Executive Summary of the Status of the Kawakawa Resource

New document to be submitted for consideration by the SC in Nov06

BIOLOGY

Kawakawa (*Euthynnus affinis*) lives in open waters close to the shoreline and prefers waters temperatures ranging from 18° to 29°C. Kawakawa form schools by size with other species sometimes containing over 5,000 individuals. Kawakawa are often found with yellowfin, skipjack and frigate tunas. Kawakawa are typically found in surface waters, however, they may range to depths of over 400 m (they have been reported under a fish-aggregating device employed in 400 m), possibly to feed.

Kawakawa grow a length of 100 cm FL and can weigh up to 14 kg but the more common size is around 60 cm. Juveniles grow rapidly reaching lengths between 50 and 65 cm by three years of age.

On the Natal coast in South Africa, sexual maturity is attained at 45-50 cm and spawning occurs mostly during summer. A 1.4 kg female (48 cm FL) may spawn approximately 0.21 million eggs per batch (corresponding to about 0.79 million eggs per season).

Kawakawa larvae are patchy but widely distributed and can generally be found close to land masses. Large changes in apparent abundance are linked to changes in ocean conditions. This species is a highly opportunistic predator feeding on small fishes, especially on clupeoids and atherinids; also squids, crustaceans and zooplankton.

No information is available on stock structure of kawakawa in Indian Ocean.

FISHERIES

Kawawkawa is caught mainly by gillnets and purse seiners (Table 1 and Figure 1) and may be an important by-catch of the industrial purse seiners. The catch estimates for kawakawa were derived from very small amounts of information and are therefore highly uncertain[1] (Figure 2). The catches provided in Table 1 are based on the information available at the Secretariat and the following observations on the catches cannot currently be verified. Annual estimates of catch kawakawa increased markedly from around 10,000 t in the late 1970's to reach the 50,000 t mark in 1990. Catches peaked at over 70, 000 t in 2002 and 2003 but have since declined. In 2005, the catch was 59,000 t.

In 2005, twenty countries reported catches of kawakawa in the IOTC area. Catches for other countries known to catch kawakawa are estimated by the Secretariat according to the species composition per gear declared during the previous year or by the major fishing countries of the region. The largest component of the catches in 2005 was taken by India (30 %), Iran (20 %), Malaysia (13 %), Thailand (11 %), Yemen (5 %) and Oman (5 %) (Figure 3).

A high percentage of the kawakawa captured by Thai purse seiners in the Andaman sea is comprised of fish 8 to 42 cm long.

[1] The uncertainty in the catch estimates has been assessed by the Secretariat and is based on the amount of processing required to account for the presence of conflicting catch reports, the level of aggregation of the catches by species and or gear, and the occurrence of unreporting fisheries for which catches had to be estimated.

AVAILABILITY OF INFORMATION FOR STOCK ASSESSMENT

There is no information on the stock structure of kawakawa in the Indian Ocean.

Numerous studies have been undertaken to investigate the age and the growth of kawakawa. These include various studies based on age and length distributions using various body parts (e.g. vertebrae, dorsal spines, and otoliths). Fecundity of kawakawa has also been studied in Indian Ocean.

Possible fishery indicators:

1. **Trends in catches**: The catch estimates for kawakawa are highly uncertain. The trend in catches indicates a large and continuous increase in the catches from the mid-1980's to 2002 (Figure 1). The estimated catches decreased over the period 2002-2005.
2. **Nominal CPUE Trends:** data not available
3. **Average weight in the catch by fisheries:**
4. **Number of squares fished:** CE data not available

STOCK ASSESSMENT

While some localised, sub-regional assessments may have been undertaken, no quantitative stock assessment has been undertaken by the IOTC Working Party on Neritics.

MANAGEMENT ADVICE

No quantitative stock assessment is currently available for kawakawa in the Indian Ocean, therefore the stock status is uncertain.

The SC notes the decline in the catches since 2002. However, the reasons for this are not clear: it may be problem related to reporting, or it may be a normal fluctuation in the fishery — a similar decline occurred in the early 1990's. Nevertheless, the SC recommends that this species be reviewed by the WPN every 2-3 years.

