in the form of diagrams information on the various net configurations permitted in the OTF.

2. DPI to encourage/support improvements to **AFMA's modelling** to determine RBCs for school whiting with a view to using this information where appropriate to inform improved management (including optimum exploitation within sustainable limits) of school whiting.

3. Subject to the direction NSW proceeds in terms of harvesting school whiting in NSW, DPI to **talk to QLD DPI** about sharing access to stout whiting.

4. DPI and industry to progress the **various outstanding reforms** proposed as part of the environmental assessment of the OT Fishery, in particular, improve the level of documented information on the spatial extent of the fishery, develop strategies to establish refuge areas and spawning closures etc and promote (and potentially fund) further research into the distribution of marine habitats off NSW, the intensity of trawling within each and ecosystem functioning etc.

Progressing these reforms will be somewhat challenging for industry and DPI given the range of interrelated issues that will require concurrent consideration and the reform program underway.

With respect to consultation generally, although the OTMAC has historically been the first-port-of-call for preliminary discussion and industry input (as pitched throughout this report), it may be that a group with expertise in Danish seining, school whiting and or the marketing sector etc. will need to be called upon. Regardless of the approach, given the expertise gained by members of the former OTMAC in recent years in terms of fisheries policy, management, compliance and administration and their dedication to the development of a comprehensive package of reforms for the fishery it is critical that they, either in full or in part, remain heavily involved in any further discussions on the future direction for harvesting school whiting in NSW including the methods that may be used.

In addressing the substantive issues identified in this report (and any others that are realised as a consequence of further discussion), due consideration will again need to be given to the outcomes of the Independent Review of NSW Commercial Fisheries Policy, Management and Administration as well as the principle directions being pursued by members of the former OTMAC in the development of the package of broader reforms for the OT Fishery. In this regard, it is envisaged that shareholders will need to make some fundamental decisions before delving into the detail of the issues at hand, including whether the fishery should, for example, continue the 'old ways' of sharing access amongst many and restricting fishing efficiency (and as a consequence profitability) to sustain the fisheries resources of NSW or should the fishery finally break this mould and for the first time seriously pursue new strategies to deliver the ultimate goal of a highly sustainable and highly profitable commercial fishery.

Acknowledgements

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13. Appendix 1: Assessment of reduced catch

[*Note: this Appendix extracted from publicly released document for privacy reasons]*

14. Appendix 2: Resource Assessment Classes (RACs)

Attribute	Class of Resource assessment				
	One	Two	Three	Four	Five
Time series estimate of biomass from dynamic models	•				
Time series estimate of total, natural and fishing mortality from dynamic models	•				
Quantitative risk analysis of future harvesting using dynamic models	•				
Biological reference points	•	•			
Estimates of total, natural and fishing mortality (from catch-curves)	•	•			
Credible indicator of abundance	•	•			
Representative time-series of commercial catch	•	•	•	•	
Credible estimate of recreational catch	•	•			
Time series of age composition data (finfish only)	•	•			
Local (NSW) information for growth, mortality, selectivity and maturity	•	•	•		
Time series of length-composition data	•	•	•		
Non-local (not NSW) information for growth, mortality, selectivity and maturity				•	•
Single biological species or stock	•	•	•	•	•
Complex of related species			•	•	•

15. Appendix 3: OTFMS resource sharing performance monitoring

GOAL 4. Appropriately share the resource and carry out fishing in a manner that minimises negative social impacts					
No.	**Performance indicator**	**Data requirements and availability**	**Trigger point**	**Robustness**	**Justification/comments**
1	Change in the distribution of landings between the *commercial sector* and *non-commercial sectors* (combining recreational and Indigenous) for each OTF primary species.	Requires commercial landings data and a time series of information (or estimates) of catches by other stakeholder sectors. Data and estimates will be obtained through mandatory catch reporting by commercial fishers and through any recreational or Indigenous fishing surveys, and compliance observations	Maximum absolute difference in the distribution of landings between the commercial and non-commercial sectors is greater than 25 percentage points when compared every five years	Medium	Further work would be needed to define specific targets for appropriate sharing of the resource and what might be considered a negative social impact. In the interim, an arbitrary trigger point has been specified that will detect a relative large shift in catch over time between the commercial sector and other stakeholder harvest sectors. This performance indicator can only be measured if updated estimates of non-commercial catch become available between comparison years.
2	Change in the distribution of landings among the *NSW commercial fisheries* for each OTF primary species	Requires commercial landings data from NSW commercial fisheries, that will be collected and available through mandatory catch reporting arrangements	Maximum absolute difference in the distribution of landings between the assessment and reference years is greater than 15 percentage points	Medium	This indicator compares the distribution of landings among the NSW commercial fisheries for each OTF primary species over time. The data used in the assessment year will be the total landings from the two fiscal years prior to that assessment year. This will be compared to the total landings of two reference years from five years previous. This cycle will continue with assessments occurring every five years.
3	Change in the distribution of landings among the ocean prawn trawl and ocean fish trawl *gear types* for each OTF primary species	Requires commercial landings data from NSW OTF fishers, that will be collected and available through mandatory catch reporting Arrangements	Maximum absolute difference in the distribution of landings between the assessment and reference years is greater than 25 percentage points	Medium	This indicator compares the distribution of landings between ocean prawn trawl and fish trawl gears for each OTF primary species over time and will assist in monitoring and managing equitable allocations within the fishery. The data used in the assessment year will be the total landings from the two fiscal years prior to that assessment year. This will be compared to the total landings of two reference years from five years previous. This cycle will continue with assessments occurring every five years.

