CHAPTER 24

24 Southern Bluefin Tuna Fishery

H Patterson, G Begg, R Curtotti and S Vieira

FIGURE 24.1 Catch distribution in the Southern Bluefin Tuna Fishery, 2009
**Table 24.1** Status of the Southern Bluefin Tuna Fishery

<table>
<thead>
<tr>
<th>Fishery status</th>
<th>2008</th>
<th>2009</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Biological status</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Southern bluefin tuna (Thunnus maccocyii)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biological status</td>
<td>Overfishing</td>
<td>Overfished</td>
<td>Overfishing</td>
</tr>
<tr>
<td><strong>Economic status</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fishery level</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Economic status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estimates of net economic returns not available but likely to be positive, although falling. Biological status of stocks indicates that current returns may not be sustainable over the long term.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Although net economic returns are positive, the stock’s overfished status is a concern.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table 24.2** Main features and statistics of the Southern Bluefin Tuna Fishery

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Key target and byproduct species</td>
<td>Southern bluefin tuna (Thunnus maccocyii)</td>
</tr>
<tr>
<td>Other byproduct species</td>
<td>None</td>
</tr>
<tr>
<td>Fishing methods</td>
<td>Purse seine; pelagic longline: monofilament mainline gear (southern bluefin tuna a byproduct in longline fishery); minor line (troll and poling)</td>
</tr>
<tr>
<td>Primary landing ports</td>
<td>Port Lincoln</td>
</tr>
<tr>
<td>Management methods</td>
<td>Output controls: individual transferable quotas, area restrictions to control incidental catches in the longline fishery.</td>
</tr>
<tr>
<td>Harvest strategy</td>
<td>No formal harvest strategy</td>
</tr>
<tr>
<td>Consultative forums</td>
<td>Southern Bluefin Tuna Management Advisory Committee (SBTMAC) Commission for the Conservation of Southern Bluefin Tuna (CCSBT)</td>
</tr>
<tr>
<td>Main markets</td>
<td>International: Japan—frozen, fresh</td>
</tr>
<tr>
<td>EPBC Act assessments:</td>
<td>Current accreditation dated 21 February 2008</td>
</tr>
<tr>
<td>—listed species (Part 13)</td>
<td>Current accreditation (short-term exemption) expires 21 October 2010</td>
</tr>
<tr>
<td>—international movement of wildlife specimens (Part 13A)</td>
<td></td>
</tr>
<tr>
<td>Ecological risk assessment</td>
<td>Level 1: Scale Intensity Consequence Analysis (SICA) completed on 207 species (Hobday et al. 2007)</td>
</tr>
<tr>
<td></td>
<td>Level 2: Productivity Susceptibility Analysis (PSA) completed on 193 species (Hobday et al. 2007)</td>
</tr>
<tr>
<td></td>
<td>Level 3: Sustainability Assessment for Fishing Effects (SAFE) completed on 83 species (Zhou et al. 2009)</td>
</tr>
<tr>
<td>Bycatch workplans</td>
<td>Australia’s Tuna Purse Seine Fisheries Bycatch Action Plan 2005 (AFMA 2005); Australia’s Tuna and Billfish Longline Fisheries, Bycatch and Discarding Workplan, November 1, 2008 to October 31, 2010 (AFMA 2008)</td>
</tr>
<tr>
<td><strong>Fishery statistics</strong></td>
<td>2008 fishing season</td>
</tr>
<tr>
<td>Total allowable catch</td>
<td>5265 t</td>
</tr>
<tr>
<td>Catch</td>
<td>Purse seine: 5211 t</td>
</tr>
<tr>
<td></td>
<td>Pelagic longline: 23 t</td>
</tr>
</tbody>
</table>

*Table 24.2 continues over the page*
Table 24.2 Main features and statistics of the Southern Bluefin Tuna Fishery continued

