Status of IOTC databases for Billfish species

IOTC Secretariat

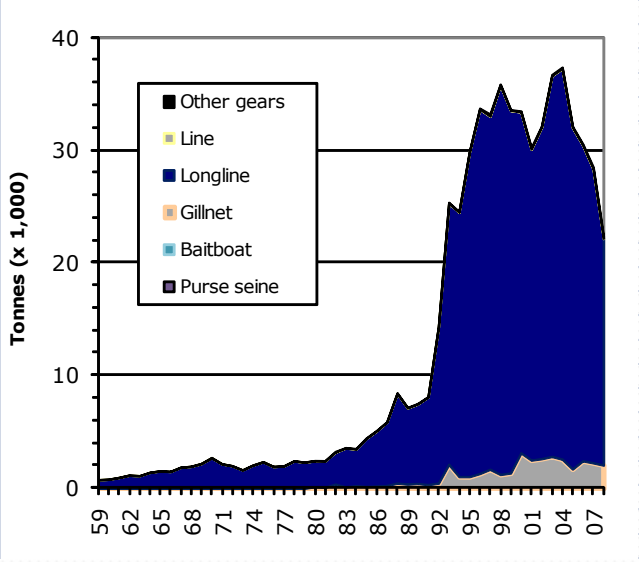
Outline

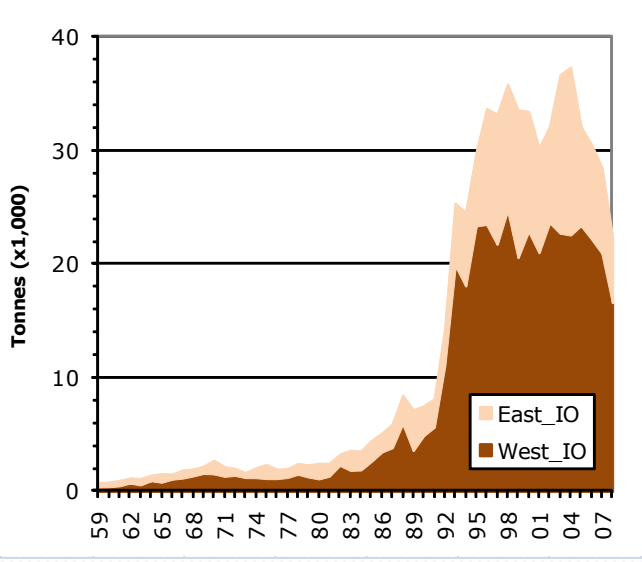
- Main activities during the last year
- Catch trends
- Status of fisheries statistics at the Secretariat
  - Swordfish
  - Marlins
  - Sailfish
- Summary of main data issues
- Future Plans
- Preparation of data for the assessments of Swordfish

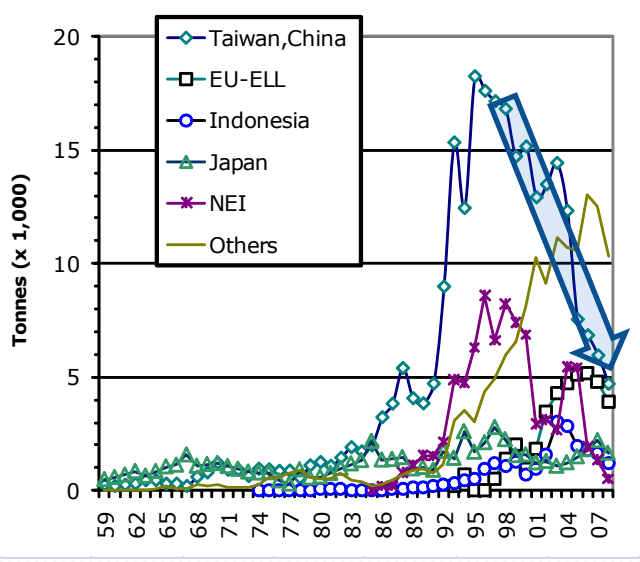
IOTC Secretariat: Main activities

- Data acquisition, verification, maintenance, dissemination
- Preparation of datasets and reports for IOTC Meetings
- Data transfer to new IOTC Database started
- Guidelines for the reporting of fisheries statistics to the IOTC: New forms for data reporting
- Data reviews leading to changes in the historical catches of some countries (India, fleets targeting swordfish, etc.)
- Activities in relation with IOTC-OFCF Project Phase II (ended in March 2010)

Catch trends: Swordfish



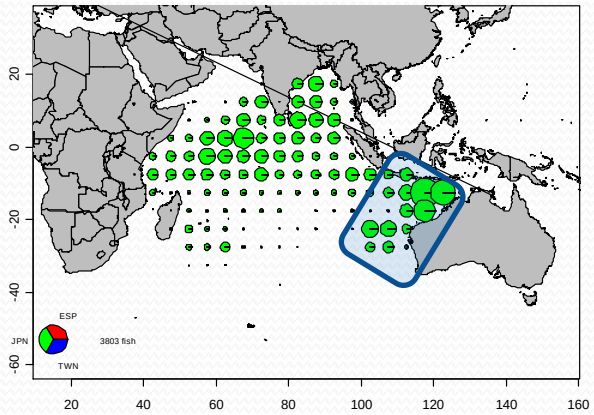




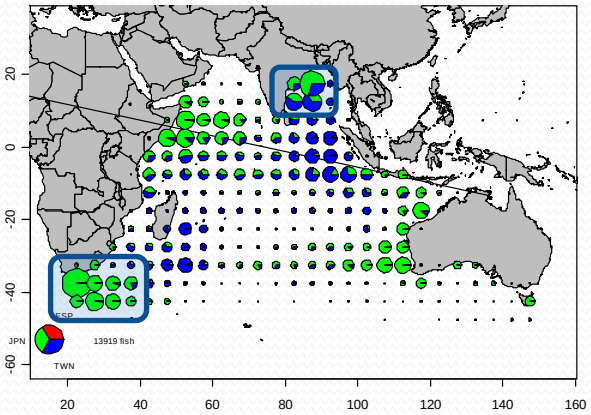
- Longline (95%) and Gillnet (5%)
- 65% catches in the western Indian Ocean
- Taiwan (20%-50%), EC (10%-40%), Japan, Indonesia, Sri Lanka, NEI
- Taiwan swordfish catch large drop: drop in number of active deep-freezing LL vessels (and pirates?)