16. Appendix 4: Eastern school whiting

The bulk of the NSW eastern school whiting catch has historically been harvested by the prawn trawl sector of the OT Fishery with some variation in the proportion of catch taken by the fish and prawn trawl sectors from year to year (refer Figure 1). Quite clearly, future catch data will also reflect the recent catches of eastern school whiting by Danish seine.

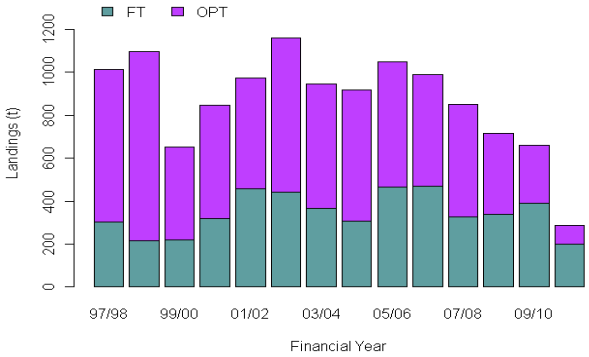
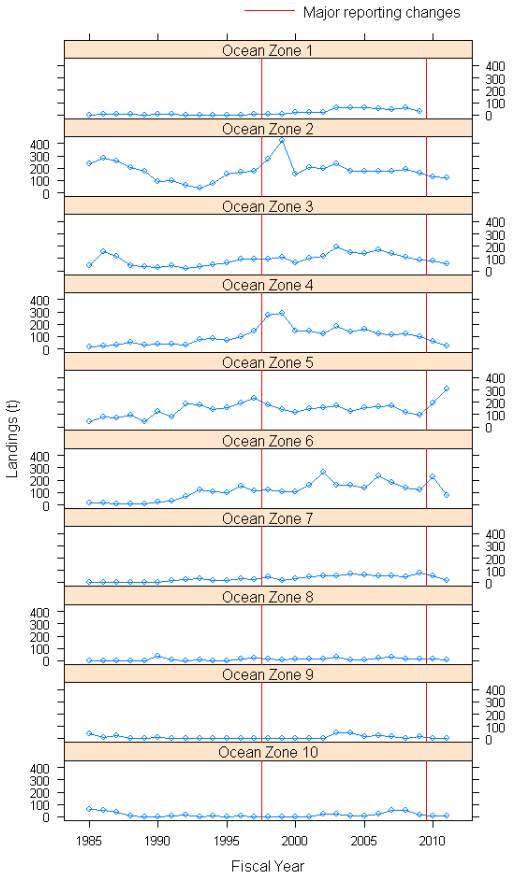


Figure 1. Annual catches of eastern school whiting by the fish and prawn trawl sectors.

The distribution of catches of eastern school whiting has changed dramatically over the years with noticeable peaks in catch in the mid to late 1980's off the Clarence and Coffs Harbour regions followed by another significant peak in the late 1990's off the Clarence and Newcastle regions in particular. Throughout the early 2000's generally high catches were taken off the central and mid north coasts with a significant peak in catches over the last couple of years off Sydney (Figure 2). These peaks are all known or otherwise believed to be the result of targeted fishing for eastern school whiting.

Figure 2



Given that one of the primary concerns raised by fishers at the Port Stephens meeting relates to the efficiency of Danish seining and the quantities taken and alleged resource sharing issues, a review of monthly catch records has been conducted in an attempt to ascertain whether the catches taken by the *San Antone* are unusually high compared to those taken in the trawl sector.