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
<th>2008 fishing season</th>
<th>2009 fishing season</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effort</td>
<td>Purse seine: 1217 search hours; 134 shots</td>
<td></td>
<td>Purse seine: 1180 search hours; 139 shots</td>
</tr>
<tr>
<td>Fishing permits</td>
<td>98 SFR owners initially allocated quota at start of fishing season</td>
<td></td>
<td>96 SFR owners initially allocated quota at start of fishing season</td>
</tr>
<tr>
<td>Active vessels</td>
<td>Purse seine: 7 Longline: 17</td>
<td></td>
<td>Purse seine: 8 Longline: 24</td>
</tr>
<tr>
<td>Observer coverage</td>
<td>Purse seine: 7 shots (11.8%) Longline: 8.8% in ETBF, 12.7% in WTBF</td>
<td></td>
<td>Purse seine: 11 shots (7.9%) Longline: 6.4% in ETBF, 8.5% in WTBF</td>
</tr>
<tr>
<td>Real gross value of production</td>
<td>Commonwealth fishery (all methods): $45.9 million South Australia aquaculture: $186.7 million (includes Commonwealth input)</td>
<td>Commonwealth fishery (all methods): $45.3 million South Australia aquaculture: $141.4 million (includes Commonwealth input)</td>
<td></td>
</tr>
<tr>
<td>Allocated management costs</td>
<td>2007–08: $2.11 million</td>
<td>2008–09: $1.90 million</td>
<td></td>
</tr>
</tbody>
</table>

EPBC Act = Environment Protection and Biodiversity Conservation Act 1999; ETBF = Eastern Tuna and Billfish Fishery; SFR = statutory fishing right; WTBF = Western Tuna and Billfish Fishery

a Fishery statistics provided by fishing season unless otherwise indicated.

