

# **COOK ISLANDS LONGLINE FISHERY**

## **ANNUAL REPORT**

**2009**



**OFFSHORE FISHERIES DIVISION**



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## CONTENTS

|   | <u>Page</u> |
|---|-------------|
| <b>1.</b> Introduction                                  | 1           |
| <b>2.</b> Licensing and fleet structure                 | 1           |
| <b>3.</b> Catch and effort                              | 2           |
| 3.1 Albacore tuna                                       | 3           |
| 3.2 Yellowfin and bigeye tuna                           | 4           |
| 3.3 Swordfish   | 4           |
| 3.4 Billfish  | 5           |
| 3.5 Bycatch species                                     | 5           |
| 3.6 Effort  | 6           |
| <b>4.</b> Catch and effort beyond national jurisdiction | 7           |
| <b>5.</b> Exports and markets                           | 7           |
| <b>6.</b> Tuna stock status                             | 9           |
| 6.1 South Pacific Albacore                              | 9           |
| 6.2 Bigeye  | 10          |
| 6.3 Yellowfin   | 10          |
| 6.4 Skipjack  | 10          |
| 6.5 Swordfish   | 10          |
| <b>7.</b> Research Programs                             |             |
| 7.1 Circle hook trial                                   | 10          |
| 7.2 Swordfish Tagging and Training Project              | 11          |
| <b>8.</b> Review of Longline Fishery Management Plan    | 12          |
| Attachment A: Reference Tables                          | 13          |

## **1. Introduction**

Two distinct fisheries are exploited by the Cook Islands longline fishery, within the Cook Islands exclusive economic zone (CKEEZ). The two fisheries are defined by the target species, setting practices, vessel sizes and fishing operations. The two fisheries, northern and southern, are separated at 15 degrees latitude south. This delineation was determined by the fishing activities and characteristics exhibited by the two fisheries.

The first fishery operating in the northern Cook Islands waters, north of 15°S latitude, target albacore tuna (*Thunnus alalunga*) destined for the cannery in Pago Pago, American Samoa. Targeting albacore requires deep sets generally using a minimum of 30 hpb<sup>1</sup>, with trip length ranging between 3 to 14 weeks. Vessels seldom venture south of 15°S latitude.

Vessels operating in the southern fishery are based out of Rarotonga. These vessels generally target tuna and billfish species, however a wide range of bycatch species are also valuable and kept for sale on the local market. Exporting to USA, Japanese and New Zealand markets has diminished over the years mainly due to economic reasons.

Note that all statistics from this report were generated using logsheet data from the national<sup>2</sup> longline fleet.

## **2. Licensing and fleet structure**

In order to develop the domestic fishery, a moratorium was imposed in the year 2000, on the licensing of all foreign fishing vessels. The practice of demised charters to local companies was devised to encourage investment to stimulate both sector growth and the local economy. In 2008 however, the moratorium was reversed, and a period of no licensing was experienced whilst new licensing procedures and mechanisms were implemented.

There is no set license issuing period during the year, with license applications processed as they are received. Cook Islands registered vessels are provided licenses to fish within the Cook Islands EEZ and high seas fishing authorizations within the Western and Central Pacific Fisheries Commission (WCPFC) convention area.

Twenty three licenses were issued in 2009 for longline vessels authorized to fish within national waters beyond territorial seas (12nm). Only 23 fishing licenses were issued in 2009 (period 1 January to 31 December 2010), 17 were pending and not issued. In accordance with the *Marine Resources Longline Fishery Regulations 2008* (also referred to as the longline management plan), the effort limit for the fishery is forty fishing licenses.

Fifteen licenses were issued to vessels operating in the northern fishery, six of these made trips to Avatiu to unload bycatch as part of the licensing incentive scheme under the longline management plan. Seven licenses were issued to vessels operating in the

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<sup>1</sup> Hooks between floats

<sup>2</sup> The national longline fleet consists of both Cook Islands flagged fishing vessels and foreign flagged fishing vessels licensed to fish within the Cook Islands EEZ.

southern fishery; however, only three of these vessels were active<sup>3</sup>. Of the six vessels based in the southern fishery, five are under 50 GRT<sup>4</sup>. Table 1 shows the number of vessels in each GRT size class.

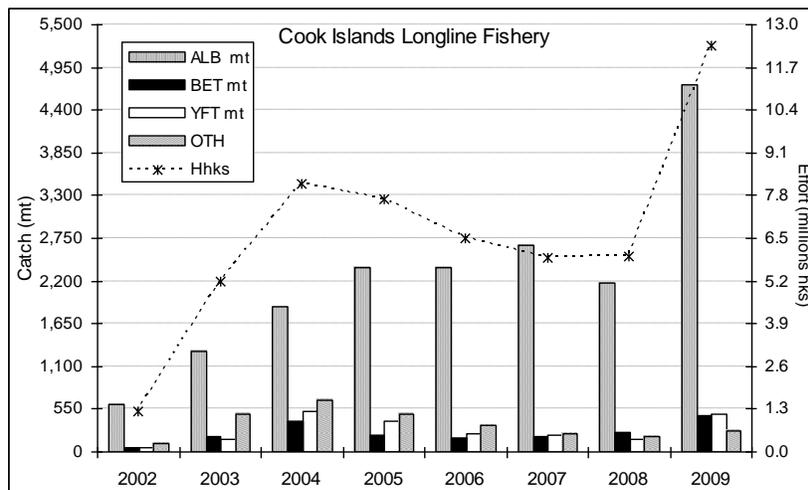
**Table 1. The number of vessels in each GRT class**

| GRT     | Number |
|---------|--------|
| 0-50    | 5      |
| 51-100  | 5      |
| 101-150 | 7      |
| 150+    | 5      |