Unfortunately, a thorough review of monthly catch records for the months of January, February, March and April 2011 (that period that the *San Antone* worked in NSW) was not possible because many fishers have not yet submitted their catch records. It was noted that of those who have submitted their catch records, one fisher recorded a total catch of 7,272 kg of eastern school whiting by the method prawn trawling for the month of January and another recorded a total catch of 6,204 kg by the method of fish trawling for the month of February.

Given the lack of complete data for recent moths a more comprehensive review of catch records over the last 11 years (2001 to 2011) has been conducted. The results validate that some fishers target and take large quantities (using prawn and fish trawl nets) and that others generally take small quantities, more likely than not as incidental catch when targeting other species. Importantly in respect of the issue at hand, it shows that although not a regular occurrence there have been many months over the last 11 years where individual businesses have taken catches of eastern school whiting on a monthly basis in quantities comparable to and in some cases in excess of the monthly catches taken by the *San Antone* (refer Figure 3).

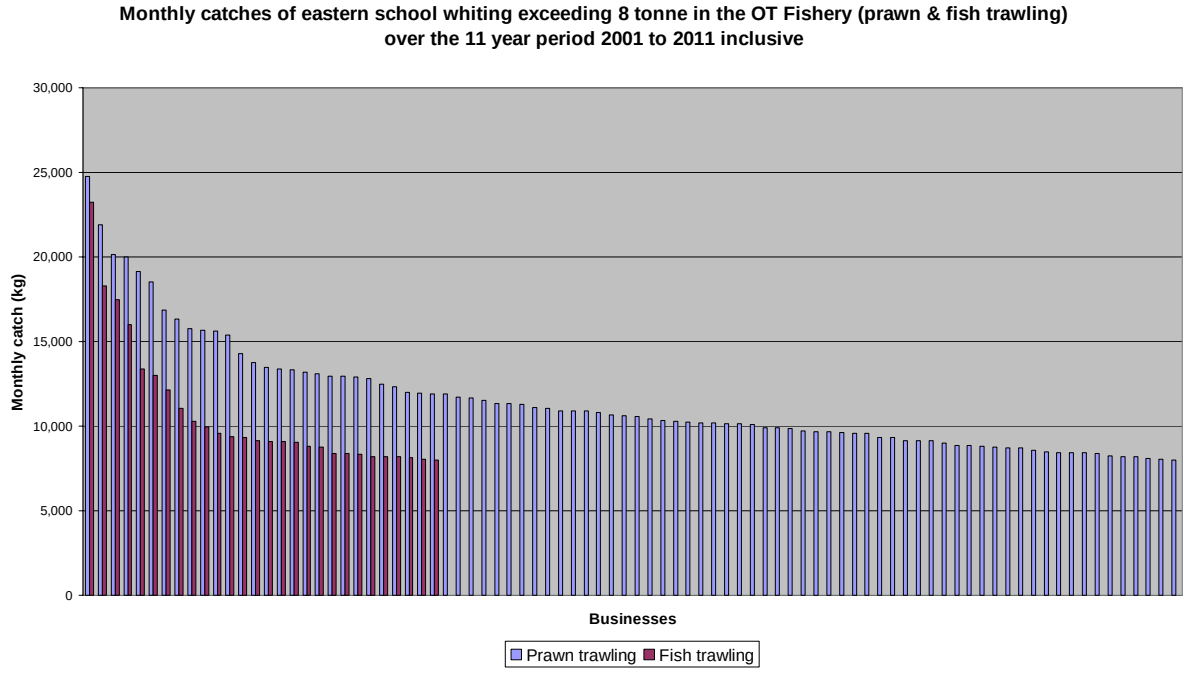


Figure 3. Largest monthly catches of eastern school whiting by fish trawl and prawn trawl over the last 11 years.

During the course of this review it was also noted that the largest reported annual catch of eastern school whiting by an individual fishing business (over the period 1997 to 2011 and excluding the *San Antone*) was 135 tonne. This catch was taken in 1997/98 by the method of prawn trawling.

17. Appendix 5: Bluespotted flathead

The bulk of the NSW bluespotted flathead catch has historically been harvested by the fish trawl sector with some variation in the proportion of catch taken by the fish and prawn trawl sectors from year to year (refer Figure 1). A small proportion of the commercial bluespotted flathead catch has been reported as harvested in the Estuary General Fishery.

