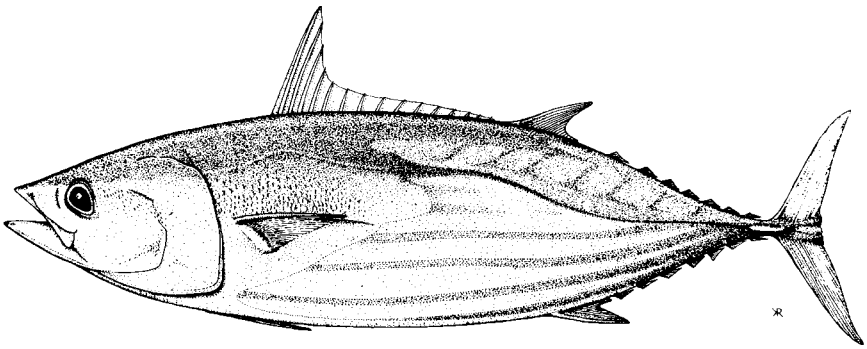
SCTB16 Working Paper

SKJ–2

OVERVIEW OF SKIPJACK FISHJERIES IN THE WESTERN AND CENTRAL PACIFIC OCEAN – 2002



Peter G. Williams

Oceanic Fisheries Programme (OFP)
Secretariat of the Pacific Community
Noumea, New Caledonia

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1. Introduction

Skipjack (*Katsuwonus pelamis*) is the dominant species in the western and central Pacific Ocean (WCPO) tuna catch accounting for nearly two-thirds of the target tuna species catch over the past decade (Lawson 2003). This species is taken primarily by purse seine and pole-and-line gear, with smaller catches by other artisanal gears in eastern Indonesia and Philippines.

This paper provides a brief overview of the WCPO skipjack fisheries. Where possible, emphasis is made to catches taken during 2002 with comparison to catches taken in recent years.

2. Catch estimates

Catches in the WCPO have increased steadily since 1970, more than doubling during the 1980s, and relatively stable since then (range 800,000–1,200,000 mt), with catches of more than 1.2 million mt in four of the last five years (Figure 1). Pole-and-line fleets, primarily Japanese, initially dominated the fishery, with the catch peaking at 380,000 mt in 1984. The relative importance of this fishery, however, has declined over the years primarily due to economic constraints. The skipjack catch increased during the 1980s due to growth in the international purse seine fleet, combined with increased catches by domestic fleets from Philippines and Indonesia (which now make up 20–25% of the total skipjack catch in WCPO in recent years).

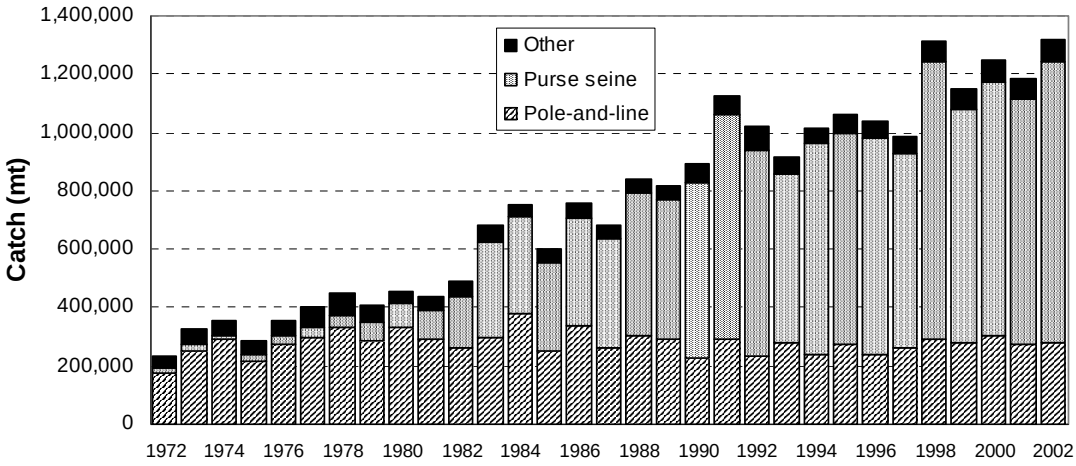

Figure 1. WCPO skipjack catch (mt) by gear

The 2002 estimated catch of 1,321,939 mt was the highest on record and around 7,000 mt more than the record of 1998. A general absence of the restrictions placed on effort in the purse seine fishery in previous years, as a result of falling prices, no doubt contributed to this higher catch level.

