Sustainable Management of WPEA Tunas
Project Progress Report

2nd Quarter 2015

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Award Basic Information

Award ID:	00077221
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Project Progress

1. In the second quarter, several activities have been planned and the following table below shows the plan and the status of the individual project activities by country. Some activities of the Indonesia and Vietnam have been delayed because of the delay of internal approval of the project.

Indonesia

2. Indonesia has approved the project and provided an official bank account on 19 July 2015. Since this date, project funds can be transferred to both DGCF and RCFMC, the two executing agencies in Indonesia. In the monitoring of the project activities in Indonesia, the following points are highlighted:

a) There are two national tuna coordinators (NTC) who are responsible for the execution of each project activity in Indonesia, one at DGCF and the other at RCFMC. NTC allowances will be provided to RCFMC staff but NTC allowances for the DGCF will be paid as honorarium to those who conduct each project activities.
b) RCFMC has been using its own budget for the payment of enumerator's salary since January 2015. As the new bank account was available, WPEA could reimburse such amount.
c) RCFMC agreed that activity numbers 10 and 11 related with harvest strategy (HS) will be merged and WPEA activities for HS will be collaborated with the Indonesian government's initiative in establishing harvest strategy framework through a series of workshops. CSIRO is heavily involved in the development of the HS, and WPEA (DGCF and RCFMC together) will work with CSIRO too.

3. Though the implementation of project activities were delayed, Indonesia conducted the following activities during the 2nd quarter:

a) Tuna catch data collection from port sampling continued since January 2015 and data were submitted to WCPFC and used at the ITFACE-6 WS.

b) As a joint activity, DGCF and RCFMC WPEA team participated in the second Indonesia's Harvest Strategy WS, 18-22 May 2015 and produced a work programme for harvest strategy case study for Indonesian tuna fisheries (WPP 713, 714, 715). To further collaborate with the government, NGOs and CSIRO, WPEA will partially support future organization of the harvest strategy workshop (**Attachment A**).

c) DGCF hosted the Sixth Indonesian (WCPFC Area) Tuna Fisheries Annual Catch Estimates (ITFACE) Workshop in Bogor, 24-26 June 2015. The WS produced 2014 provisional tuna catch estimates by species and by gear. A provisional Indonesian tuna catch estimate for year 2014 was 483,000 mt. A WS report and recommendations were produced for review by the participants (**Attachment B**).

Outcomes	Activity (IDN)	Period scheduled	Q1 and Q2	Q3 and Q4
1.1	1. (DGCF) Logbook awareness WS	Q1-Q4		Will be implemented
1.1	2. (DGCF) Capacity building of the country science	Q3	Preparatory actions taken in Q2	Will be implemented
1.1	3. (DGCF, RCFMC) National tuna coordinator	Q1-Q4	Implemented in Q1 and Q2	Continued
1.1	4. (DGCF) Annual Tuna Catch Estimates Workshop	Q2	Implemented in Q2	
1.2	5. Prior Study on Climate Change	Q1-Q4	Preparatory actions taken in Q2	Will be implemented
1.2 and 2.2	6. Review WS on CC, Supply Chain Analysis, and Sustainability/Certification	Q4	Preparatory actions taken in Q2	Will be implemented
2.1	7. (DGCF) Implementing national compliance review monitoring	Q1-Q4		Will be implemented
2.2	8. Consultancy - Supply chain analysis/traceability	Q1-Q4	Preparatory actions taken in Q2	Will be implemented
2.2	9. Consultancy on sustainability/certification	Q1-Q4	Preparatory actions taken in Q2	Will be implemented
2.3	10. Research on harvest strategy	Q2-Q4	Preparatory actions taken in Q2	Will be implemented
2.3	11. Convene a review WS on harvest strategy (RPs and HCRs)	Q4	Preparatory actions taken in Q2	Will be implemented
2.3	12. (RCFMC) Conduct data review WS	Q1-Q4		Will be implemented
2.3	13. (RCFMC) Sub-regional stock assessment workshop	Q4		Will be implemented
2.3	14. (RCFMC) Data collection from port sampling	Q1-Q4	Implemented in Q1 and Q2	
3.1	15. Database	Q1-Q4		Will be implemented
3.1	16. IW Learn activities	Q1-Q4		Will be implemented

Philippines

4. There have been no problems in implementing WPEA project in the Philippines, though some consultancies have been delayed because of insufficient domestic expertise or limited budget to hire international level experts. The project however tries to hire domestic experts as part of a capacity building, which includes prior studies in the areas of climate change, reference points and harvest control rules, certification and eco-labeling, and supply chain.

5. NFRDI noted that WS for reference points (RPs) and harvest control rules (HCRs) needs to be held in the first quarter of 2016 to meet their government schedule on this issue. So activities 6 and 15 will be delayed but preparatory work will continue during Q3 and Q4.

6. Several activities have been conducted in the second quarter, including:
   a) The sixth WPEA/NSAP Tuna Data Review WS, 21-22 May 2015. Draft report is in the **Attachment C.**
   b) The eighth Philippines/WCPFC Annual Tuna Fisheries Catch Estimates Review WS, 25-26 May 2015. WS recommendations were adopted for future work (**Attachment D**). The following table shows the estimated catches of oceanic tunas for 2014:

Workshop Outcome	
Domestically-based Fleets	2014 total tuna catch
Purse seine	78,153
Ringnet	45,502
Handline (large-fish)	31,444
Hook-and-line	15,356
Gillnet	3,031
Troll	6,125
Tuna LL	465
Others	280
TOTAL ESTIMATES	**180,356**

   c) Expansion of observer data collection: Deployed a total of 6 observers (2 observers in Infanta, 2 observers in Bicol and 2 observers in Surigao); Observers boarded in RingNet/Purse Seine Vessels every month.

d) Observer Handbook and Species ID Guide published: Operation Manuals and Species ID are currently in their final drafts for review prior to printing/publishing. Draft Species ID is attached **(Attachment E)**

e) Consultancy on the selection of proper port sampling sites: consultancy contract was made and proposal was presented at the May Review WS. Presentation is attached in **Attachment F**.

f) Data collection from port sampling: during Jan - June 2015, tuna catch data were collected from 22 landing sites and these data will be encoded in the NSAP Database System upon completion of 2014 data encoding. Port sampling, data encoding, field supervision and other activities are ongoing activities.

Philippines

Outcome	Activity (VNN)	period	Q1 and Q2	Q3 and Q4
1.1	1. Capacity building in country's science	Q3	Preparatory actions taken in Q2	Will be implemented
1.1	2. Catch estimation WS	Q2	Implemented in Q2	
1.1	3. NTC	Q1-Q4	Implemented in Q1 and Q2	Continued
1.2	4. Prior study on CC (consultancy)	Q2	Preparatory actions taken in Q2	Will be implemented
2.1	5. Update *Operational Guide for Filipino Fishermen*	Q1	Implemented in Q1	
2.1	6. WS on national RPs and HCRs	Q4	Preparatory actions taken in Q2	Preparatory actions continued Will be implemented in Q1, 2016
2.2	7. Prior study on certification and eco-labeling	Q2	Preparatory actions taken in Q2	Will be implemented
2.2	8. Consultancy on Philippine Tuna Supply Chain Analysis	Q2	Preparatory actions taken in Q2	Will be implemented
2.2	9. National workshop on three Consultancy Reports from pilot study	Q2	Preparatory actions taken in Q2	Will be implemented
2.3	10. Sub-regional stock assessment workshop	Q4		Will be implemented
2.3	11. Data review WS	Q2	Implemented in Q2	
2.3	12. MCS and VMS programs established	Q1-Q4	Implemented in Q2	Continued
2.3	13. Port sampling	Q1-Q4	Implemented in Q1 and Q2	Continued
2.3	14. Training WS on E-logbook	Q3		Will be implemented
2.4	15. Orientation on EAFM and WS on EAFM (combined with WS on RPs and HCRs)	Q2-Q3		Will be implemented WS will be held in Q1, 2016
3.1	16. IW Learn / PEMSEA EAS Congress	Q4		Will be implemented

Vietnam

7. There was a government reshuffling last November 2014 and the reshuffling will continue in some provinces. Former agency in central government (DECAFIREP) that implemented WPEA project demolished last December 2014. As a consequence, the WPEA official bank account was also closed. So no project fund could be transferred to Vietnam since December 2014. Because of this, most WPEA project activities were stopped.

8. All foreign projects with a certain size should be endorsed by the Prime Minister in Vietnam. As of the 1st July, the Minister of Planning and Investment sent a recommendation letter to the Prime Minister to propose implementing the WPEA project in Vietnam. Now Vietnam is waiting for the final decision by the Prime Minister. Once approved, then a new official bank account for this project will be opened, project funds will be transferred, and all activities will be commenced as planned.

9. The project manager visited Hanoi to facilitate the process of the Prime Minister's endorsement and immediate action plan once the project is approved. The NTC and the project manager traveled to provinces to encourage sub-DECAFIREP staff and enumerators to resume data collection from port sampling ASAP using WCPFC protocol. So far, very limited activities have been conducted in both central government and provinces. The project manager and the NTC consulted with other relevant staff, and prepared a preparatory work plan to facilitate the 2015 activities in the near future. A summary of project activities is noted in the table below.

Vietnam

Outcome	Activity (VNN)	period	Q1 and Q2	Q3 and Q4
1.1	1. Support participation of Vietnam to SC11	Q3	Preparatory actions taken in Q2	Will be implemented

	2. National tuna coordinator	Q1-Q4	Implemented in Q1 and Q2	Continued
1.1	3. Convene A Data Review and catch estimation workshop	Q2	Deferred to Q3	Will be implemented
1.1	4. Reconstruction of catch histories	Q2	Preparatory actions taken in Q2	Will be implemented
1.2	5. Prior study on CC	~~Q4~~ Q3	Preparatory actions taken in Q2	Will be implemented
2.1	6. Implementing national compliance review monitoring	Q1-Q4		Will be implemented
2.1	7. Consultancy on RPs and HCRs	Q4		Will be implemented
2.1	8. WS on Consultancies for CC and RPS	Q4		Will be implemented
2.1	9. Participation in Tuna Data WS at SPC	Q2	Implemented	
2.2	10. Consultancy – TUNA Supply chain analysis/traceability	Q2	Preparatory actions taken in Q2	Will be implemented
2.2	11. Consultancy on sustainability/certification	Q2	Preparatory actions taken in Q2	Will be implemented
2.2	12. WS on Market-based Sustainability Consultancies	Q4		Will be implemented
2.3	13. Sub-regional SA scientists' meeting	Q4		Will be implemented
	14. Port sampling	Q1-Q4	Partially implemented	Will be implemented
3.1	15. website			
3.1	16. Participation in the regional knowledge platform	Q1-Q4		Will be implemented

Attachment A

The Second Indonesian Harvest Strategy Workshop

18-22 May 2015, Bogor, Indonesia

Summary Report for the Reference Points, Harvest Strategies and the Precautionary approach in the management of Indonesian Tropical Tuna Fisheries

Background

1. Establish a common understanding within Ministry of Maritime Affairs and Fisheries (MMAF) and Indonesian tuna fishing industry of the role and purpose of reference points and harvest strategies in fisheries management and the steps and considerations required for their development.

- Increased understanding of reference points and their relationship with higher level objectives of fisheries management;
- Clarified relationship between reference points at RFMO (whole stock) and Indonesian domestic fisheries management (see below);
- Agreed to recommend Indonesia adopt tiered framework of reference points recommended by WCPFC SC;
- Noted it was important to approach this development in a practical and pragmatic manner that was appropriate to the particular Indonesian context and explicitly adaptive. That is, design and implement harvest strategies based on current understanding and available information and monitoring systems, with an explicit priority on identifying important uncertainties and addressing them in the 1st cycle of review and revision of the harvest strategy.

2. Review and consider alternative approaches to the development and implementation of harvest strategies, including, conceptual understanding of the fishery system, available time series data and information sources, methods of assessment and practical management measures that are appropriate to Indonesian fisheries management.

- Reviewed experience from CCSBT and Australia in development and implementation of RP and HS and the use of MSE to design and select HS that are most likely to meet objectives (reference points) and provide desired mix of trade-offs between social and economic benefits and conservation of the productivity of the stock(s) (see presentations and discussion)
- Agreed that it was important (for effectiveness of management and to meet Indonesia's international obligations) for RP and HS to be consistent (from both conceptual and process perspective) and compatible (from a fisheries management perspective) with those being considered (and/or adopted) in the WCPFC and IOTC. (Note issues identified in terms of connectivity, "complementary measures", consistency with objectives for Indonesia's domestic fisheries management and objectives for sustainable tuna production).
- Reviewed process and current status of RP and HS development in WCPFC and IOTC and recognized opportunities for support for capacity building and for advancing Indonesia's NPA for tuna resources.
- Agreed that 713, 714,715 (or some subset) were appropriate areas for a case study to develop HS, given their importance to Indonesia for continued development of their tuna fisheries and significance in the wider international tuna fisheries.

3. Identify preferred approach(es) and requirements for development and evaluation of potential harvest strategies, including, essential times series data and other information requirements, and; the actions required to make then available at the national level for the purposes of tuna harvest strategy implementation.

- Reviewed extensive range of government, NGO and industry data sources, monitoring programs and information available for tuna fisheries in 713, 714, and 715
- Agreed, in principle, that empirical (rather than model based) harvest strategies are more likely to be appropriate to the Indonesian context.
- Recognised the need for different categories of i) monitoring data and ii) information on the nature and dynamics of the fish stocks and fishing fleets.
    - Stock monitoring data: (To be completed):
        - Estimates of total removals (e.g. total catch, discards, use as bait etc)
        - The level of uncertainty in estimates of total catch
        - Estimates of total effort (and uncertainty)
        - Catch and effort data suitable for estimating CPUE for use as an index of relative abundance (by sector)
        - Size (length/weight) composition of the catch
        - Tagging data for estimating rate of fishing mortality, connectivity and growth (and potentially abundance and natural mortality)
        - Size/Age at maturity (for estimating impact of fishing on the reproductive component of the population
    - Fishery monitoring data (To be completed):
        - Fleet characteristics by sector (vessels size, operational range, target and bycatch etc)
        - Gear characteristics
        - Business/Employment profile
        - Market/value chain

4. Scope an action plan and implementation schedule to develop, evaluate and select potential harvest strategies for tuna fisheries management in areas 713, 714 and 715 of Indonesia, including a working paper for:

- Broader consideration and decision by MMAF;
- Seeking additional support and appropriate expertise for the HS development process; and
- Communication to the relevant tuna RFMOs.

5. Tentative work programme for harvest strategy case study for Indonesian tuna fisheries (WPP 713, 714, 715)is annexed below:

Work programme for harvest strategy case study for Indonesian tuna fisheries (WPP 713, 714, 715)

Scoping and preparatory analysis for workshop

1) Establish Technical Working Group (TWG) and Harvest Strategy Steering Committee
    a) Completion date: 29 May
    b) Responsibility: DGCF (SC), RCFMC (TWG)

2) Meeting for the Collation of existing data (Advice from CSIRO on collation of data for HS use)
    - (DGCF) Data series from as presented in workshop – Responsibility: Yayan
    - (RCFMC) Biological and other information on population biology and fisheries from regional institute/ agencies/ universities/ NGOs – Responsibility: Lilis
    - (Associations) Buyer/industry data – Responsibility: Wildon and Yayan

    a) Completion date: 3 August

b) Responsibility: as above

3) Pre-workshop for data anlaysis (18-20 August, DGCF)
   - ➢ CSIRO expert attend for advice on data analysis (WPEA support the expert's travel cost + time)
   a) Completion date: 15 August
   b) Responsibility: TWG, Expert, SC

4) Analysis of existing data for input to HS development (according to guidelines made from Pre-WS)
   - ➢ Exploratory analysis for identifying and scoping case studies, see below (catch, effort and biological data)
   - ➢ Specific analysis for designing of monitoring system for HS data series
   - ➢ Characterizing the uncertainty in data and information input.
     Advice from CSIRO for:
     - Scoping of potential modeling approaches
     - Interpretation: Population dynamics, fisheries economics (supply chain and market/fisheries profile), and HS development
     - Summarize relevant HS literatures (Input for WS)

   a) Completion date: 15 August
   b) Responsibility: HS expert, TWG, SC

Technical Workshop

3-day WS in conjunction with RCFMC' s stock assessment training WS (23-28 August) (late September 2015 contingency)

(RCFMC will host this WS)

WS convened by TWG (hosted by RCFMC) and assisted by CSIRO HS expert (WEPA support CSIRO expert's meeting time and preparation time)
- ➢ Reviewing analysis of available data
- ➢ Identifying data gaps and/or additional data sets
- ➢ Confirm case study (utilizing data from Kendari/Sodohoa, Sorong, Majene, Bitung and Ternate) – develop one HS
- ➢ Explore alternative forms of HS – input/output
- ➢ Form of model/platform for analysis
- ➢ Discussion and design for information management
- ➢ Develop detailed work programme

a) Completion date: 28 August
b) Responsibility: TWG, HS expert, SC, NGO

Intersessional analysis

TWG with advice and input from CSIRO HS expert
- ➢ Additional analysis and data collation (TWG)
- ➢ Preliminary model development (CSIRO, TWG)
- ➢ Draft stakeholder engagement strategy (SC)

a) Completion date: 16 October
b) Responsibility: as above

WS Preparation (HS SC and TWG Meeting, teleconference)

- ➢ Review analysis and model development
- ➢ Finalize detailed agenda for November WS

a) Completion date: 20 October
b) Responsibility: SC, NGO

HS Stakeholder WS

- ➢ Introduce and overview of HS work program
- ➢ Demonstration of the case study

a) Completion date: 18 November
b) Responsibility: SC, TWG, HS expert, NGO

HS Technical WS (DGCF will host this WS)

- ➢ Review intersessional work
- ➢ Demonstration of case study
- ➢ Scope activities for 2016 and 2017

a) Completion date: 19-20 November, Bali

b) Responsibility: TWG, HS expert, SC

NOTE

1) Bold indicated priority
2) HS SC: Saut, Fayakun, Retno, Ibes, Wudianto, HS expert (Campbell)
3) TWG: Duto, Lilis, Bayu, Anas, Dicky, NGO, Industry, Association, HS expert (Dale?)