SWO catch by area main LL fleets

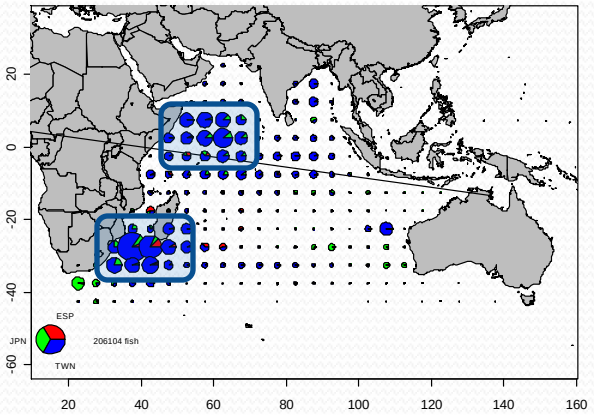
SWO 1952-1959



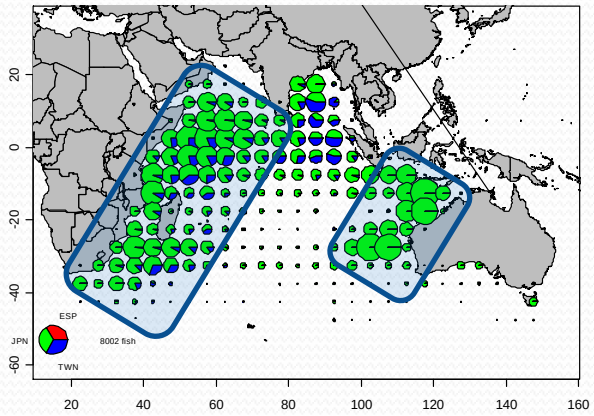
SWO 1970-1979



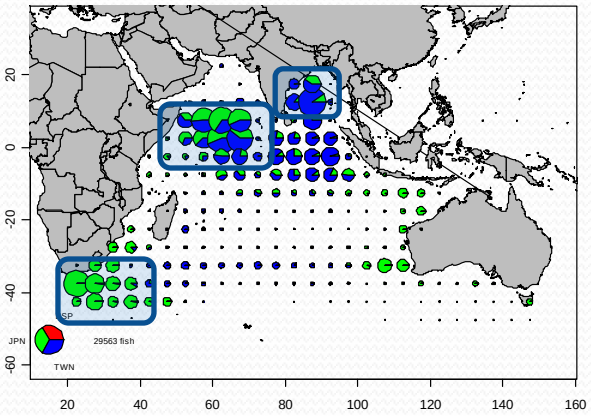
SWO 1990-1999



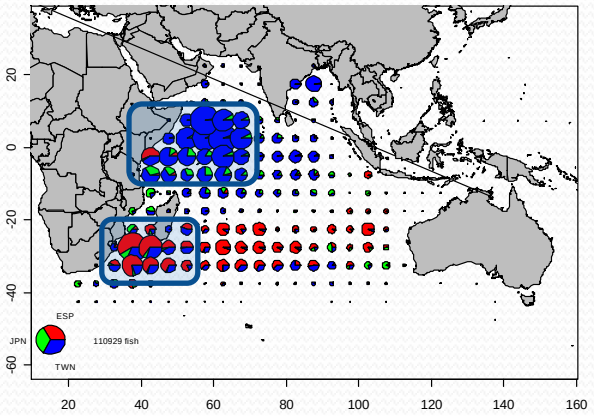
SWO 1960-1969



SWO 1980-1989

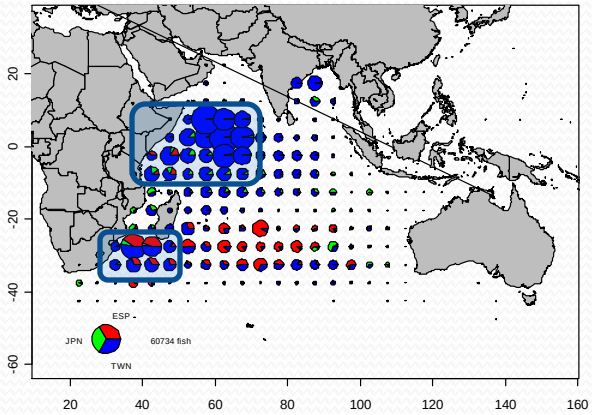


SWO 2000-2008

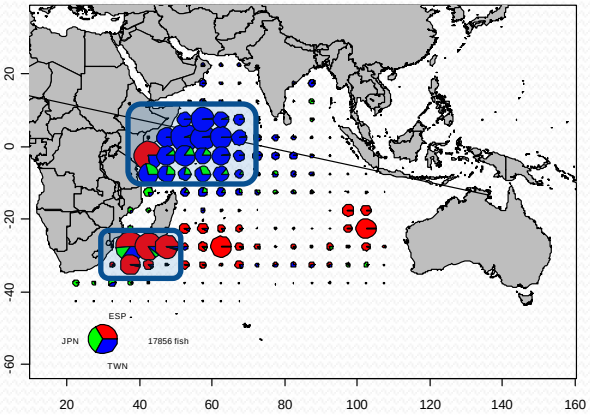


SWO catch by area main LL fleets

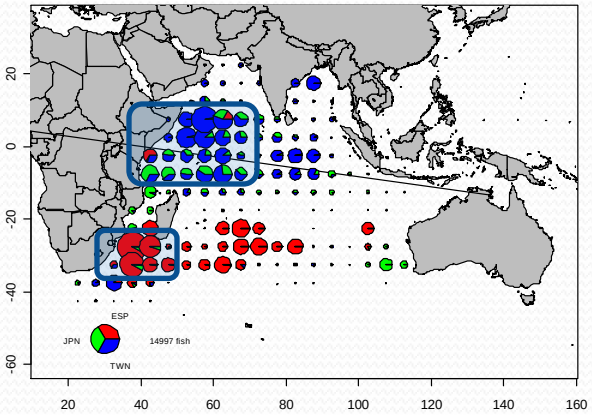
SWO 2000-2003



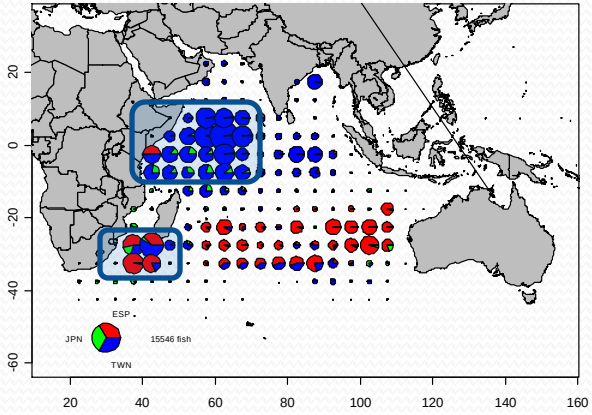
SWO 2005



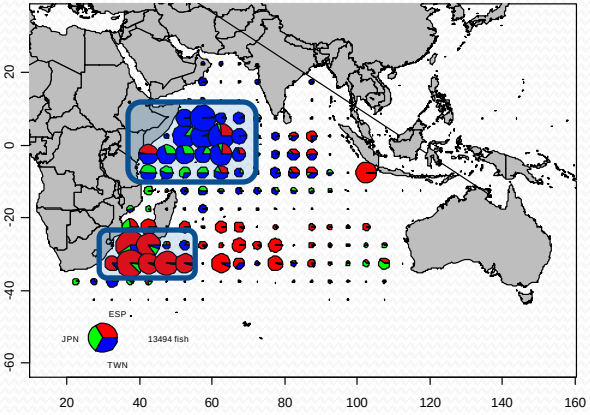
SWO 2007



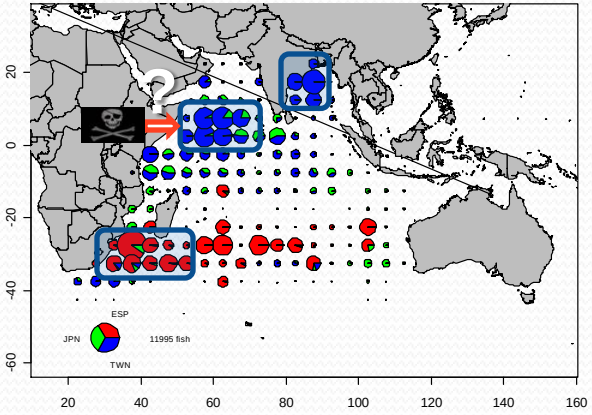
SWO 2004



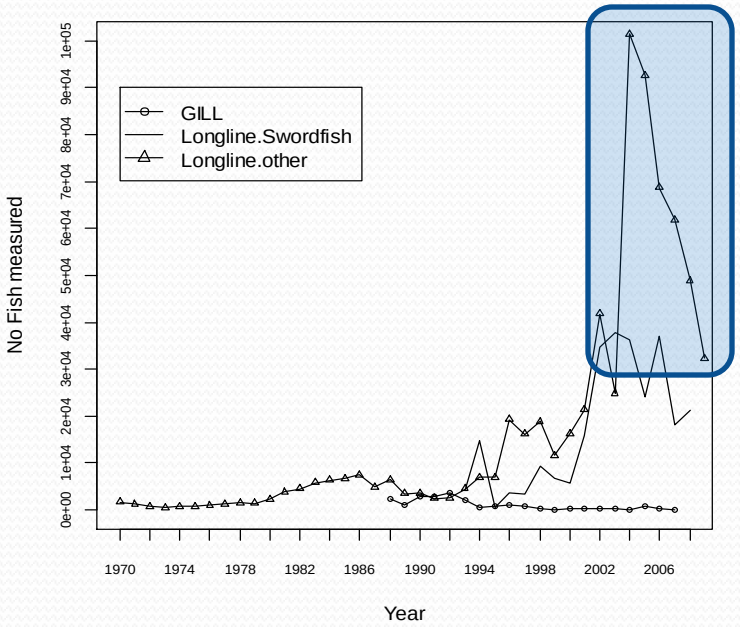
SWO 2006

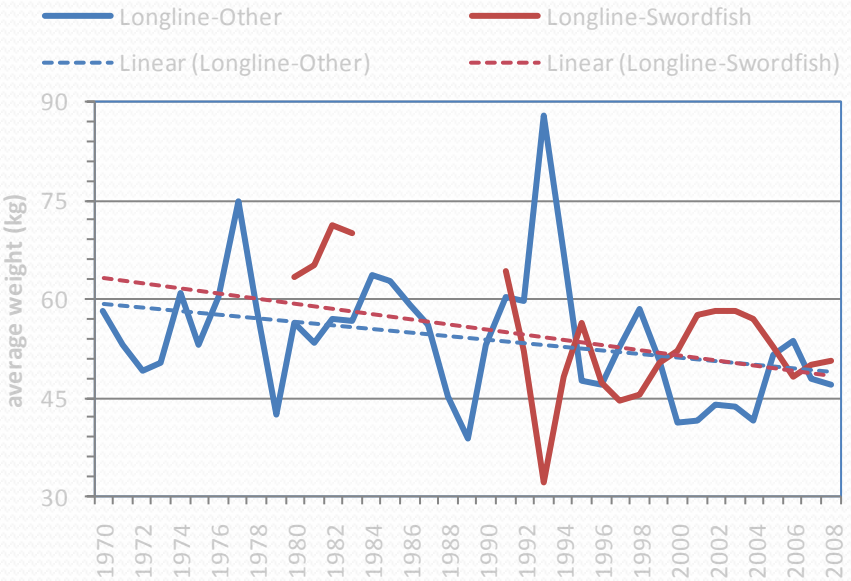


SWO 2008



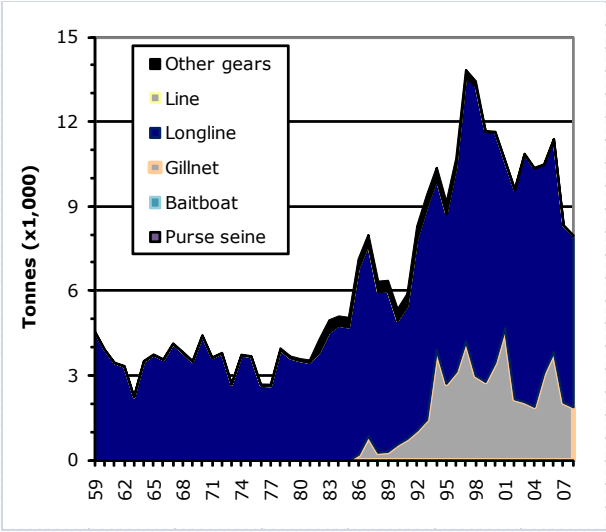
SWO #sampled & average weight

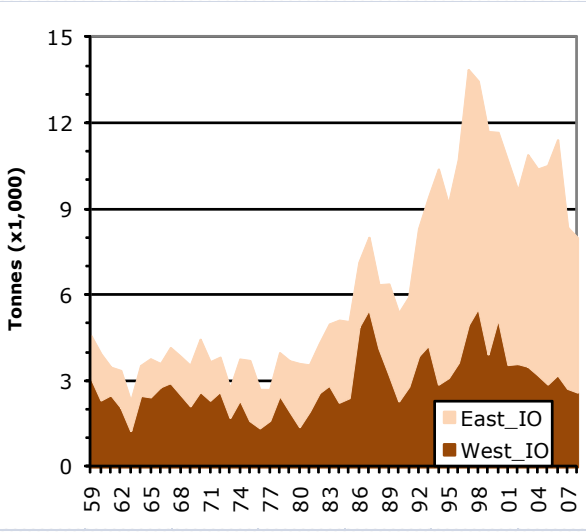


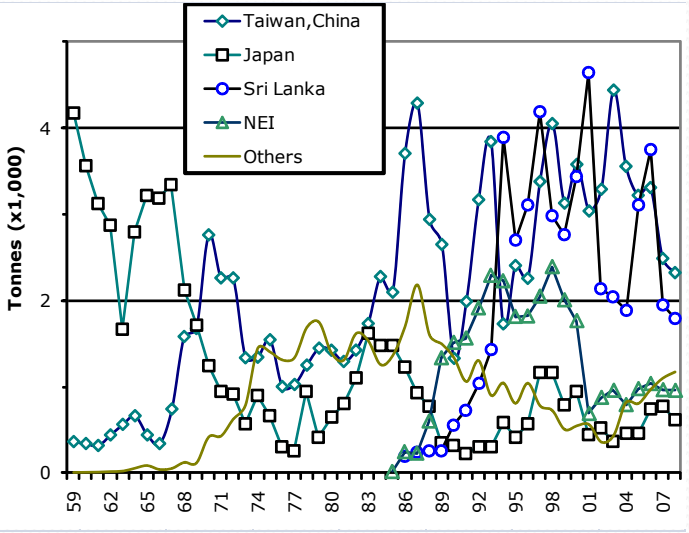


- Lack of samples before 1970's, extremely high sampling coverage (number of fish sampled) since 2004 (Taiwan) and extremely low coverage since 2000 for Japan
- Likely drop in LL average weight (≈12kg) since 1970's driven by a drop in the size of swordfish caught by longline fisheries
- Dramatic changes in average weight over the time series (*e.g.* 1993)

Catch trends: Blue marlin



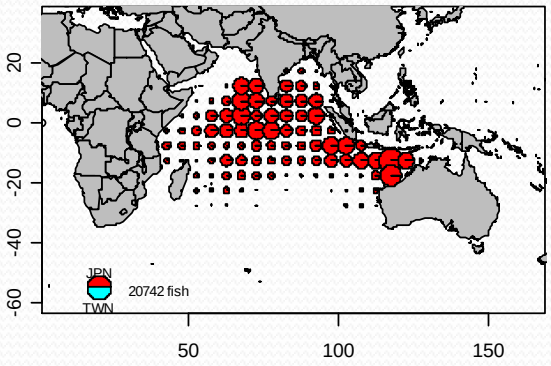




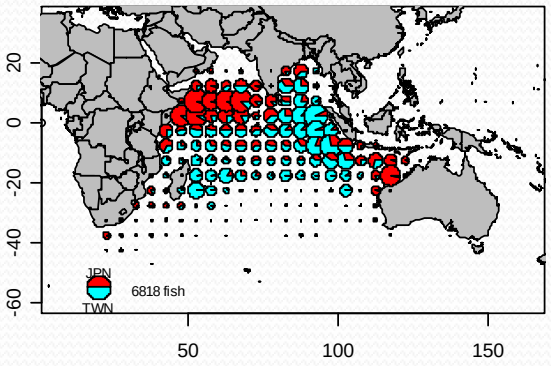
- Industrial and artisanal fisheries
- Longline (65%) and Gillnet (34%)
- Most catches in the East (75%)
- Taiwan (25%), Sri Lanka (25%), Indonesia (15%), India (15%), Japan, NEI