### 3. Catch and Effort

The average<sup>5</sup> annual catch for the CKEEZ is about 3,100mt with tuna making up the majority of the catch. Over the years total catch has slightly fluctuated due to effort levels, but in general it has increased since 2002. The total reported catch for 2009 of 5,955mt is the highest on record, and a significant increase compared to 2,792mt reported in 2008. This steep increase in catches is a result of the increase in vessel effort in the zone as demonstrated in figure 1. Of the total 2009 catch, Cook Islands flagged vessels reported a total catch of 1,887.2mt.

Northern fishery catches began increasing in March 2009, indicating the start of the fishing season. The highest monthly reported catch volume was attained in August by both fisheries with a total of 833.3mt. Lowest total catch for the year was recorded in February with 109.1mt.



**Figure 1. Tuna catch and effort over time**

For the last few years catch composition has remained relatively stable. Albacore has always dominated catches followed by yellowfin and bigeye tuna. Reductions in the

<sup>3</sup> An 'active' vessel is defined as a vessel undertaking fishing activity at least 1 day during the calendar year.

<sup>4</sup> Gross registered tonnage

<sup>5</sup> Average period 2002-2009

proportions of yellowfin, swordfish and marlin catches in the southern fishery have contributed to the increase in albacore catch proportions since 2006. Dumping in the northern fishery of less desirable species has contributed to this, as well as the shift in effort from the southern multi-species targeted fishery to the northern albacore targeting fishery. Species (such as swordfish and marlin) caught in the northern fishery that are not processed through the canneries in Pago Pago are sold to the local markets of American Samoa and Samoa (Apia), discarded or consumed by the crew.

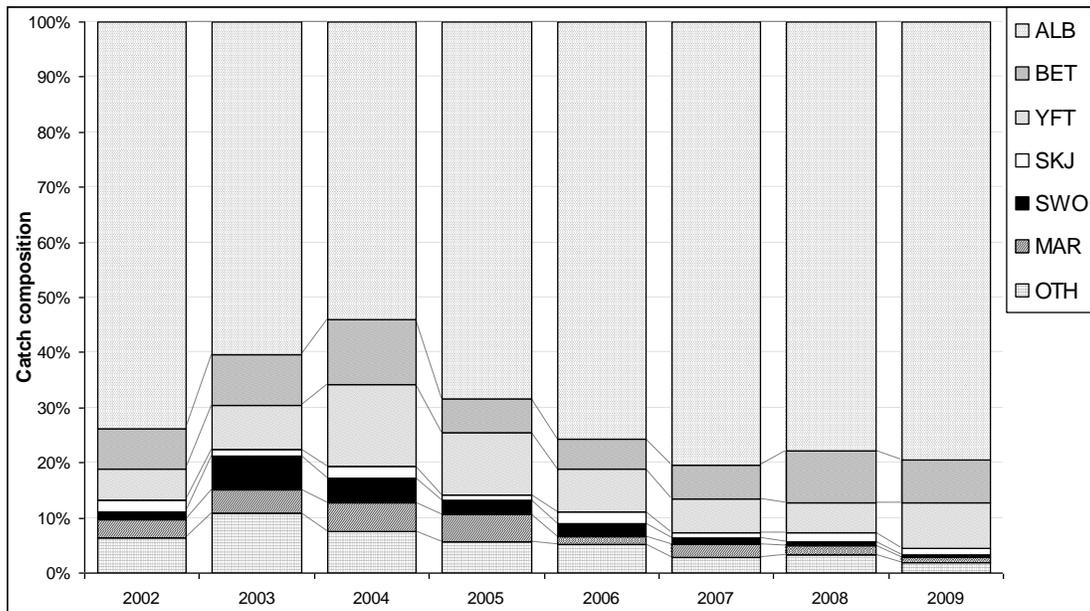


Figure 2. Catch composition by species over time

Seasonal trends are usually well demonstrated in the southern fishery, where catches normally begin increasing in March, followed by two peaks in catch rates around June and August, indicating the migration of fish through the zone. 2009 was an odd year for the southern fishery, with a late start to the season, which continued through to December, traditionally a time when catch rates are at their lowest.