Attachment B

Sixth Indonesian (WCPFC Area) Annual Catch Estimates Workshop

24-26 June 2015
Hotel Salak, The Heritage, Bogor, Indonesia

RECOMMENDATIONS

Draft

1. The workshop recommended **DGCF** and **WCPFC** consider a PRELIMINARY DATA PREPARATION WORKSHOP in the future which would focus on ONE GEAR (per year) and involve all relevant stakeholders (including **DGCF**, **P4KSI/RCFMC** , **Industry**, **NGOs**, **WCPFC)**. This workshop would provide a mechanism for consolidating all potential data (for that GEAR) to be used as input into the main annual catch estimates workshop (that would not involve the Industry and NGOs at this stage). The workshop specifically recommended that …
    a. **DGCF** and **WCPFC** prepare (i) an agenda and (ii) the precise data provision requirements from each stakeholder to the preliminary workshop at least 4 months prior to the workshop so it can be distributed well in advance.
    b. **DGCF, P4KSI/RCFMC** and **WCPFC** consider how to produce clear guidelines and a systematic set of procedures for how to consolidate and use the data provided in this workshop which might require input from a statistical expert.
    c. The first preliminary data preparation workshop in 2016 should focus on the LONGLINE gear.

   It was noted that future data preparation workshops could consider, for example, the breakdown of the purse seine fishery data into smaller more logical components (e.g. catch from large industrial-type vessels versus the *pajeko)*.

2. In order to get a better understanding of the tuna species catch by gear and area, **DGCF** and **P4KSI/RCFMC** provide the following summaries for future workshops in respective working papers:
    a. LANDED CATCH by GEAR, FMA and LANDING POINT for the oceanic tuna SPECIES by GEAR (longline, pole-and-line, purse seine, Handline gears) according to the table below.

   Table x. LANDINGS of Oceanic tuna species by GEAR, FMA and Landing site for Year 2014 (Source Data compiled by DGCF)

GEAR	FMA	Landing site	Tuna Species Catch						
			SKJ MT	SKJ %	YFT MT	YFT %	BET MT	BET %	TOTAL
LL	FMA 716	NUTRINDO	0	0%	1,203	90%	201	10%	1,403
LL	FMA 716	BMU	0	0%	876	85%	123	5%	1,000
...	...	...	...		...		...		...

3. The workshop again noted the benefits to the work in producing annual catch estimates of additional independent information compiled and presented by the **Directorate of Surveillance** (VMS and port entry/exit data) and the **Directorate of Fisheries Resources Management (Sub-directorate Evaluation of Fisheries Resources)** (logbook data) and strongly recommended their participation at future workshops. These agencies were requested to prepare and present the following information for future workshops:
    i. **Directorate of Surveillance** (for VMS and port entry/exit data) should present
        a. a summary of the VMS days-at-sea broken down by GEAR and Area (FMAs 713/714/715 and FMAs 716/717)
        b. an indication of VMS data COVERAGE by GEAR and FMA Area
        c. These summaries should concentrate on longline, purse seine and pole-and-line vessels, where possible

ii. **Directorate of Fisheries Resources Management (Sub-directorate Evaluation of Fisheries Resources)** (logbook data)

a. The number of completed logbooks by GEAR and Area (FMAs 713/714/715 and FMAs 716/717)
b. A summary of catch for the key species, effort (number of trips and number of days) and species composition by GEAR and Area (FMAs 713/714/715 and FMAs 716/717), according to the completed logbooks
c. These summaries should concentrate on longline, purse seine and pole-and-line vessels, where possible.

4. In order to satisfy the reporting obligations of the WCPFC, the workshop recommended that **DGCF** extend the breakdown of species composition by AREA and GEAR for the 2014 estimates to cover the relevant WCPFC key species (by August 2015), and that this be continued in future years. At this stage, the breakdown should cover each BILLFISH species, ALBACORE TUNA and the neritic tuna species (as a group), with consideration of the KEY SHARK SPECIES later. The table below outlines the requirements. This table covers two objectives: (i) extends the species list to cover all key species of the WCPFC, and (ii) shows the relative proportion of oceanic tuna species to the total catch for each gear.

Species / Species Group	2014 SPECIES COMPOSITION by WEIGHT -- FMA's 713/714/715						
	LONGLINE	PURSE SEINE	POLE-AND-LINE	HANDLINE	TROLL	GILLNET	OTHERS
Skipjack Tuna							
Yellowfin Tuna							
Bigeye Tuna							
Albacore Tuna							
Striped Marlin							
Blue Marlin							
Black Marlin							
Swordfish							
Sailfish							
Neritic tuna							
Others							
Total	100%	100%	100%	100%	100%	100%	100%

5. **DGCF** and **P4KSI/RCFMC,** in collaboration with **WCPFC**, work towards obtaining more information from the GILLNET fishery, in particular, reviewing port sampling to determine the reliable species composition of oceanic tuna taken by this gear and through communication with the provincial offices and other stakeholders involved in this fishery.

6. WCFPC requested that **DGCF** compile and submit Aggregate catch/effort data (in the specified format and for the WCPFC Area only) from the available 2014 logbook data to ensure they satisfy the WCPFC Scientific Data Submission obligation before mid-July 2015 (which will then be reported to the 11th WCPFC Scientific Committee and the 11th WCPFC Technical and Compliance Committee).

7. **WCPFC** requested the **DGCF** to produce an English version of the Fisheries data and estimates validation process that DGCF currently holds in Bahasa-Indonesia version only.

Attachment C

REPORT OF THE SIXTH WPEA – PHILIPPINES NSAP TUNA DATA REVIEW WORKSHOP

21 - 22 May 2015
Iloilo, Visayas, Philippines

Contents

1. INTRODUCTION

The Western and Central Pacific Fisheries Commission (WCPFC) has been involved in supporting tuna fishery data collection in the Philippines since 2006, initially through the Indonesia and Philippines Data Collection Project (IPDCP) and more recently through the ***West Pacific East Asia Oceanic Fisheries Management (WPEA OFM)*** project (funded by the Global Environment Facility - GEF), which began in 2010 (see http://www.wcpfc.int/doc/2009/wpea-ofm-project-document). The activities to be carried out under the WPEA project contribute towards the following objective:

"*To strengthen national capacities and international cooperation on priority transboundary concerns relating to the conservation and management of highly migratory fish stocks in the west Pacific Ocean and east Asia (Indonesia, Philippines and Vietnam)*"

The WPEA OFM project covers, *inter alia*, the following key areas

(i) strengthen national capacities in fishery monitoring and assessment,
(ii) improve knowledge of oceanic fish stocks and reduce uncertainties in stock assessments,
(iii) strengthen national capacities in oceanic fishery management, with participant countries contributing to the management of shared migratory fish stocks,
(iv) strengthen national laws, policies and institutions, to implement applicable global and regional instruments.
(v) this second WPEA Phase differs from Phase 1 in several respects:
    a. it is falls under a larger programme, and is one of 5 regional projects, and,
    b. it now includes consideration of the impact of climate change on tuna fisheries
    c. a greater focus on EAFM and fisheries certification,

The Philippines domestic fisheries are widespread, diverse and numerous, and the logistics for undertaking data collection to obtain representative indications for use in WCPFC scientific work presents a challenging task. The catch, effort and size data collected at landing centers collected in the Philippines through the BFAR National Stock Assessment Project (NSAP) provide fundamental information for tuna stock assessments and therefore, ensuring the appropriate quality and coverage of these data through the annual tuna data review workshop is a key activity of the WPEA OFP project.

The breakdown of species catch estimates by gear type for the Philippines domestic fisheries has been one of the most significant gaps in the provision of data to the WCPFC, and the annual tuna data review workshop also serves to produce tuna catch estimates that are subsequently used in the annual Philippines tuna catch estimates workshop.

2. REVIEW OF PROGRESS ON RECOMMENDATIONS FROM THE FIFTH WORKSHOP

The Workshop briefly reviewed each of the recommendations from the fifth workshop and noted the current status/update, in particular, which recommendations would be covered by specific agenda items in this sixth workshop.

Peter Williams presented the recommendations from the previous workshop; there were no comments on the status of the recommendations and the workshop noted that there are some recommendations now completed, some recommendations to be discussed further and some recommendations to be carried over.

3. NSAP PORT SAMPLING DATA REVIEW

The main focus of these workshops is to (i) review NSAP port sampling data collected in each region and (ii) compile data to use in the annual catch estimates review workshop to be conducted in the following week. The following sections briefly cover the key points from each presentation and subsequent discussion.

3.1 WCPFC Requirements for data

An introductory presentation on the WCPFC requirements for scientific data and current issues with Philippines tuna data was presented, covering the following areas:

- Why collect data?
- Data-reporting obligations to the WCPFC
- Philippines submissions of data to WCFPC
- Why NSAP Data are so important
- Current issues with Philippines tuna data
- Workshop structure and expected outcomes

The purpose of this introductory session was to inform participants of their role and the importance in providing (the NSAP) data to the WCPFC and how the workshop would proceed to review their data.

The presentation noted that NSAP data collection has provided a significant contribution to resolving problems in Philippines catch estimates in recent years, including

- Provision of reliable Species composition by gear for annual catch estimates
- Highlighting the different characteristics between purse seine and baby purse seine operations and catch
- Highlighting the different characteristics between large-fish HL and hook-and-line
- Providing validation of catch volumes for municipal gears (e.g. hook-and-line)

It was noted that, although there is still room for improvement, the main outputs of this data workshop improve year on year, are considered in the following Catch Estimates Workshop. The latter workshop in turn provides information to the WCPFC via the National Part 1 report, supporting the modelling of stock assessments for tuna in the West and Central Pacific Ocean.

3.2 Tuna Catch Estimates by Species and Gear Type in each NSAP Region

Recent (2014) data collected from the NSAP in each region data were presented. Presentations from each region were structured in a similar manner and covered the following key areas :

- Main tuna fishing grounds and landing centers
- Seasonality in fishery
- Estimated number of vessels
- Estimated catch by species from NSAP and non-NSAP landing sites in the region
- Disposal of tuna catch (% breakdown)
- Problems in estimates or collecting data

A list of presentations is contained in **APPENDIX 5** and a list of the tuna catch estimates for each Gear/Region was compiled from the presentations and further discussion. The following points of interest were noted from these presentations:

BFAR – NSAP 1

- 5 fishing grounds region 1
- It was recognized that there:
  - is a need to conduct rapid assessments for Non-NSAP landing sites.
  - are still coastal barangays not monitored by NSAP.
  - are no catch estimates for Non-NSAP
  - is a need to conduct a total Boat and Gear Inventory
- The workshop asked if it was possible to estimate any increase or decrease in boats gears since previous boat gear estimates. However in response it was advised that there are no boat gear estimates available.
- It seems some barangays are not sampled; there is a focus on the major sites. However estimates for what were previously non-NSAP sites, are close to findings now that they are included as NSAP sites.

BFAR – NSAP 2

- Three main fishing grounds were detailed in the presentation.
- It was noted that there was a possibility that tuna caught off the coasts of Cagayan, Batanes, and Isabela are being unloaded outside Region 2 or even outside of the Philippines.
- Tuna unloaded during non-sampling days are not recorded.
- Tuna landing sites in this region are now fully covered by NSAP due to the expansion in coverage.
- Estimates for what were previously non-NSAP sites are close to those estimates produced now that they are NSAP sites.
- Tuna CPUE in this region is higher in the summer months

BFAR – NSAP 3

- Zambales:
  - Purse seine [commercial] landings showed a decrease in the first quarter in 2014 over 2013, though for the remaining months 2014 catches were higher.
  - Ring-net [commercial] landings were lower overall in 2014 compared to 2013.
  - For purse seine and ring net the principle catch is skipjack followed by yellowfin, whereas for hand-line [municipal] the catch is dominated by yellowfin then skipjack.
  - Interestingly, for multiple hand-line [municipal], in 2013 yellowfin was dominant followed by skipjack, but in 2014 the dominance was reversed.
- Aurora:
  - Line gears major catch was yellowfin
  - Skipjack then yellowfin dominated the purse seine fishery
  - Ringnets and gillnets caught a high proportion of 'other species', of the name species skipjack was dominant.

BFAR – NSAP 4a – Lamon Bay

- 2014 was the first year that NSAP data collection has been implemented under the expansion of the NSAP, but only 7 months of data were collected and expect a full year for 2015.
- Raised estimates were provided.
- There is a clear distinction between landing sites which support vessels catching oceanic tunas and those catching only the neritic species and this needs to be taken into account with respect to sampling coverage and the estimation of the oceanic tuna species.

BFAR – NSAP 4b - MIMAROPA

- Region 4b has 16 fishing grounds

- The previous 15 NSAP sites have extended with an additional 43 NSAP sites giving a total of 58 sites.
- The main tuna catching gears in 2014 are large-fish HL, HL with light and MHL
- A large increase in tuna landings was noted for 2014 over 2013
- It is known that there are some non-sampled tuna landing sites in Romblon.
- The current status is that NSAP is now covering 90% of tuna landing sites in Palawan and 60% in Mindoro.
- There was some confusion regarding the designation/definition of multi-hand line [MHL]. For the purposes of the WCPFC estimation process, the MHL and other hook-and-line gears catching small tunas are grouped into the category "small-fish" hook and line.

BFAR – NSAP 5

- Unraised estimates were presented for Region 5 but the raising was undertaken during the workshop. The estimates for the non-NSAP sites were provided.
- As in previous years, the seasonal peak in the catch of ALB (February) was noted in the large-fish handline fishery.
- The following issues were identified for Region 5:
  - Indifferent attitude of fishers, most of whom declined to be interviewed
  - Exact effort (# of boats, hauls, hours) was not determined for catches taken in the Pacific Ocean.
  - Fishers did not use a permanent fish broker, the catch is brought to the household or the market.
  - Many tuna fishing vessels are unregistered.
  - Color coding is not used for tuna fishing vessels

BFAR – NSAP 6

- Data is stratified by commercial vs municipal fishers
- 41 of 81 sites are sampled, with a fishery that includes 14 gear types
- There is a need to sample 5 new tuna sites in:
  - Tinigbas, Pucio & Union, Libertad, Antique - Culipapa & Bacuyangan, Hinoba-an
- It was thought that the increase in HL landings for 2014 compared to 2013, was due to more minor sites providing additional hand line data. The fishery has evolved and increased in recent years too, hence this wasn't thought to be a reporting artefact.
- The clear increase in catch for 2014 compared to previous years was due to better coverage of landing sites due to the expansion of the NSAP. It was suggested that there may need to be some consideration of revising estimates for previous years to consider landings of large-fish HL that were not previously covered.
- Noting that in the peak season 75% of the large-fish HL catch goes to General Santos, it may be that those receipts could be used to reconcile the catch estimates from Region 6 for large-fish Handline.

BFAR – NSAP 8

- Data collection was disrupted during 2014 due to the typhoon, but estimates were provided to the workshop. At this stage, there has been about 5 t. of tuna landings from the NSAP landing sites in 2015 and complete estimates will be provided at the 2016 workshop.

BFAR – NSAP 11

- Two fishing areas, Davao Gulf and the Philippine Sea.
- Closed season for commercial fisheries in Davao Gulf – July and August
- Ringnet and handline are the dominant gears [59.87% and 30.67% respectively] in terms of catch
- Research is currently being conducted on eggs and larvae distribution and abundance
- Data is stratified into major vs minor landing sites [more than or less than 100 boat units], and by commercial and municipal.

- There was a query regarding how annual estimates were calculated, i.e. was the monthly average raised to give annual data. There was some discussion about the validity of such an approach if there was seasonality in the fishery. The tables will be revisited and amended as appropriate. This needs to be discussed further and unraised data may be applied in the review of consolidated data [Appendix 7].
- The workshop was reminded that data gathered from 2004 to 2006 was used to determine the july/august closure in the Davao Gulf.
- It was noted that there were much higher estimates than in previous years in the presentation due to the new stratified estimation process. Was this due to an increased number of boats? Are all the units 100% active all the time? Albacore catches for example appeared to be very high. Revised estimates were provided under agenda item 7 and a recommendation on the review of the estimation process was formulated.

BFAR – NSAP 12

- There is an estimated 47% increase in tuna landings since 2013, to 121,971 mt in 2014, mainly due to higher levels of effort and catch from the HSP fishery.
- The following issues were identified:
  - Catch estimates (species and gear type) are limited to monitored sites only.
  - Difficulty was experienced in estimating tuna catches from the Moro Gulf since some of the boats fishing here also land in Region 9
  - A total boat and gear inventory is lacking

BFAR - CARAGA

- The two main fishing grounds in terms of overall volume of tuna landings are the Surigao Sea and the Philippine Sea [48% and 43% respectively]
- The NSAP expansion is now covering 80% of tuna landing sites.
- The greatest proportion [61%] of landed catch in 2014 was skipjack, followed by yellowfin [24%]
- The size range of landed fish was notably different in the Surigao Sea and the Philippine Sea
- The following issues were raised:
  - Some Caraga commercial vessels are landing outside of the region where prices are higher e.g. Davao and Gensan.
  - It is sometimes difficult to distinguish species caught and associated gears where the catch and gears are mixed.
  - There are currently insufficient numbers of enumerators to cover the remaining non-NSAP sites.

BFAR - ARMM

- Skipjack [73%] represented the principle landed catch.
- There were many non-NSAP sites in the region ARMM but most of those sites are small and low priority in regards to potential tuna landing sites. The NSAP sites have been selected as they are the major tuna landing sites (and therefore cover the majority of tuna landings).
- There was a question on the misidentification of bigeye tuna and this was noted as an area for further work.
- Two issues were raised:
  - It is difficult to retain NSAP enumerators, who tend to look for better jobs
  - The relatively high turn-over of NSAP enumerators increases the possibility of misidentification of species; this is especially true when distinguishing between small yellowfin and bigeye.