24.1 BACKGROUND

Southern bluefin tuna (SBT) constitutes a single, highly migratory stock that spawns in the north-east Indian Ocean and migrates throughout the temperate, southern oceans. SBT is one of the most highly valued fish species for sashimi, especially in Japan. It is therefore targeted by fishing fleets from a number of nations, both on the high seas and within the Exclusive Economic Zones of Australia, New Zealand, Indonesia and South Africa (Table 24.2). Young fish (aged one to four years) move from the spawning ground into the Australian Fishing Zone and southwards along the Western Australian coast. Surface-schooling juveniles are found seasonally in the continental-shelf region of southern Australia, but the proportion of the juvenile stock that migrates into this area is not known. Juvenile SBT are targeted in the Great Australian Bight by Australian purse seiners (Fig. 24.1), which predominantly take two- to three-year-old fish and small numbers of one- and four-year-old fish. Throughout the rest of its range, SBT is targeted by pelagic longliners, including domestic longliners operating along Australia’s east coast (Fig. 24.1). Longliners harvest all ages, from juveniles about three years old (~100 cm fork length; 20 kg whole weight) through to adults (10+ years old).
<table>
<thead>
<tr>
<th>Year</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1930s</td>
<td>Commercial fishing for SBT began off south-east Australia.</td>
</tr>
<tr>
<td>1950s</td>
<td>Pole and live-bait fishing began for surface-schooling SBT (New South Wales and South Australia).</td>
</tr>
<tr>
<td>Early 1960s</td>
<td>Global catch of SBT peaked at 81 605 t.</td>
</tr>
<tr>
<td>Pre-1979</td>
<td>Japanese vessels operated unregulated in what became the AFZ.</td>
</tr>
<tr>
<td>Early 1980s</td>
<td>Clear signs that the SBT stock was overfished became evident.</td>
</tr>
<tr>
<td>1982</td>
<td>Australia’s catch of SBT peaked at 21 500 t. Most of the catch processed for canning.</td>
</tr>
<tr>
<td>1983</td>
<td>TAC of 21 000 t introduced for Australian catch.</td>
</tr>
<tr>
<td>1984</td>
<td>Introduction of individual transferable quotas led to reduction in latent effort in New South Wales and Western Australia, and concentration of quota holdings in South Australia.</td>
</tr>
<tr>
<td>1989</td>
<td>Australia, Japan and New Zealand began trilateral discussions to set non-binding international management measures, including national allocations of 5265 t (Australia), 6065 t (Japan) and 420 t (New Zealand).</td>
</tr>
<tr>
<td>1990</td>
<td>First trials of ranching SBT in South Australia.</td>
</tr>
<tr>
<td>1993</td>
<td>Australia, Japan and New Zealand developed informal, collaborative management arrangements and signed an international convention (to come into force in 1994).</td>
</tr>
<tr>
<td>1994</td>
<td>CCSBT established—responsible for global management of the SBT stock.</td>
</tr>
<tr>
<td>Late 1990s</td>
<td>Around a third of the global catch not controlled by CCSBT. A lack of MCS mechanisms allowed large amounts of IUU fishing to remain unchecked.</td>
</tr>
<tr>
<td>1997</td>
<td>Japanese fishers excluded from the AFZ following failure to agree on global TAC.</td>
</tr>
<tr>
<td>1998 to 2002</td>
<td>Failure to agree on global TAC or national allocations. Australia maintained TAC of 5265 t.</td>
</tr>
<tr>
<td>1998</td>
<td>Japan unilaterally embarked on its EFP, increasing its reported catch by 1464 t to 7500 t.</td>
</tr>
<tr>
<td>1999</td>
<td>Japan again unilaterally conducted its EFP, reporting a catch of 7554 t. Non-CCSBT catch, including 1464 t from Japanese EFP, estimated to exceed 7400 t. Australia and New Zealand sought and obtained the prescription of interim measures by the ITLOS to halt the Japanese EFP. Australia did not pursue CITES nomination of SBT.</td>
</tr>
<tr>
<td>2000</td>
<td>International arbitral tribunal determined ITLOS did not have jurisdiction over EFP.</td>
</tr>
<tr>
<td>2001</td>
<td>Republic of Korea became a member of CCSBT.</td>
</tr>
<tr>
<td>2002</td>
<td>Fishing Entity of Taiwan became a member of the extended Commission.</td>
</tr>
<tr>
<td>2004</td>
<td>Philippines formally accepted as a cooperating non-member of CCSBT.</td>
</tr>
<tr>
<td>2005</td>
<td>A nomination to list SBT as a threatened species under the EPBC Act rejected by the then Minister for the Environment and Heritage.</td>
</tr>
<tr>
<td>2006</td>
<td>CCSBT revealed large, unreported catches of SBT from 1985 to 2005. Some estimates exceeded 178 000 t (Polacheck &amp; Davies 2008). Severe loss of confidence in the primary catch series used in stock assessment, and abandonment of the adoption of a management procedure (incorporating a rebuilding strategy) by CCSBT. CCSBT reduced the global TAC from 2007 to 2009 inclusive (11 810 t per year), including a reduced national allocation to Japan (3000 t) for 2007 to 2011, to be reviewed in 2011. South Africa and European Community formally accepted as cooperating non-members of CCSBT.</td>
</tr>
<tr>
<td>2008</td>
<td>Indonesia became a member of CCSBT.</td>
</tr>
<tr>
<td>2009</td>
<td>CCSBT adopted MCS measures to eliminate IUU fishing (to be implemented in 2010). CCSBT estimated SBT spawning stock biomass to be less than 10% of pre-exploitation biomass (CCSBT 2008a). CCSBT concluded there were no signs the stock had begun to rebuild; instead, historically low recruitment from 1999 to 2002 would lead to further declines in spawning stock biomass in the near future.</td>
</tr>
<tr>
<td></td>
<td>CCSBT reduced the global TAC by 20% for 2010 and 2011 because of the poor status of the SBT stock, which was estimated to be ~5% SSB0. Australia’s TAC was reduced to 4015 t per year for the next two years. CCSBT agreed to implement a management procedure in 2011 to be used in TAC setting from 2012 and beyond. An interim rebuilding target of 20% of unfished spawning stock biomass was agreed. A new nomination to list SBT as a threatened species under the EPBC Act is currently being assessed.</td>
</tr>
</tbody>
</table>