Figure 3 shows catch rate trends for the three main tuna species (albacore, bigeye and yellowfin) for the zone. No separation of data between northern and southern fisheries was made, as a large majority of the 2009 effort in the southern fishery was generated by a single vessel<sup>6</sup>. The average tuna catch rate is heavily influenced by the albacore catch rates, again some bias is caused by the under reporting<sup>7</sup> of dumping in the northern fishery.

### 3.1 Albacore tuna

Since the development of the national fleet and further development of the northern fishery in 2002, albacore tuna has remained the dominant catch species. Albacore catches

<sup>6</sup> Aggregated reporting is practiced, with a minimum of 3 vessels to prevent the release of commercially sensitive information.

<sup>7</sup> Dumping is reported on logsheets by some vessels, and also reported by observers. Some anecdotal information is provided by the fishermen themselves. Work continues to determine what levels of dumping is occurring for different species.

have steadily increased over the years, except in 2008 where licensing was halted to amend the licensing regime, and reintroduced the licensing of foreign fishing vessels.

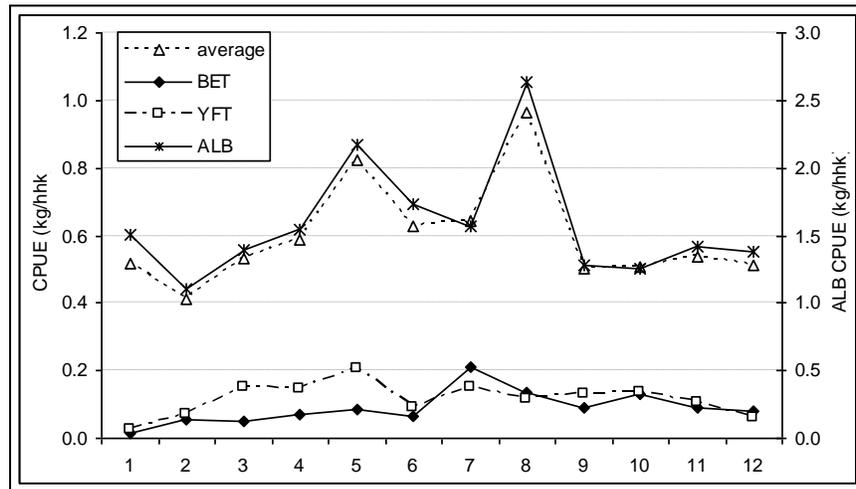


Figure 3. 2009 CPUE trends for tuna species

A significant increase in albacore catches was experienced in 2009, a record for Cook Islands catch records. A total of 4,731.2mt was reported for the CKEEZ, 93.5% of this from the northern fishery. Catch rates in the northern fishery have decreased in the last two years, going from 2.9 to 2.2 kg/hhks<sup>8</sup>. When the longline fishery began in 2002, albacore CPUE<sup>9</sup> in the northern fishery was 3.8 kg/hhks. These high catch rates are expected from a relatively unfished fishery, the high catch rates attributed to the removal of the larger fish in the population and relative abundance.

### 3.2 Yellowfin and bigeye tuna

In the northern fishery yellowfin is more valuable than bigeye. Bigeye value diminishes if frozen, due to discolouration from freeze burn. However in the fresh fish market, especially in Japan, bigeye is the more valuable of the two species due to the darker colour of the meat and fat content. The retail market out of Rarotonga does not distinguish between the two species and sells them as ‘tuna’. However, distinctions are made for albacore and skipjack.

The highest catches for both species were landed in July, whilst the lowest recorded catches were landed in January. Average CPUE for yellowfin was 0.116kg/hhk with the catch rates in the northern fishery higher than those in the southern fishery. Bigeye CPUE was 0.09kg/hhk for the EEZ. Bigeye and yellowfin CPUE for the southern fishery is highest in May compared to July for the northern fishery.

### 3.3 Swordfish

Total swordfish catch for 2009 was 23.5mt. This is relatively low compared to 2003 and 2004, where 129.3mt and 150.8mt were reported, respectively. These high catches were the result of concentrated efforts and targeting of swordfish in the southern fishery. Since then the number of vessels operating in the southern fishery targeting swordfish has

<sup>8</sup> Kilograms per 100 hooks of effort

<sup>9</sup> Catch per unit effort is the unit used for catch rates. In this case kg’s per 100 hook effort.

diminished, with only a few domestic vessels based in Rarotonga. However, the fishing strategies of these vessels have changed over the years. Rather than using shallow set techniques purely targeting swordfish, the number of hooks per basket has increased to allow for a range of species inhabiting shallower waters to be caught, to satisfy the local market.

### 3.4 Billfish

Of the billfish, blue marlin is the most abundant species with a total catch of 46.2mt. Highest catches for blue marlin were recorded in April and December, as seen in figure 4. The highest recorded catch for black marlin was also recorded in April. Only 8mt of striped marlin was recorded.

Recorded quantities of spearfish and sailfish are minute, 1.9mt and 0.36mt respectively. In the northern fishery these species are likely to be discarded or consumed by crew.