General Comment

The expansion of NSAP sites in 2014 has made a positive difference to reported catch estimates; and in general the new data corroborates the estimates for what were previously non-NSAP sites. Exceptionally Region 6 showed a great increase in hand-line catches of yellowfin following the NSAP expansion, which shows just one of the benefits of expanded sampling to identify gaps that were not previously covered. In conclusion, the workshop acknowledged the value of the expansion of the NSAP sampling to both remove the uncertainty and confirm where possible in the estimates for the non-NSAP sites, and also improve previous notions of what was happening in the non-NSAP sites.

3.3 Review of the consolidated NSAP data and NSAP Tuna size data

A comprehensive description of the consolidated region's data compiled by the central NFRDI/BFAR office in Manila was provided (Ms Garvilles). The presentation looked in detailed at the catch and size composition by GEAR and species for each region and provided a very useful comparison between of the catch composition and volume, and differences in size composition amongst all regions.

The WCPFC representative acknowledged the usefulness of the information presented by the regional offices, but in particular, the BFAR/NFRDI presentation which consolidated all of the regions data and formed the basis for the estimates compiled for each GEAR (**APPENDIX 7**).

3.4 Preliminary Audit of NSAP Data by Region and Gear

The preliminary audit was prepared and presented by SPC (Peter Williams). It reviewed and identified any potential inconsistencies and problems in the data provided, the national NSAP tuna samples by GEAR and SPECIES including target coverage; species and size composition by REGION and GEAR; recommendations and future work. In addition this year CPUE time series by gears by quarter were also presented

The main comments, suggestions and recommendations discussed were as follows:

- May be possible to reduce variance in the CPUE by gear graphs by sorting gears at greater detail e.g. separate those that are targeting different spp/groups.
- Is it worth pursuing CPUE at the national level by gear type to compare by regional CPUE for example to better identify trends over time?
- Following a query from the workshop, it was clarified that data entry "outstanding" did not mean it was very good, rather it meant that the data was missing for whatever reason.
- In relation to the increasing use of payaos, the workshop asked if gear changes may be correlated with changes in CPUE. This is considered to be a comprehensive dedicated study outside the scope of this group. BFAR is especially concerned about the potential negative effect of payaos.
- **Recommendation:** It was suggested that CPUE could be presented by region, noting that for a comparative study, it would be important for the Regions to agree stratifications – e.g. gear, municipal vs commercial sectors etc. e.g. hook and line are mixed then. It was agreed that it would be very useful if differences in CPUE were identified and characterized at a regional level. The workshop agreed that the provisions of CPUE data should be encouraged but not obligatory, given that some regions did not currently have the capacity to deliver this analysis at present.
- It was reported that payaos are increasing being deployed without associated management plans and information on catch is not readily available because fishermen have a incentive to deny fishing on payaos [they are required to pay a percentage of the value of the catch from payaos as part of the program to maintain the payaos].

4. PROGRESS ON A CONSULTANCY ON CRITERIA FOR OPTIMUM SITE SELECTION

Consultants presented on the status of a project "Consultancy to Criteria for Selection of Optimum Sample Size and Individual Landing Sites for Port Sampling and Data Collection to Improve the Accuracy of Total Annual Tuna Catch Estimates of the Philippines." [**APPENDIX 8**].

Whilst acknowledging that the current large number of NPAS sites is considered to be extremely valuable, the presentation detailed the project objectives which were to identify a minimum number of sites to provide acceptable data without sacrificing accuracy. The methodology was described and the workshop was advised of progress to date. The workshop was advised that the selection of sites will not be based on PSA-BAS alone, but PSA-BAS data will be

considered. The basis of the study will depend on NSAP data. Currently the main selection criterion identified is the amount of tuna catch landed.

5. CATCH ESTIMATES DERIVED FROM NSAP AND NON-NSAP SITES

The workshop participants reviewed the consolidated catch estimates for each GEAR, broken down by REGION and SPECIES, but with most of the time spent considering the estimates of tuna catch by gear for landing centers in each region that were not covered by NSAP. Estimates for non-NSAP landing sites had improved since the last workshop but there remained improvement in many areas. The workshop recommended that a study to review the NSAP Sampling Procedure and Extrapolation of Catch Estimation to Non-NSAP Area in the Philippine Tuna Fisheries will be implemented in some regions to further improve tuna catch estimates in non-NSAP areas.

Participants noted that better estimates could be obtained for 2014 due to expansion of NSAP monitoring, particularly in new key landing sites for tuna. Tuna catch estimates for each region and gear for the non-NSAP sites were compiled from discussions and are contained in **APPENDIX 8**, which also contain the estimates for the NSAP-monitored landing sites and comments on estimates, where necessary.

6. REVIEW OF CONSOLIDATED WPEA – NSAP ESTIMATES

The workshop reviewed the 2014 consolidated tuna catch estimates from NSAP sites and non-NSAP sites [APPENDIX 6].

It was noted that where no catch was included in the table – this may actually reflect that there was no data however there was catch. It was agreed that it would be more accurate to provide a guestimate of catch where data is lacking, that would be more accurate and useful than the current 'no catch' value.

7. RECOMMENDATIONS AND WORKSHOP CLOSE

The workshop participants reviewed and agreed on a list of 4 main recommendations based on discussions made during the two days (**APPENDIX 3**). All participants agreed to action the recommendations relevant to their organisation/region over the coming year.

The WCPFC are committed to holding this type of workshop on an annual basis in the next few years (even in the absence of WPEA funding) to review the data collected by the NSAP and identify priority areas for improved coverage and data quality. It was acknowledged that the NSAP data do not produce annual catch estimates. However, NSAP data provide key information for determining the annual catch estimates for the Philippines-domestic fleets by gear, which is the objective of the subsequent workshop conducted in the same week. The importance of the NSAP data to producing annual catch estimates meant that a workshop to review NSAP data will be required on an annual basis over the short term, so the next workshop should therefore be scheduled for May 2016.

APPENDIX 1 – AGENDA

6th WPEA – NSAP Tuna Data Review Workshop

Amigos Hotel, Iloilo City
21 - 22 May 2015

1. Registration

2. Welcome Message

3. Introduction of Participants

4. Rationale of the Workshop

5. Review Progress on recommendations from 5th Workshop (May 2014)

6. NSAP Port Sampling Data Review

a. Brief review of WCPFC Data Requirements
b. Presentation of NSAP Data by Region
   i. Brief regional presentation
   ii. Summary of 2014 tuna catch data
   iii. For BFAR-NSAP Regional Offices that have the following fishing methods:
      - HANDLINE with LIGHT
      - FLOATING-HANDLINE
      - Other variations of this fishing method (*please specify*)
c. Presentation of Consolidated NSAP Regional Data – summary (BFAR/NFRDI)
d. NSAP Tuna Size Data Review (BFAR/NFRDI Manila and WCPFC/SPC)
   i. Size data by REGION and GEAR
      - Large-fish Handline
      - Small-fish Handline
      - Large Purse seine
      - Ringnet/small Purse seine
      - Other gears

7. Progress on the Consultancy on Criteria for Optimum Site Selection

8. Review of Consolidated WPEA - NSAP Estimates

9. Recommendations / Workshop Close

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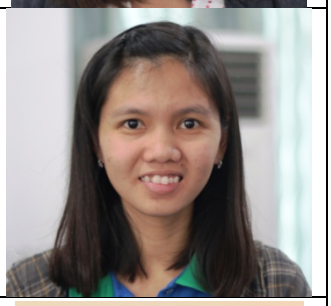
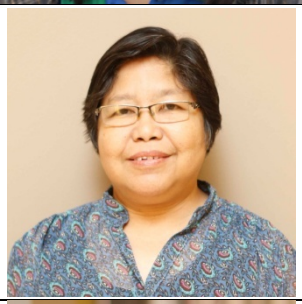
	RACHELLE MENDOZA Designation: NSAP Data Analyst Office Address: Diosdado Macapagal Gov't Center, Maimpis, City of San Fernando, Pampanga eMail Address: lola_chell@yahoo.com Telephone no./Fax no.: 045 455 0824/455 0823 Mobile no.: 0932 510 2550	
BFAR Region IVA	MARIBETH H. RAMOS Designation: ACCII/Project Leader Office Address: BFAR Reg. 4A, 2nd Flr. ICC Bldg., NIA Compound ,Edsa, Quezon City eMail Address: nsap4a@yahoo.com / mhramos59@yahoo.com Telephone no./Fax no.: 02 925 3209 Mobile no.: 0917 373 8881	
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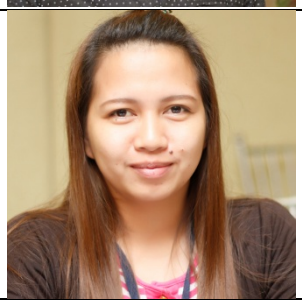
	JEANETTE JARDIN Designation: NSAP Data Analyst Office Address: 3rd Flr. Old City Hall, Puerto Princesa City, Palawan eMail Address: jardinjeanette@yahoo.com Telephone no./Fax no.: 048 433 7417 Mobile no.: 0909 931 0864	

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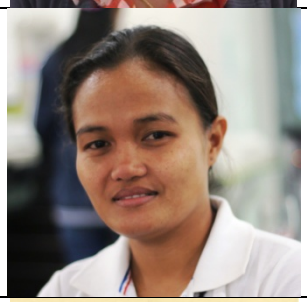
	AIREEN AZURIN Designation: NSAP Enumerator Office Address: BFAR RO5 eMail Address: ajuaquera@yahoo.com Telephone no./Fax no. Mobile no.: 0918 502 8827	
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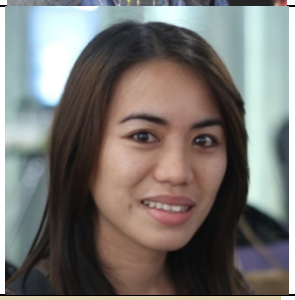
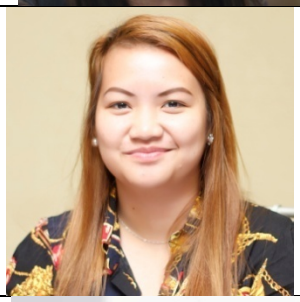
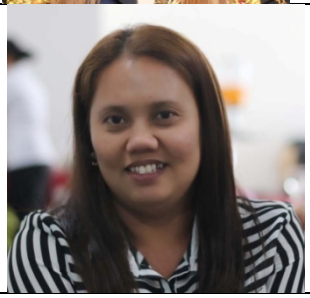
	FRANCIS JAVE CANILLO Designation: NSAP Data Analyst Office Address: R. Magsaysay Ave., Davao City eMail Address: francisjavec@y.com / francisjavec@y.com Telephone no./Fax no.: 082 227 9838 Mobile no.: 0919 330 6307	
	Name: ROSE ANTONETH F. LOQUERE Designation: NSAP Data Analyst Office Address: R. Magsaysay Ave., Davao City eMail Address: roseloquere@gmail.com Telephone no./Fax no.: 082 227 9838 Mobile no.: 0920 772 7925	
BFAR Region XII	LAILA L. EMPERUA Designation: NSAP Project Leader Office Address: Regional Gov't Center, Carpenter Hill, Koronadal City eMail Address: bnette_nick@yahoo.com Telephone no./Fax no. 083 228 1889 Mobile no.: 0939 924 5475	

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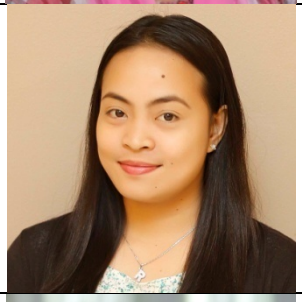
	ROSE MARIE R. PECHON Designation: NSAP Data Analyst Office Address: Regional Gov't Center, Carpenter Hill, Koronadal City eMail Address: rose.pechon@yahoo.com.ph Telephone no./Fax no.: 082 227 9838 Mobile no.: 0948 940 3569	
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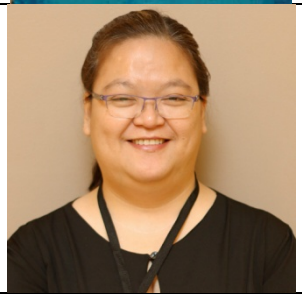
CONSULTANT	GENELYN MA. SARTE Designation: WPEA Consultant Office Address: School of Statistics, UP Diliman, Diliman Quezon City eMail Address: gensarte@gmail.com Telephone no./Fax no.: 02 928 0881 Mobile no.:	

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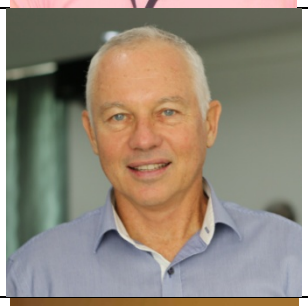
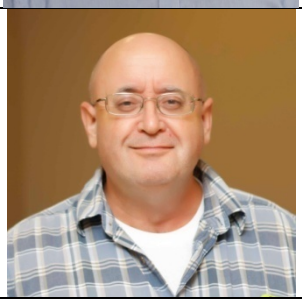
SPC	PETER WILLAMS Designation: Principal Fisheries Scientist (Data) Office Address: Ansevata, Noumea, New Caledonia eMail Address: peterw@spc.int Telephone no./Fax no.: 687 262000 Mobile no.:	
WCPFC	TONY BEECHING Designation: WCPFC Asst. Science Manager Office Address: Pohnpei, Federated States of Micronesia eMail Address: tony.beeching@wcpfc.int Telephone no./Fax no.: 691-320-1992 Mobile no.:	
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APPENDIX 3 – FIFTH WPEA/NSAP Tuna Data Review Workshop RECOMMENDATIONS

RECOMMENDATIONS

20-21 May 2015
Iloilo City, Philippines

1. The estimates derived from the NSAP landing sites have a good level of certainty while the estimates from the non-NSAP landing sites are mostly uncertain. The workshop discussed and recommended the following indicators should be used in the presentation of NSAP estimates by REGION and GEAR in the future:

1	Estimates from NSAP data
2	No NSAP data/coverage – Estimated from RAPID ASSESSMENT
3	No NSAP data/coverage – Estimated from gear/Vessel INVENTORY
4	No NSAP data/coverage – Estimated from other methods
5	No NSAP data/coverage– Evidence of catch for this gear, but no data or method to estimate catch

2. The workshop recommended regional offices include a section in their presentations next year to outline the methodology (with an example) of how they estimate the catch by GEAR and SPECIES for the non-NSAP sites. The next workshop will have a specific agenda item to review the methodologies to estimate catch for non-NSAP sites with the objective of deciding on a standard approach to be used by all regions thereafter.

3. The workshop noted that there was still some Regional NSAP data for tuna fisheries yet to be provided to **BFAR/NFRDI**. **Regional BFAR-NSAP offices** agreed to provide scanned copies of monthly NSAP raw data every 1st or 2nd week of the following month to ensure that NSAP tuna fisheries data (other than the WPEA data) are provided and entered in the NSAP Database system at NFRDI.

4. In regards to preparing and presenting CPUE graphs in the future, the workshop recommended that

a. Future regional presentations continue to include slides on NSAP catch history (e.g. last 5 years data by gear and by species) and CPUE (or effort) trends per month along with catch trends;
b. Regional offices were encouraged to attempt to produce CPUE graphs that considered further breakdown within the GEAR TYPE, such as distinguishing between SET TYPE (free-school versus FAD for PS and RN), distinguishing between targeting (tuna or small pelagics, for example) and distinguishing between types of hook-and-line; it was noted that this work is not mandatory;
c. WCPFC/SPC expand on the consolidated national-level gear/species CPUE graphs presented this year to consider the factors mentioned in the point (b.) above and include graphs that compare each region's CPUE by GEAR/SPECIES.

5. The workshop recommended that BFAR/NFRDI consider developing the terms of reference for a study on the use, effectiveness and management of FADs in Philippine waters.

APPENDIX 4 – Target estimates for national tuna size and species composition sampling

Number of fish to sample

GEAR	TOTAL TUNA	SKIPJACK	YELLOWFIN	BIGEYE
Large-fish Handline	26,000	0	24,000	2,000
Small-fish Hook-and-line	38,000	12,000	24,000	2,000
Ringnet	16,500	12,000	4,000	500
Purse seine	26,000	18,000	7,000	1,000
Each of the other Gears	14,000	6,000	6,000	2,000

Notes

These target estimates should ideally represent the minimum level of sampling required for regional stock assessments. They should be considered as a guide to setting sampling target levels at the NSAP Region level and they will be continually reviewed and enhanced in the future, particularly with respect to available resources.