AFZ = Australian Fishing Zone; CCSBT = Commission for the Conservation of Southern Bluefin Tuna; CITES = Convention on International Trade in Endangered Species of Wild Fauna and Flora; EFP = experimental fishing program; EPBC Act = Environment Protection and Biodiversity Conservation Act 1999; ITLOS = International Tribunal for the Law of the Sea; IUU = illegal, unregulated and unreported; MCS = monitoring, control and surveillance; SBT = southern bluefin tuna; TAC = total allowable catch
24.2 HARVEST STRATEGY

The Commonwealth Fisheries Harvest Strategy Policy is not prescribed for fisheries, such as the Southern Bluefin Tuna Fishery (SBTF), that are managed by international management bodies. The CCSBT, however, is developing a management procedure (similar to a harvest strategy) to be implemented by 2011 (Table 24.3). Once in place, this will form the basis of setting the total allowable catch (TAC). The CCSBT has also agreed to an interim rebuilding target of 20% of unfished spawning stock biomass.

24.3 THE 2009 FISHERY

Key target and byproduct species

National annual catch allocations for 2009 were Australia—5265 t, Japan—3000 t, New Zealand—420 t, Republic of Korea—1140 t, and Fishing Entity of Taiwan—1140 t. Interim catch allocations for cooperating non-members and observers for 2009 were Indonesia—750 t, Philippines—45 t, South Africa—40 t, and European Community—10 t. Korea and Chinese Taipei pledged to limit their respective actual catches to less than 1000 t until at least 2009, so the effective annual TAC for 2007 to 2009 will be below 11 530 t.

Australia’s total catch for the 2009 fishing season was 5242 t, with almost all harvested fish (5015 t, representing 96% of the total catch) being fish captured in the purse-seine fishery (Fig. 24.5) and transferred to grow-out pontoons in Port Lincoln. Approximately 227 t were caught by longline in the Eastern Tuna and Billfish Fishery (ETBF), and less than 1 t by longline in the Western Tuna and Billfish Fishery (WTBF). There were insufficient data from which to estimate the total Australian recreational catch during 2009.

In 2009, 8 purse-seine and 24 longline vessels contributed to the total catch. The observer program of the Australian Fisheries Management Authority (AFMA) aims to monitor 10% of SBT fishing activities and employs international observers in compliance with CCSBT observer standards. In 2008–09 the purse-seine coverage was 7.9% of sets. A coverage level of 32.9% was achieved in the longline ETBF south of 30°S from May to September (the months in which SBT are usually caught), and 8.5% in the longline WTBF.

In 2008–09 the value of the fishery’s commercial production was $45.3 million (Fig. 24.2). This is about half the 2002–03 value of $90 million and also significantly lower than in earlier years. Recent exchange rate movements and competition from northern bluefin tuna ranched in the Mediterranean have reduced the price of SBT on the Japanese market. The method for estimating the gross value of production (GVP) of the SBTF is explained in Box 1 (page 41 of Chapter 1).

FIGURE 24.2 Real value of SBT production by financial year, 1998–99 to 2008–09

Trade

Between 2002–03 and 2008–09, Australian exports of SBT declined in value by 50% (in real terms) to $158 million (Fig. 24.3). As noted above, this reflects reduced prices on the main Japanese market caused by increased competition from the Mediterranean, as well as the relatively high value of the Australian dollar, which reduced the competitiveness of Australian exports. Unit
export values of frozen and fresh or chilled SBT declined by 59% and 47%, respectively, from 2002−03 to 2008−09 (Fig. 24.4).

In the purse-seine sector, there is a lag between the capture of SBT and the sale of the final product from ranches. Schools of SBT are usually captured in the Great Australian Bight between January and March, whereas exports peak in July–September after fish have been fattened in ranch pontoons. Therefore, care is required when comparing trends in the gross value of the capture fishery and the value of exports. For example, the large drop in the GVP of the capture fishery between 2002−03 and 2003−04 appears as a fall in export value in the following year (2003−04 to 2004−05).

### Minor byproduct species

Australian logbook and observer data suggest that there is minimal incidental catch during purse-seine fishing for SBT. Longlining bycatch consists mainly of large, pelagic fish, including substantial numbers of sharks. Longline byproduct is reported in the ETBF and WTBF chapters (Chapters 22 and 25).