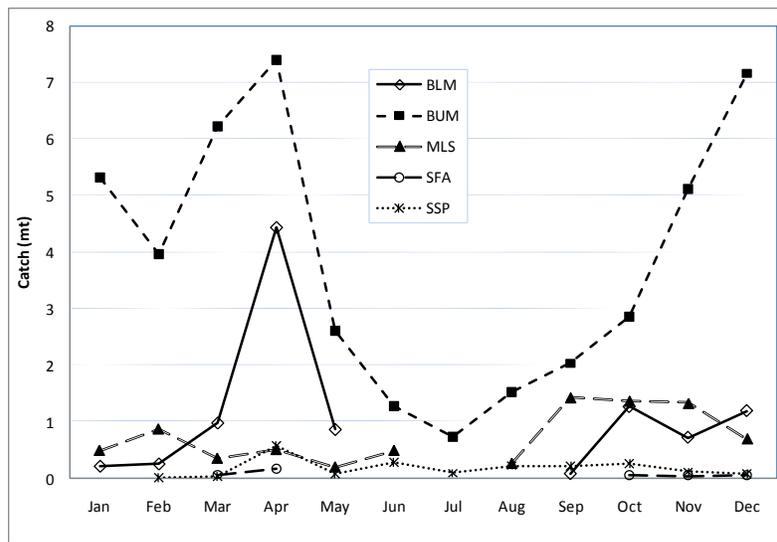
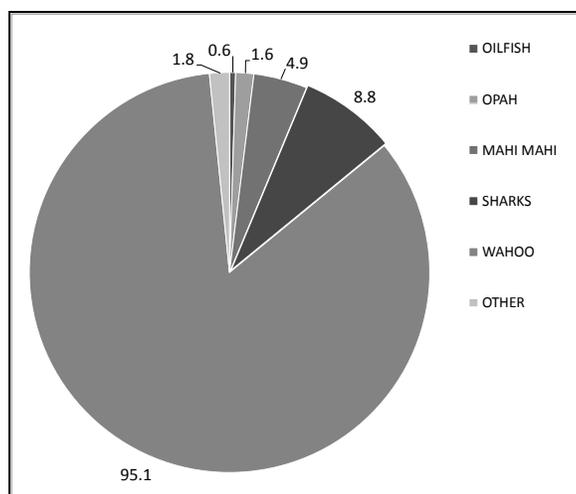


Figure 4. Billfish monthly reported catch totals

### 3.5 Bycatch species

Total reported bycatch volume is 112.8mt. Wahoo accounts for 84.3% and is one of the more valuable bycatch species for both the northern and southern fisheries. Wahoo can be sold to the cannery in Pago Pago, and is also a popular fish on the local Rarotongan market. Reported shark catches totalled 8.8mt and mahi mahi 4.3mt. Figure 5 shows bycatch species composition.



**Figure 5. Bycatch species catch composition**

### 3.6 Effort

Longline fishing effort is determined from the number of hooks set over time. A total of 12.4 million hooks was recorded for 2009, a 208% increase from 2008 driven by effort increases in the northern fishery. Effort fluctuated by an average 9% between 2005 and 2008, with an annual effort average of 6.5 million hooks. The 2009 effort increase has increased the annual average (2005 to 2009) by almost 1.2 million hooks.

Effort in the southern fishery has diminished significantly since 2004, as seen in figure 6. A combination of factors continues to limit the growth of this fishery. Vessel and fishing gear parts are sourced overseas and need to be imported. Fuel and provision costs in Rarotonga are high, and labour sourcing from within the Cook Islands is difficult. Cook Islanders are able to find higher paying, less labour intensive employment on land, resulting in companies sourcing crewmen from countries such as Fiji and the Philippines.

The variability in catch rates due to seasonal and climatic influences is a major factor in the longevity of fishing operations in the southern fishery. Most effort in the southern fishery has been limited to 100nm of Rarotonga, as determined by fishing operators. Because of the fresh fish nature of the southern fishery, fishing operations tend to remain close to Rarotonga ensuring easy access to the local market and international flights when exporting, as well as minimizing fuel costs.

Figure 7 demonstrates quarterly effort distribution by all vessels authorized to fish within the Cook Islands EEZ. Note fishing effort increases in the second quarter, corresponding to the increasing catch rates. Effort in the north is concentrated in a band around the island of Suvarrow continuing east to the high seas pocket shared between the Cook Islands, French Polynesia and Kiribati. The first quarter has the lowest catch rates and vessels usually tend to use this period to carry out maintenance, or move to more productive areas.

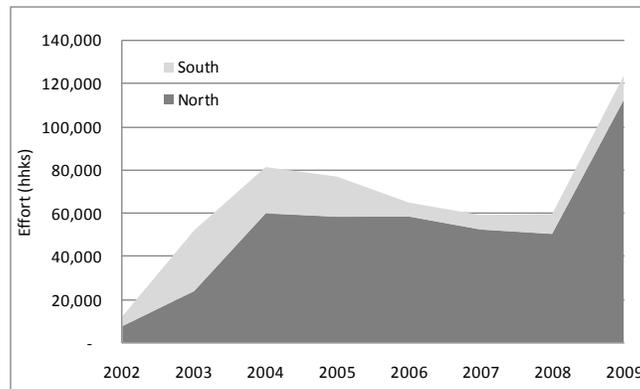


Figure 6. Northern vs. Southern fishery effort within the Cook Islands EEZ.