APPENDIX 5 – LIST OF PRESENTATIONS

1. WCPFC data requirements and current issues with the Philippines catch data	Prepared and presented by SPC (Peter Williams)
2. Region 1 – Luzon	*REGION 1*
3. Region 2 – Batanes/Cagayan	*REGION 2*
4. Region 3 – Zambales	*REGION 3*
5. Region 4a – Lamon bay	*REGION 4a*
6. Region 4b - MIMAROPA	*REGION 4b*
7. Region 5 – Bicol	*REGION 5*
8. Region 6 – Visayas	*REGION 6*
9. Region 11– Davao	*REGION 11*
10. Region 12 - Gensan	*REGION 12*
11. Region CARAGA	*REGION CARAGA*
12. Region ARMM	*REGION ARMM*
13. Review of the consolidated NSAP Data for 2013	BFAR/NFRDI (Elaine Garvilles)
14. Preliminary AUDIT of NSAP data by Region and Gear	Prepared and Presented by SPC (Peter Williams) and BFAR/NFRDI (Elaine Garvilles)
15. Catch estimates derived from NSAP and non-NSAP sites	BFAR/NFRDI (Elaine Garvilles)

APPENDIX 6 – 2014 Tuna Catch Estimates from NSAP sites and non-NSAP sites

Region	Source of estimate	SKJ	YFT	BET		TOTAL	Comments
PURSE SEINE - 2014							
NSAP + estimates for areas not covered by NSAP							
Region	Source of estimate	SKJ	YFT	BET	ALB	TOTAL	Comments
1	NSAP	346.81	402.97			749.78	
	Salomague fish port					*0.00*	
	non-NSAP landing sites estimate						
3	NSAP	3,121.35	1,860.33	110.35		5,092.03	
	non-NSAP landing sites estimate					*0.00*	
4A	NSAP					0.00	
	non-NSAP landing sites estimate					*69.40*	
4B	NSAP	9.84					
	non-NSAP landing sites estimate						
5	NSAP	71.96	161.50	19.15	-	252.61	
	non-NSAP landing sites estimate				-	0.00	
6	NSAP	2,429.19	959.49	123.98		3,512.66	
	non-NSAP landing sites estimate					*0.00*	
8	*non-NSAP landing sites estimate*					*0.00*	
11	NSAP					0.00	
12	NSAP	32,352.70	7,822	656.47		40,831.43	
	Private landing wharfs	*10,039.84*	*2,427.44*	*203.72*		12,671.00	
	non-NSAP landing sites estimate						
ARMM	NSAP					0.00	
	non-NSAP landing sites estimate					*0.00*	
CARAGA	NSAP					0.00	
	non-NSAP landing sites estimate					*0.00*	
		48,371.70	*13,633.99*	*1,113.67*	*0.00*	*63,178.91*	
	NSAP	79%	19%	2%			
	2014	50,059.68	12,103.47	1,015.76		63,178.91	
	2013	**35,678**	**7,596**	**487**		**43,761**	
		82%	17%	1%			
	2012	40,912	10,936	1,319		53,166	
		77%	21%	2%			
	2011	39,670	10,505	928		51,103	
		78%	21%	2%			
	2010	32,734	8,170	495		41,398	
		79%	20%	1%			
	2009	23,556	4,002	502		28,061	
		84%	14%	2%			
	GSC	42,392.54	10,249.70	860.19		53,502.43	
	outside GSC	7,667.14	1,853.77	155.57		9,676.48	

Region	Source of estimate	SKJ	YFT	BET	ALB	TOTAL	Comments
RINGNET - 2014							
NSAP + estimates for areas not covered by NSAP							
Region	Source of estimate	SKJ	YFT	BET	ALB	TOTAL	Comments
1	NSAP	338.870	108.026			446.897	Ringnet and baby ringnet
	non-NSAP landing sites estimate					0.000	
2	NSAP	493.790	157.000		62.260	650.790	
	non-NSAP landing sites estimate					0.000	
3	NSAP	1,143.120	672.080	131.590		1,946.790	
	non-NSAP landing sites estimate					0.000	
4A	NSAP	557.331	446.100	31.955		1,035.386	
	non-NSAP landing sites estimate					0.000	
4-MIMAROPA	NSAP	82.680	33.330	4.400		120.410	
	non-NSAP landing sites estimate	80.740				80.740	
5	NSAP	133.611	58.633	12.442	0.020	204.687	
	non-NSAP landing sites estimate					0.000	
6	NSAP	1,048.640	209.070	3.850		1,261.560	
	non-NSAP landing sites estimate					0.000	
8	NSAP					0.000	
	non-NSAP landing sites estimate	*3,457.434*	*1,233.570*	*741.840*		5,432.844	
9	*non-NSAP landing sites estimate*					0.000	
11	NSAP	370.000	105.800	0.000		475.800	
	non-NSAP landing sites estimate	*1,420.180*	*1,039.550*	*0.000*	*0.000*	2,459.730	
12	NSAP	22,557	4,238	297		27,092.000	
	non-NSAP landing sites estimate					0.000	
	Private landing wharfs	*8,398.511*	*1,577.909*	*0.000*		10,087.000	
CARAGA	NSAP	280.700	32.130	34.800		347.630	
	non-NSAP landing sites estimate					0.000	
ARMM	NSAP	578.350	3.630	0.000	0.270	582.250	
	non-NSAP landing sites estimate	*3,342.860*	*20.980*		*1.560*	3,363.840	
		44,283.818	*9,935.808*	*1,257.877*		*45,501.353*	
	NSAP	83%	16%	1%			
		37,885	**7,118**	**499**		**45,501**	
	2013	**30,714**	**6,829**	**449**		**37,991**	
		81%	18%	1%			
	2012	**23,255**	**5,590**	**655**		**29,500**	
		79%	19%	2%			
	2011	**21,667**	**5,677**	**578**		**27,922**	
		78%	20%	2%			
	2010	**20,338**	**6,106**	**344**		**26,789**	
		76%	23%	1%			
	2009	**18,153**	**4,467**	**177**		**22,796**	
		80%	20%	1%			
		6,929.253	1,301.865	201.815			
		30,956	5,816	297			
Complete, Independent estimates							
Region	Source of estimate	SKJ	YFT	BET		TOTAL	Comments
12	Cannery receipts	12,175	2,857			15,032	

Region	Source of estimate	SKJ	YFT	BET	TOTAL	Comments
HANDLINE (large-fish) - 2014						
NSAP + estimates for areas not covered by NSAP						
Region	Source of estimate	SKJ	YFT	BET	TOTAL	Comments
1	NSAP	108.908	156.867	0.459	266.234	
	non-NSAP landing sites estimate	*0.000*	*0.000*	*0.000*	*0.000*	
2	NSAP	0.000	0.000	0.000	0.000	
	non-NSAP landing sites estimate					(included in hook-and-line)
3	NSAP	*82.370*	192.170	*11.340*	285.880	
	non-NSAP landing sites estimate				*0.000*	
4B	NSAP	97.550	2,423.010	1.160	2,521.720	HL separated from HK using National NSAP database
	non-NSAP landing sites estimate	*0.410*		*0.180*	*0.000*	
5	NSAP	80.3	319.0	18.1	417.4	INCLUDES non-NSAP -- ALB = 54.01 t. ; .0037 - oth
	non-NSAP landing sites estimate	0	0	0	0	
6	NSAP	1,877.860	6,803.480	93.020	8,774.360	Previous years under-reported .....
	non-NSAP landing sites estimate	*1,139.980*	*3,949.360*	*39.490*	5,128.830	based on rapid assessment .... 3,021 t. of BET originally but changed to species comp from NSAP sites
8	NSAP			*0.000*	0.000	
	non-NSAP landing sites estimate			*0.000*	*0.000*	
11	NSAP	162.020	308.740	3.470	474.230	13.21 t. ALB
	non-NSAP landing sites estimate	103.800	2,095.800	30.520	2,230.120	502.32t ALB
12	NSAP	2.000	10,320.000	511.000	10,833.000	14 t - Alb
	Private landing wharfs				*0.000*	
	....					
CARAGA	NSAP	151.240	513.980	5.140	670.360	
	non-NSAP landing sites estimate				0.000	
ARMM	NSAP	*0.000*	*0.000*	*0.000*	0.000	
	non-NSAP landing sites estimate	*0.000*	*0.000*	*0.000*	0.000	
		3,806.473	*27,082.360*	*713.871*	*31,602.113*	
		12%	86%	2%		
		3,806	**26,925**	**713**	**31,445**	
	2013	**708**	**12,052**	**767**	**13,527**	
		3%	94%	3%		
	2012	**439**	**14,449**	**508**	**15,396**	
		3%	94%	3%		
	2011	**62**	**10,577**	**225**	**10,864**	
		1%	97%	2%		
	2010	**137**	**13,885**	**364**	**14,385**	
		1%	97%	3%		
	2009	**102**	**7,768**	**330**	**8,200**	
		1%	95%	4%		
					10,833.000	
Complete, Independent estimates						
Region	Source of estimate	SKJ	YFT	BET	TOTAL	Comments
12	*PFDA*				6,200	accounts for fish coming from other areas overland ...

Region	Source of estimate	SKJ	YFT	BET	TOTAL	Comments
HOOK-AND-LINE (incl. MHL) - 2014						
NSAP + estimates for areas not covered by NSAP						
Region	Source of estimate	SKJ	YFT	BET	TOTAL	Comments
1	NSAP	139.6	135.6	1.9	277	
	non-NSAP landing sites estimate	*0*	*0*	*0*	*0*	
2	NSAP	6.05	5.89	5.81	17.75	
	non-NSAP landing sites estimate	*0*	*0*	*0*	0	
3	NSAP	*1,013*	*729*	*0*	*1,741*	
	non-NSAP landing sites estimate	*0*	*0*	*0*	*0*	
4A	NSAP	84.09	89.88	18.72	192.69	16.68
	non-NSAP landing sites estimate	*0*	*0*	*0*	*0*	
4B	NSAP	195	2,067	94	2,356	HK separated from HL using National NSAP database; 1.38t. ALB
	non-NSAP landing sites estimate	*36*	*0*	*0*	*36*	
5	NSAP	59	27	14	100	0.12 t. ALB
	non-NSAP landing sites estimate				*0*	
6	NSAP	901	1,716	1	2,618	
	non-NSAP landing sites estimate	*0*	*0*	*0*	0	
8	NSAP	0	0	0	0	
	non-NSAP landing sites estimate	*1,659*	*2,518*	*0*	*4,177*	Used 2011 study estimates
9	*non-NSAP landing sites estimate*				*1,000*	
10	NSAP					
	non-NSAP landing sites estimate					
11	NSAP	21	61	0	81	7.1t ALB
	non-NSAP landing sites estimate	178	163	*0*	342	3.62 t. ALB
12	NSAP	220	303	26	549	Municipal outside GSCFP; 3 t. Of ALB
	non-NSAP landing sites estimate					
	....					
ARMM	NSAP	23	3	1	27	
	non-NSAP landing sites estimate	90.47	11.40	3.59	105	
CARAGA	NSAP	1,749.7	605.8	380.2	2,736	
	non-NSAP landing sites estimate	*0*	*0*	*0*	*0*	
		6,373.968	*8,433.801*	*547.627*	*15,355.396*	
		42%	55%	4%		
		6,374	**8,434**	**548**	**15,355**	
	2013	**7,277**	**7,705**	**340**	**15,323**	
		54%	41%	5%		
	2012	**6,533**	**5,055**	**597**	**12,184**	
		54%	41%	5%		
	2011	**4,792**	**9,542**	**384**	**14,718**	
		33%	65%	3%		
	2010	**1,764**	**3,085**	**501**	**5,350**	
		33%	58%	9%		
	2009	**1,519**	**2,744**	**186**	**4,449**	
		34%	62%	4%		

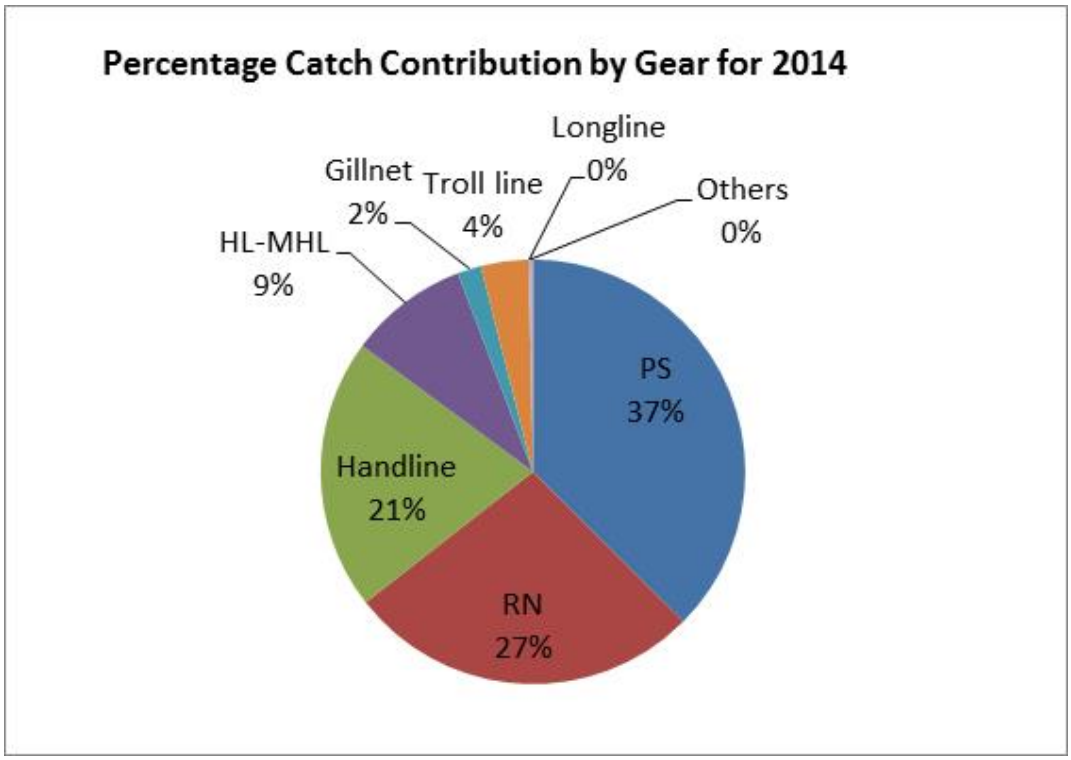
Region	Source of estimate	SKJ	YFT	BET	TOTAL	Comments
GILLNET - 2014						
NSAP + estimates for areas not covered by NSAP						
Region	Source of estimate	SKJ	YFT	BET	TOTAL	Comments
1	NSAP	4.543	1.647	0.008	6.198	
	non-NSAP landing sites estimate	0.000	0.000	0.000	0.000	
2	NSAP	94.000	263.090	5.100	362.190	
	non-NSAP landing sites estimate					
3	NSAP	4.540	2.040	0.000	6.580	Gillnet, trammel net ----- >>> Gillnet
4A	NSAP	5.685	0.297	0.000	5.982	
	non-NSAP landing sites estimate		0.000		0.000	
4B	NSAP	22.030	61.620	0.000	83.650	
	non-NSAP landing sites estimate		0.000		0.000	
5	NSAP	18.531	7.672	6.275	32.478	
	non-NSAP landing sites estimate	0.000	0.000	0.000	0.000	
6	NSAP	1,382.740	22.660	12.440	1,417.840	
	non-NSAP landing sites estimate	*0.000*	*0.000*	*0.000*	0.000	
8	NSAP	*0.000*	*0.000*	*0.000*	0.000	
	non-NSAP landing sites estimate	*504.347*	*375.008*	*0.000*	879.355	
11	NSAP	*1.830*	*0.240*	*0.000*	2.070	
	non-NSAP landing sites estimate	*7.020*	*2.420*	*0.000*	9.440	
12	NSAP	45.000	7.000	0.000	52.000	
	non-NSAP landing sites estimate					
ARMM	NSAP	20.760	0.000	0.000	20.760	
	non-NSAP landing sites estimate	118.360	0.000	0.000	118.360	
CARAGA	NSAP	33.330	0.170	0.000	33.500	
	non-NSAP landing sites estimate	0.000	0.000	0.000	0.000	
		*2,262.7*16	*743.864*	*23.823*	*3,030.403*	
		75%	25%	1%		
		2,263	**744**	**24**	**3,030**	
	2013	**1,389**	**153**	**29**	**1,571**	
		87%	12%	1%		
	2012	**1,193**	**170**	**14**	**1,377**	
		87%	12%	1%		
	2011	**642**	**195**	**1**	**838**	
		77%	23%	0%		
	2010	**354**	**82**	**1**	**437**	
		81%	19%	0%		
	2009	**249**	**98**	**9**	**356**	
		70%	28%	2%		