#### 24.4 BIOLOGICAL STATUS

**Southern Bluefin Tuna**

*(Thunnus maccoyii)*

**Table 24.4** Biology of southern bluefin tuna

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Range</strong></td>
<td><em>Species</em>: Mostly distributed between 30°S and 60°S in southern temperate oceans, excluding the eastern Pacific Ocean.</td>
</tr>
<tr>
<td><strong>Stock</strong></td>
<td><em>Stock</em>: Southern bluefin tuna constitutes a single, highly migratory pelagic stock.</td>
</tr>
<tr>
<td><strong>Depth</strong></td>
<td>0–500 m</td>
</tr>
<tr>
<td><strong>Longevity</strong></td>
<td>40+ years</td>
</tr>
<tr>
<td><strong>Maturity (50%)</strong></td>
<td><em>Age</em>: ~10−12 years</td>
</tr>
<tr>
<td><strong>Size</strong></td>
<td><em>Size</em>: 120–130 cm FL</td>
</tr>
<tr>
<td><strong>Spawning season</strong></td>
<td>September–April. A single-known spawning ground is located in the north-east Indian Ocean (10–20°S, 105–120°E).</td>
</tr>
<tr>
<td><strong>Size</strong></td>
<td><em>Maximum</em>: 225 cm FL; ~200 kg whole weight</td>
</tr>
<tr>
<td><strong>Recruitment into the fishery:</strong></td>
<td>~55 cm FL; 3.5 kg whole weight (9–12 months of age)</td>
</tr>
</tbody>
</table>

**Source**: Gomon et al. (2008).
Since 2005, fishery status reports have yet to become apparent, although poor recruitment from 2000 to 2002 is evident as weak year-classes, which will have a negative impact on the spawning stock. Median projections under the 2009 TAC of 11,810 t (global catch) for the base case indicate a decline in the biomass until 2013 (CCSBT 2009). In order to rebuild the stock, and to buffer against further poor recruitment, a 20% TAC reduction was implemented for the 2010 fishing season.

SBT is considered to be overfished and subject to overfishing (Table 24.1).

Reliability of the assessment

The CCSBT operating model is sophisticated and well accepted by the international scientific community. Furthermore, intensive data collection and research have taken place over many years into both the biology of SBT and associated fisheries. However, the recognition in 2006 that the true global catch of SBT has been much greater than previously reported means that much of the previous assessment work is now invalid. Most important is the lack of information on how reported effort levels relate to the estimated levels of unreported catch.

Previous assessment/s

In 2006 as a result of uncertainty in historical catch (Fig. 24.6) and catch per unit effort (CPUE) arising from two decades of unreported catch and effort, a series of scenarios encompassing a wide range of possible circumstances were evaluated in lieu of a stock assessment. Outcomes of these scenarios were consistent with each other and suggested the SBT spawning stock to be at a low fraction of its original biomass and well below the level that could produce MSY. All scenarios indicated that any future catches over 14,925 t posed very serious threats to the stock, and that catches must be reduced below this level if the spawning stock biomass is to rebuild (CCSBT 2006).

Results from a limited range of scenarios in 2008 were generally consistent with those from 2006, if not indicative of further decline. Scenarios indicated that the spawning stock status determination

In 2009 a revised operating model was used to run various scenarios using different annual catches to determine the impact on the stock. All the scenarios indicated results consistent with those from previous assessments in recent years; the stock remains at a very low level (~5% of unfished spawning stock biomass) and well below the level that could produce maximum sustainable yield (MSY) (CCSBT 2009). Recruitment during the past 20 years is estimated to be below that seen from 1950 to 1980. Recent trends in recruitment

![Figure 24.5](image1.png)  
**Figure 24.5** Southern bluefin tuna catch history (Australia) by financial year, 1989–1990 to 2008–09

![Figure 24.6](image2.png)  
**Figure 24.6** Southern bluefin tuna catch history (reported global), 1952 to 2008

NOTE: Total global catches exceeded reported global catches over 1985–2005; some scientists estimate unreported catches to have surpassed 178,000 t over this period (Polacheck & Davies 2008).
stock biomass was still very low (generally below 10% of pre-exploitation spawning stock biomass, a level at which recruitment may be at risk of further decline), and well below the level that could produce MSY. In 2008 a relative index of abundance obtained from aerial surveys of surface-schooling juveniles in the Great Australian Bight (a fisheries-independent indicator of recruitment) was incorporated into the operating model. Analysis of independent indicators suggested historically low recruitment from 1999 to 2002 (CCSBT 2008a).