KAWAKAWA SUMMARY

Maximum Sustainable Yield :	-
Current (2005) Catch:	58,771 tonnes
Mean catch over the last 5 years (2001-05)	64,608 tonnes
Current Replacement Yield :	-
Relative Biomass ($B_{current}/B_{MSY}$) :	-
Relative Fishing Mortality ($F_{current}/F_{MSY}$):	-

Table 1. *Kawakawa:* ***c****atches by gear and main fleets for the period 1956-2005 (in thousands of tonnes). Data as of 9 October 2006.*

Gear	Fleet	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82
Purse seine	Malaysia	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.4	0.5	0.4	0.3	1.2	0.9	1.0	0.5	0.8	1.3	0.8	0.9	1.7	1.1	2.6	1.1	0.9
	Thailand															0.1	0.4	0.4	0.6	0.5	1.1	0.7	0.6	0.8	0.1	0.0	0.0	1.2
	India																					0.1	0.1	0.2	0.4		0.6	0.6
	Other Fleets	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.8	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	1.0	0.6	0.4	0.5	0.4	0.3	1.4	1.3	1.4	1.1	1.2	2.4	1.6	1.6	2.7	1.5	2.6	1.7	2.6
Gillnet	India	0.6	0.4	0.5	0.4	0.8	1.2	0.3	0.7	0.7	0.5	0.5	0.6	0.6	0.5	0.9	1.7	1.8	8.7	2.5	3.2	5.3	3.6	5.0	6.7		11.1	11.4
	Iran, Islamic Republic															0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3		0.2	0.2	0.4	0.7
	Yemen	0.4	0.4	0.4	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.4	0.4	0.5	0.5	0.4	0.5	0.6	0.6	0.7	0.6	1.8	1.0	0.9
	Oman	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.7	0.8	0.9	1.0	1.1	1.0	1.2	1.1	0.8
	Pakistan	0.3	0.7	0.3	0.3	0.4	0.4	0.6	0.9	1.2	1.3	1.8	1.8	1.8	1.6	1.4	1.2	1.4	1.1	1.5	1.7	1.6	1.4	0.8	1.4	0.7	1.0	1.3
	United Arab Emirates															0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	2.0
	Indonesia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.3	0.6	0.3	0.5	0.5	0.6	0.3
	Other Fleets	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.2	0.1	0.2	0.1	0.2	0.3	0.5	0.3	0.1	0.2	0.2	0.7	0.6
	Total	1.4	1.7	1.4	1.4	1.8	2.1	1.5	2.1	2.6	2.5	2.9	3.1	3.1	2.8	3.3	3.8	4.4	11.0	5.6	6.9	9.7	7.9	8.1	10.6	4.8	16.0	18.0
Line	Indonesia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.3	0.3					0.0	0.2
	Maldives												0.3	0.3	0.4	0.4	0.3	0.4	0.6	0.5	0.3	0.9	0.9	0.7	0.6	0.9	1.0	1.2
	Other Fleets	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.2	0.3	0.3	0.4	0.3	0.3	0.2	0.3	0.4	0.6	0.5	1.0
	Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.4	0.8	0.6	0.7	1.0	1.0	0.9	1.5	1.1	1.0	1.0	1.4	1.6	2.4
Other gears	Maldives												0.2	0.2	0.2	0.3	0.2	0.3	0.6	0.4	0.2	0.2	0.2	0.2	0.2	0.3	0.5	1.0
	Other Fleets	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.3	0.2	0.3	0.6	0.4	0.2	0.2	0.2	0.2	0.2	0.3	0.5	1.0
All	**Total**	**1.5**	**1.8**	**1.5**	**1.6**	**2.0**	**2.3**	**1.7**	**2.4**	**3.6**	**3.2**	**3.3**	**4.1**	**4.0**	**3.7**	**5.7**	**5.9**	**6.7**	**13.7**	**8.3**	**10.3**	**12.9**	**10.8**	**12.1**	**13.3**	**9.1**	**19.8**	**24.1**