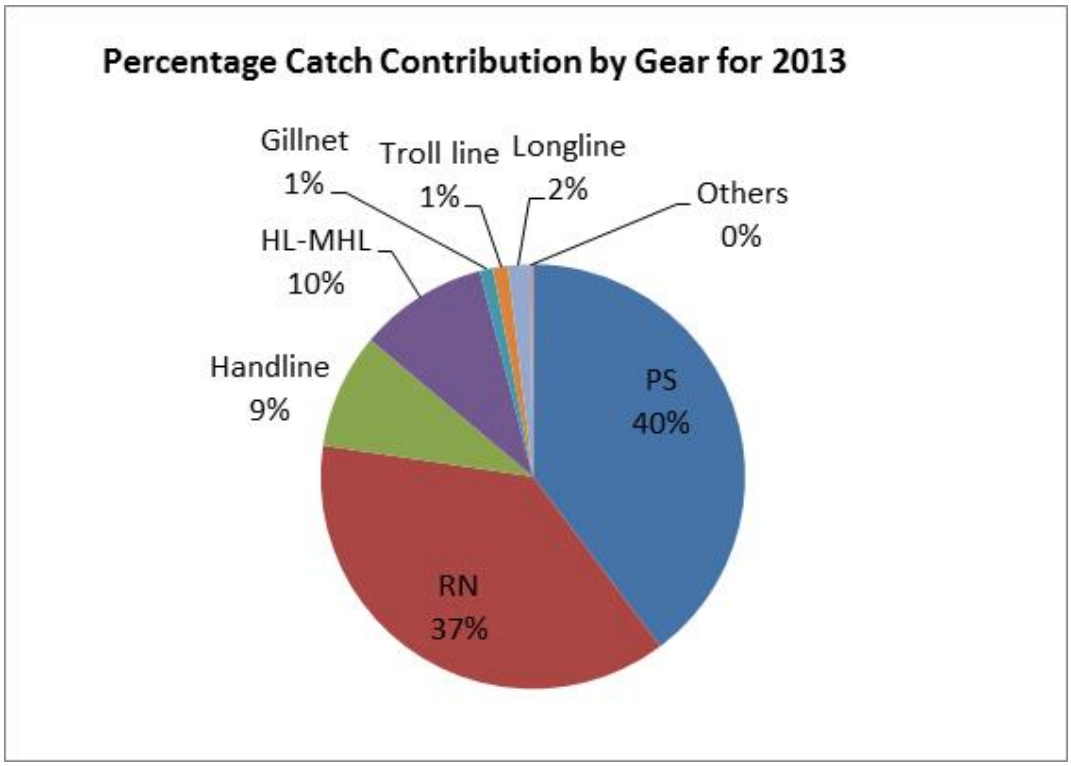
Region	Source of estimate	SKJ	YFT	BET	TOTAL	Comments
TROLL - 2014						
NSAP + estimates for areas not covered by NSAP						
Region	Source of estimate	SKJ	YFT	BET	TOTAL	Comments
1	NSAP	78.720	58.329	2.690	139.739	
	non-NSAP landing sites estimate	0.000	0.000	0.000	0.000	
2	NSAP	86.930	106.870	1.350	195.150	
	non-NSAP landing sites estimate				0.000	
3	*non-NSAP landing sites estimate*				0.000	No known troll activity
4A	NSAP	1.017	0.029	0.000	1.046	
4B	NSAP	1.430	9.570	0.360	11.360	
	non-NSAP landing sites estimate		0.000		0.000	No known troll activity
5	NSAP	0.209	0.183	0.457	0.849	
	non-NSAP landing sites estimate					
6	NSAP	41.480	42.750	0.320	84.550	
	non-NSAP landing sites estimate	*0.000*	*0.000*	*0.000*	*0.000*	
8	NSAP	0.000	0.000	0.000	0.000	
	non-NSAP landing sites estimate	*1015.331*	*754.949*	*0.000*	*1770.280*	
11	NSAP	823.910	301.010	0.290	1125.210	ALB -- 0.31t.
	non-NSAP landing sites estimate	663.620	403.790	0.000	1067.410	ALB -- 11.95t.
12	NSAP	261.000	213.000	3.000	477.000	
	non-NSAP landing sites estimate				*0.000*	
	....					
ARMM	NSAP	14.660	21.230	6.230	42.120	
	non-NSAP landing sites estimate	*84.730*	*122.710*	*36.010*	243.450	
CARAGA	NSAP	563.650	357.770	9.310	930.730	ALB -- 0.17 t.
	non-NSAP landing sites estimate	*36.250*	*0.000*	*0.000*	*36.250*	
		3672.937	*2392.190*	*60.017*	*6125.144*	
		60%	39%	1%		
		3,673	**2,392**	**60**	**6,125**	
	2013	**994**	**788**	**19**	**1,801**	
		63%	35%	1%		
	2012	**1,218**	**677**	**28**	**1,922**	
		63%	35%	1%		
	2011	**271**	**307**	**0**	**579**	
		47%	53%	0%		
	2010	**154**	**175**	**3**	**332**	
		46%	53%	1%		
	2009	**225**	**96**	**6**	**327**	
		69%	29%	2%		

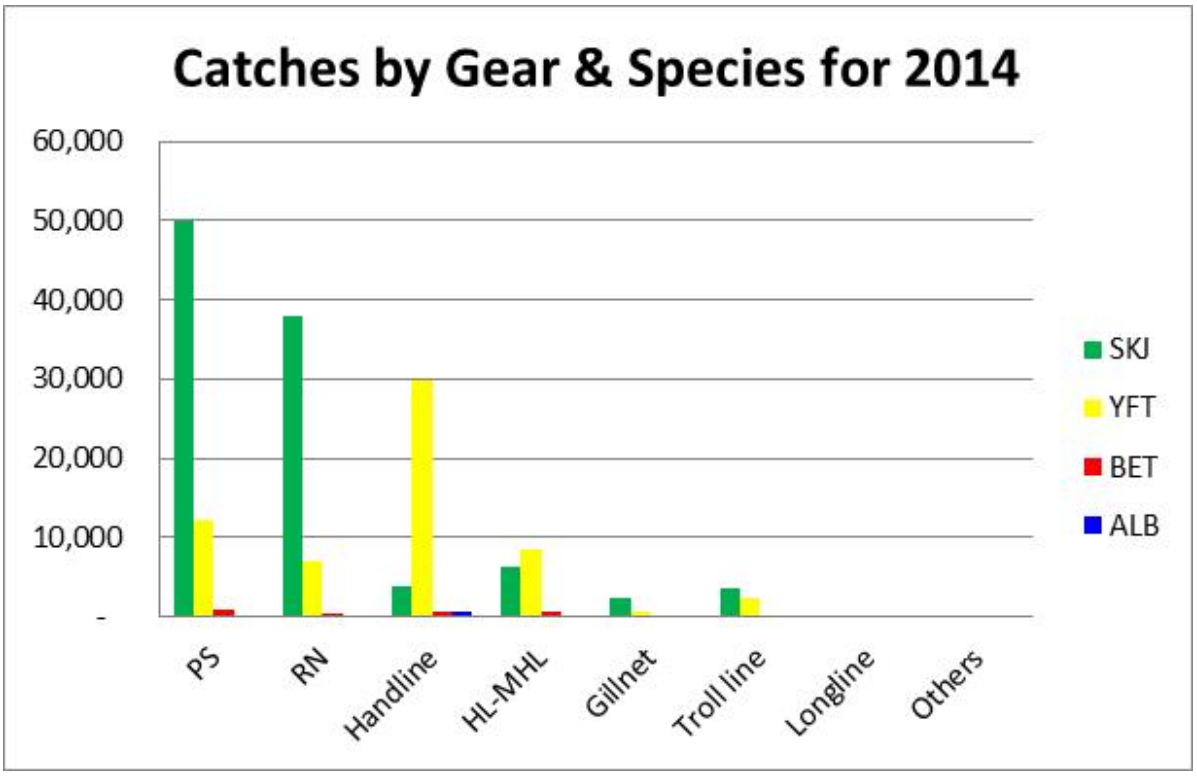
LONGLINE - 2014 (incldes BSLL, DLL etc)						
NSAP + estimates for areas not covered by NSAP						
Region	Source of estimate	SKJ	YFT	BET	TOTAL	Comments
1	NSAP	75.050	62.650	0.190	137.890	
	non-NSAP landing sites estimate				*0.000*	
2	NSAP	23.550	20.320	2.010	45.880	
	non-NSAP landing sites estimate	*0.000*	*0.000*	*0.000*	*0.000*	
3	*non-NSAP landing sites estimate*				*0.000*	
4A	NSAP	*0.000*	0.000	*0.000*	0.000	
4B	NSAP	*3.440*	0.000	*1.590*	5.030	
	non-NSAP landing sites estimate	*6.870*	0.000	*3.140*	*10.010*	
5	NSAP	*0.369*	0.013	0.022	0.404	
6	NSAP	1.200	37.800	0.080	39.080	
8	*non-NSAP landing sites estimate*				*0.000*	
11	*non-NSAP landing sites estimate*				*0.000*	1.00 t - 2012
12	*non-NSAP landing sites estimate*				*0.000*	Yes - but no data - < 1 t.
					0.000	
					0.000	
ARMM	NSAP		*4.190*	*0.430*	*4.620*	
	non-NSAP landing sites estimate		*24.220*	*2.480*	*26.700*	
CARAGA	NSAP	0.330	0.970	0.000	1.300	
		110.479	*124.973*	*7.462*	*242.914*	
		45%	51%	3%		
		111	**150**	**10**	**271**	
	2013	335	2,239	1	2,575	
		58%	42%	0%		
	2012	320	228	0	548	
		58%	42%	0%		
	2011	**236**	**219**	**0**	**455**	
		52%	48%	0%		
	2010	**30**	**11**	**0**	**41**	
		72%	28%	0%		
	2009	**154**	**144**	**0**	**298**	
		52%	48%	0%		

OTHER GEARS - 2014						
NSAP + estimates for areas not covered by NSAP						
Region	Source of estimate	SKJ	YFT	BET	TOTAL	Comments
1	NSAP	2.240	0.473	0.010	2.723	
	non-NSAP landing sites estimate	*0.000*	*0.000*	*0.000*	*0.000*	
2	NSAP	0.000	0.380	0.000	0.380	Round haul seine
	non-NSAP landing sites estimate					
3	NSAP	31.630		0.300	31.930	
4A	NSAP	0.000	0.000	0.000	0.000	?? Not specified
	non-NSAP landing sites estimate	0.000	0.000	0.000	0.000	
4B	NSAP	10.130	16.220	0.000	26.350	?? Not specified
	non-NSAP landing sites estimate	0.040	0.000	0.000	0.040	
5	NSAP	1.310	0.588	0.344	2.242	Range of gears Muro-ami, Fish corral, Danish seine,
	non-NSAP landing sites estimate	*0.000*	*0.000*	*0.000*	*0.000*	
6	NSAP	98.960	104.380	7.200	210.540	Gear = japanese set net and Danish Seine
	non-NSAP landing sites estimate	0.000	0.000		0.000	
8	NSAP				0.000	
	non-NSAP landing sites estimate				0.000	
11	*non-NSAP landing sites estimate*				0.000	
12	*non-NSAP landing sites estimate*				0.000	
					0.000	
					0.000	
ARMM	NSAP	*0.690*	*0.000*		0.690	Bagnet
	non-NSAP landing sites estimate	*3.990*	*0.000*		3.990	Bagnet
CARAGA	NSAP	*0.740*	*0.020*		0.760	Bagnet
		149.730	*122.061*	*7.854*	*279.645*	
		54%	44%	3%		
		150	**122**	**8**	**280**	
	2013	**192**	**158**	**0**	**350**	
		67%	33%	0%		
	2012	**347**	**172**	**1**	**520**	
		67%	33%	0%		

APPENDIX 7 – Summary of estimates by Gear and Species 2014 and 2013






Catches by Gear & Species for 2014
60,000
50,000
40,000
30,000
20,000
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-
PS
RN
Handline
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Gillnet
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Others
SKJ
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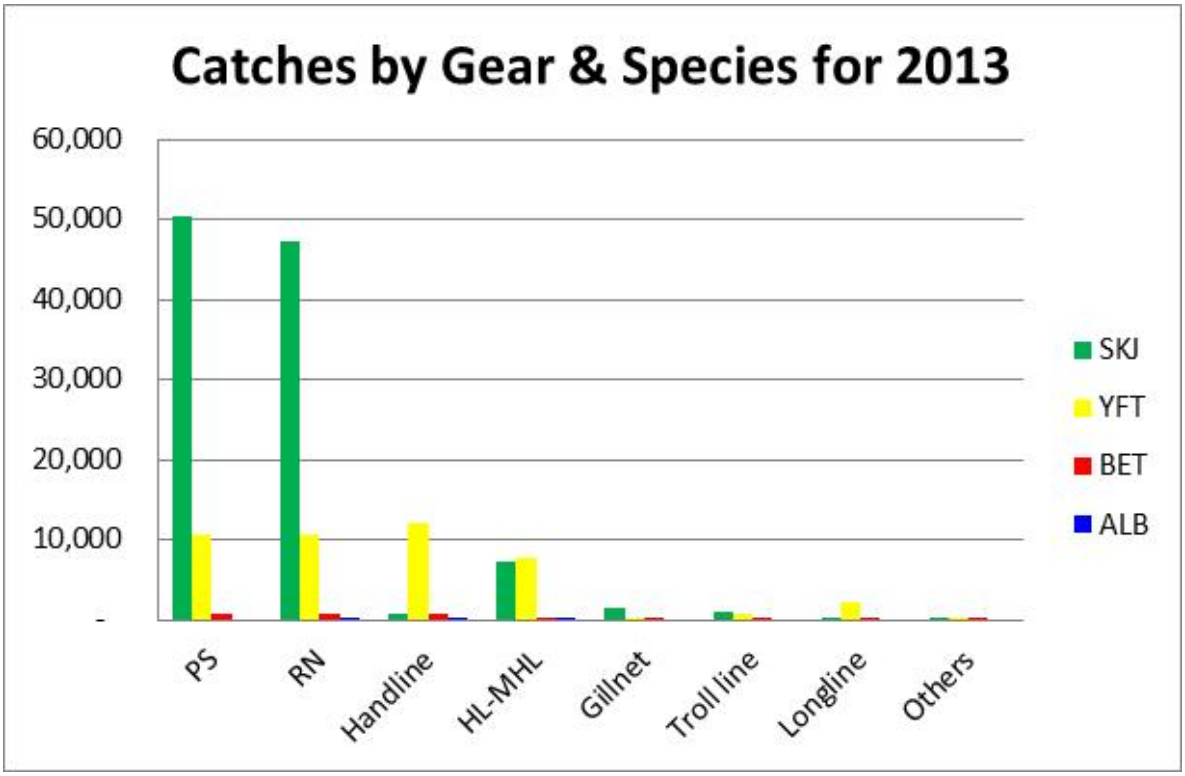
Catches by Gear & Species for 2013
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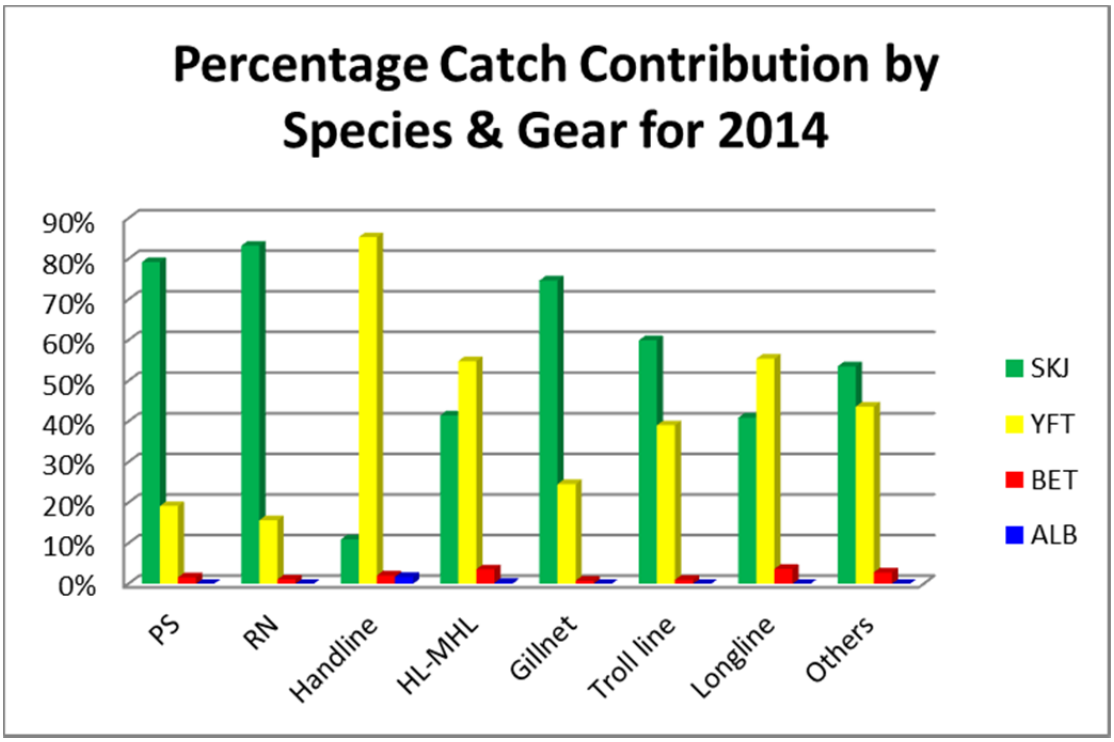
Percentage Catch Contribution by Species & Gear for 2014
90%
80%
70%
60%
50%
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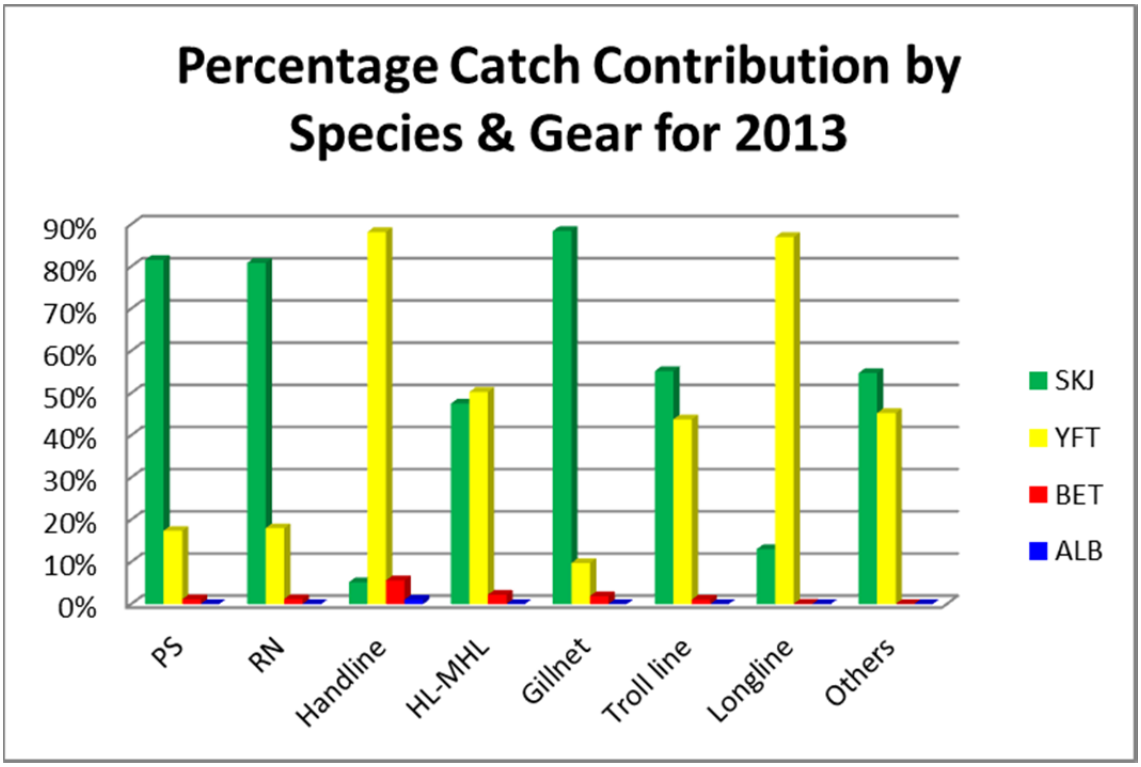
Percentage Catch Contribution by Species & Gear for 2013
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APPENDIX 8 – Project Status: CRITERIA FOR OPTIMUM SITE SELECTION

Criteria for Selection of Optimum Sample Size and Individual Landing Sites for Port Sampling and Data Collection to Improve the Accuracy of Total Annual Tuna Catch Estimates of the Philippines Summary of estimates by Gear and Species 2014 and 2013

1. Introduction

The Western and Central Pacific Fisheries Commission (WCPFC) manages highly migratory fish stocks in the Western and Central Pacific Ocean, including the West Pacific and East Asian Seas through the WPEA SM Project. The Philippine annual work plan for the 2015 WPEA project activities was agreed in January 2015. According to the Annual Work Plan, the Philippine government will conduct a consultancy work to select the optimum number of landing sites and individual landing sites to improve the accuracy of tuna catch estimates to be submitted to WCPFC. The research will utilize the data collected from nationwide landing sites for 2015 – a one-year BFAR project.