The 2002 catch comprised the following:

- The **purse seine** gear to a record 962,740 mt (73%), most of which was taken by the four main DWFN fleets (644,704 mt) and Philippines purse seine and ringnet fisheries, but with a significant contribution from the PNG fleet (89,948 mt), which contributed a slightly higher catch than the US fleet for 2002;
- The provisional estimate for the **pole-and-line** gear 280,578 mt (21%). This catch primarily comprised catches by the Japanese fleet (the most recent estimate was 96,144 mt for 2001–the lowest catch in more than 30 years) and the Indonesian fleet (167,046 mt). There was also a noted recovery in the contribution (9,013 mt) by Solomon Islands fleet compared with the low catches in recent years;
- Other gears – ~70,000 mt (6%) representing mostly unclassified gears in Indonesia, Philippines and Japan.

3. Distribution of the catch

Figure 2 shows the average spatial distribution of skipjack catch in the WCPO for the period 1990–2001 and the spatial distribution of the 2002 catch for the purse seine gear only (catch data by area for the other gears are not complete for 2002). The great majority of the skipjack catch is taken in equatorial areas, and a lesser amount in the seasonal home-water fishery of Japan. The domestic fisheries in Indonesia (pole-and-line) and the Philippines (e.g. ring-net and purse seine) account for the skipjack catch in the western equatorial portion of the WCPO. The distribution (and catch) of skipjack in equatorial areas to the east of the Philippines oscillates from east to west in relation to ENSO events. For example, skipjack catches in 2002 were more eastwards than the average of the past decade and understood to be related to the El Nino event during this year.