Gear	Fleet	Av01/05	Av56/05	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05
Purse seine	Malaysia	8.2	2.4	1.5	1.7	2.6	2.2	1.4	1.9	2.1	3.1	3.4	5.5	3.4	1.9	2.4	4.0	4.2	6.1	5.4	6.9	6.0	10.1	8.7	8.5	7.8
	Thailand	6.3	2.4	0.4	0.6	1.5	0.7	4.5	2.2	2.2	4.5	7.0	7.7	7.2	5.7	8.6	7.0	6.6	6.5	2.6	6.3	6.2	4.9	7.0	7.0	6.5
	India	1.3	0.7	0.9	0.7	0.8	2.2	1.0	1.4	2.6	2.9	1.2	1.5	1.2	0.9	1.1	1.0	1.3	1.2	1.6	1.6	1.4	1.6	1.7	1.0	1.0
	Other Fleets	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total	15.9	5.5	2.8	3.0	4.9	5.1	6.9	5.4	6.9	10.5	11.6	14.7	11.8	8.5	12.1	12.1	12.2	13.9	9.6	14.9	13.6	16.7	17.5	16.6	15.3
Gillnet	India	15.4	8.5	8.6	11.1	15.8	16.0	12.9	13.9	23.7	29.9	13.8	17.4	13.8	9.7	12.1	11.1	15.3	14.1	17.8	18.5	15.8	18.3	18.0	12.4	12.4
	Iran, Islamic Republic	13.2	2.7	2.5	3.9	1.7	1.9	0.6	2.2	0.8	0.7	0.7	0.7	0.5	2.1	3.9	5.7	7.8	7.9	10.9	13.5	12.5	16.4	14.1	11.6	11.6
	Yemen	2.8	1.1	0.8	1.2	2.1	1.5	1.4	1.7	1.3	1.6	1.7	1.7	0.6	1.2	1.3	1.5	1.7	1.9	2.1	2.3	2.5	2.7	2.9	3.1	3.1
	Oman	2.2	1.1	0.4	1.1	1.0	1.1	2.6	3.5	2.0	2.1	1.1	1.6	0.9	1.4	2.2	2.4	2.5	1.8	1.5	1.7	2.0	1.5	2.9	2.5	2.2
	Pakistan	2.0	1.5	0.4	0.5	0.8	1.6	2.0	4.1	1.4	2.1	1.9	1.5	1.5	1.7	1.4	2.9	2.8	2.9	3.4	3.0	2.2	1.6	1.8	2.1	2.1
	Sri Lanka	1.4	0.4				0.0	0.0	0.0	0.2	0.1	0.1	0.2	0.1	1.1	1.2	1.5	2.2	2.2	1.4	1.4	2.3	2.6	0.7	0.7	0.5
	United Arab Emirates	0.7	0.8	0.9	0.9	0.8	1.2	1.8	1.9	2.0	2.1	2.0	2.1	1.2	2.3	2.1	2.1	2.2	2.2	2.2	0.7	0.9	0.7	0.7	0.6	0.6
	Indonesia	0.7	0.3	0.3	0.3	0.3	0.3	0.1	0.3	0.4	0.3	0.2	0.2	0.3	0.3	0.9	0.9	0.9	0.9	1.0	0.9	0.6	0.6	0.5	0.9	0.7
	Other Fleets	1.0	0.5	0.2	0.4	0.3	0.3	0.6	0.7	0.5	0.7	0.9	1.0	0.7	0.7	0.9	1.1	1.6	1.8	0.8	0.8	0.6	0.8	1.7	1.0	0.7
	Total	39.3	16.8	14.1	19.4	22.9	23.9	22.0	28.4	32.4	39.6	22.3	26.4	19.5	20.7	26.0	29.1	37.0	35.7	41.3	42.8	39.4	45.1	43.3	35.0	33.9
Line	India	4.9	1.4									4.3	5.5	4.3	3.0	3.8	3.5	4.8	4.4	5.6	5.8	4.9	5.7	5.4	4.2	4.2
	Indonesia	1.4	0.3	0.2	0.1	0.1	0.0	1.4	0.2	0.2	0.2	0.4	0.4	1.5	2.2	0.0	0.1	0.0	0.0	0.0	1.2	1.8	1.6	1.4	0.2	1.9
	Maldives	0.5	0.6	1.3	0.7	1.4	0.7	0.9	0.6	0.8	1.0	0.8	1.2	1.9	0.9	1.0	1.2	0.6	1.4	0.5	0.5	0.4	0.4	0.5	0.5	0.6
	Other Fleets	0.6	0.6	1.0	1.1	0.9	1.0	2.6	1.2	1.2	1.2	1.5	1.6	1.3	1.5	1.4	1.3	1.3	1.1	0.9	0.5	0.7	0.5	0.7	0.6	0.6
	Total	7.4	2.9	2.4	2.0	2.4	1.7	4.9	2.0	2.1	2.5	7.1	8.6	9.1	7.7	6.2	6.0	6.7	6.9	6.9	8.0	7.8	8.3	8.0	5.4	7.3
Other gears	Maldives	1.9	0.7	1.1	0.8	1.0	0.6	0.5	0.6	0.6	1.0	0.8	1.3	1.7	1.7	1.7	2.6	1.5	2.2	1.2	1.4	1.7	1.8	1.9	1.8	2.1
	Other Fleets	0.1	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.1
	Total	2.0	0.8	1.3	1.0	1.0	0.6	0.5	0.6	0.6	1.0	0.8	1.3	1.7	1.7	1.7	2.6	1.5	2.2	1.3	1.4	1.8	1.9	2.0	1.9	2.3
All	**Total**	**64.6**	**26.0**	**20.6**	**25.4**	**31.2**	**31.3**	**34.3**	**36.4**	**42.0**	**53.6**	**41.9**	**51.0**	**42.1**	**38.7**	**46.0**	**49.8**	**57.3**	**58.7**	**59.1**	**67.1**	**62.7**	**71.9**	**70.8**	**58.9**	**58.8**