With the one-year BFAR project, all the landing areas throughout the country will be monitored this year, hence, it will be a good opportunity to conduct a study that will be able to determine and select the optimum number of landing sites and specific landing sites for data collection, assuming that in the coming years there will be lesser funds available for the monitoring of landed catches. In this case, identifying priority landing sites and determining the optimum number of landing sites (sample size) will greatly enhance the capacity of the Philippine government to provide accurate total tuna catch estimates even with fewer landing sites for data collection.

2. Objectives of the Project

The Terms of Reference (TOR) clearly sets the objective of the study to be the enhancement of national capacity of providing more accurate tuna catch estimates by identifying key landing sites for port sampling and data collection under limited government budget in the future. Specifically,

a) develop some experimental set-ups to conduct this research using statistical sampling techniques and potential multivariate analysis as appropriate;
b) identify and make a list of various factors that can influence the selection of landing sites to improve the reliability of annual total catch estimates – these factors will be used as criteria for the selection of key landing sites under budget constraint;
c) identify landing sites based on a) and b), considering species, gear and geographic distance for cost-effective data collection; and
d) evaluate the different sets of sampling sites (combination of landing sites) to be suggested using the data from the one-year government project.

3. Criteria Setting

It is important that criteria for initially identifying the landing sites be set in place. Evaluation of accuracy may be done only after the 2015 data collected is made available for analysis. The basic data to be used for setting the criteria set is the 2014 data on catches by species and by gear for each sampled landing site. The total number of NSAP sites prior to 2014 is 176, while in 2014, it is increased to 682.

Table 1. Number of Landing Sites per Region

Region	Existing	2014
1	22	60
2	12	76
3	15	41
4A	3	25
4B	4	49
5	21	72
6	12	69
7	7	48
8	10	0
9	14	39
10	14	26
11	18	32
12	8	22
CARAGA	8	54
ARMM	8	30
CAR	0	24
NFBC	0	15
TOTAL	**176**	**682**

In this study, the goal is to find a smaller number of sites to be sampled without sacrificing much of the accuracy in estimation in the event that the current number of landing sites will be further reduced to just around 30-50 sites. It is assumed for the moment that with this smaller number of sites, the main goal is to estimate at the national level.

The criteria for identifying the potential sampling sites will involve the following steps:

1. Identify the top-producing provinces based on annual catch (by species of tuna and overall) from the PSA-BAS reported figures and identify the corresponding NSAP sites within these provinces as an initial guide.
2. Identify the top-producing landing sites based on annual catch (by species of tuna and overall, by type of landing site, by fishing gear) from the NFRDI/BFAR reported figures as an initial guide.
3. The identified sites from the first two steps will be matched and produce a pool of potential landing sites.
4. Each of the identified landing sites will be analyzed using time series data (monthly frequency) to evaluate if any seasonality or structural break in the pattern is present. Each will also be evaluated based on the variety of species,

and gear types. If data is available, compliance with the 10% sub-sampling suggestion will also be evaluated. The proposed landing sites to be sampled will be identified based on the results of these analyses.

5. Lastly, cost and accuracy will be evaluated once the 2015 NSAP data is available.

4. Illustration

At the time the following outputs were generated, NFRDI was still encoding some of the 2014 data. The team currently has the list of WPEA sites, but not the list for all 682 NSAP sites covered in 2014. This illustration only shows the first step in identifying the potential landing sites.

4.1 Current WPEA Sites

Currently, there are 35 NSAP-WPEA sites, i.e., the WPEA Project gives funding for monitoring these landing sites. Most of these sites, according to NFRDI, have significant tuna unloadings based on BFAR-NSAP Regional Office recommendation. The identified NSAP-WPEA sites are

Table 2. List of NSAP-WPEA Sites by Region

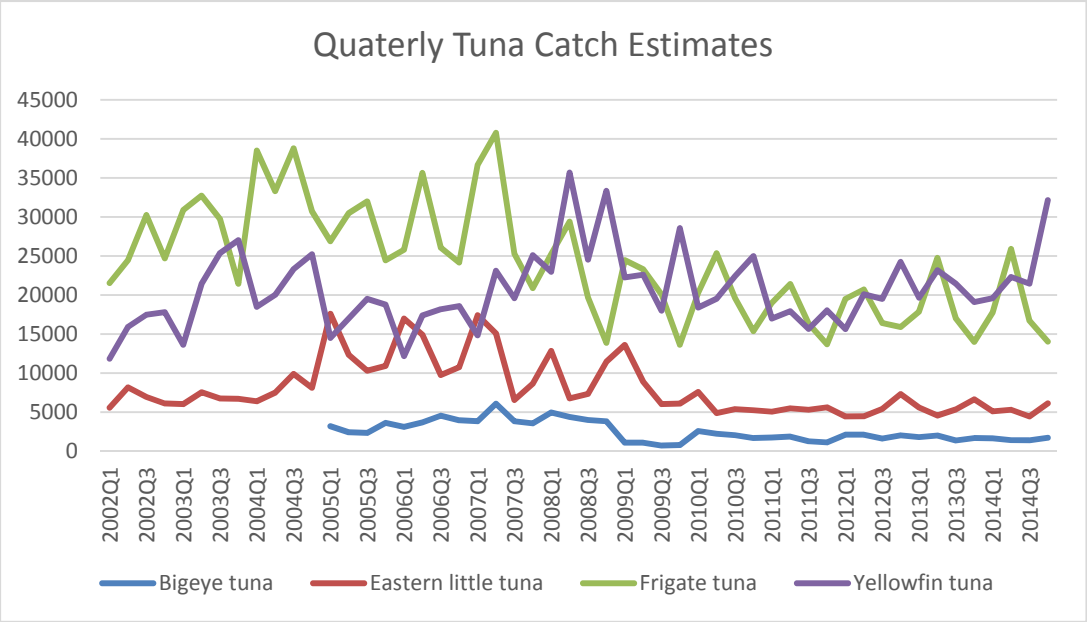
REGION	LANDING CENTER
1	Balinga say, Bolinao, Pangasinan
	Luciente 1, Bolinao, Pangasinan
3	Calibungan Landing Center, Tarlac
	Subic Fishport, Zambales
4B	Bgy. Bagong Silang, Oriental Mindoro
	Brgy. Bancao Bancao/Jacana, Palawan
	Brgy. Matahimik Fishport, Palawan
	Mamburao, Occidental Mindoro (Brgy. II)
	Mamburao, Occidental Mindoro (Brgy.. VII)
	Poblacion, Sablayan, Occidental Mindoro
	Buenavista, Sablayan, Occidental Mindoro
5	Batalay, Catanduanes
	Cabugao, Catanduanes
	Pananaogan, Catanduanes
	Pioduran, Albay
6	Buruanga Aklan, Fish Port of Alegria
	Talisayan, Anini-y, Antique
8	Rodsan Ngolos Guiuan, Eastern Samar
	Sabang 1 Borongan, Eastern Samar
	Sabang 2 Borongan, Eastern Samar
	Sapao Beach Guiuan, Eastern Samar
	Rawis Fishport, Borongan, Eastern Samar

REGION	LANDING CENTER
CARAGA	Manggagoy, Bislig City, Surigao del Sur
	Santan, Bungtod, Surigao del Sur
	Tandag, Bungtod, Surigao del Sur
	Unidad/Aras-Asan, Surigao del Sur
11	Jamboree A, Davao Oriental
	Pob. Kinanga 1, Davao Occidental
	Pob. Kinanga 2, Davao Occidental
	Lower Tagawisan, Davao Oriental
12	M-1, GSCFPC, South Cotabato
	M-3, GSCFPC, South Cotabato
	M-2, GSCFPC, South Cotabato
ARMM	Jolo, Sulu
	Tapian D.O.S., Maguindanao

4.2 Philippine Statistics Authority Data on Fisheries

The dataset utilized in this analysis came from the Commercial Fisheries Volume of Production by Species in the CountrySTAT database. The PSA quarterly catch dataset has only four species of tuna, namely: Big Eye tuna, Eastern little tuna, Frigate tuna, and Yellow Fin tuna. The available dataset runs from first quarter of 2002 until last quarter of 2014; however, the data on the quarterly catch of Big Eye tuna started in first quarter of 2005. The figure below shows the quarterly movement of the tuna catch by species.

Initial time series analyses show that eastern little, frigate, and yellow fin tuna exhibited seasonality. The eastern little tuna catch shows significantly lower catch during the first and third quarters as compared to the last quarter. Moreover, the frigate tuna catch during first and second quarters appear to be significantly higher than the last quarter of each year, with the first quarter being the quarter with the highest catch. Furthermore, the first and third quarters of the yellow fin catch tend to be significantly lower as compared to fourth quarter of each year, with the first quarter being the quarter with the lowest catch in each year. In the case of big eye tuna, seasonality appeared to be absent in the quarterly tuna catch data.



4.3 Provinces with the Highest Tuna Catch by Species

South Cotabato, Zamboanga del Sur, Sulu and Quezon are the top provinces which have the highest yellow tuna catch in 2014. While South Cotabato and Sulu have NSAP-WPEA sites, there are NSAP sites in regions 4A and 9 which may be explored for the provinces of Quezon and Zamboanga del Sur.

Table 3. Top Producing Provinces for Yellow Fin Tuna

Province	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Annual	Cumulative Total	Cumulative %
South Cotabato	14333.61	14210.42	14076.3	23292.96	65913.29	65913.29	69.00%
Zamboanga del Sur	1052.92	1075.58	1439.83	1476.23	5044.56	70957.85	74.28%
Sulu	925.57	671.88	991.36	1808.52	4397.33	75355.18	78.89%
Quezon	342.7	788.27	645.36	627.87	2404.2	77759.38	81.40%
Eastern Samar	285.13	825.2	635.3	411.4	2157.03	79916.41	83.66%
Palawan	114.74	885.92	193.57	593.37	1787.6	81704.01	85.53%
Davao City	173.78	325.9	484.97	498.13	1482.78	83186.79	87.09%
Lanao del Norte	212.08	340.64	111.74	227.72	892.18	84078.97	88.02%
Iloilo	101.07	46.26	300	368.15	815.48	84894.45	88.87%
Metro Manila	129.96	198.24	269.03	160.84	758.07	85652.52	89.67%

For frigate tuna, 12 provinces give about 80% of the total annual catch in 2014. These provinces are Sulu, Quezon, Zamboanga del Sur, Metro Manila, South Cotabato, Misamis Occidental, Zamboanga City, Cebu, Camarines Sur, Palawan, Iloilo and Lanao del Norte. Of these 12 provinces Sulu, South Cotabato and Palawan currently have NSAP-WPEA sites.

Table 4. Top Producing Provinces for Frigate Tuna

Province	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Annual	Cumulative Total	Cumulative %
Sulu	4187.31	5158.56	3461.52	2649.48	15456.87	15456.87	20.76%
Quezon	2427.51	4379.56	2091.74	2225.23	11124.04	26580.91	35.70%
Zamboanga del Sur	1428.01	1675.53	1533.42	1534.03	6170.99	32751.9	43.98%
Metro Manila	877.2	3480.32	739.64	488.62	5585.78	38337.68	51.49%
South Cotabato	1188.23	2366.1	1189.76	487.95	5232.04	43569.72	58.51%
Misamis Occidental	809.78	1354.29	1222.63	79.7	3466.4	47036.12	63.17%
Zamboanga City	1409.24	571.4	392.75	761.95	3135.34	50171.46	67.38%
Cebu	676.02	781.21	501.18	415.2	2373.61	52545.07	70.57%
Camarines Sur	404	625.01	696.96	544.02	2269.99	54815.06	73.61%
Palawan	371.82	778.62	519.28	436.34	2106.06	56921.12	76.44%
Iloilo	277.6	83.92	128.52	977.62	1467.66	58388.78	78.41%
Lanao del Norte	202.38	649.6	290.52	267.38	1409.88	59798.66	80.31%

In the case of big eye tuna, the top provinces are Davao City, Quezon, Sulu, Iloilo, Albay, South Cotabato, Leyte and Zamboanga del Sur.

Table 5. Top Producing Provinces for Big Eye Tuna

Province	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Annual	Cumulative Total	Cumulative %
Davao City	159.76	356.48	431.95	308.44	1256.63	1256.63	20.34%
Quezon	53.68	277.61	306.69	321.63	959.61	2216.24	35.87%
Sulu	609.61	55.85	62.43	74.79	802.68	3018.92	48.86%
Iloilo	359.43	25.91	34.79	90.95	511.08	3530	57.13%
Albay	109.15	106.39	130.33	150.18	496.05	4026.05	65.16%
South Cotabato	61.21	87.42	82.58	100.62	331.83	4357.88	70.53%
Leyte		4.25	61.64	263.67	329.56	4687.44	75.86%
Zamboanga del Sur	17.81	108.39	49.07	94.11	269.38	4956.82	80.22%
Lanao del Norte	23.84	84.72	35.46	34.82	178.84	5135.66	83.11%
Occidental Mindoro	66.25	20.52	34.63	19.24	140.64	5276.3	85.39%

Finally, for eastern little tuna, the top producing provinces are Sulu, Zamboanga del Sur, Zamboanga City, Misamis Occidental, Zamboanga del Norte, South Cotabato and Albay.

Table 6. Top Producing Provinces for Eastern Little Tuna

Province	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Annual	Cumulative Total	Cumulative %
Sulu	2063.01	2502.18	1998.59	2903.69	9467.47	9467.47	45.12%
Zamboanga del Sur	973.24	607.3	1073.05	1355.47	4009.06	13476.53	64.23%
Zamboanga City	141.44	714.4		590.47	1446.31	14922.84	71.13%
Misamis Occidental	519.76	65.05	97.57	78.64	761.02	15683.86	74.75%
Zamboanga del Norte	210.47	47.21	185.77	87.43	530.88	16214.74	77.28%
South Cotabato	145.9	305.73	2.02	34.2	487.85	16702.59	79.61%
Albay	42.95	48.47	169.54	178.96	439.92	17142.51	81.71%
Cagayan	46.63	184.9	157.19	37.34	426.06	17568.57	83.74%
Basilan	74.45	41.78	123.58	85.04	324.85	17893.42	85.28%
Cebu	27	165	85	40	317	18210.42	86.80%

For all species, the top provinces are South Cotabato, Sulu, Zamboanga del Sur, Quezon, Metro Manila, Zamboanga City, Misamis Occidental, Palawan, Eastern Samar and Iloilo.

Table 7. Top Producing Provinces for All Four Species

Province	Yellow Fin	Frigate	Big Eye	Eastern	TOTAL	Cumulative Total	Cumulative %
South Cotabato	65913.29	5232.04	331.83	487.85	71965.01	71965.01	36.50%
Sulu	4397.33	15456.87	802.68	9467.47	30124.35	102089.4	51.78%
Zamboanga del Sur	5044.56	6170.99	269.38	4009.06	15493.99	117583.4	59.64%
Quezon	2404.2	11124.04	959.61	0	14487.85	132071.2	66.99%
Metro Manila	758.07	5585.78	0	153.9	6497.75	138569.0	70.29%
Zamboanga City	737.13	3135.34	0	1446.31	5318.78	143887.7	72.99%
Misamis Occidental	157.07	3466.4	71.14	761.02	4455.63	148343.4	75.25%
Palawan	1787.6	2106.06	16.66	220.28	4130.60	152474.0	77.34%
Eastern Samar	2157.03	1169.49	137.47	0	3463.99	155938.0	79.10%
Iloilo	815.48	1467.66	511.08	169.29	2963.51	158901.5	80.60%

Given this list of top producing provinces, the landing sites under each province will further be analyzed. In the case of Region 8, the 2013 data will be used as a basis. Currently there are no NSAP sites in Region 8, but the possibility of having NSAP sites again in the region in the future cannot be discounted.

The same procedure will be done on the landing sites covered in 2014, i.e., top producing landing sites will be determined, but this will be done with greater detail considering the gear type and species.

Attachment D

EIGHTH PHILIPPINES/WCPFC ANNUAL TUNA FISHERIES CATCH ESTIMATES REVIEW WORKSHOP

25-26 May 2015

RECOMMENDATIONS

Draft

1. The workshop recommended that **WCPFC/SPC** (in collaboration with **BFAR/NFRDI**) develop an instructions document (initially an electronic version) clearly outlining how to undertake the catch estimation process, including data review process, for purse seine, ringnet and large-fish Handline gears. This document should include, *inter alia*, flow-charts describing the steps involved, what needs to be included/excluded and responsibilities in compiling and providing data to be used in the catch estimation process (**for example, see ANNEX A**). In particular, the following should be included:
    a. The table showing the breakdown of the Philippines-flagged purse seine fleets into categories of sub-fleet which is to be used to compile catch estimates.
    b. A list of the Philippines-flagged purse seine vessels and an indication as to what category they belong to. This list should be used in the compilation of data.
    c. Template tables to be used for data review WS for each Region and for catch estimates WS as an appendix of the document.
    d. Previous year Data Review WS and Catch Estimates WS reports attached as an illustration.