BUM catch by area main LL fleets

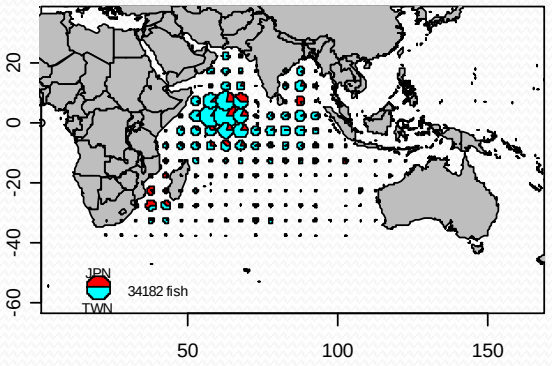
BUM 1952-1959



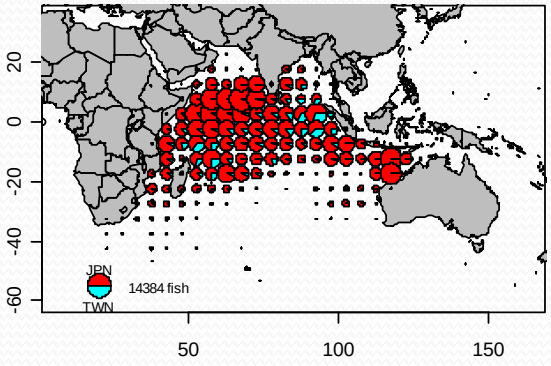
BUM 1970-1979



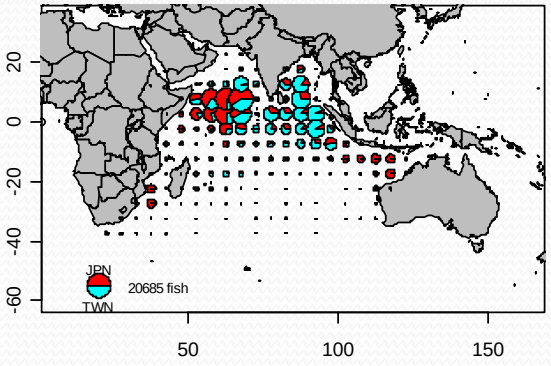
BUM 1990-1999



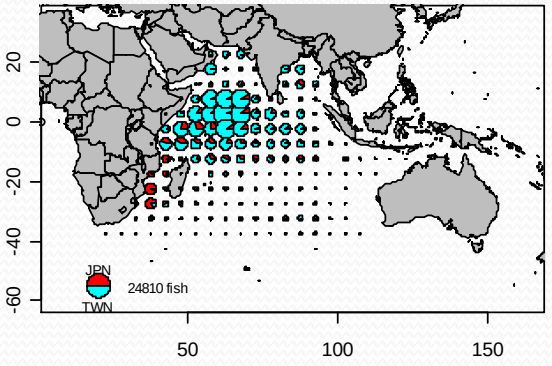
BUM 1960-1969



BUM 1980-1989

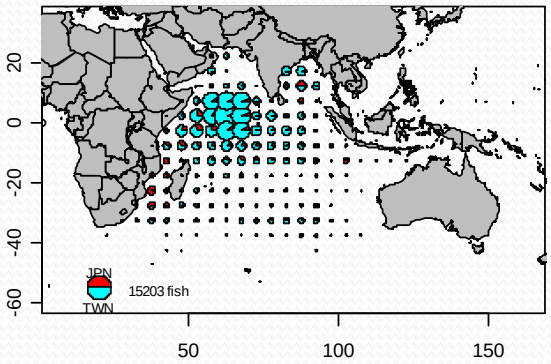


BUM 2000-2008

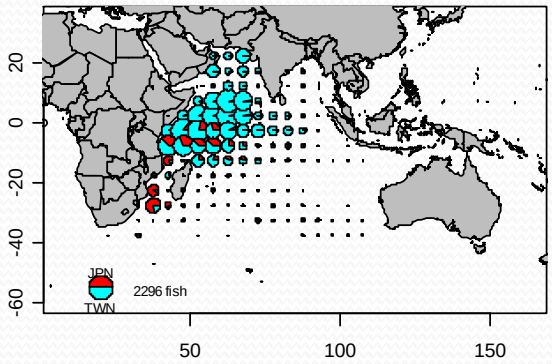


BUM catch by area main LL fleets

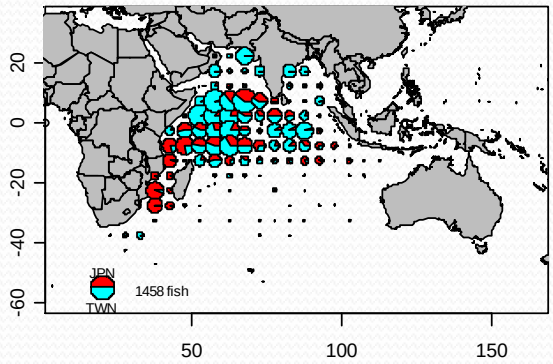
BUM 2000-2003



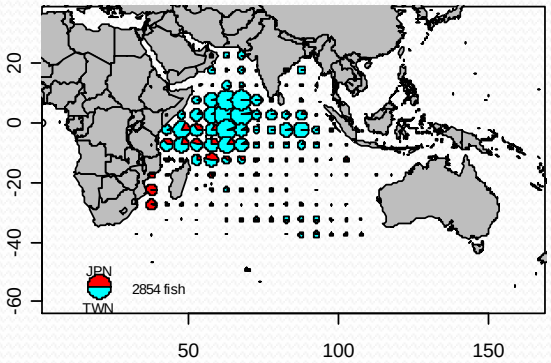
BUM 2005



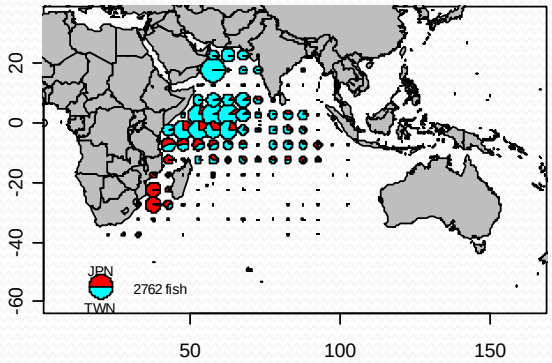
BUM 2007



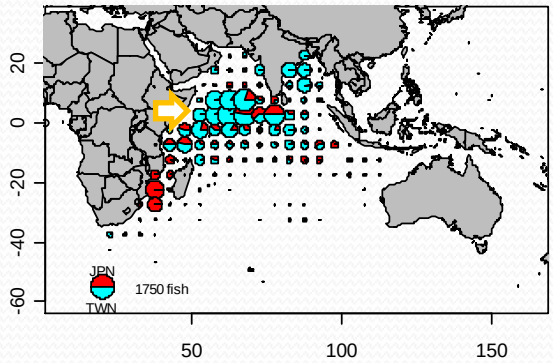
BUM 2004



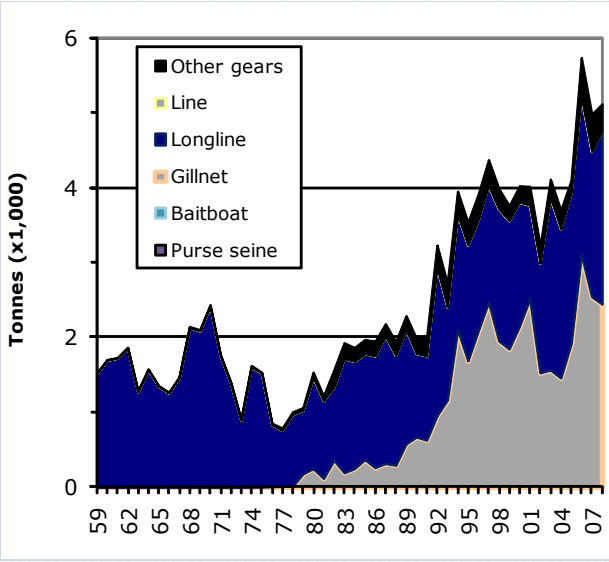
BUM 2006

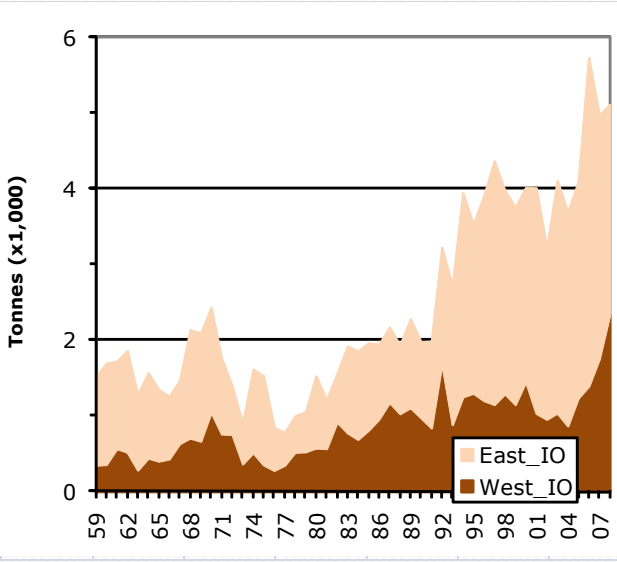


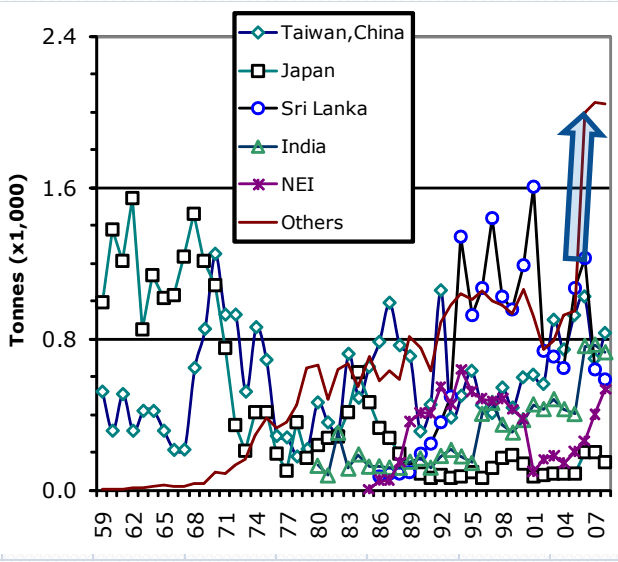
BUM 2008



Catch trends: Black marlin



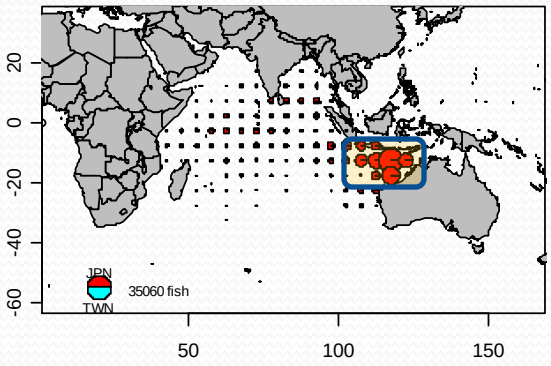




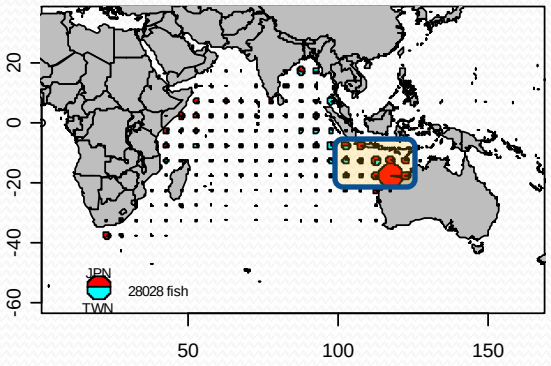
- Industrial and artisanal fisheries
- Longline (45%) and Gillnet (50%)
- Most catches from the East (80%)
- Taiwan (20%), Sri Lanka (20%), India (20%), Indonesia, Japan, NEI