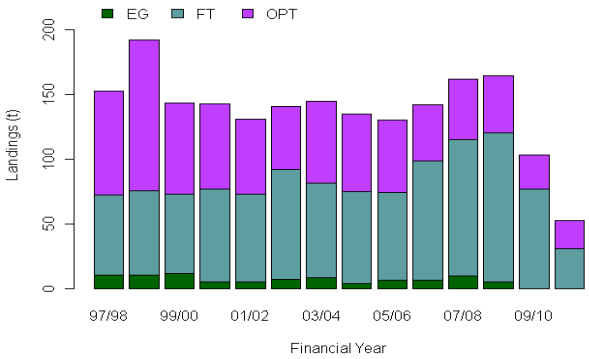
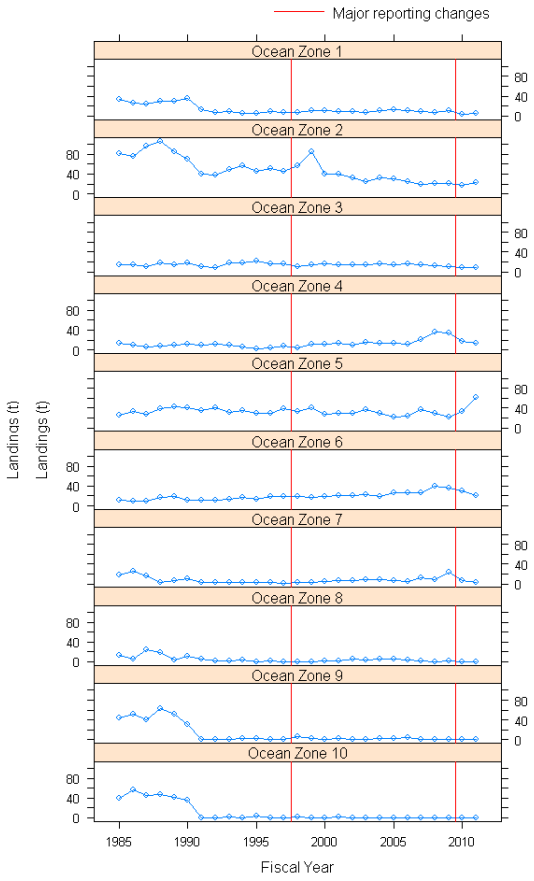


Figure 1. Annual commercial catches of bluespotted flathead.

The distribution of catches of bluespotted flathead has changed over the years with noticeable peaks in catch in the mid to late 1980's off the Clarence region and south coast followed by another peak in 1999 off the Clarence regions and another over the last few years off Sydney (Figure 2). It is not clear from the data available whether these peaks are the result of fishers actively targeting bluespotted flathead or simply an indicator of the abundance of flathead in the area at the time

Figure 2



Given that one of the primary concerns raised by fishers at the Port Stephens meeting relates to the efficiency of Danish seining and the quantities taken and alleged resource sharing issues, a review of monthly catch records has been conducted in an attempt to ascertain whether the catches taken by the *San Antone* are unusually high compared to those taken in the trawl sector.

Unfortunately, a thorough review of monthly catch records for the months of January, February, March and April 2011 (that period that the *San Antone* worked in NSW) was not possible because many fishers have not yet submitted their catch records. It was, however, noted that of those who have submitted their catch records, one fisher recorded a total catch of 316 kg by the method fish trawling for January and another recorded a total catch of 1,485 kg by the method of fishing trawling for the month of February

Given the lack of complete data for recent moths a more comprehensive review of catch records over the last 11 years (2001 to 2011) has been conducted. The results of the review show that fishers using prawn trawl nets typically take and land small quantities of bluespotted flathead up to a maximum of around 1 tonne per month (north of Smoky Cape), possibly taken as incidental catch when targeting other species such as prawns. It also shows that some fishers take large quantities of bluespotted flathead in fish trawl nets and importantly in respect of the issue at hand that there have been many months over the last 11 years where individual businesses have taken catches of bluespotted flathead on a monthly basis in quantities comparable to and in some cases excess of the monthly catches taken by the *San Antone*. (Figure 3).