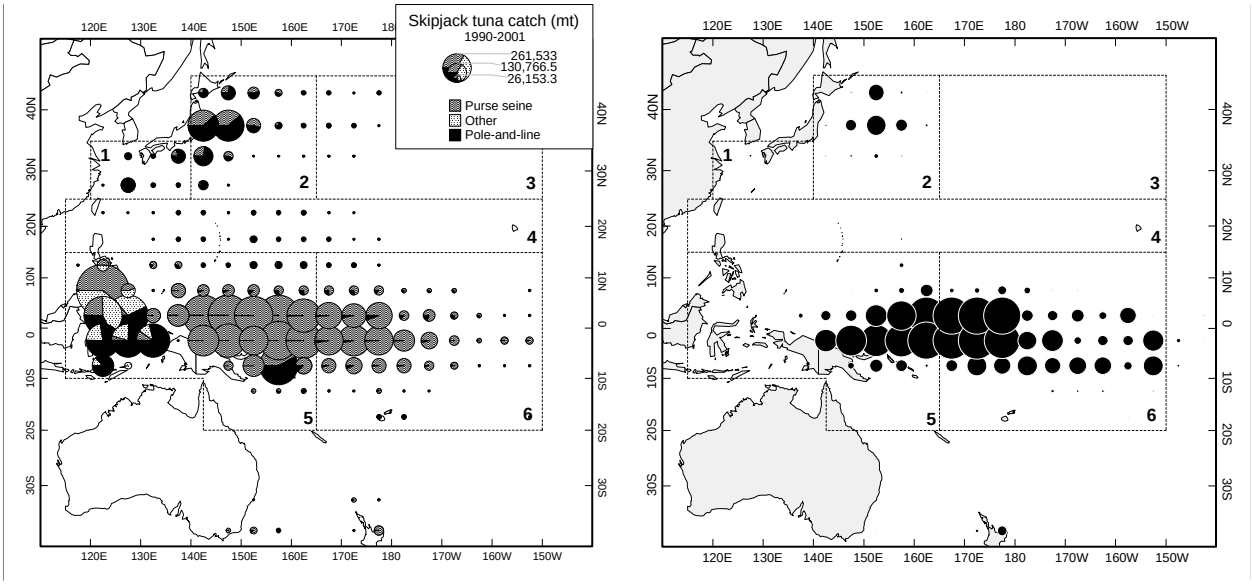

Figure 2. Distribution of WCPO skipjack catch for 1990–2001 (left) and the 2002 purse seine skipjack catch (right). The six-region spatial stratification used in stock assessment is shown.

4. Catch per unit of effort

Purse seine sets are made on two main school types – associated (floating object) and unassociated (free-swimming). Associated (log) sets initially accounted for most of the catch as the fishery developed in the WCPO, but as experience was acquired and gear technology improved, unassociated (free) schools become more important. In recent years (1999 in particular), several fleets concentrated fishing on associated sets, and primarily drifting man-made FADs. This has had some implications for the species (and size) composition of the catch, although there has been a marked reduction in the use of drifting FADs in the last 2–3 years.

Figure 3 shows the annual time series of skipjack CPUE by vessel nation and set type (and for all sets combined). The 2002 skipjack CPUE for all set types are consistent for the three Asian fleets (Japan, Korea and Taiwan) and continues the overall increasing trend since 1997. In contrast, the US fleet, which fished further to the east during 2002 (see Figures 9–12 in WP GEN–1), generally experienced poorer skipjack catch rates. The 2002 skipjack CPUE trends in nearly all instances increased from the levels seen in 2001, and in several instances where at their highest level ever. The gradual increase in skipjack CPUE for free-school sets over the past 5 years is related to a certain extent to technological advances enabling better detection of free-swimming schools. Skipjack CPUE for drifting FAD sets undertaken by the US fleet during 2002 was again clearly lower than the other fleets and perhaps related to (i) different areas fished (the US tend to fish further east) and/or (ii) the three Asian fleets only use drifting FADs when appropriate (Drifting FADs sets account for a much higher proportion of the sets for the US than for the three Asian fleets–see Figure 7 in WP GEN–1). Not shown here, but of interest, is that fishing in the general area either side of the 160°E longitude produced very high rates in the latter months of 2002 and into the first months of 2003.