BLM catch by area main LL fleets

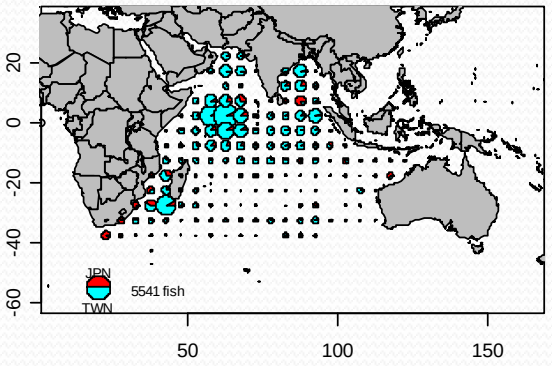
BLM 1952-1959



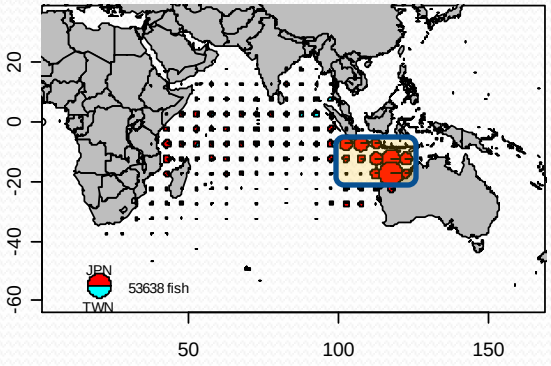
BLM 1970-1979



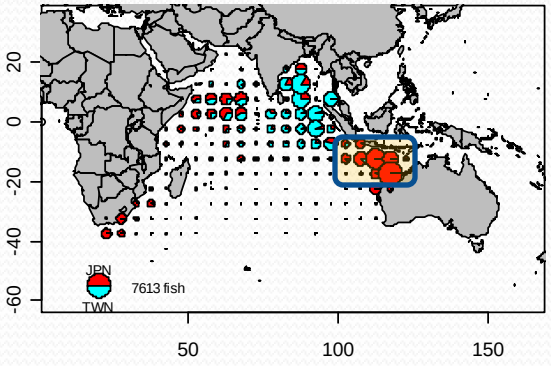
BLM 1990-1999



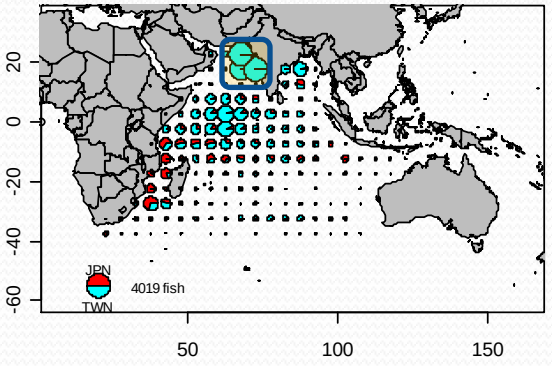
BLM 1960-1969



BLM 1980-1989

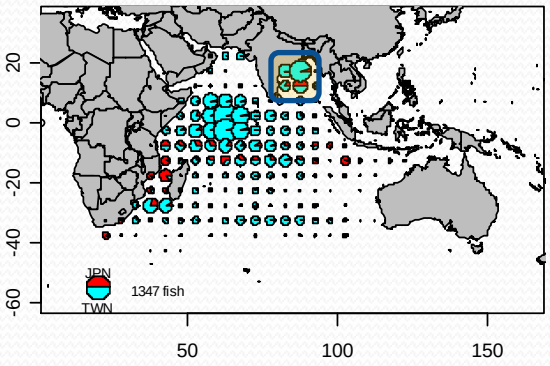


BLM 2000-2008

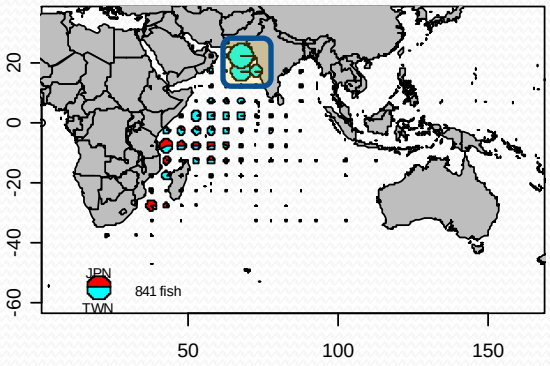


BLM catch by area main LL fleets

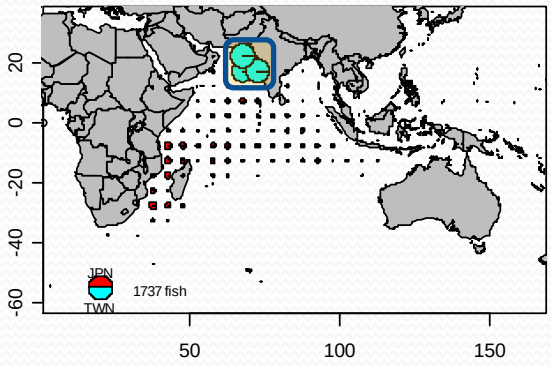
BLM 2000-2003



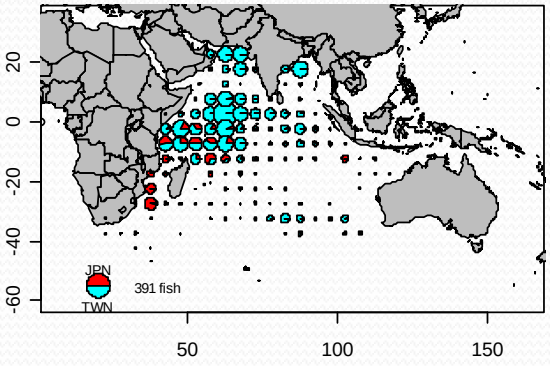
BLM 2005



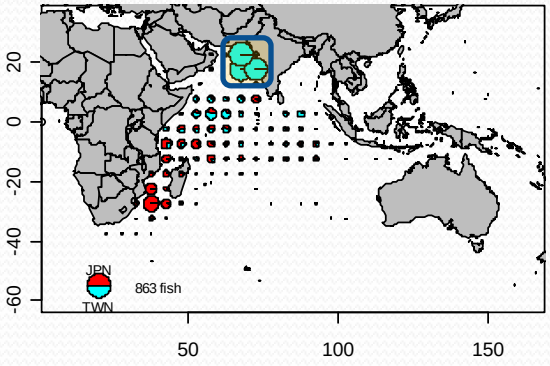
BLM 2007



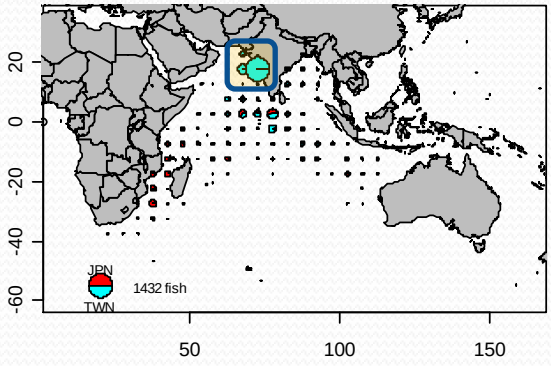
BLM 2004



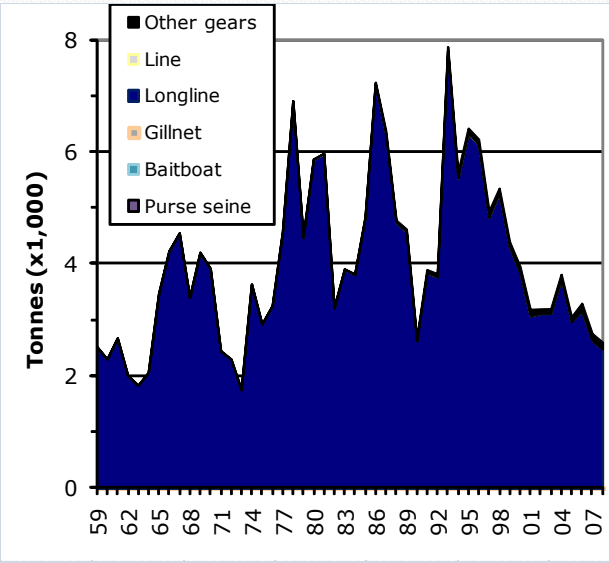
BLM 2006

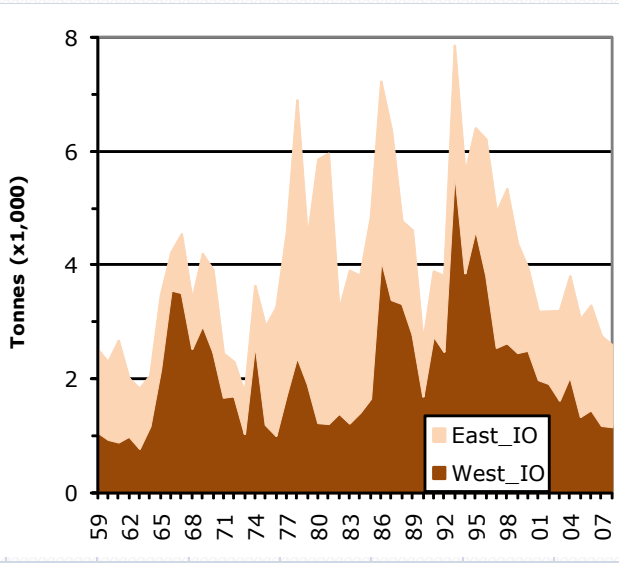


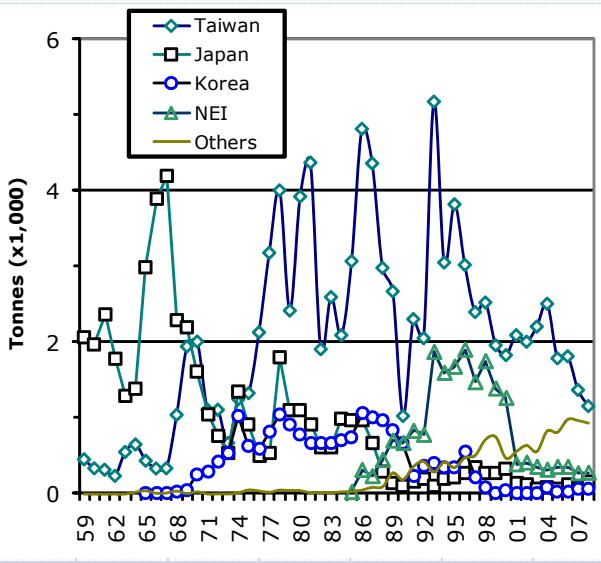
BLM 2008



Catch trends: Striped marlin



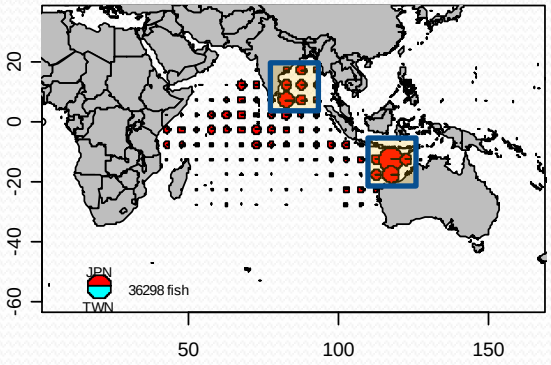




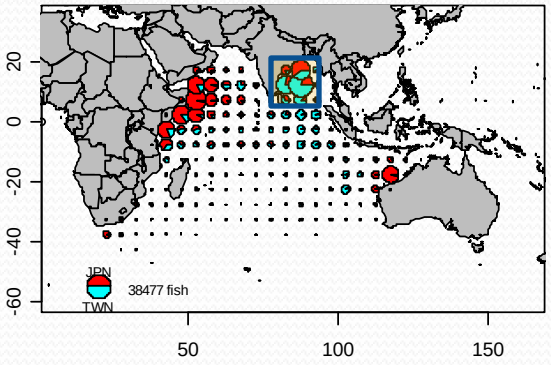
- Industrial fisheries: Longline (98%)
- Similar catches by area
- Taiwan (50%), Japan, NEI

MLS catch by area main LL fleets

MLS 1952-1959



MLS 1970-1979



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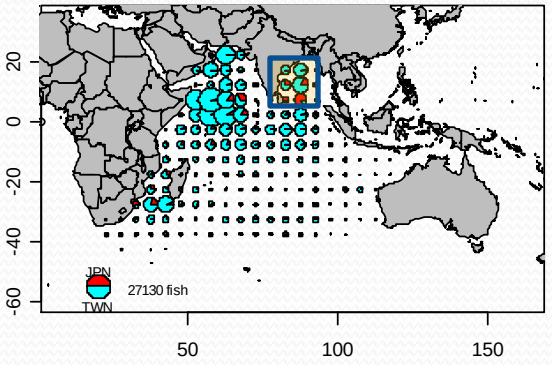

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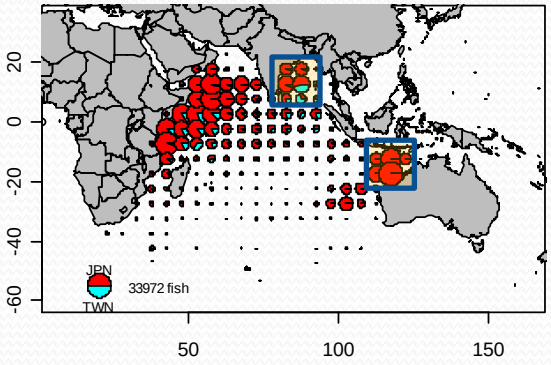

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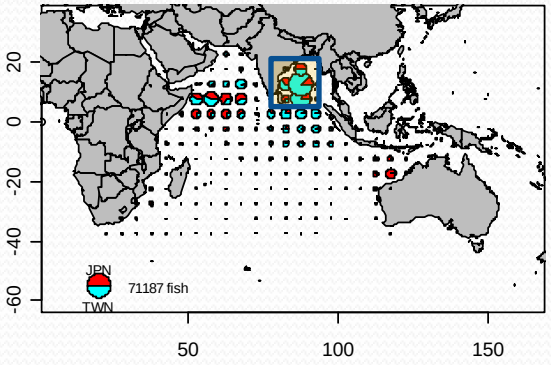

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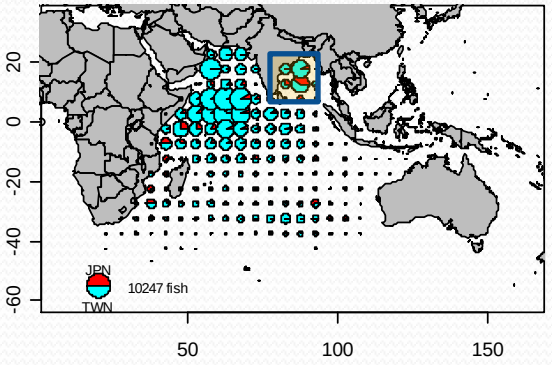
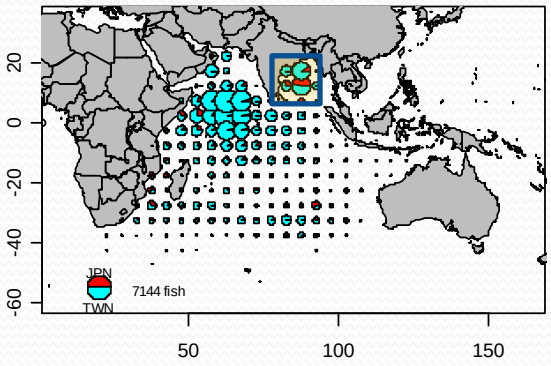
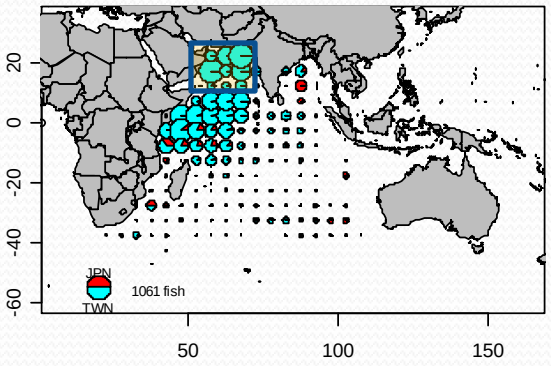


MLS catch by area main LL fleets

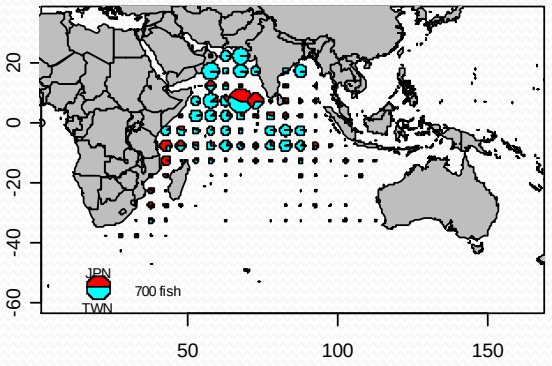
MLS 2000-2003



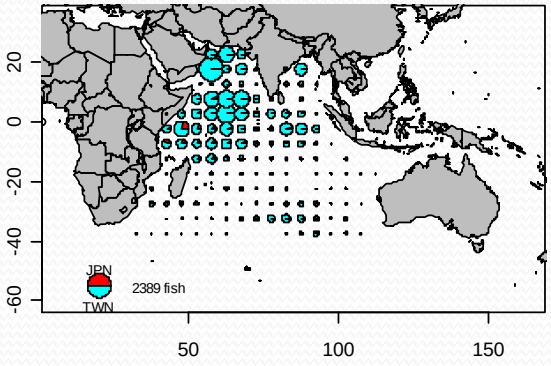
MLS 2005



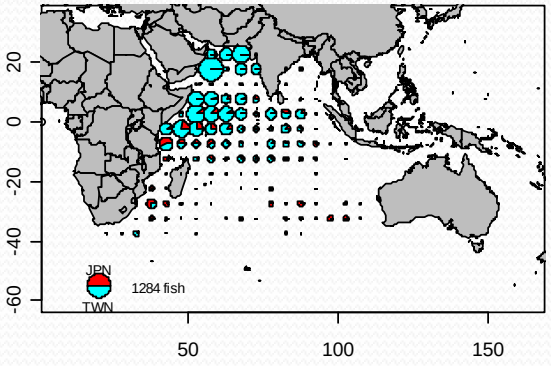
MLS 2007



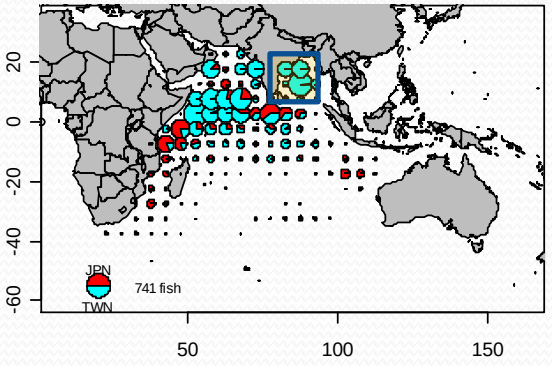
MLS 2004



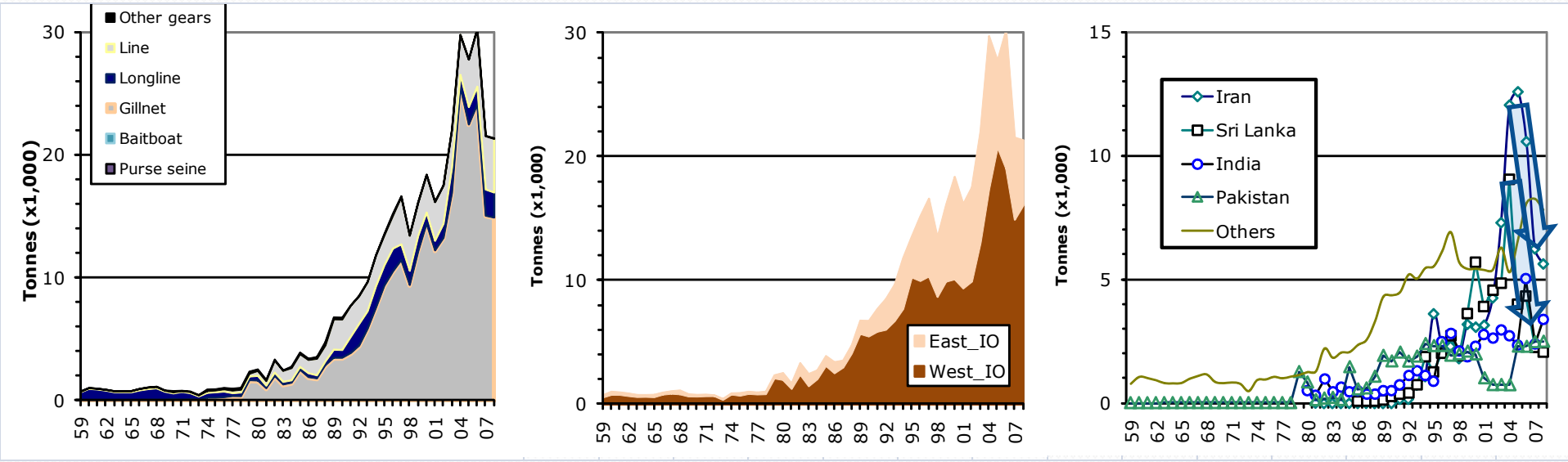
MLS 2006



MLS 2008



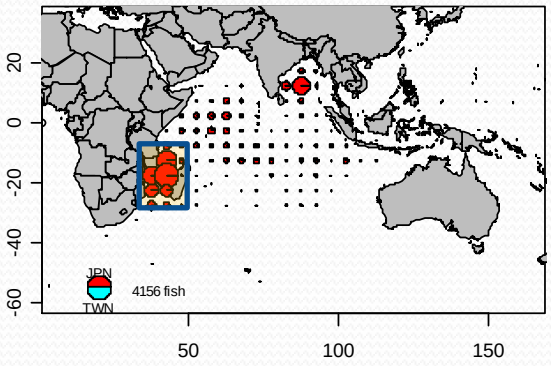
Catch trends: IP sailfish



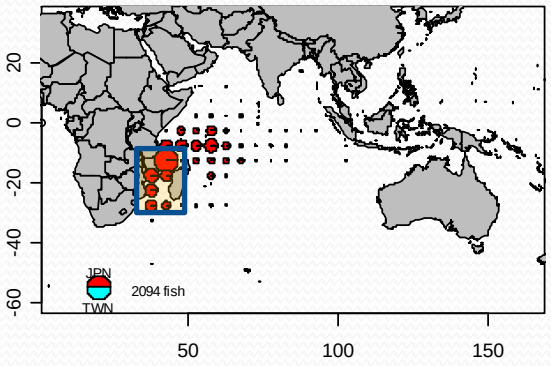
- Mostly artisanal fisheries
- Gillnet (75%), longline (5%), hand line, troll line (15%)
- Higher catches in the West (75%)
- Iran(30%), Sri Lanka(10%), India(10%), Pakistan(10%)