    This document should be distributed to all relevant stakeholders **before the end of 2015, with subsequent reminders leading up to the next workshop**, to prepare for the estimation of 2015 catches. All stakeholders (**BFAR, PSA, PFDA** and **Industry Associations/Representatives)** will be expected to provide presentations of their estimates at future workshops. This document should be reviewed and updated each year to take into account any improvements in the process. This may also require inter-agency (BFAR/NFRDI, PSA and PFDA) validation workshops to be conducted throughout the year to facilitate the process (coordinated by BFAR/NFRDI).

2. The workshop recommended that **BFAR and NFRDI, in collaboration with WCPFC/SPC,** continue to review the differences observed in (i) catch/effort reported and (ii) species and size composition, produced from different data sources (observer data, logbooks, NSAP, cannery data), and report the findings at the next workshop. If necessary, BFAR/NFRDI will have a one-day meeting to finalize the sources of such differences. The primary focus should be on the HSP purse seine vessels but the work should also be extended to other fleets, where relevant.

3. The workshop recommended that **BFAR/NFRDI** and **Industry** follow-up with the fishing companies identified as not providing logsheets to ensure the timely submission of logsheet data, highlighting this requirement as an important WCPFC member-country data submission obligation. (The purse seine fishery is the primary focus at this stage).

4. In regards to initiatives related to E-Reporting, the workshop recommended

    a. **BFAR/NFRDI** liaise with the MARLIN E-Logbook technical service provider to obtain and provide WCPFC/SPC with a sample data file, and then

b. **WCPFC/SPC** will develop a data loader so that detailed vessel logbook data produced from the MARLIN E-Logbook system can be loaded into the NFRDI's version of the TUFMAN, thereby facilitating the submission of operational data to the WCPFC as a member country reporting obligation.

5. **BFAR/NFRDI** will compile NSAP data collected under BFAR 1-year project from all landing sites and convene a consultation meeting with **University of Philippines Statistical Team (UPST)** to brief the frame and scope of NSAP data. **BFAR Regional offices** should submit their 2014 NSAP data as soon as possible to the BFAR/NFRDI central office to ensure all data are available for this study. **UPST** will finalize detailed proposal and submit it to **BFAR/NFRDI** and Project Manager by the end of September 2015. UPST will conduct analysis according to the agreed TOR and present a progress report at a workshop in October/November 2015. Further analysis will continue to provide preliminary results at 2016 NSAP Data Review and Annual Catch Estimates WS.

6. **BFAR/NFRDI** will liaise with **PSA** to review their respective 2014 regional estimates (NSAP-derived and PSA) that differ considerably and report to the next workshop. The regions identified as high priority to be addressed before the other regions are:

   a. Region 9 - Zamboanga Peninsula
   b. Region 12 - SOCCSKSARGEN
   c. Region - ARMM

7. The workshop recommended a dedicated agenda item at next year's workshop to review the methods used in each region to estimate catches in non-NSAP sites, in order to determine the best approach for a standardized estimation process to be used by all regions for the non-NSAP sites (for example, the rapid assessment, interviews, gear/vessel inventory, other approach, etc.). **BFAR/NFRDI** and **BFAR regional offices** will provide a detailed explanation of the methodologies they use to estimate catches in non-NSAP sites to be presented at the 2016 NSAP Data Review and Annual Catch Estimates WS.

ANNEX A. Categories of Philippines-flagged PURSE SEINE fleet used for catch estimation

Category of purse-seine catch	Landing Base	FLEET in the WCPFC estimates
1. Catch from Philippines-based vessels	Philippines	Philippine "domestic"
2. Catch from Philippines-flagged vessels based in PNG operating under bilateral access (e.g. TPJ)	PNG	Philippine "distant-water" [distinguish from "domestic"]
3. Catch from Philippines-flagged catcher vessels, based in PNG (bilateral access) landed into the Philippines (catch may arrive via carrier)	PNG (catcher) Philippines (carrier)	[do not include – counted in logsheets provided from 2. above]
4. Foreign-flagged catcher vessels, landed into Philippine ports (catch may arrive via carrier)	Philippines	FOREIGN-FLAG CATCH [do not include – counted elsewhere]
5. Catch from Philippines-flagged vessels operating under joint-venture fishing companies in PNG (RD Fishing in PNG and Frabelle (PNG) Corporation)	PNG	PNG purse seine catch - charter arrangement [do not include – counted elsewhere]

Criteria for Selection of Optimum Sample Size and Individual Landing Sites for Port Sampling and Data Collection to Improve the Accuracy of Total Annual Tuna Catch Estimates of the Philippines

Presented by

Genelyn Ma. F. Sarte

Kevin Carl P. Santos

- Introduction
- Objectives of the Project
- Criteria Setting
- Initial Runs Using PSA-BAS Data

Introduction

- The Western and Central Pacific Fisheries Commission (WCPFC) manages highly migratory fish stocks in the Western and Central Pacific Ocean, including the West Pacific and East Asian Seas through the WPEA SM Project
- The Philippine annual work plan for the 2015 WPEA project activities was agreed in January 2015
  - According to the Annual Work Plan, the Philippine government will conduct a consultancy work to select the optimum number of landing sites and individual landing sites to improve the accuracy of tuna catch estimates to be submitted to WCPFC
  - The research will utilize the data collected from nationwide landing sites for 2015 – a one-year BFAR project.

Introduction

- With the one-year BFAR project, all the landing areas throughout the country will be monitored this year, hence, it will be a good opportunity to conduct a study that will be able to determine and select the optimum number of landing sites and specific landing sites for data collection, assuming that in the coming years there will be lesser funds available for the monitoring of landed catches
- In this case, identifying priority landing sites and determining the optimum number of landing sites (sample size) will greatly enhance the capacity of the Philippine government to provide accurate total tuna catch estimates even with fewer landing sites for data collection

Objectives of the Project

- Main Objective: the enhancement of national capacity of providing more accurate tuna catch estimates by identifying key landing sites for port sampling and data collection under limited government budget in the future
  - develop some experimental set-ups to conduct this research using statistical sampling techniques and potential multivariate analysis as appropriate;
  - identify and make a list of various factors that can influence the selection of landing sites to improve the reliability of annual total catch estimates – these factors will be used as criteria for the selection of key landing sites under budget constraint;
  - identify landing sites based on a) and b), considering species, gear and geographic distance for cost-effective data collection; and
  - evaluate the different sets of sampling sites (combination of landing sites) to be suggested using the data from the one-year government project

Criteria Setting

- It is important that criteria for initially identifying the landing sites be set in place
- Evaluation of accuracy may be done only after the 2015 data collected is made available for analysis
- The basic data to be used for setting the criteria set is the 2014 data on catches by species and by gear for each sampled landing site
- The total number of NSAP sites prior to 2014 is 176, while in 2014, it is increased to 682.

Region	Existing	2014
1	22	60
2	12	76
3	15	41
4A	3	25
4B	4	49
5	21	72
6	12	69
7	7	48
8	10	0
9	14	39
10	14	26
11	18	32
12	8	22
CARAGA	8	54
ARMM	8	30
CAR	0	24
NFBC	0	15
TOTAL	176	682

Table 1. Number of Landing Sites per Region

Criteria Setting

- The goal is to find a smaller number of sites to be sampled without sacrificing much of the accuracy in estimation in the event that the current number of landing sites will be further reduced to just around 30-50 sites
- It is assumed for the moment that with this smaller number of sites, the main goal is to estimate at the national level

Criteria Setting

- Identify the top-producing provinces based on annual catch (by species of tuna and overall) from the PSA-BAS reported figures and identify the corresponding NSAP sites within these provinces as an initial guide
- Identify the top-producing landing sites based on annual catch (by species of tuna and overall, by type of landing site, by fishing gear) from the NFRDI/BFAR reported figures as an initial guide
- The identified sites from the first two steps will be matched and produce a pool of potential landing sites

Criteria Setting

- Each of the identified landing sites will be analyzed using time series data (monthly frequency) to evaluate if any seasonality or structural break in the pattern is present
- Each will also be evaluated based on the variety of species, and gear type
- If data is available, compliance with the 10% sub-sampling suggestion will also be evaluated
- The proposed landing sites to be sampled will be identified based on the results of these analyses
- Lastly, cost and accuracy will be evaluated once the 2015 NSAP data is available

Initial Runs Using PSA-BAS Data for 2014

Top Producing Provinces for Skipjack

Province	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Annual	Cumulative Total	Cumulative %
South Cotabato	3245955	2863656	2050115	2054634	10214360	10214359.99	82.39%
Zamboanga del Sur	85072.02	66601.98	89427.86	85520.59	326622.5	10540982.44	85.02%
Zamboanga City	87769.04	140508.2	4982.35	84357.75	317617.4	10858599.81	87.58%
Sulu	37420.61	82782.42	78383.07	75469.7	274055.8	11132655.61	89.79%
Eastern Samar	30812.39	64273.69	61462.5	43640.95	200189.5	11332845.14	91.41%
Metro Manila	20769.03	44366.2	55922.8	26418.98	147477	11480322.15	92.60%
Quezon	18590.76	29502.33	9688.42	29878.39	87659.9	11567982.05	93.30%
Iloilo	48973.4	7856.1	5966.4	20224.97	83020.87	11651002.92	93.97%
Zambales	28543.18	11864.93	13875.84	18653.7	72937.65	11723940.57	94.56%
Sultan Kudarat	13921.68	18926.93	19142.5	19911.1	71902.21	11795842.78	95.14%

Initial Runs Using PSA-BAS Data for 2014

Top Producing Provinces for Yellow Fin Tuna

Province	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Annual	Cumulative Total	Cumulative %
South Cotabato	14333.61	14210.42	14076.3	23292.96	65913.29	65913.29	69.00%
Zamboanga del Sur	1052.92	1075.58	1439.83	1476.23	5044.56	70957.85	74.28%
Sulu	925.57	671.88	991.36	1808.52	4397.33	75355.18	78.89%
Quezon	342.7	788.27	645.36	627.87	2404.2	77759.38	81.40%
Eastern Samar	285.13	825.2	635.3	411.4	2157.03	79916.41	83.66%
Palawan	114.74	885.92	193.57	593.37	1787.6	81704.01	85.53%
Davao City	173.78	325.9	484.97	498.13	1482.78	83186.79	87.09%
Lanao del Norte	212.08	340.64	111.74	227.72	892.18	84078.97	88.02%
Iloilo	101.07	46.26	300	368.15	815.48	84894.45	88.87%
Metro Manila	129.96	198.24	269.03	160.84	758.07	85652.52	89.67%

Initial Runs Using PSA-BAS Data for 2014

Top Producing Provinces for Frigate Tuna

Province	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Annual	Cumulative Total	Cumulative %
Sulu	4187.31	5158.56	3461.52	2649.48	15456.87	15456.87	20.76%
Quezon	2427.51	4379.56	2091.74	2225.23	11124.04	26580.91	35.70%
Zamboanga del Sur	1428.01	1675.53	1533.42	1534.03	6170.99	32751.9	43.98%
Metro Manila	877.2	3480.32	739.64	488.62	5585.78	38337.68	51.49%
South Cotabato	1188.23	2366.1	1189.76	487.95	5232.04	43569.72	58.51%
Misamis Occidental	809.78	1354.29	1222.63	79.7	3466.4	47036.12	63.17%
Zamboanga City	1409.24	571.4	392.75	761.95	3135.34	50171.46	67.38%
Cebu	676.02	781.21	501.18	415.2	2373.61	52545.07	70.57%
Camarines Sur	404	625.01	696.96	544.02	2269.99	54815.06	73.61%
Palawan	371.82	778.62	519.28	436.34	2106.06	56921.12	76.44%
Iloilo	277.6	83.92	128.52	977.62	1467.66	58388.78	78.41%
Lanao del Norte	202.38	649.6	290.52	267.38	1409.88	59798.66	80.31%

Initial Runs Using PSA-BAS Data for 2014

Top Producing Provinces for Big Eye Tuna

Province	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Annual	Cumulative Total	Cumulative %
Davao City	159.76	356.48	431.95	308.44	1256.63	1256.63	20.34%
Quezon	53.68	277.61	306.69	321.63	959.61	2216.24	35.87%
Sulu	609.61	55.85	62.43	74.79	802.68	3018.92	48.86%
Iloilo	359.43	25.91	34.79	90.95	511.08	3530	57.13%
Albay	109.15	106.39	130.33	150.18	496.05	4026.05	65.16%
South Cotabato	61.21	87.42	82.58	100.62	331.83	4357.88	70.53%
Leyte		4.25	61.64	263.67	329.56	4687.44	75.86%
Zamboanga del Sur	17.81	108.39	49.07	94.11	269.38	4956.82	80.22%
Lanao del Norte	23.84	84.72	35.46	34.82	178.84	5135.66	83.11%
Occidental Mindoro	66.25	20.52	34.63	19.24	140.64	5276.3	85.39%

Initial Runs Using PSA-BAS Data for 2014

Top Producing Provinces for Eastern Little Tuna

Province	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Annual	Cumulative Total	Cumulative %
Sulu	2063.01	2502.18	1998.59	2903.69	9467.47	9467.47	45.12%
Zamboanga del Sur	973.24	607.3	1073.05	1355.47	4009.06	13476.53	64.23%
Zamboanga City	141.44	714.4		590.47	1446.31	14922.84	71.13%
Misamis Occidental	519.76	65.05	97.57	78.64	761.02	15683.86	74.75%
Zamboanga del Norte	210.47	47.21	185.77	87.43	530.88	16214.74	77.28%
South Cotabato	145.9	305.73	2.02	34.2	487.85	16702.59	79.61%
Albay	42.95	48.47	169.54	178.96	439.92	17142.51	81.71%
Cagayan	46.63	184.9	157.19	37.34	426.06	17568.57	83.74%
Basilan	74.45	41.78	123.58	85.04	324.85	17893.42	85.28%
Cebu	27	165	85	40	317	18210.42	86.80%

Thank you very much!!!

Republic of the Philippines
DEPARTMENT OF AGRICULTURE
BUREAU OF FISHERIES AND AQUATIC RESOURCES
PHILIPPINE FISHERIES OBSERVER PROGRAM

SPECIES IDENTIFICATION MANUAL

This Species Identification Manual is a property of Philippine Fisheries Observer Program of the Bureau of Fisheries and Aquatic Resources. It is primarily designed for Fisheries Observer onboard Purse Seine and Longline Fisheries operating in High Seas and in Philippine EEZ.

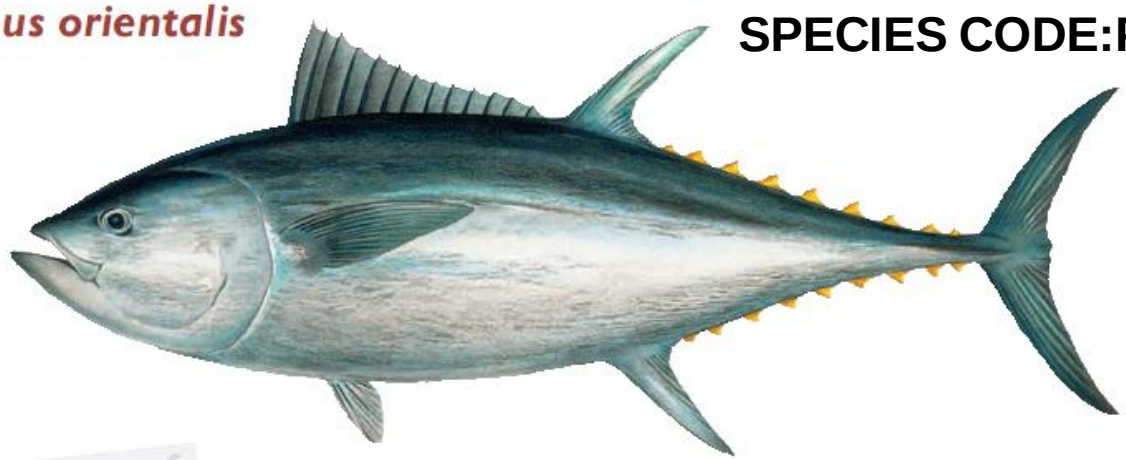
Most fish images are courtesy of Secretariat of Pacific Community (SPC) and can be downloaded at http://www.spc.int/oceanfish/en/species-id-guide . Other photos were taken from http://www.fishbase.org with name of the contributor cited.