#### 4. Catch and effort beyond national jurisdiction

Twenty-five Cook Islands registered vessels were authorized to fish beyond national jurisdiction, on the high seas areas within the WCPFC convention area. Nine of these vessels also sought authorization to fish in areas of other national jurisdictions, with authorization from those nations to do so.

Table 2. Catch and effort for Cook Islands vessels operating beyond national jurisdiction

|              | hhks         | alb (mt)    | bet (mt)    | yft (mt)    | oth (mt)    | total (mt)   |
|--------------|--------------|-------------|-------------|-------------|-------------|--------------|
| Other EEZ    | 2,810        | 62.4        | 10.4        | 31.1        | 11.8        | 115.8        |
| High seas    | 535          | 11.2        | 1.1         | 4.4         | 1.5         | 18.2         |
| <b>Total</b> | <b>3,345</b> | <b>73.7</b> | <b>11.5</b> | <b>35.5</b> | <b>13.4</b> | <b>134.1</b> |

Table 2 shows the total catches from within other EEZ's and on the high seas. Approximately 134mt was recorded for catches taken beyond the Cook Islands EEZ with 86% taken from other EEZ's.

#### 5. Exports and markets

Little exporting (from Cook Islands ports) was done in 2009, a total of 9.38mt exported in the second quarter only. Of this 8.12mt went to Japan and 1.26mt sent to the US. Unless fish quality and catch volumes are high, and exchange rates favourable, better returns for the fishing companies can be made on the local market.

Table 3. Total 2009 exports from Rarotonga

| Species      | No         | Kgs            |
|--------------|------------|----------------|
| ALB          | 204        | 4,766.8        |
| BET          | 50         | 2,140.5        |
| YFT          | 64         | 2,019.5        |
| MLS          | 3          | 252.2          |
| LAG          | 1          | 24.0           |
| DOL          | 4          | 27.0           |
| WAH          | 8          | 150.0          |
| <b>TOTAL</b> | <b>334</b> | <b>9,380.0</b> |

The value of albacore alone unloaded to the canneries in Pago Pago is estimated at USD\$12.3 million dollars for 2009. Yellowfin, skipjack and wahoo are also unloaded in Pago pago and bought by canneries.



**Figure 7. Quarterly longline effort distribution for 2009 within the Cook Islands EEZ, by Cook Islands registered vessels and vessels authorized to fish within the Cook Islands EEZ.**

## **6. Tuna stock status**

As the body that manages highly migratory fish species within the Western and Central Pacific Ocean (WCPO), the Western and Central Pacific Fisheries Commission produces a number of scientific stock assessment papers each year. Due to the resource requirements and costs associated with this work, stock assessments for each species are not carried out on an annual basis; however, species are selected by the Scientific Committee, a subsidiary body of the Commission that provides scientific advice and recommendations.

Stock status and catch information provided in this section of the report is sourced from the Executive Summary of the Fifth Regular Session of the WCPFC Scientific Committee ([www.wcpfc.int/doc/summary-report-edited-version](http://www.wcpfc.int/doc/summary-report-edited-version)).

Provisional total tuna catch for 2008 was 2,426,195mt. Purse seine tuna catches contributed to 74%, longline catch contributed to 10%, and pole and line catches 7%. The remaining tuna catch was landed by other fishing gears, mostly from the Indonesian and Philippine fisheries. The provisional WCPO tuna catches contributed to 81% of total Pacific Ocean tuna catches, 56% of global tuna catches.

For clarification, the terms *overfishing* and *overfished* will be defined.

Overfishing relates to the current (or most recent period) rate of fishing mortality, compared to the rate of fishing mortality that produces maximum sustainable yield.

If the rate of fishing mortality (therefore catch) is above the level of catch that allows the stock to maintain its maximum sustainable yield, then overfishing is occurring as the amount of catch removed does not allow the stock to replenish to produce its maximum sustainable yield for the fishery.

Overfished relates to the status of a stock, being at a level that is below its capability to produce its maximum sustainable yield for the fishery. A stock may be overfished, but have no overfishing occurring. This simply means that the stock levels are below that capable of producing maximum sustainable yield, and that fishing mortality has been reduced to a level that allows the stock to recover and replenish itself.

### **6.1 South Pacific Albacore**

Total provisional 2008 catch for South Pacific albacore is 95,043mt, or 4% of total WCPO tuna catches. The 2009 stock assessment indicated that no overfishing of this stock is occurring, and it is not overfished. It was noted however, that current fishing mortality levels may be affecting catch rates on adult albacore.