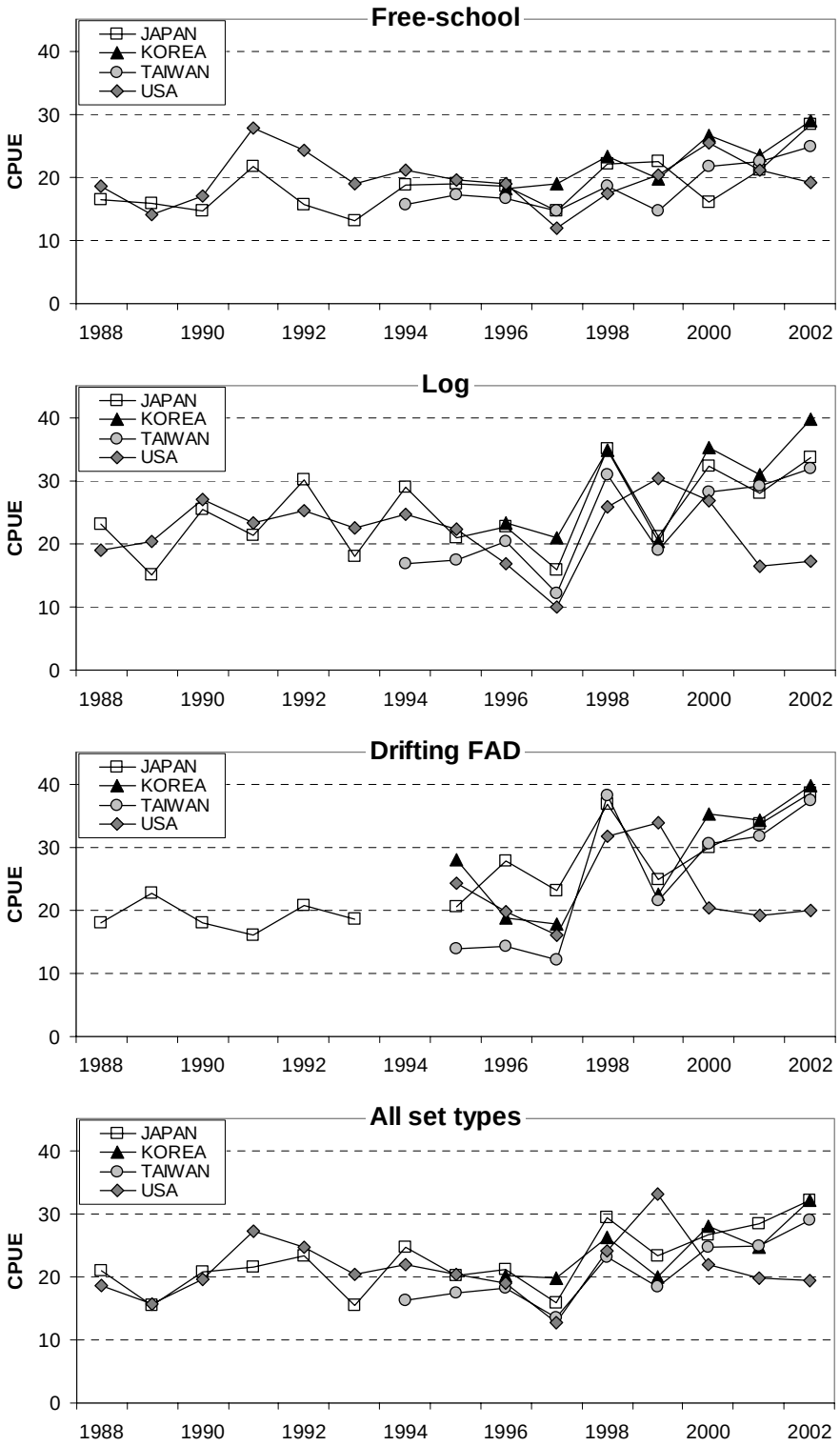

Figure 3. Skipjack tuna CPUE (mt per day) by major set-type categories (free-school, log and drifting FAD sets) and all set types combined for Japanese, Korean, Taiwanese and US purse seiners fishing in the WCPO. Effort and CPUE were partitioned by set type according to the proportions of total sets attributed to each set type.

Nominal skipjack CPUE for the offshore and distant-water Japanese **pole-and-line** fleets show no clear trend since 1994 (Figure 4). The skipjack CPUE for the offshore fleet, active in and around the Japanese home fishery, shows an oscillating pattern (between 4–6 mt/day) for most of the 1990s. In contrast, the distant-water fleet, primarily active in tropical waters, consistently accounted for a higher CPUE (between 6–8 mt/day) over this period. Skipjack CPUE in the Solomon Islands domestic pole-and-line fishery tend to be stable but lower than the Japanese fleets. There were significant reductions in effort by the Solomon Island fleet during recent years, no doubt contributing to a slight decline in CPUE. Nominal skipjack CPUE for the Japanese and Solomon Island fleets tend to follow a similar pattern from year to year, suggesting that stock-wide effects are involved. Some increases in CPUE have coincided with substantial effort reduction and the departure of less competitive boats from the fishery, as well as the acquisition of improved technology, e.g. bird radar. Ogura and Shono (1999) considered several of these factors in estimating the standardised CPUE for the Japanese pole-and-line fleets (Figure 5). The importance in considering these factors is demonstrated when comparing nominal (Figure 4) and standardised (Figure 5) CPUE for the Japanese distant-water fleet where, for example, the trend in nominal CPUE over the past decade is downwards while there is no clear trend in standardised CPUE (i.e. it is generally more stable).