SFA catch by area main LL fleets

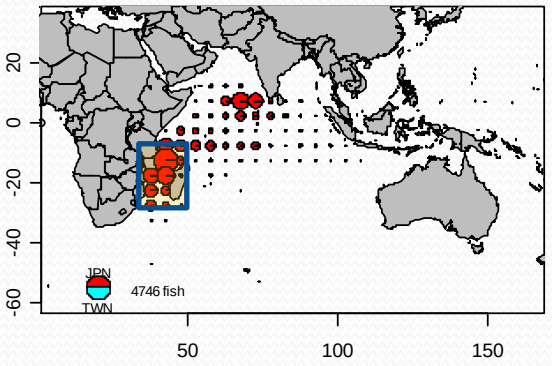
SFA 2000-03



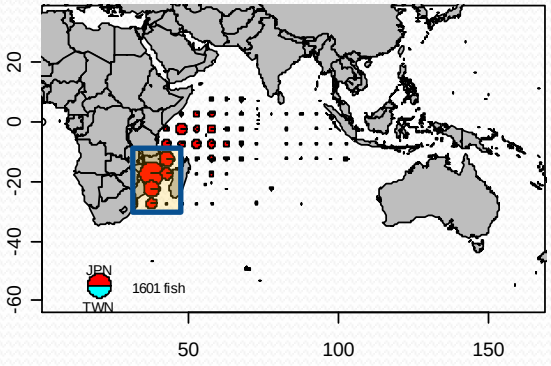
SFA 2005



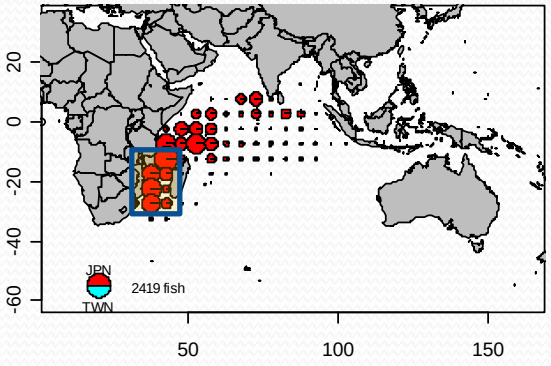
SFA 2007



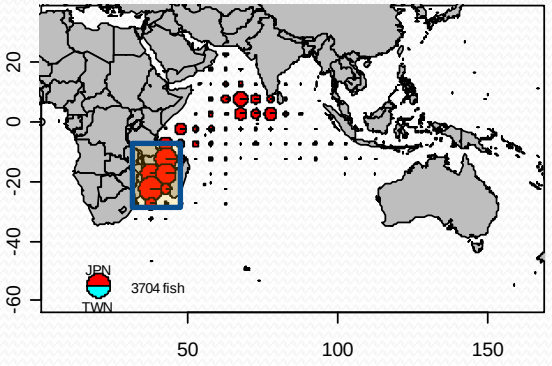
SFA 2004



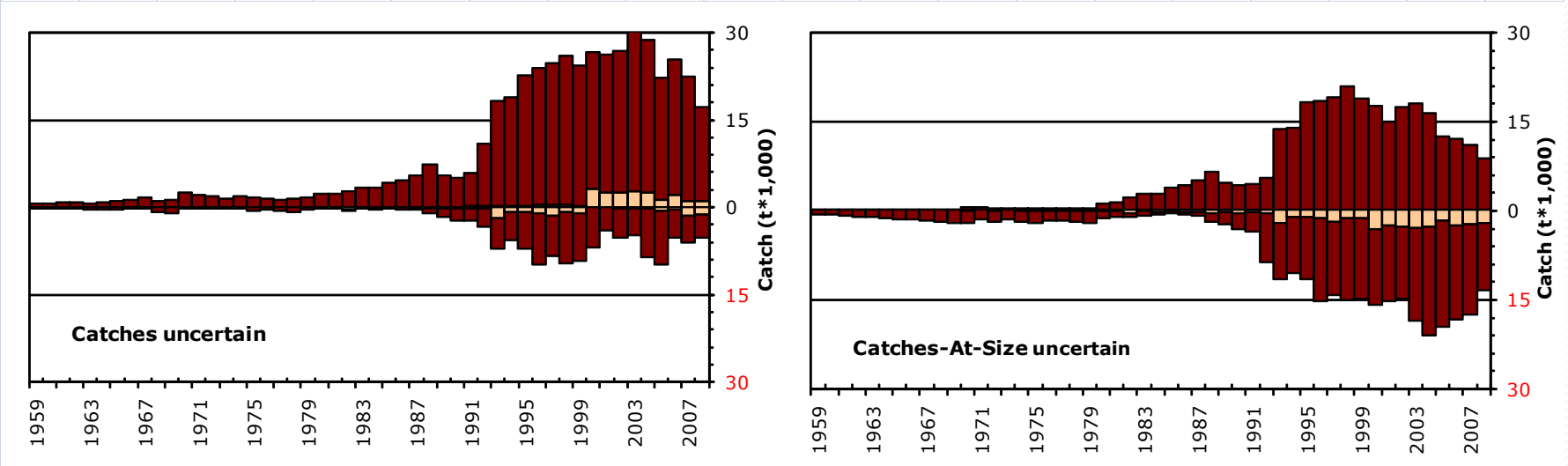
SFA 2006



SFA 2008



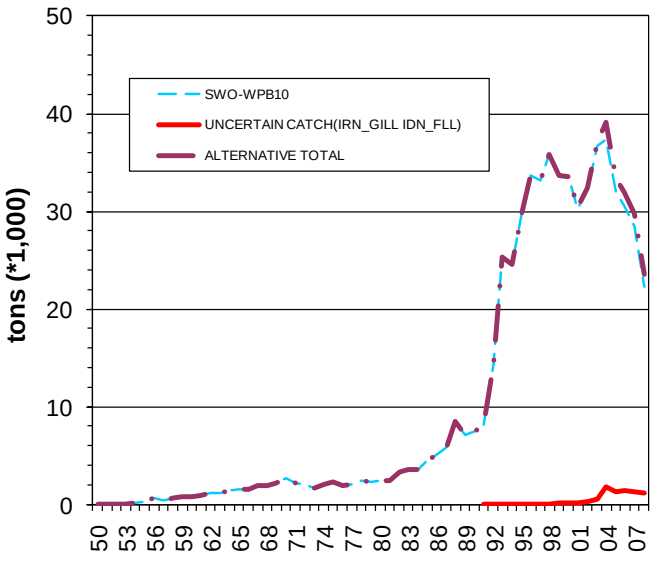
Data Status: Swordfish (i)



- *Retained catches*: uncertain for **Iran**, **Pakistan**, **Sri Lanka**, **NEI**, **India** and **Indonesia** (recent)
- *Discards* not known
- *CPUE series*: not available for fresh-tuna longliners (before 2007) and drifting gillnets
  - Poor quality or not available for artisanal fisheries
- *Trends in average weight*: not available before 1980 for most industrial fisheries; cannot be derived for most artisanal fisheries; not available by sex
- *Catch-at-Size*: compromised due to the paucity of the size data from some fisheries (**Iran**, **Pakistan**, **NEI**, **Japan**, **India** and all **artisanal**) and the lack of **sex-ratio** information
- *Catch-at-Age*: Estimates compromised due to the above issues

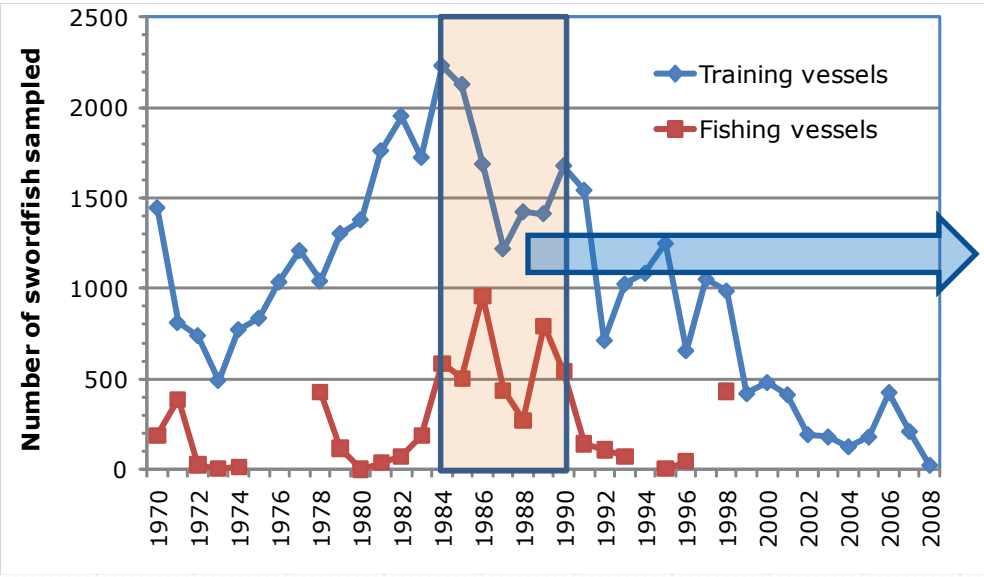
Data Status: Swordfish (ii)

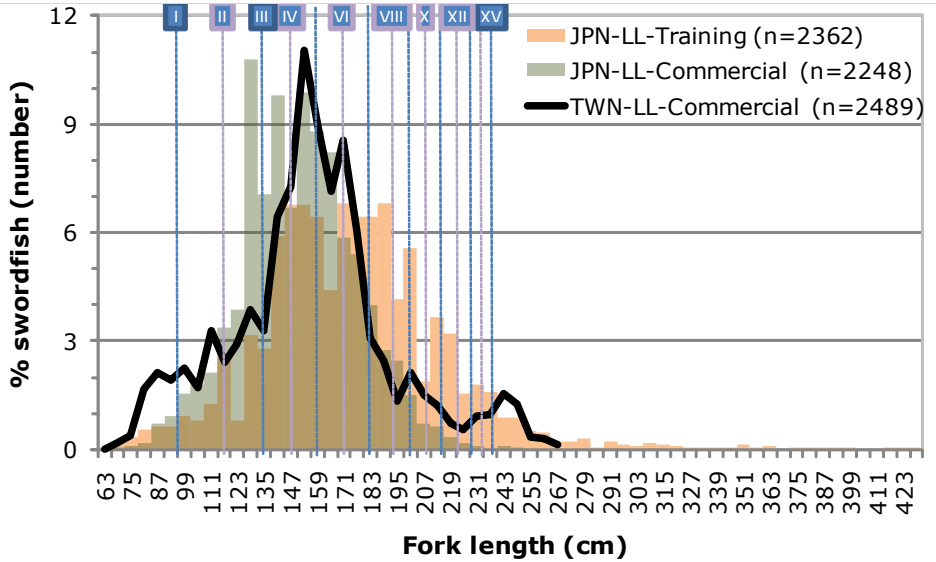
Year	WPB10	IRN(++)	IDN(++)	ALT.TOTAL
1991	8104	2		8106
1992	14319	7		14326
1993	25333	12		25345
1994	24508	25		24534
1995	29818	27		29846
1996	33682	42		33724
1997	33166	44		33210
1998	35814	43		35856
1999	33552	97		33648
2000	33431	102		33533
2001	30193	165		30358
2002	32107	267		32374
2003	36662	486		37149
2004	37320	743	1092	39154
2005	32068	1027	285	33381
2006	30513	1181	224	31918
2007	28483	747	532	29762
2008	22335	548	619	23502



- *To date Iran has not reported catches of SWO for its gillnet fishery and Indonesia is thought to have reported incomplete catches of swordfish for longliners operating in the South (targeting Albacore)*
- *Catches were estimated for the drifting gillnet component for 1991-2008, using the ratio YFT:SWO (≈9:1) from alternative fleets (Pakistan and Sri Lanka)*
- *Catches for Indonesia were estimated using the ratio ALB:SWO from Taiwanese vessels in the South (20-45S; 80-115E) and catches of Albacore estimated for Indonesian longliners*
- *The alternative catch series for the SWO represents an increase of up to around 1,800 tons, depending on the year*

Data Status: Swordfish (iii)

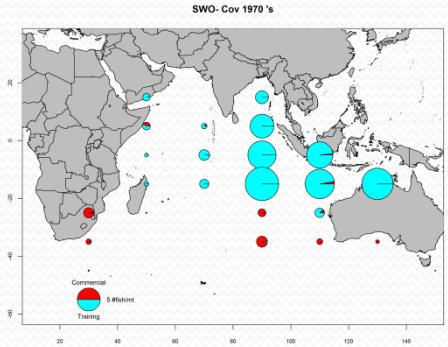


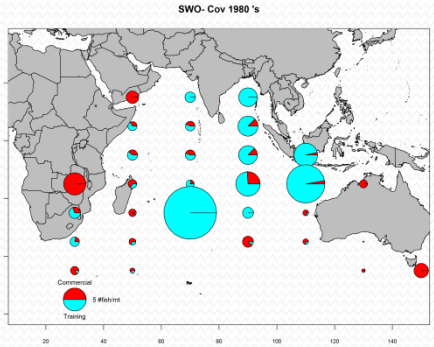


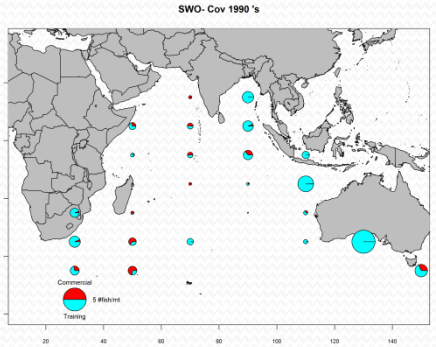
- ***Are the samples used for Japan representative of the fishery ??***
- *Samples from training vessels tend to contain larger specimens of swordfish than those from commercial vessels (for samples collected from the same strata)*
- *Samples collected on vessels from Taiwan tend to contain a broader range of sizes of swordfish with more specimens on both sides of the distribution*

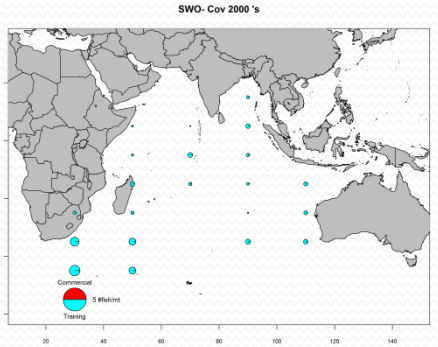
Data Status: Swordfish (iv)