Future assessment needs
The next stock assessment will occur in 2011. The management procedure should also be implemented in 2011, and this will govern the TAC setting process for 2012 and beyond. In the short term, the immediate need of the CCSBT is to ensure accurate catch and effort reporting to enable accurate biomass predictions possible in the light of uncertainties and historical unreported catches (CCSBT 2008b).

24.5 ECONOMIC STATUS

The Australian Bureau of Agricultural and Resource Economics–Bureau of Rural Sciences did not survey the SBTF, so estimates of net economic returns (NER) are not available. The vertically integrated characteristics of the wild catch sector and farming sector make assessment of economic performance in the wild catch sector difficult. However, indicators of fishery economic performance available include latent effort, value of quota, export prices, effort and catch rates. The discussion that follows focuses on performance in the period ending 2008–09. This period is prior to recent TAC changes for SBT.

Latency
AFMA sets the TAC for the SBTF to coincide with the national allocation from the CCSBT. Under the informal trilateral discussions, Australia’s allocation remained constant at 5265 t over the period 1989 to 2009. The quota has generally been filled every year since 2000, although small overcatches in 2003 and 2006 led to corresponding allocation reductions in 2004, 2007 and 2008 (Table 24.5). These consistently low levels of quota latency in the fishery indicate that NER have been positive.

Table 24.5 Latent effort in the SBTF

<table>
<thead>
<tr>
<th>Season</th>
<th>Catch (tonnes)</th>
<th>TAC (tonnes)</th>
<th>% of TAC caught</th>
<th>Latency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>5244</td>
<td>5265</td>
<td>99.6</td>
<td>0.4</td>
</tr>
<tr>
<td>2006</td>
<td>5635</td>
<td>5265</td>
<td>107</td>
<td>–7.0</td>
</tr>
<tr>
<td>2007</td>
<td>4813</td>
<td>5265</td>
<td>91.4</td>
<td>8.6</td>
</tr>
<tr>
<td>2008</td>
<td>5051</td>
<td>5265</td>
<td>95.9</td>
<td>4.1</td>
</tr>
<tr>
<td>2009</td>
<td>5242</td>
<td>5265</td>
<td>99.6</td>
<td>4.1</td>
</tr>
</tbody>
</table>

TAC = total allowable catch

Value of quota
Generally, the value a holder places on a unit of quota is related to the holder’s perception about the current and future profits of the fishery, meaning that quota values can provide an indication of fishery profitability. Anecdotal evidence suggests that this may not be the case in the SBTF given limited trade, quota aggregation among a small number of operators and seasonal leasing to cover requirements to fish in other Commonwealth fisheries (e.g. Eastern Tuna and Billfish Fishery).

Despite these factors, movements in quota lease prices from season to season may still give a broad indication of relative profitability between fishing seasons. Anecdotal evidence suggests that SBT lease quota prices declined in 2008–09, reflecting the negative effect of the global financial crisis on international tuna demand. This has also been reflected by a significant build-up of cold store inventories in key export markets with tuna wholesalers attempting to hold off selling product until demand and prices improve.
Export prices
Figure 24.4 showed that SBT export prices declined from 2002–03 to 2008–09. In 2008–09 the average SBT export price in real terms dropped by 9% from $19.80 per kilogram in 2007–08 to $17.96 per kilogram (2008–09 dollars). The latter price is 39% lower than the $29.52 recorded in 2002–03. Furthermore, comparing the 2008–09 price to the average export price for the incomplete 2009–10 financial year (July 2009 to April 2010) reveals a further 25% drop to $13.45 per kg. These price declines further indicate that NER are likely to have declined in 2008–09.