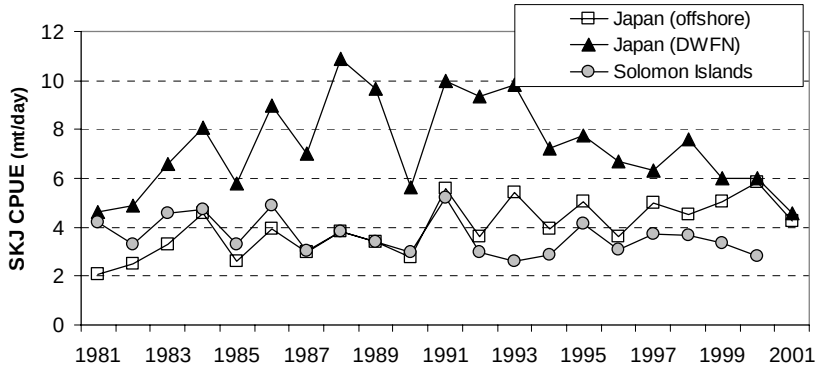

Figure 4. Nominal skipjack tuna CPUE (mt/day) for selected pole-and-line fleets

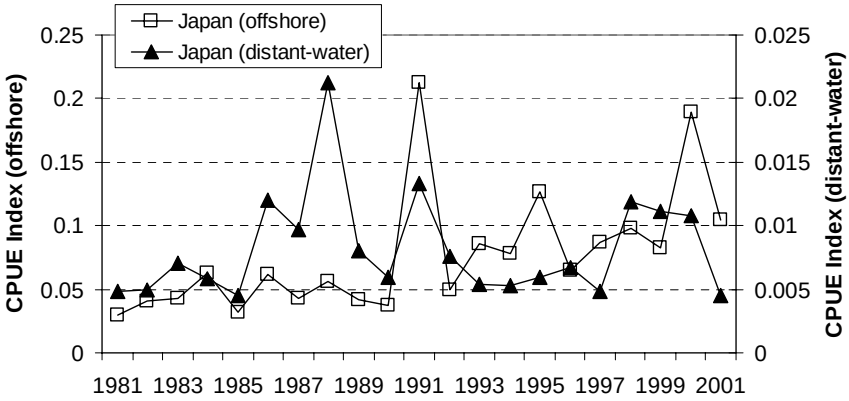

Figure 5. Standardised skipjack tuna CPUE (mt/day) for Japanese pole-and-line fleets

5. Size of fish caught

In the WCPO, skipjack size composition data are available from fishery observers and port sampling activity, mostly involving the international fleet fishing east of 140°E. Figure 6 shows the annual catch-at-size for skipjack, over the period 1997–2001 (2002 not yet complete) for the main skipjack fisheries in the WCPO. The purse seine gear accounts for most of the catch, which is typically in the size range 40–70 cm. Purse-seine unassociated sets usually take slightly larger skipjack than the pole-and-line and purse-seine associated sets (i.e. log and FAD). In contrast, the Philippines and Indonesian domestic fisheries catch much smaller fish and account for most of the WCPO skipjack catch in 20–40 cm size range. Figure 7 shows the seasonal variations in catch-at-size for skipjack over the period 2000–2001. There are several instances where modal progressions are evident. For example, the first three quarters of 2000 show a mode in the purse-seine unassociated and associated catch progressing from about 52 cm, through 56 cm in the second quarter, to 60 cm by the third quarter 2000.