JAPAN

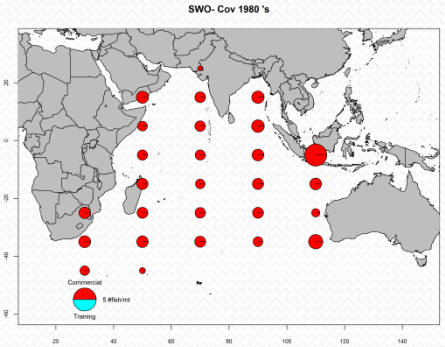


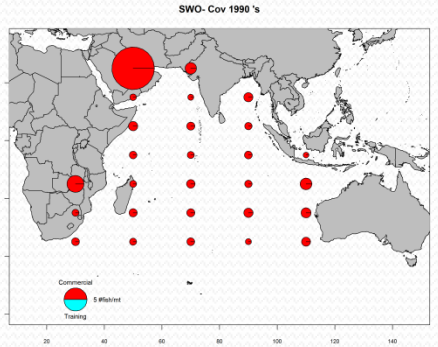


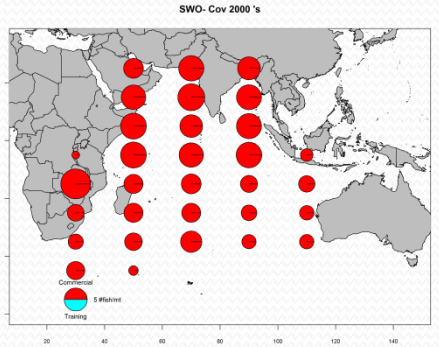




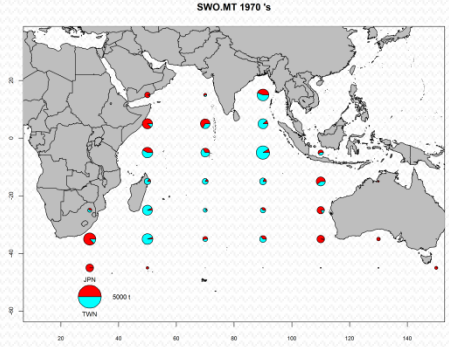
TAIWAN

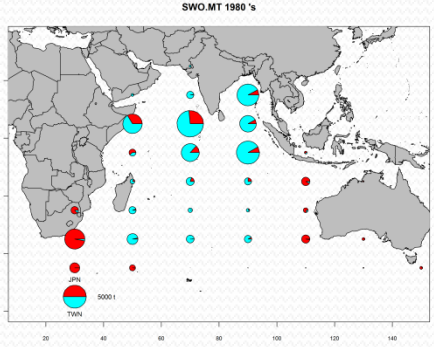


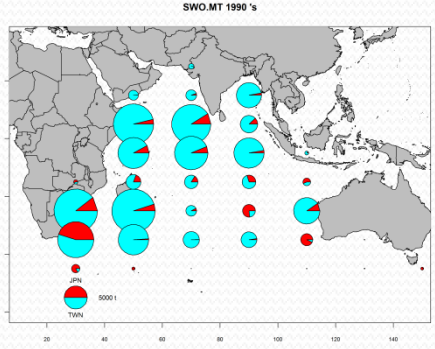


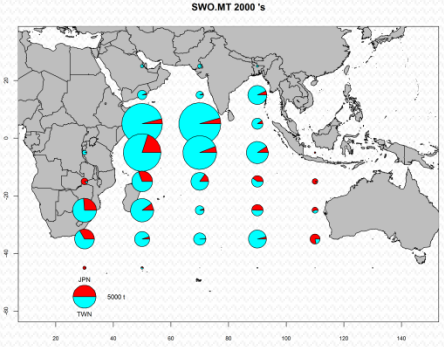


CATCH

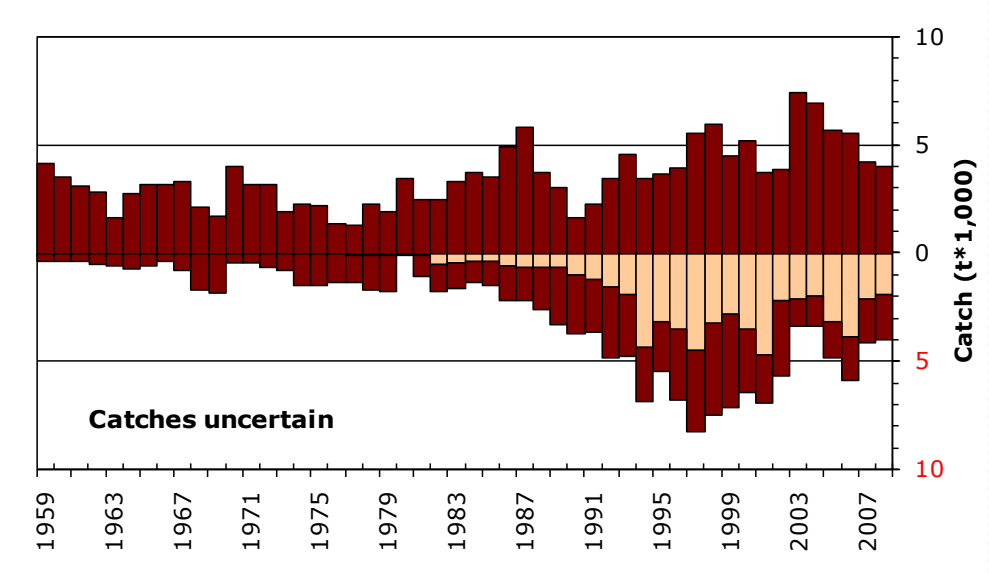






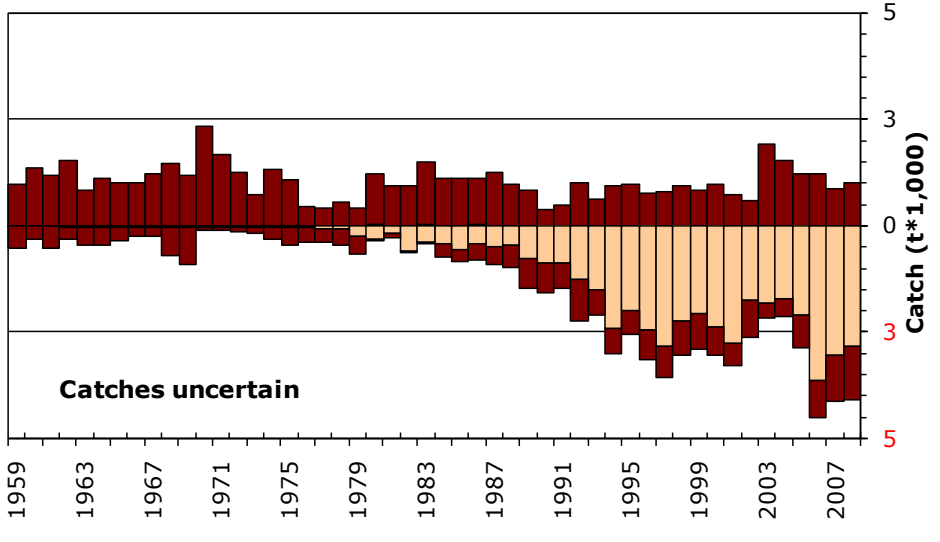


Data status: Blue marlin



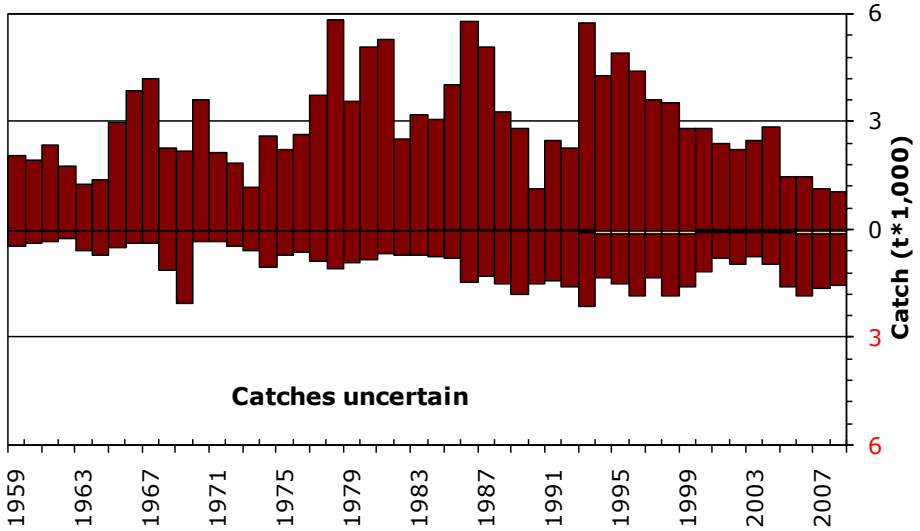
- *Retained catches*: poorly known for drifting gillnets (**Iran, Pakistan, Sri Lanka**) and most artisanal fisheries (aggregated or not reported)
- *Discards* not known
- *CPUE series*: not reliable for most industrial fisheries (incomplete catches)
  - Poor quality or not available for most sport and artisanal fisheries
- *Trends in average weight*: not available before 1970 for most industrial fisheries; cannot be derived for most artisanal fisheries; not available by sex
- *Catch-at-Size*: not available as insufficient length frequency data (artisanal)
- *Catch-at-Age*: [sex]-length-age keys not available for the Indian Ocean

Data status: Black marlin



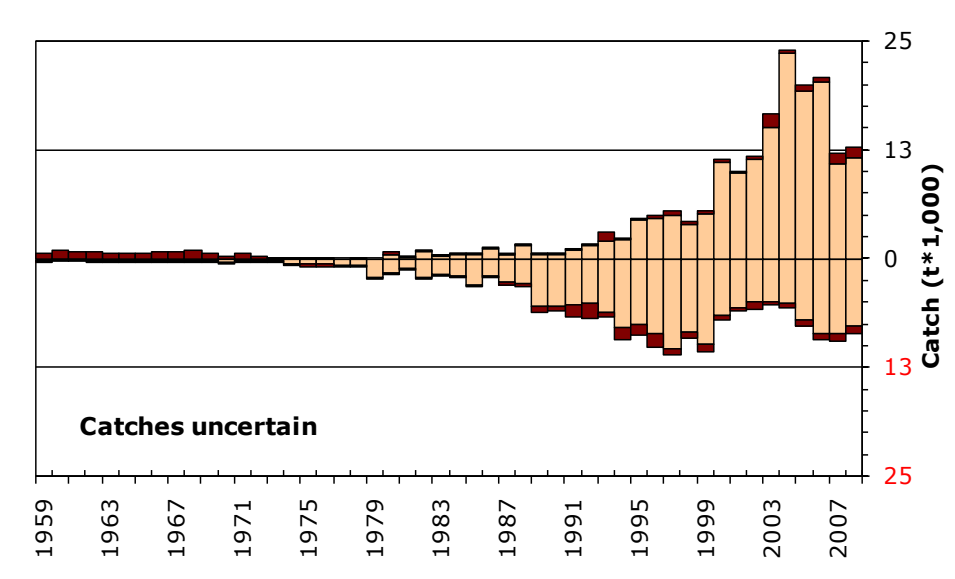
- *Retained catches*: poorly known for drifting gillnets (**Iran, Pakistan, Sri Lanka**) and most artisanal fisheries (aggregated or not reported)
- *Discards* not known
- *CPUE series*: not reliable for most industrial fisheries (incomplete catches)
  - Inaccurate or not available for most sport and artisanal fisheries
- *Trends in average weight*: not available before 1970 for most industrial fisheries; cannot be derived for most artisanal fisheries; not available by sex
- *Catch-at-Size*: not available as insufficient length frequency data (artisanal)
- *Catch-at-Age*: [sex]-length-age keys not available for the Indian Ocean

Data status: Striped marlin



- *Retained catches*: poorly known for some industrial fisheries (aggregated or not reported), including drifting gillnets (**Iran, Pakistan, Sri Lanka**)
- *Discards* not known
- *CPUE series*: not reliable for some industrial fisheries (incomplete catches)
- *Trends in average weight*: not available before 1970 for most industrial fisheries; not available by sex; sample sizes are usually low (Japan)
- *Catch-at-Size*: not available
- *Catch-at-Age*: not estimated

Data status: IP sailfish



- *Retained catches*: poorly known for some artisanal fisheries (aggregated or not reported) and most industrial fisheries
- *Discards* not known
- *CPUE series*: available for the sport fishery of Kenya; not reliable for most industrial fisheries (incomplete catches)
- *Trends in average weight*: not available before 1970 and sample sizes very low since then; not available by sex
- *Catch-at-Size*: not available as insufficient length frequency data (artisanal)
- *Catch-at-Age*: not estimated due to the paucity of length data

Summary of main data issues

1. CE from ARTISANAL and SPORT fisheries
   - *Very incomplete data from **drifting gillnet** fisheries of **Iran** and **Pakistan***
   - *Poor species breakdown for billfish caught in **Sri Lanka** (coastal and offshore fisheries)*
   - *Uncertain catches from the artisanal fisheries of **Indonesia** and **India** (no CE data)*
   - *Lack of data from most **Sport** fisheries*

2. CE from INDUSTRIAL fisheries
   - *Uncertain catches of swordfish and marlins for the **longline** fisheries of **Indonesia***
   - *Very incomplete catches for the **longline** fisheries of **India***
   - *Uncertain catches of billfish for the longline fishery of **South Korea***
   - *Lack of catch series for industrial purse seiners (**EU, Seychelles, Japan, Iran, Thailand**)*

3. SF from All fisheries
   - *Lack of size data from **drifting gillnet** fisheries of **Iran** and **Pakistan***
   - *Samples for the **gillnet/longline** fishery of **Sri Lanka** are likely to be biased*
   - *Lack of size data for the longline fisheries of **India, Oman** and **Taiwanese fresh-tuna longliners***
   - *Lack of size data from the **artisanal** fisheries of **India** and **Indonesia***
   - *Low sampling coverage and non-representativeness of samples for the longline fishery of **Japan***