The Cook Islands longline fleet target the mature proportion (adult) of the albacore stock. Of the 2008 provisional catch estimates, the total Cook Islands in zone catch contributed to 2.3% of total WCPO catches for albacore. The Cook Islands fleet (registered vessels) contributed to 1.6% of the total 2008 provisional catch estimates.

## **6.2 Bigeye**

The total provisional 2008 catch was 157,054mt in the WCPO. Overfishing is occurring to the bigeye stock. Therefore fishing mortality is occurring at a rate greater than that of a level of fishing mortality that allows the stock to produce maximum sustainable yield. It is also likely that bigeye is in a slightly overfished state, or will be in the near future.

Total 2008 in zone catch contributed to 0.16% of the 2008 provisional catch estimates of WCPO bigeye catch. The total reported catch of the Cook Islands fleet in the WCPO contributed to 1.6% of the catch.

## **6.3 Yellowfin**

The 2009 assessment outcomes were slightly more optimistic than the previous 2007 assessment. The current status of the stock is that overfishing is not occurring, and that it is not in an overfished state. However, it is highly likely that this stock is near being fully exploited and fishing mortality for this stock should not increase.

The total in zone catch for 2008 was 153.4mt or 0.03% of total WCPO catch. The Cook Islands fleet for the entire WCPO area contributed to 0.04% of the total 2008 yellowfin catch estimates.

## **6.4 Skipjack**

The last assessment for this stock was carried out in 2008; however, advice from the WCPFC 2009 Scientific Committee considered that the status of this stock remains the same. That is, the skipjack tuna stock is in a healthy state, overfishing is not occurring nor is it in an overfished state. The total provisional 2008 skipjack catch estimates were 1,634,617mt. This equated to 67% of total WCPO catches.

The total 2008 catches in the Cook Islands EEZ equates to 0.005% of WCPO catches and 0.04% of total skipjack catches taken by the Cook Islands fleet within the WCPO area.

## **6.5 Swordfish**

The last assessment for South Pacific swordfish was carried out in 2008. Due to data gaps within the South Pacific data set for this species, particularly in the south-central Pacific region in which the Cook Islands lie, uncertainties remain relating to the outcomes of this assessment. Conclusions from the assessments indicate that the stock is not overfished, however due to assessment uncertainties and taking in to consideration the principle of the precautionary approach in fisheries management, catch limits established in the Conservation and Management Measure 2009-03 (<http://www.wcpfc.int/doc/cmm-2009-03/conservation-and-management-swordfish>) shall be followed.

# **7. Research Programs**

## **7.1 Circle hook trial**

In 2008, MMR in collaboration with Steve Beverly of SPC (Secretariat of the Pacific Community) and Dan Curran of NOAA (US National Oceanic and Atmospheric

Administration) helped to set up preliminary circle hook trials, carried out in 2008 and 2009, to determine the efficacy of 16/0 circle hooks compared to the range of hooks that were being used by the shallow setting longline fleet based out of Rarotonga. A 50/50 mix of circle hooks and standard hooks used by the trial vessel enabled the comparison between the hook types.

Circle hooks are used to reduce turtle mortality, in shallow set longline fisheries such as swordfish fisheries, as studies have shown they increase the likelihood of being mouth hooked, reduce the likelihood of turtles swallowing the hook and causing internal damage, and reduce mortality rates.

Initial trials have shown that using circle hooks increases catch rates of target species, including swordfish which are soft mouthed. However, it also increases shark catch rates. These trials require 100% observer coverage and more trials are required to make sound conclusions from this study. Further trials and study may include a comparison between small vs. large circle hooks.

## **7.2 Swordfish Tagging and Training Project**

The Cook Islands swordfish tagging and training project began in September 2009. Training of local tagging technicians was carried out over a 3 week period by the pelagic tagging program coordinator for the Australian Commonwealth Scientific and Industrial Research Organization, Dr. Karen Evans. Funding for this project was provided by a US Federal Grant through the National Marine Fisheries Service (NMFS) of NOAA. Twenty Pop-up, Satellite, Archival Tags are expected to be deployed within Cook Islands waters.

The tagging program and the information that will be gained from it will help the Cook Islands and regional scientists attempting to determine the stock status of this species within the South Pacific. Tagging with archival tags provides invaluable information about species behaviour, movement through the water column and migration routes. Satellite archival tags also allow for greater collection of data without having to recapture the fish, unlike conventional tags.

Between September 2009 and January 2010, eight swordfish were tagged with PSATs programmed to collect and archive temperature, depth, and light data every 10 seconds. This light data is also used to estimate geo-location and track the movement of each tagged swordfish. Eight tags have been deployed, with each being programmed to remain on the fish for 365 days post deployment. Premature tag releases are expected due to a variety of reasons such as the removal of tag anchor in the fish prior to the tagging wound healing, fish mortality and capture by fishing boats.

Observers monitor fishing operations during tagging exercises to ensure the collection of necessary scientific information to be collated with tagging data. Tagging is expected to recommence in July 2010.