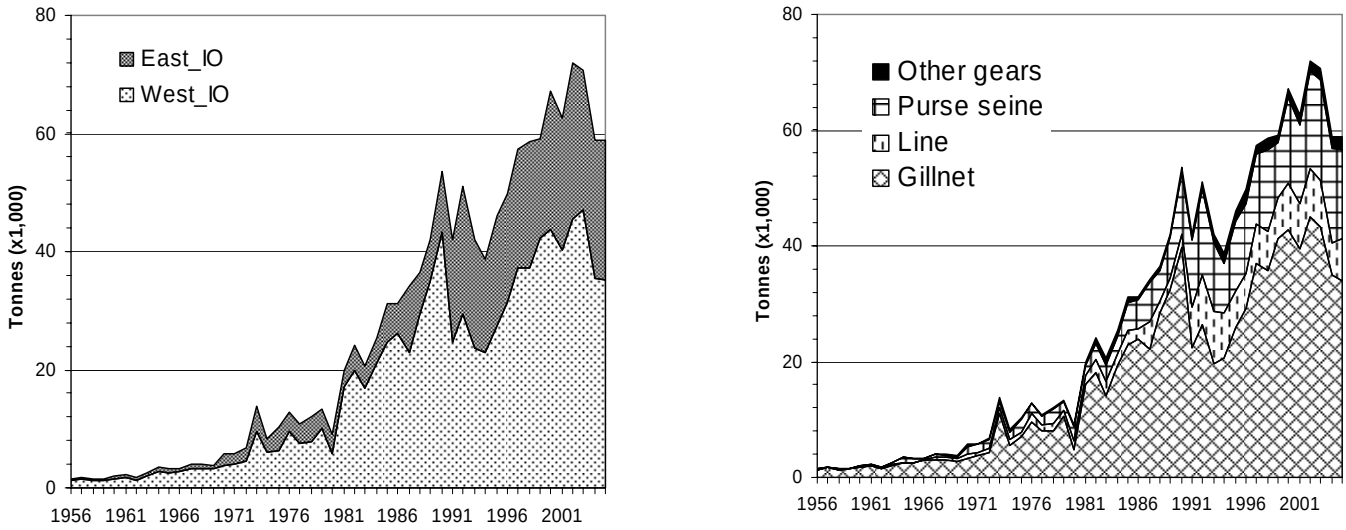

Figure 1. *Kawakawa: (a) annual catches from 1956 to 2005 by (on the left) area i.e. Eastern and Western Indian Ocean and (on the right) gear.* *Data as of October 2006*

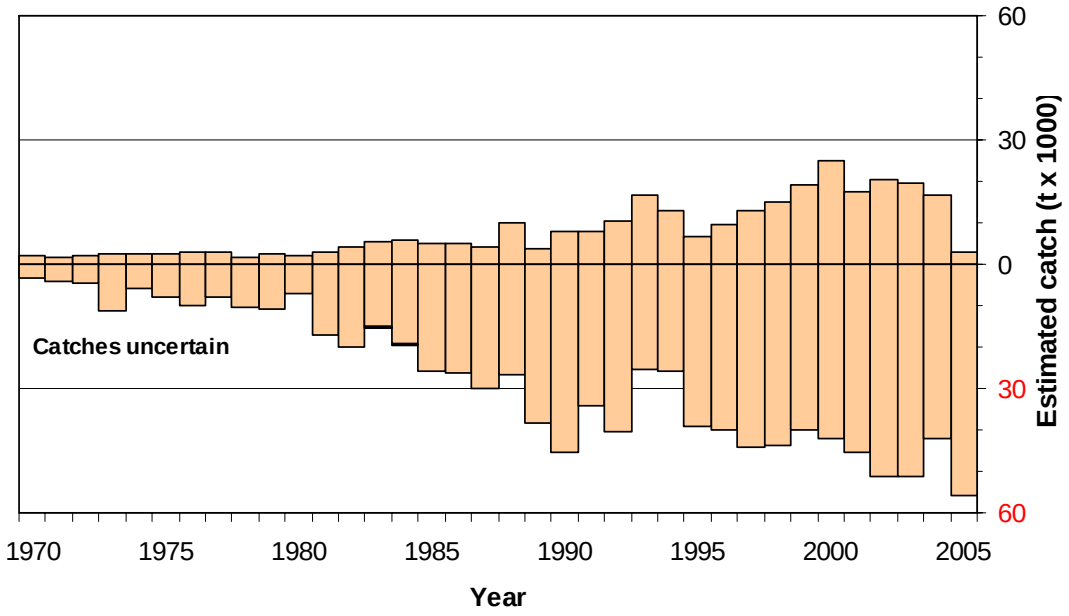

Figure 2. *Kawakawa: uncertainty of annual catch estimates. The amount of the catch below the zero-line has been categorised as uncertain according to the criteria given in the text.* *Data as of October 2006*