4. Lack of BIOLOGICAL DATA for some billfish species

IOTC Secretariat: Future Plans

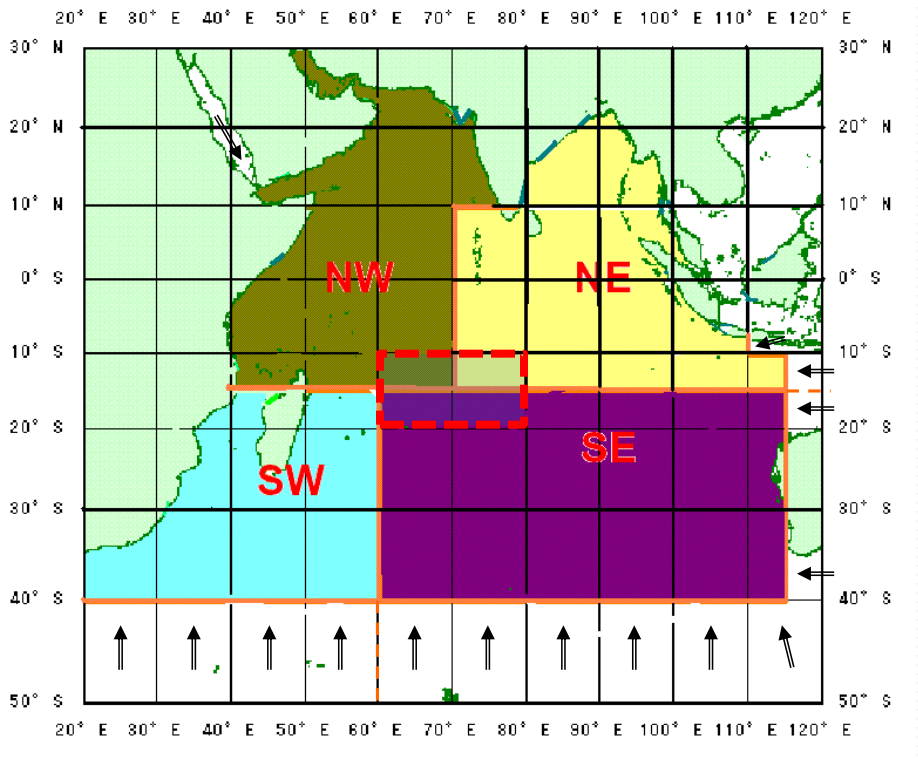
- **IOTC-OFCF Project Phase III** ready for execution (up to 3 year)
- The IOTC Secretariat to **assist the implementation of sampling programmes** in developing countries of the Indian Ocean so as the minima levels of coverage for artisanal fisheries set by the Commission (5% of levels of activity) can be achieved
- The IOTC Secretariat to carry out a study to **assess the feasibility of timely reporting of monthly catches** for the fisheries (for YFT & BET) in the Indian Ocean
  - First Phase: Fisheries of **Comoros**, offshore fisheries of **Sri Lanka** and gillnet fisheries of **Iran**
  - To follow: Study to cover also all other fisheries

Swordfish Stock Assessments

- Preparation of datasets:
  - Stock assessment models using samples
  - Stock assessment models using estimates of Catch-At-Size (CAS)
  - Stock assessment models using estimates of Catch-At-Age (CAA)

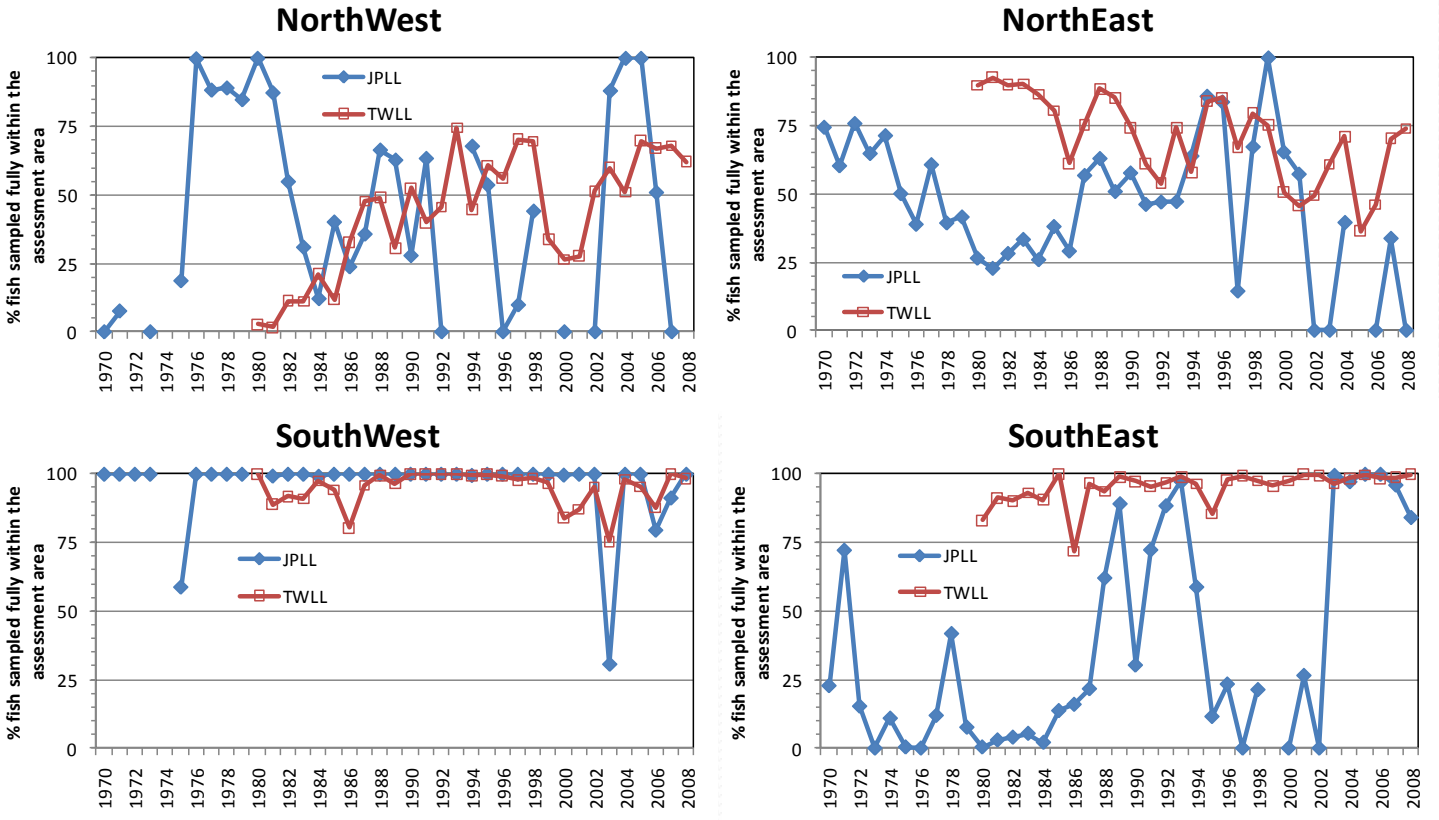
- Including:
  - Estimates of total catch of swordfish in weight and number by Assessment Fishery, Year, Quarter and Assessment Area
  - Tables containing samples and estimates of CAS and CAA for the above strata

Areas used for the assessment



Length frequency samples for Japan and Taiwan longline fleets had to be broken by area for 10° lat*20° lon areas overlapping assessment areas (e.g. area shown in red)

Allocation of samples

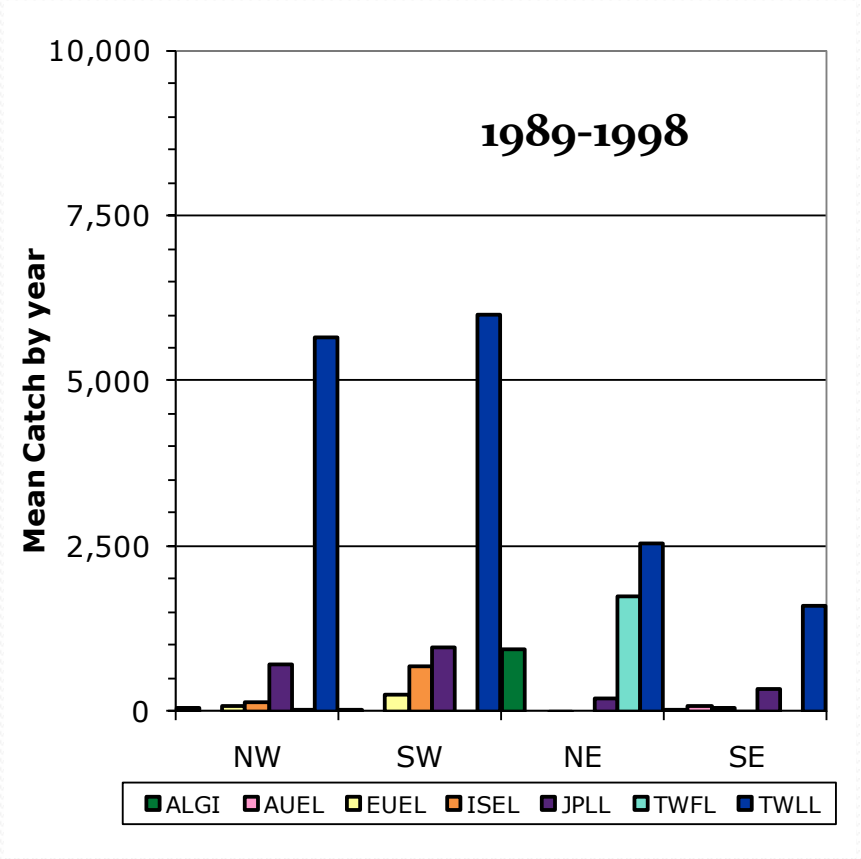


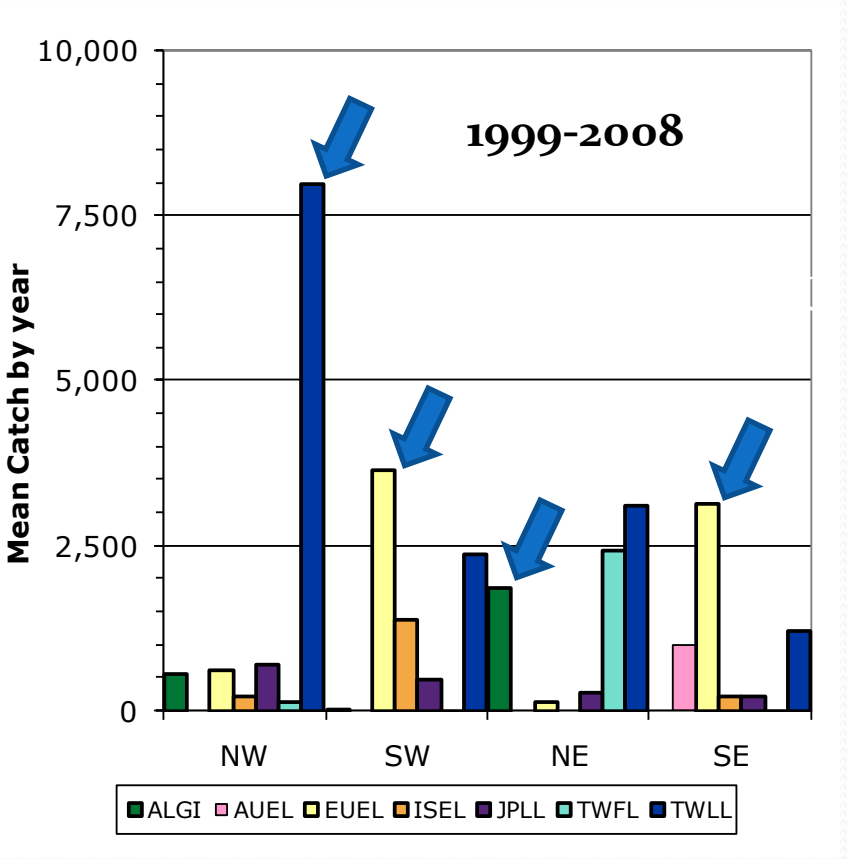
30%-40% of the fish comes from 10-20 strata overlapping two or more areas
Most of the samples from Southwest Area come from strata not overlapping
Up to 100% of the samples need to be re-allocated for other areas

Assessment fisheries

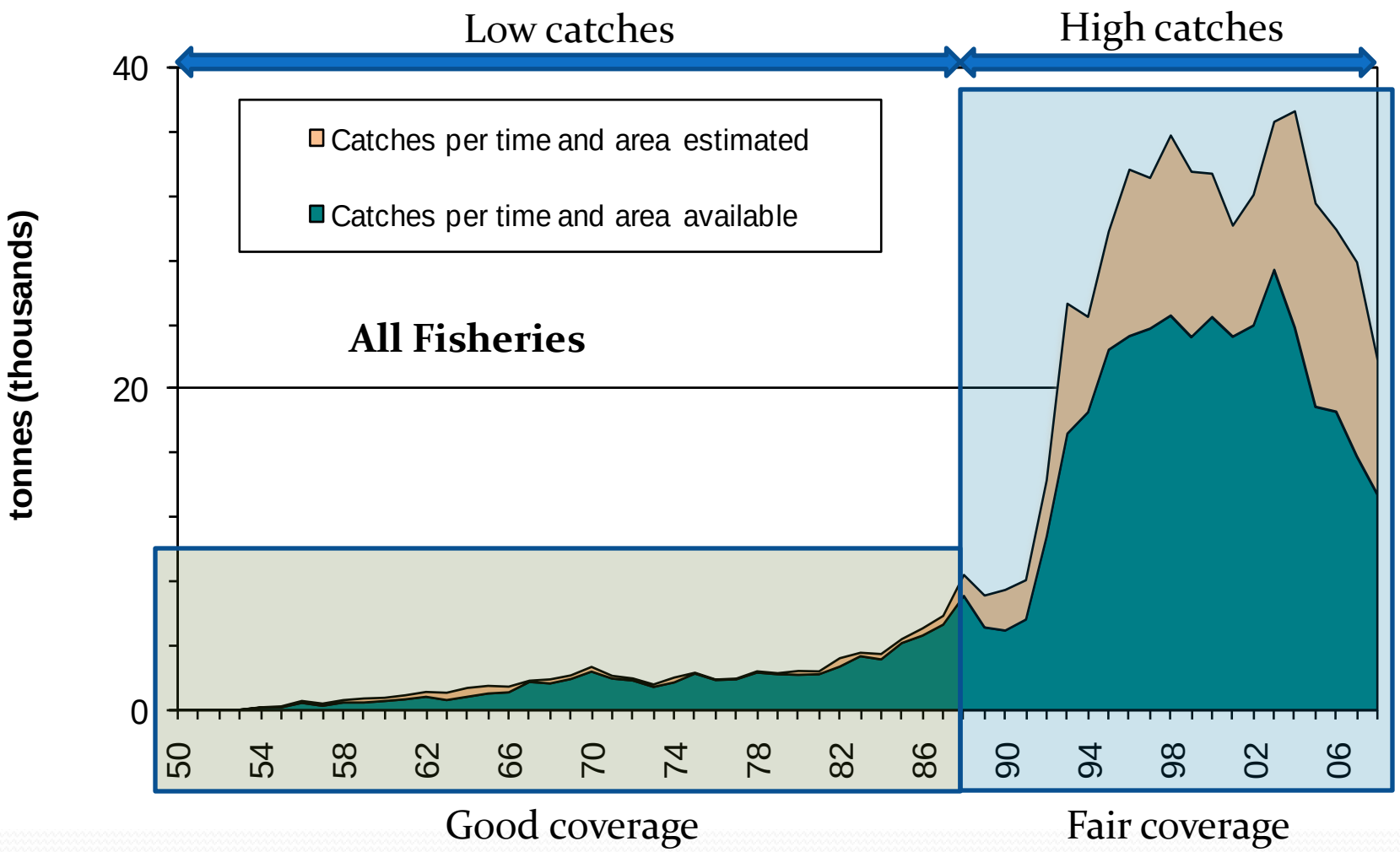
Fishery	*Description*	*Total Catch 50-08*	*% 50-08*	*% 04-08*
ALGI	Contains data for all gillnet, trolling and other minor artisanal fisheries	36,781	6	8
AUEL	Contains data for the longline fishery of Australia (target is SWO)	10,821	2	1
EUEL	Contains data for EU longliners plus other longliners assimilated to EU longliners, all targetting SWO	**78,662**	**13**	**36**
ISEL	Contains data for the semi-industrial longline fleets operating in Reunion, Mayotte, Madagascar, Mauritius and the Seychelles, which also target SWO	26,160	4	6
JPLL	Contains data for the longline fishery of Japan plus other fleets assimilated to the Japanese fleet (e.g. South Korea, Thailand, Oman)	**75,510**	**12**	6
TWFL	Contains data for the fresh-tuna longline fleets of Taiwan and Indonesia, plus other fresh-tuna longline fleets assimilated to those and all sport fisheries and fleets operating hand lines	44,328	7	9
TWLL	Contains data for the large scale tuna longline fleet of Taiwan plus other longline fleets assimilated to the Taiwanese fleet (a component of the Taiwanese fleet may target SWO)	**341,374**	**56**	**34**