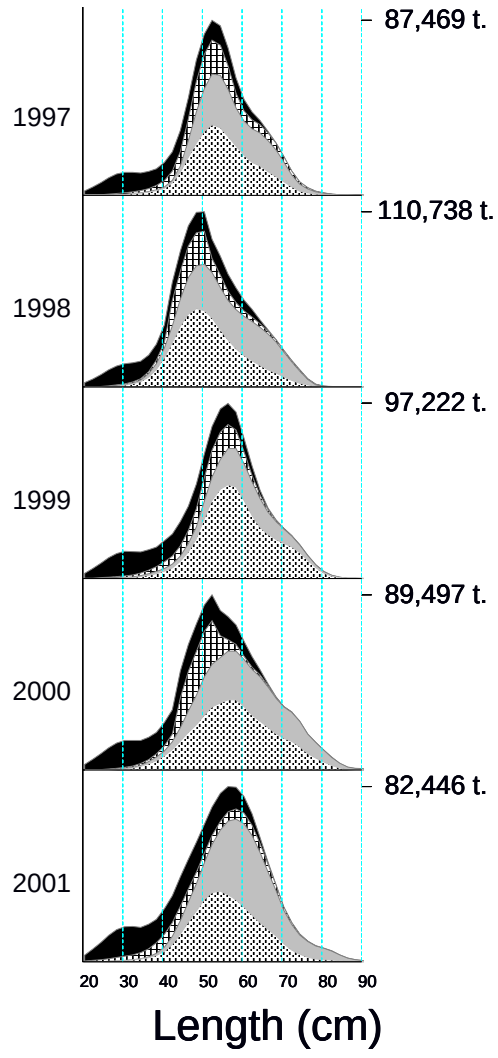

Figure 6. Annual Skipjack tuna catch-at-size in the WCPO, 1997–2001.
The catch is broken down into the Indonesian/Philippines domestic fisheries component (black), the pole-and-line fishery component (hatched), unassociated-set catch from the purse-seine fishery (grey) and associated-set catch from purse-seine fishery (dotted). The y-axis scale is in weight – the figures on the right indicate the catch weight in a 2-cm size class.

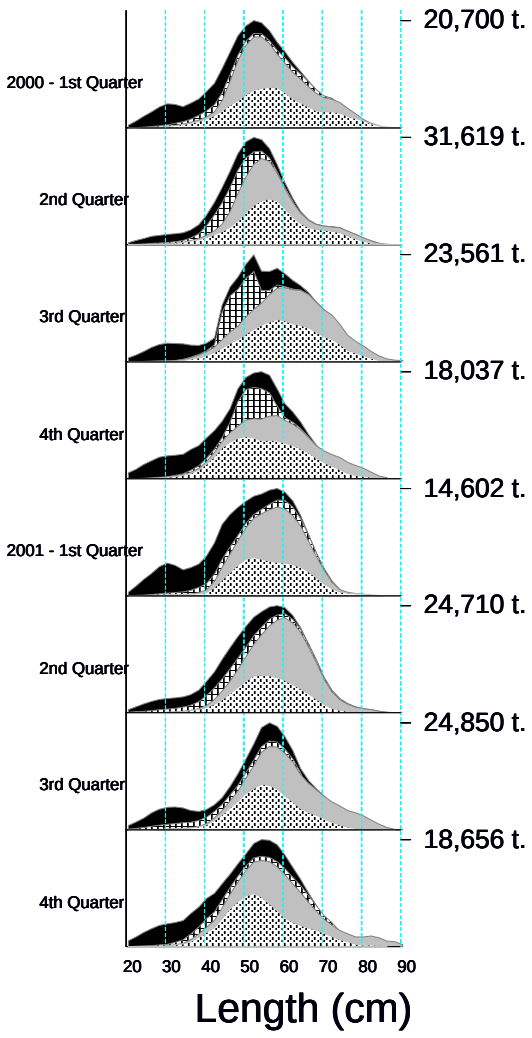

Figure 7. Quarterly Skipjack tuna catch-at-size in the WCPO, 2000–2001.
The catch is broken down into the Indonesian/Philippines domestic fisheries component (black), the pole-and-line fishery component (hatched), unassociated-set catch from the purse-seine fishery (grey) and associated-set catch from purse-seine fishery (dotted). The y-axis scale is in weight – the figures on the right indicate the catch weight in a 2-cm size class.

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