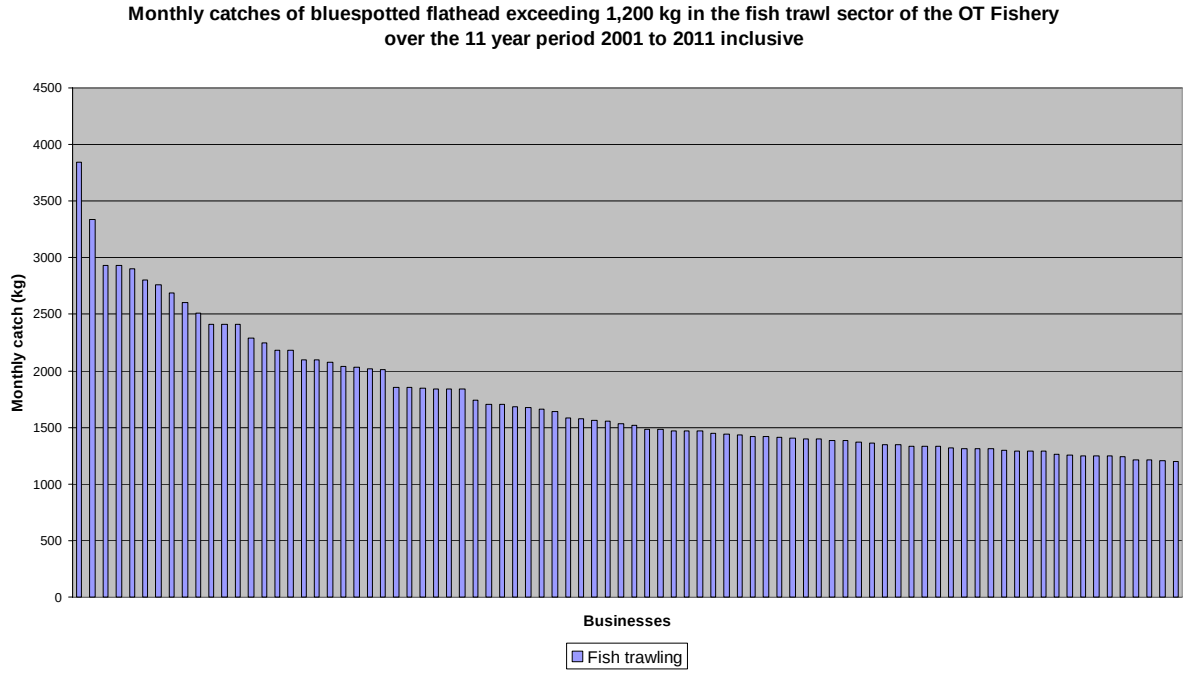


Figure 3. Largest monthly catches of bluespotted flathead by fish trawl over the last 11 years.

The largest reported annual catch of bluespotted flathead by an individual fishing business (over the period 1997 to 2011 and excluding the *San Antone*) was in excess of 12 tonnes. This catch was taken in 2009/10 by the method of fish trawling and is comparable to the total catch by the *San Antone* over three months in 2010/11.

18. Appendix 6: Sustainability and resource sharing strategies

To stimulate industry discussion, following are some strategies that are sometimes adopted individually or collectively) to address species specific sustainability and resource sharing issues.

Strategy	Description	Sustainability	Resource Sharing	**Industry wide** viability (subject to cost of program)
Access	**Fishery wide restructuring**	Can contribute, but does not always address species specific issues	Can contribute	Can contribute, but does not always address species/business specific issues
	Restricted access	Can contribute	Can contribute	Can contribute
Gear	**Restrict efficiency**	Can contribute	Can contribute	Negative
Spatial	**Restrict gear types to designated grounds**	Can contribute	Can contribute	Can be negative
Catch	**Size limits**	Can contribute	Can contribute	Can contribute
	Trip limits	Can contribute	Can contribute	Negative
	Competitive TACs	Good	Negative	Can contribute
	TACs and individually transferrable quotas	Good	Good (provided quota can be transferred to anyone who wants it)	Good

NOTE: While the concept of individually transferrable quotas (ITQs) may be unpalatable to some fishers, in some cases it is one of the more efficient and effective means for allocating and trading of access to natural resources. Coupled with appropriate gear requirements (e.g. alternate codends & BRDs) and trip limits designed to minimise discarding for those who do not hold quota, such a scheme could potentially be introduced for school whiting across all sectors of

the NSW OT Fishery. Further, the Integrated Voice Response (IVR) system that is currently being developed in connection with FishOnline, which will include online catch and effort reporting, quota usage enquiry functions and a bulletin board for advertising shares and quota etc, provides the infrastructure necessary for cost effective implementation of a school whiting ITQ scheme in the NSW OT Fishery.

The two most useful things that such a scheme would deliver for the OT Fishery would be security of access for those who rely heavily on school whiting as a main target species and avoidance of alternate strategies (such as some of those above) that could possibly result in perverse long term outcomes for individual shareholders and the OT Fishery as a whole.

It is acknowledges that one of the most controversial issues with such schemes is more often than not the initial allocation of quota. This should not, however, been seen as an insurmountable barrier that cannot be overcome.