Catches by Area and Fishery

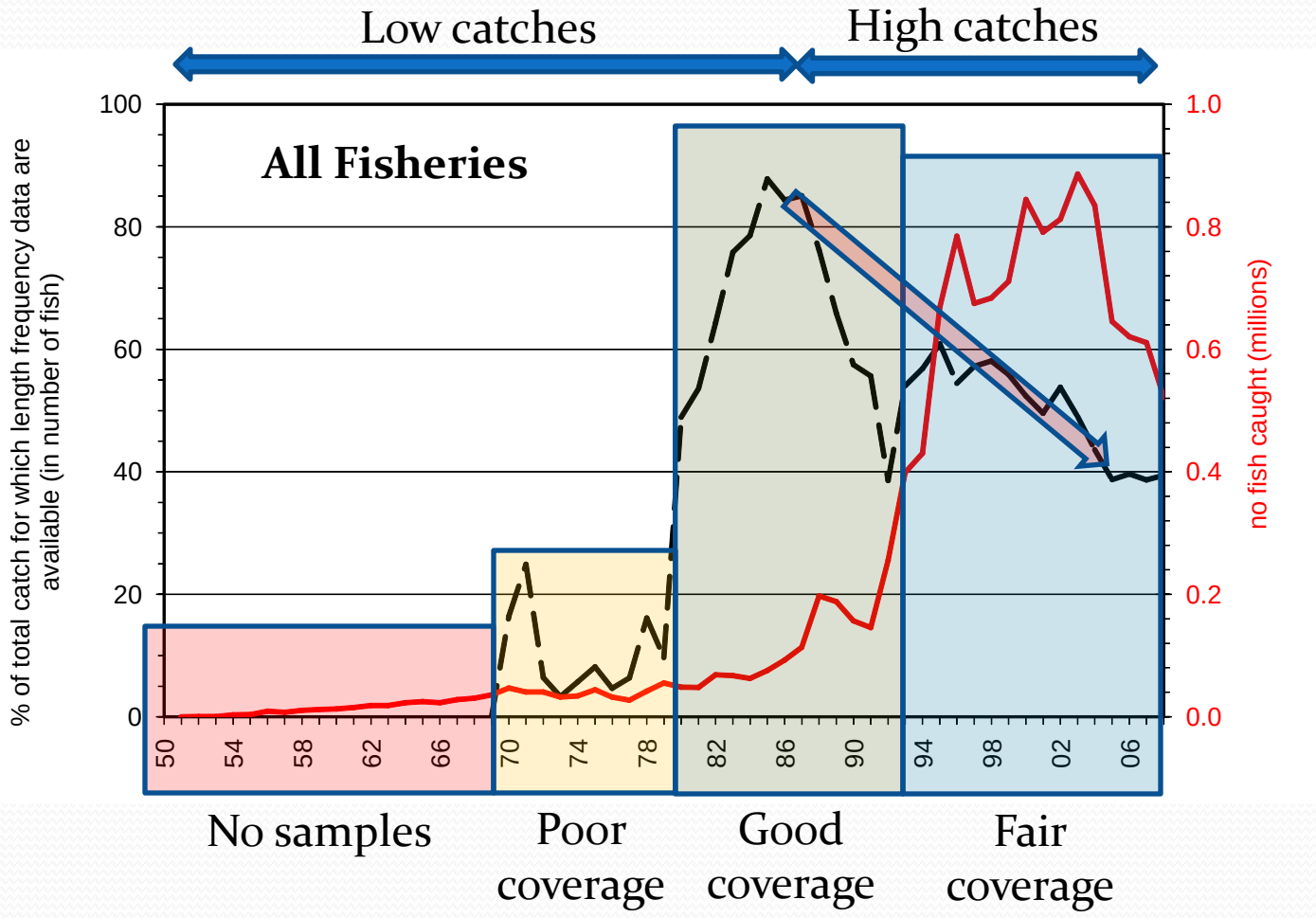




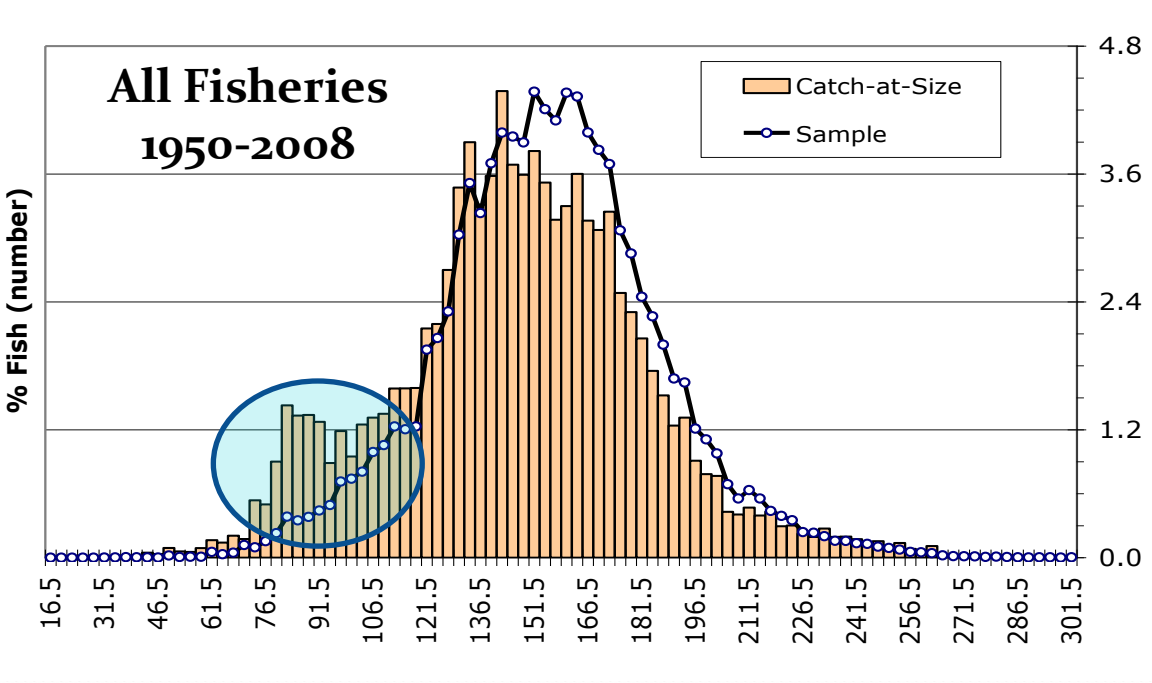
Coverage time-area catches



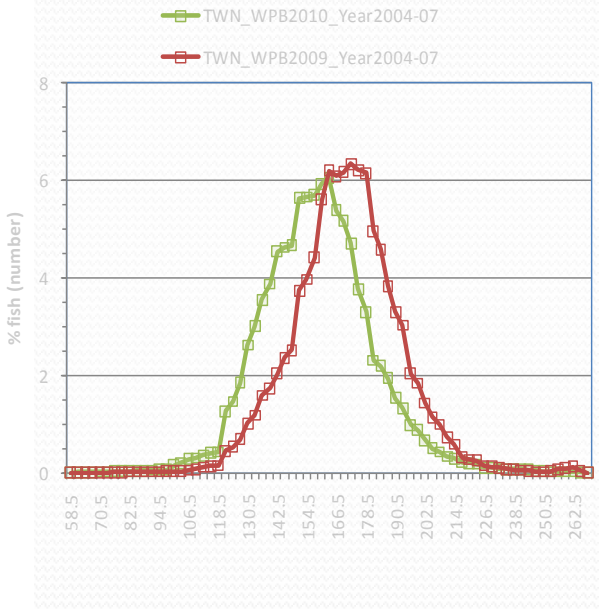
Coverage size data



Catch-at-Size *vs.* original samples



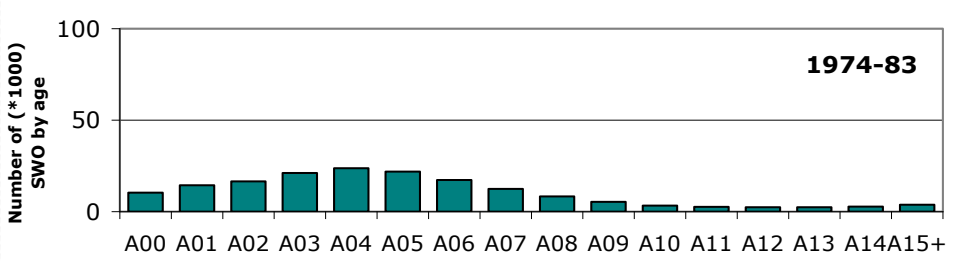
Length distributions for CAS and samples have similar shapes: differences are due to small sample sizes (gillnet and longline fishery of Japan)

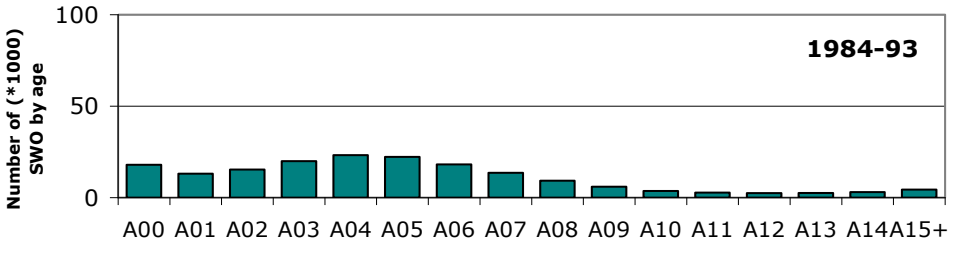


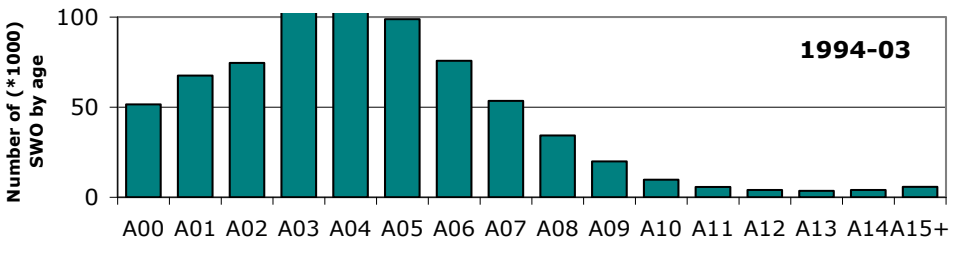
Taiwan provided revised length frequency data for 2004-08 (swordfish of smaller size)

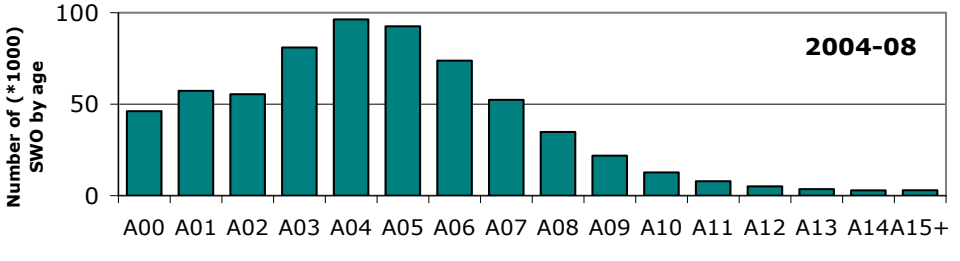
Catch-at-Age

- Length-age key provided by Sheng-Ping Wang
- CAA build from estimated CAS (Secretariat)
- CAA compromised by issues in CAS
- Changes in CAA issuing from changes in TWN samples









Main needs

- Clarify issues concerning total catch of drifting gillnets (**Iran**, **Pakistan**) and longlines of **Indonesia** and **India**
- CPC's to increase length data collection and reporting to the IOTC
  - **Japan** to resume size sampling on commercial vessels
  - **Taiwan** to collect size data from fresh tuna longliners
  - **Japan** and **Taiwan** to provide size data by month and 5x5 area
  - **Iran** and other countries having artisanal fisheries, gillnet in particular, to collect and report size data to the IOTC
  - CPC's to collect data on swordfish length by sex (sex-ratio)
- IOTC Secretariat to revisit the estimation of CAS
  - Substitution scheme and minimum sample number

Thanks for your attention