## **8. Review of Longline Fishery Management Plan**

The *Marine Resources (Longline Fishery) Regulations 2008* is up for review during 2010. Whilst MMR will be leading this work, consultation with industry and stakeholders will be carried out later in the year.

## Attachment A: Reference Tables

**Table 4. Species catches in metric tonnes by year, for the catches taken within the Cook Islands EEZ.**

| Species                             | 2002          | 2003            | 2004            | 2005            | 2006            | 2007            | 2008            | 2009            |
|-------------------------------------|---------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| ALBACORE                            | 607.73        | 1,298.24        | 1,873.18        | 2,374.31        | 2,380.02        | 2,655.00        | 2,175.71        | 4,731.61        |
| AMBERJACKS                          |               | 0.02            |                 |                 |                 |                 |                 |                 |
| BAR JACK                            |               |                 | 0.07            |                 |                 |                 |                 |                 |
| BARRACUDA                           |               | 0.01            |                 |                 |                 |                 |                 |                 |
| BARRACUDAS (UNIDENTIFIED)           | 0.20          | 2.10            | 1.02            | 0.24            | 0.26            | 0.46            | 0.19            | 0.01            |
| BIGEYE                              | 60.62         | 197.29          | 403.91          | 208.78          | 171.78          | 199.64          | 259.21          | 461.46          |
| BIG-SCALED POMFRET                  | 0.06          | 0.47            | 0.14            | 0.09            | 0.16            | 0.05            |                 |                 |
| BLACK DISC FISH                     |               |                 |                 |                 |                 | -               |                 |                 |
| BLACK MARLIN                        | 0.29          | 5.61            | 10.25           | 8.12            | 7.82            | 15.88           | 10.98           | 9.90            |
| BLUE COD                            |               |                 | 0.43            |                 |                 |                 |                 |                 |
| BLUE MARLIN                         | 13.60         | 45.97           | 131.56          | 124.03          | 25.31           | 43.43           | 29.90           | 46.19           |
| BLUE SHARK                          | 0.03          | 1.30            | 0.57            |                 |                 |                 |                 | 0.01            |
| BLUEFIN TUNAS (PACIFIC)             |               |                 | 0.20            |                 |                 | 0.15            |                 |                 |
| COOKIE CUTTER SHARK                 |               | 0.00            |                 |                 |                 |                 |                 |                 |
| DOLPHINS / PORPOISES (UNIDENTIFIED) |               | 0.02            |                 |                 |                 |                 |                 |                 |
| DRIFT FISHES (FAMILY)               |               |                 | 0.02            |                 |                 |                 |                 |                 |
| ESCOLAR                             |               | 1.13            | 0.59            |                 |                 | 0.05            |                 | 0.02            |
| GREAT BARRACUDA                     |               |                 | 0.07            | 0.05            |                 | 0.03            | 0.12            |                 |
| LANCETFISHES                        |               | 0.50            |                 |                 |                 |                 |                 |                 |
| MAHI MAHI / DOLPHINFISH / DORADO    | 17.50         | 51.84           | 32.21           | 27.06           | 19.93           | 11.96           | 7.24            | 4.88            |
| MAKO SHARKS                         |               | 0.43            |                 |                 |                 |                 |                 |                 |
| MARLIN                              |               |                 |                 |                 | 1.10            |                 |                 |                 |
| OCEAN SUNFISH                       |               |                 |                 |                 |                 | 0.30            |                 | 0.05            |
| OCEANIC WHITE-TIP SHARK             | 0.04          | 0.40            |                 | 0.04            |                 |                 |                 |                 |
| OILFISH                             | 0.22          | 6.02            | 4.65            | 0.54            | 0.16            | 0.87            | 0.12            | 0.55            |
| OPAH / MOONFISH                     | 7.85          | 43.34           | 20.71           | 8.01            | 3.12            | 2.99            | 4.29            | 1.65            |
| OTHER FISH                          | 0.06          | 0.21            | 0.21            | 0.02            |                 | 4.52            | 0.08            | 0.08            |
| PACIFIC BLUEFIN TUNA                | 1.79          | 3.10            | 1.44            | 1.42            |                 |                 |                 |                 |
| PACIFIC POMFRET                     |               |                 |                 |                 |                 | 0.03            |                 |                 |
| POMFRETS AND OCEAN BREAMS           |               | 0.01            | 0.03            | 0.06            | 0.11            | 0.03            |                 | 0.02            |
| RAYS, SKATES AND MANTAS             |               | -               |                 |                 |                 |                 |                 |                 |
| RUDDERFISH                          |               | 1.03            |                 |                 |                 |                 |                 |                 |
| SAILFISH (INDO-PACIFIC)             | 1.19          | 2.11            | 3.46            | 1.07            | 0.34            | 0.54            | 0.62            | 0.36            |
| SHARK FINS                          | 0.00          | 2.55            | 4.31            | 0.11            |                 | 0.76            | 0.11            |                 |
| SHARKS (UNIDENTIFIED)               | 9.48          | 50.95           | 83.05           | 70.87           | 26.08           | 10.22           | 19.71           | 8.79            |
| SHORT FINNED MAKO SHARK             | 0.08          | 0.05            |                 |                 |                 |                 |                 |                 |
| SHORT-BILLED SPEARFISH              | 3.23          | 9.19            | 8.11            | 2.04            | 2.42            | 1.45            | 2.00            | 1.92            |
| SKATE                               |               | 0.07            | 0.01            |                 |                 |                 |                 |                 |
| SKIPJACK                            | 18.48         | 28.82           | 79.47           | 32.76           | 65.02           | 29.25           | 42.40           | 76.29           |
| SOUTHERN BLUEFIN TUNA               |               |                 |                 |                 |                 |                 | 0.40            |                 |
| STRIPED MARLIN                      | 11.89         | 39.58           | 38.72           | 41.89           | 14.19           | 13.16           | 10.68           | 7.97            |
| SUNFISH (R. TRUNCATA)               |               | 0.04            | 0.15            |                 |                 |                 |                 |                 |
| SWORDFISH                           | 11.90         | 129.29          | 150.77          | 85.63           | 75.69           | 39.58           | 19.99           | 23.55           |
| TUNA (UNIDENTIFIED)                 |               |                 |                 |                 |                 |                 |                 | 0.06            |
| UNSPECIFIED                         |               | 0.09            | 0.26            | 0.86            | 1.12            | 5.62            | 5.28            | 1.59            |
| WAHOO                               | 13.25         | 59.90           | 101.32          | 87.15           | 105.89          | 56.70           | 49.57           | 89.86           |
| YELLOWFIN                           | 46.24         | 169.60          | 516.12          | 395.28          | 242.04          | 209.05          | 153.71          | 487.75          |
| <b>Total</b>                        | <b>825.70</b> | <b>2,151.25</b> | <b>3,466.99</b> | <b>3,470.40</b> | <b>3,142.55</b> | <b>3,301.69</b> | <b>2,792.31</b> | <b>5,954.55</b> |