Overall economic performance
The SBTF is a high value, high-profit fishery. However, given the biological status of the SBT stock, it is likely that some proportion of profits over the past few decades have been generated by fishing down the stock rather than harvesting at sustainable levels, at least at the global scale. Consequently, the current level of profits may not be sustainable over the longer term.

The economic indicators discussed provide some guidance as to which way NER in the wild catch sector have moved relative to previous years. Prices are at historically low levels, indicating that the gross returns on catch are low relative to previous years. A stable catch rate indicates that the cost of fishing remains relatively stable, although lower fuel prices in 2008–09 could imply a slight decrease in aggregated costs. Together with anecdotal evidence of declines in quota lease prices, these indicators suggest that NER in the fishery have declined.

It is likely that long term NER from the SBTF could be maximised through a reduction in global catches to allow stocks to recover to more abundant levels so that the costs of fishing are lower and the risk to overall stock sustainability is reduced.

24.6 ENVIRONMENTAL STATUS
The CCSBT has several measures in place to mitigate the environmental impact of fishing. This includes reducing seabird interactions through the mandatory use (by all Members and Cooperating Non-Members) of tori lines on SBT longline vessels below 30ºS. The CCSBT Scientific Observer Program has a target coverage level of 10% for catch and effort in all fisheries. The CCSBT also publishes education pamphlets and guides on seabirds and sharks for SBT fishers. The Working Group on Ecologically Related Species (WG-ERS) has recommended that all Members and Cooperating Non-Members implement international guidelines on sharks, seabirds and turtles (e.g. the FAO Guidelines to reduce sea turtle mortality in fishing operations); comply with all measures to protect ecologically related species (ERS) implemented by the Indian Ocean Tuna Commission (IOTC) and the Western Central Pacific Fisheries Commission (WCPFC); and collect and report data on ERS to the CCSBT, for sharing with the IOTC and the WCPFC. The WG-ERS has also recommended that a risk assessment be undertaken for ERS in the SBTF.

Ecological risk assessment
An ecological risk assessment based on the methodology developed by AFMA and the Commonwealth Scientific and Industrial Research Organisation was undertaken for SBT. The Level 2 assessment indicated that only two species, of the 193 assessed, were considered to be at high risk: SBT and white shark (Hobday et al. 2007). A Level 3 assessment was also conducted on 83 non-target species (6 chondrichthyans and 77 teleosts) to determine the impact of SBT fishing on the sustainability of these species (AFMA 2009). It was determined that the risk to the sustainability of these non-target species was low (Zhou et al. 2009).
Threatened, endangered and protected species

Seabirds
In waters south of 30°S, albatross and other seabirds are occasionally hooked on longline gear when diving on baits during line setting. In August 1998, the then Australian Government Minister for the Environment and Heritage approved a threat abatement plan to reduce the incidental catch (or bycatch) of seabirds during oceanic longline fishing operations; this was updated in 2006 (DEWR 2006; see Chapter 22 for further details).

Sharks
Interactions between sharks and purse seines are rare. For example, observer data from 2003 to 2008 showed interactions with only a single hammerhead shark and a single mako shark during that period; both sharks were released alive. However, it is likely that observers miss some interactions. The observer program monitors 10% of both purse seine and longline catch. From these data, the purse seine method appears to have very infrequent interactions with shark species. Interactions with sharks using longline gear are noted in the ETBF and WTBF chapters (Chapters 22 and 25).

Pelagic habitats
There is minimal negative interaction with pelagic habitats.

24.7 Harvest strategy performance

Australia’s national allocation of 5265 t remained unchanged from 1989 to 2009, despite serious declines in spawning stock biomass and poor recruitment. The CCSBT is in the process of developing a harvest strategy (or management procedure) by 2011, which will include interim and long-term rebuilding targets and management objectives for the stock. In the interim, Australia has accepted a 24% reduction in its allocation over the 2010 and 2011 fishing seasons to 8030 t.

24.8 Literature cited


——2008, Australia’s Tuna and Billfish Longline Fisheries, Bycatch and Discarding Workplan, November 1, 2008 to October 31, 2010, AFMA, Canberra.