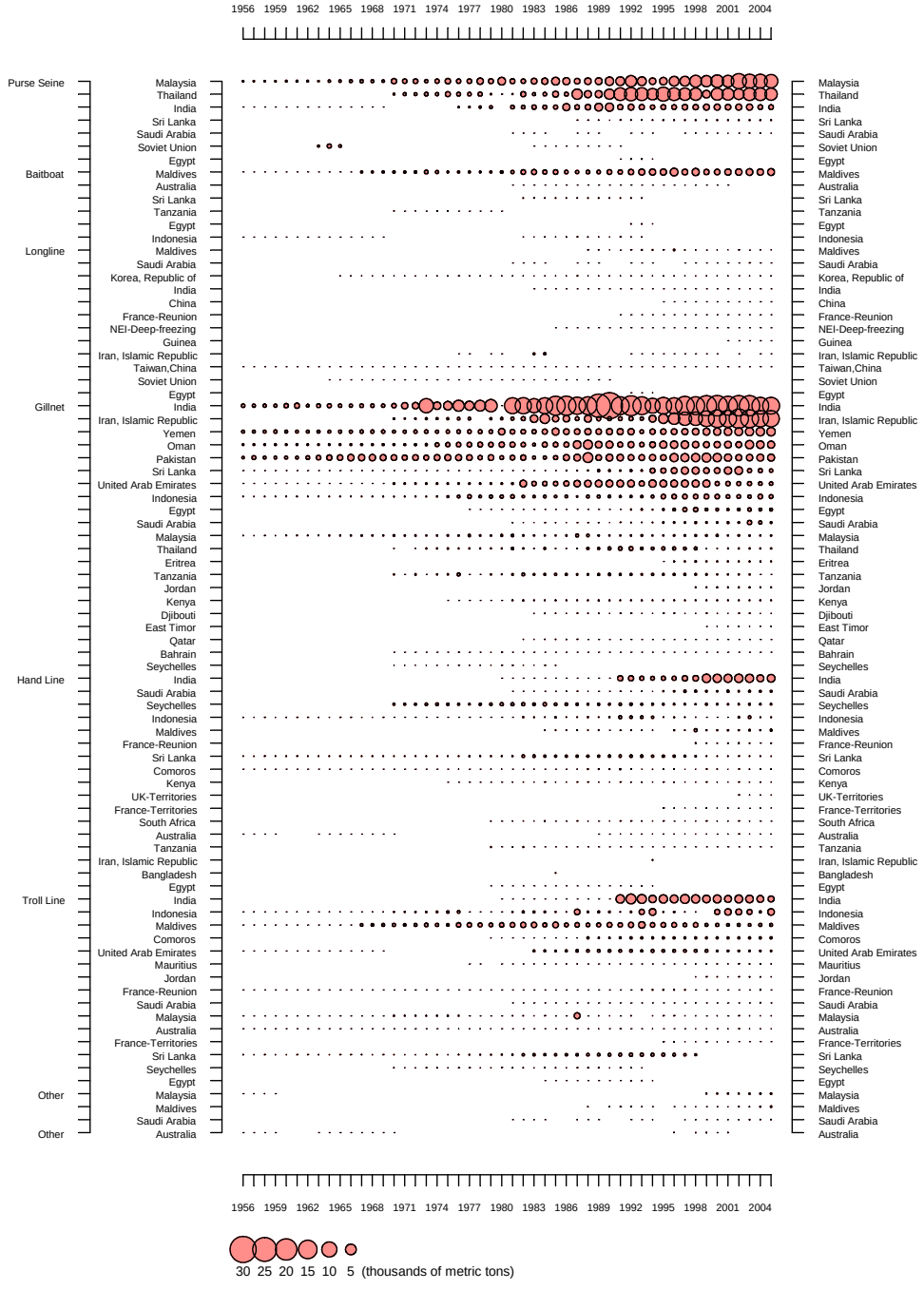

Figure 3. *Catches of kawakawa by gear and main fleets for the period 1956-2005 (in thousands of tonnes).* *Data as of October 2006*