**Table 5. Monthly tuna catch and effort within the Cook Islands EEZ, for 2009. NB: CPUE is in kg per one hundred hooks of effort.**

| Month         | hhooks         | alb_n          | alb_mt          | alb_cpue | bet_n         | bet_mt        | bet_cpue | yft_n         | yft_mt        | yft_cpue | oth_n         | oth_c         |
|---------------|----------------|----------------|-----------------|----------|---------------|---------------|----------|---------------|---------------|----------|---------------|---------------|
| Jan           | 5,781          | 9,562          | 168.22          | 1.51     | 116           | 2.51          | 0.01     | 144           | 3.16          | 0.02     | 929           | 12.94         |
| Feb           | 4,813          | 4,851          | 83.17           | 1.10     | 363           | 7.75          | 0.06     | 377           | 7.68          | 0.07     | 756           | 10.52         |
| Mar           | 4,000          | 5,306          | 101.13          | 1.40     | 227           | 6.61          | 0.05     | 779           | 16.21         | 0.15     | 566           | 10.68         |
| Apr           | 11,916         | 25,072         | 507.80          | 1.54     | 1,105         | 29.19         | 0.07     | 1,281         | 34.56         | 0.15     | 1,237         | 23.65         |
| May           | 13,941         | 38,618         | 717.80          | 2.17     | 1,164         | 29.68         | 0.08     | 2,452         | 64.12         | 0.21     | 1,546         | 14.92         |
| Jun           | 12,421         | 33,187         | 594.30          | 1.73     | 811           | 21.94         | 0.06     | 1,662         | 47.27         | 0.09     | 2,613         | 21.39         |
| Jul           | 11,847         | 25,573         | 443.94          | 1.56     | 4,435         | 111.81        | 0.21     | 3,271         | 92.47         | 0.15     | 5,083         | 26.07         |
| Aug           | 13,799         | 37,036         | 678.72          | 2.64     | 2,647         | 70.90         | 0.14     | 1,796         | 53.62         | 0.12     | 3,527         | 30.04         |
| Sep           | 11,819         | 21,662         | 392.25          | 1.28     | 1,591         | 42.08         | 0.09     | 1,846         | 55.03         | 0.13     | 4,016         | 33.54         |
| Oct           | 13,532         | 27,297         | 486.79          | 1.25     | 2,804         | 76.56         | 0.13     | 2,521         | 68.64         | 0.14     | 5,301         | 36.50         |
| Nov           | 12,497         | 21,601         | 386.60          | 1.42     | 1,505         | 39.95         | 0.09     | 1,190         | 33.48         | 0.10     | 3,086         | 28.24         |
| Dec           | 7,455          | 9,421          | 170.43          | 1.39     | 835           | 22.50         | 0.08     | 476           | 11.14         | 0.06     | 2,187         | 23.63         |
| <b>TOTALS</b> | <b>123,821</b> | <b>259,186</b> | <b>4,731.15</b> |          | <b>17,603</b> | <b>461.46</b> |          | <b>17,795</b> | <b>487.36</b> |          | <b>30,847</b> | <b>272.11</b> |