Copy of this manual is available at Fisheries Observer Program Management Office, BFAR MCS Station and Fishing Technology Laboratory, Navotas Fishport Complex, Navotas City. Tel: +63 (2) 283-7581. Email: fopmo2010@gmail.com

TUNA

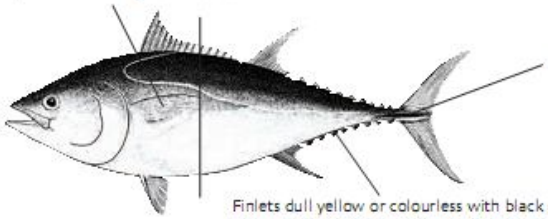
Thunnus orientalis

SPECIES CODE:PBF



English: Pacific bluefin tuna
French: Thon rouge du Pacifique
Japanese: Kuro maguro
Hawaiian: Bluefin tuna
Local:

Pectoral fins short — never reach space between dorsal fins
Nageoires pectorales courtes — ne dépassent jamais l'espace compris entre les nageoires dorsales

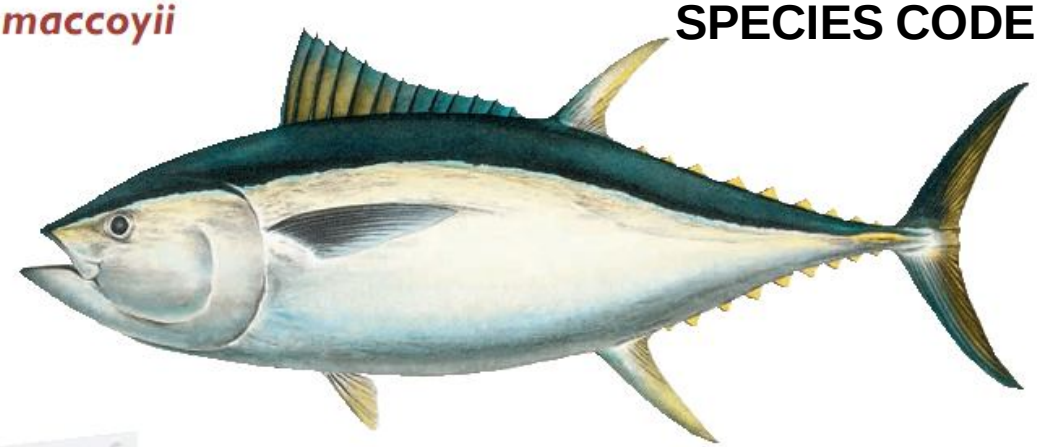


Main caudal keel dark to black
Carène caudale principale, foncée à noire

Finlets dull yellow or colourless with black edge
Pinnules jaune pâle ou incolores à bordure noire

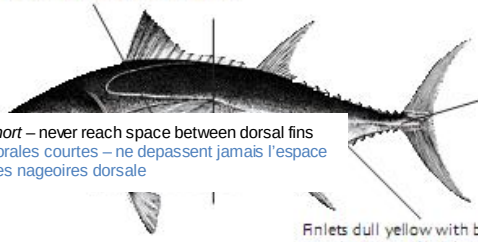
Thunnus maccoyii

SPECIES CODE:SBF



English: Southern bluefin tuna
French: Thon rouge du sud
Japanese: Bachi maguro, Minami maguro
Local:

Pectoral fins short — never reach space between dorsal fins
Nageoires pectorales courtes — ne dépassent jamais l'espace compris entre les nageoires dorsales



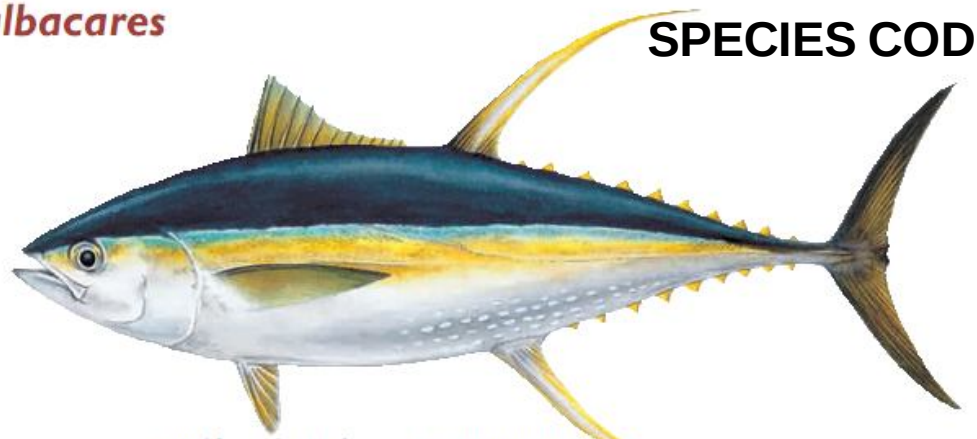
Main caudal keel dull yellow
Carène caudale principale jaune pâle

Pectoral fins short – never reach space between dorsal fins
Nageoires pectorales courtes – ne depassent jamais l'espace
Compris entre les nageoires dorsale

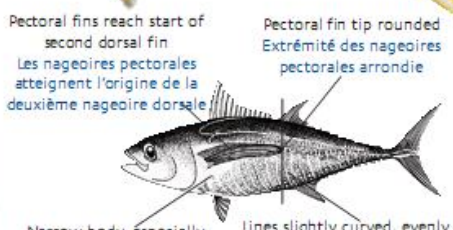
Finlets dull yellow with black edge
Pinnules jaune pâle à bordure noire

Thunnus albacares

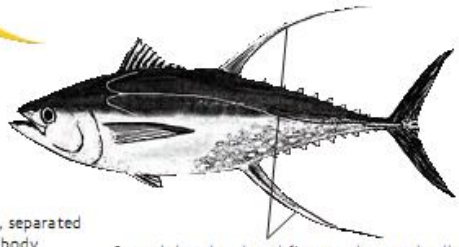
SPECIES CODE:YFT



English: Yellowfin tuna
French: Albacore, Thon jaune
Japanese: Kihada maguro, Shibi
Hawaiian: Ahi (large), Shibi (medium), Shibi-ko (small)
Local:



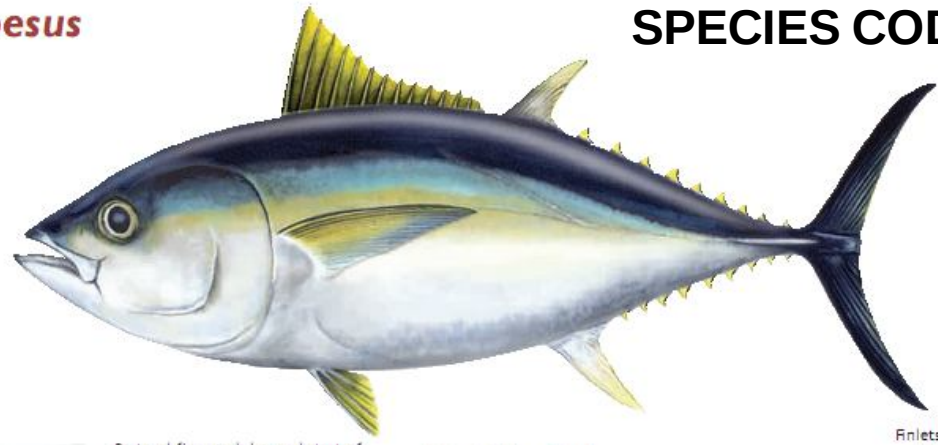
Juvenile (to 70 cm)
Juvénile (jusqu'à 70 cm)



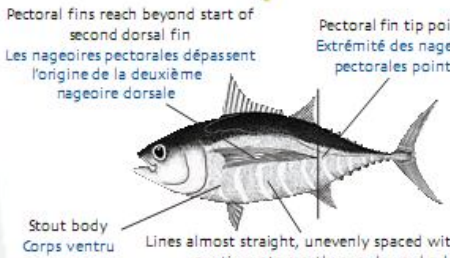
Adult
Adulte

Thunnus obesus

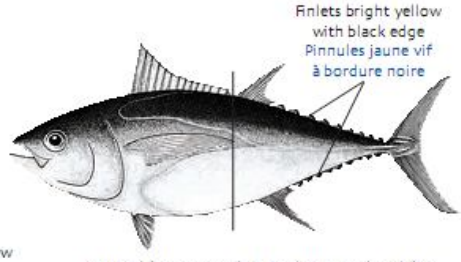
SPECIES CODE:BET



English: Bigeye tuna
French: Thon obèse
Japanese: Mebachi, Mebuto, Shibi
Hawaiian: Ahi, Mebachi, Ahi po'onui
Local:



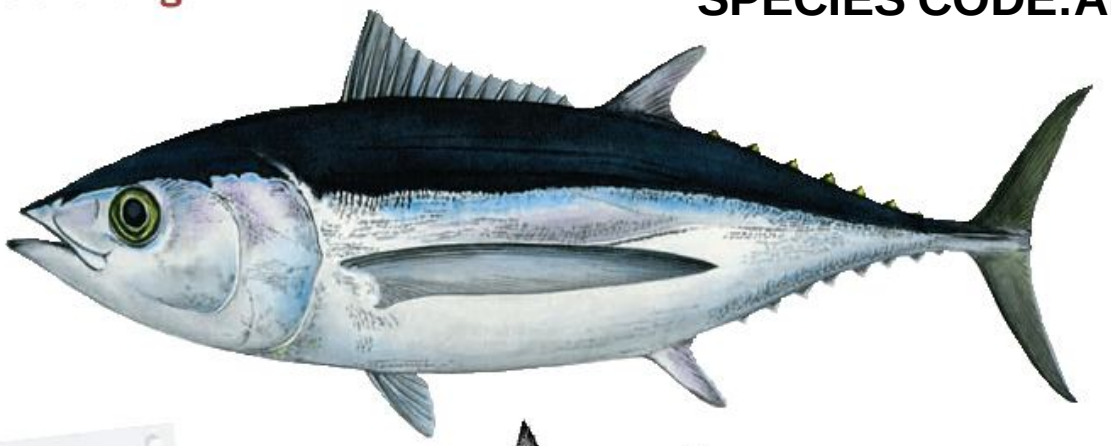
Juvenile (to 70 cm)
Juvénile (jusqu'à 70 cm)



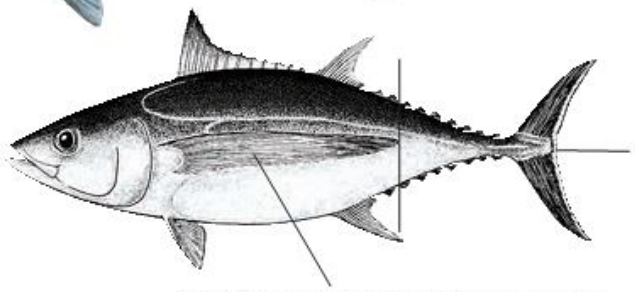
Adult
Adulte

Thunnus alalunga

SPECIES CODE:ALB

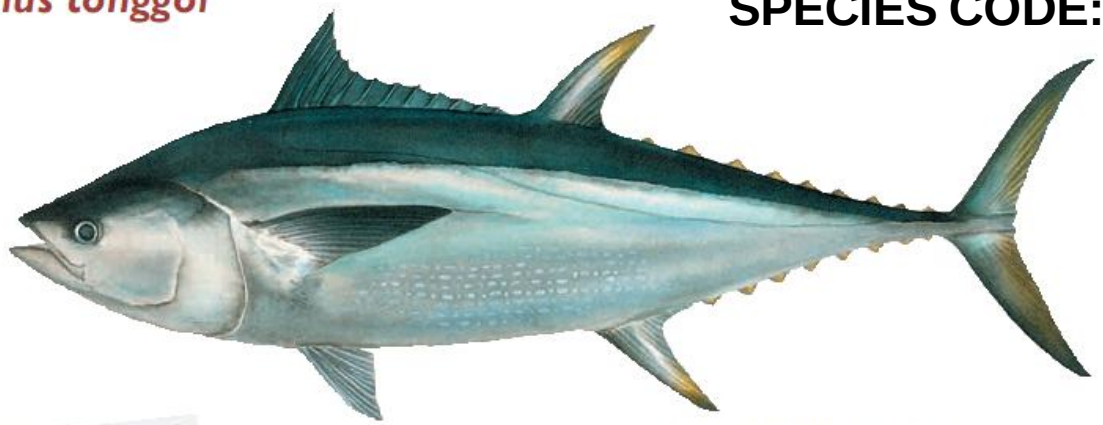


English: Albacore tuna
French: Germon, Thon blanc
Japanese: Tombo, Bincho, Binnaga maguro
Hawaiian: Tombo, Ahi palaha
Local:

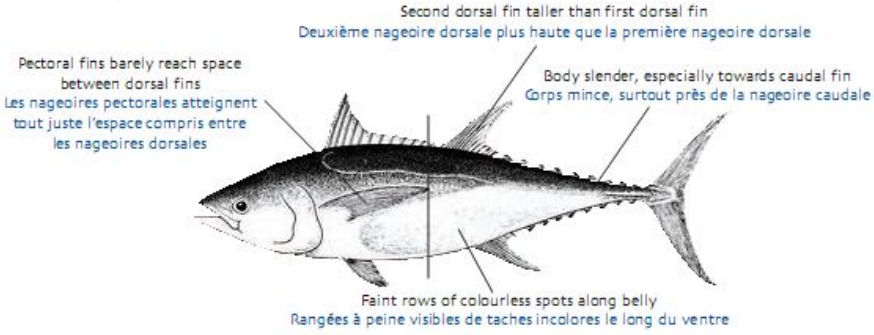


Thunnus tonggol

SPECIES CODE:LOT

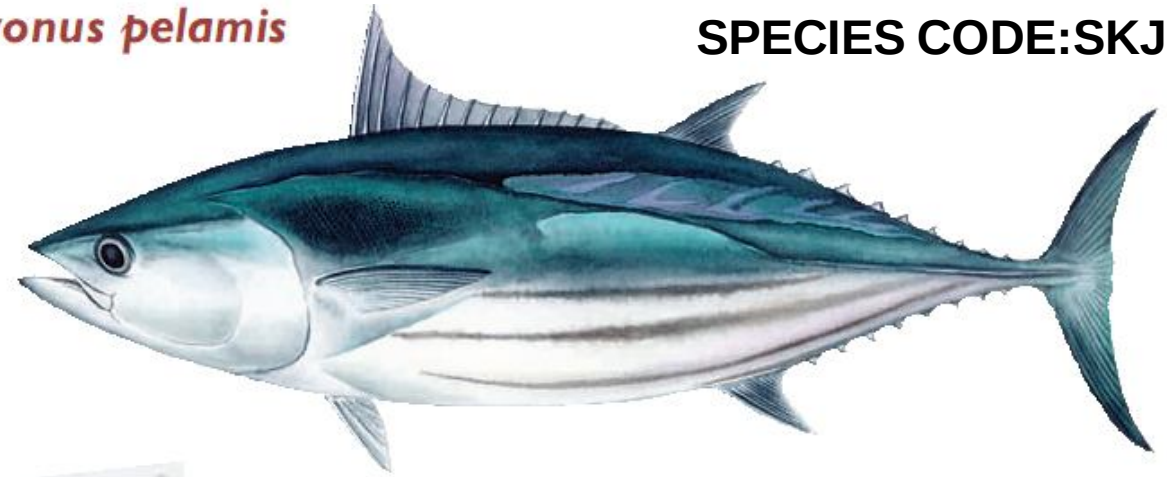


English: Longtail tuna
French: Thon mignon
Japanese: Koshinaga
Local:

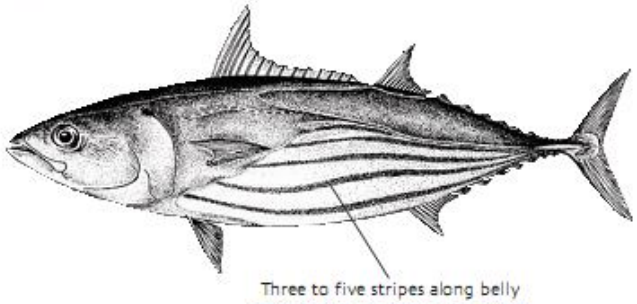


Katsuwonus pelamis

SPECIES CODE:SKJ

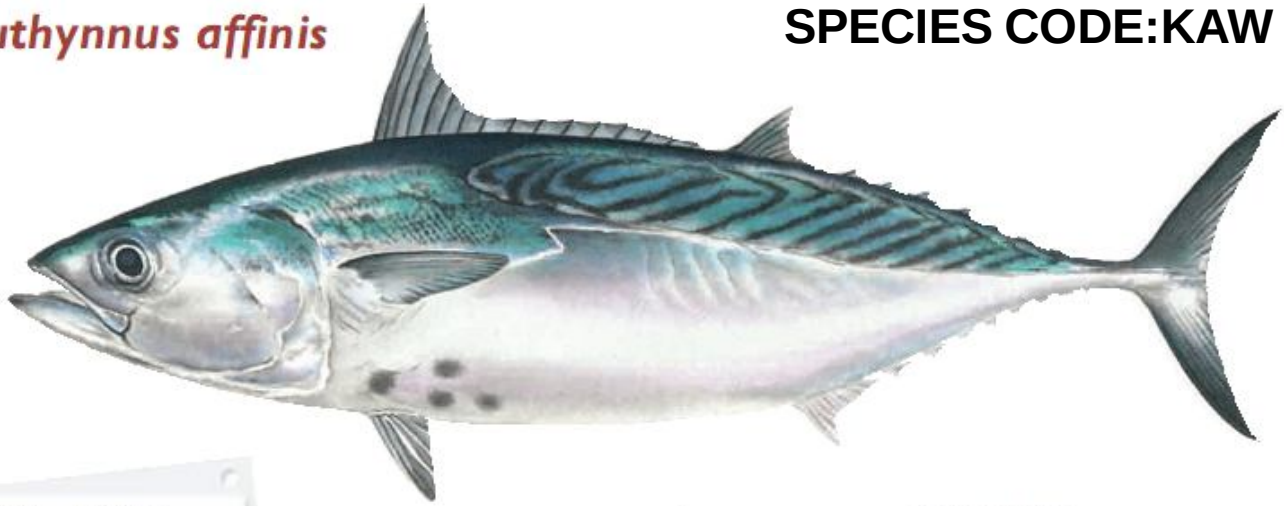


English: Skipjack tuna
French: Bonite à ventre rayé
Japanese: Katsuo
Hawaiian: Aku, Otaru (when large)
Local:

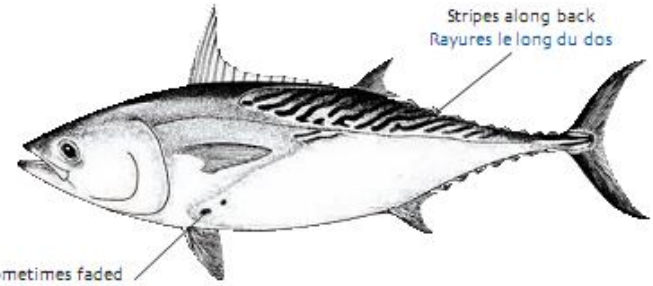


Euthynnus affinis

SPECIES CODE:KAW

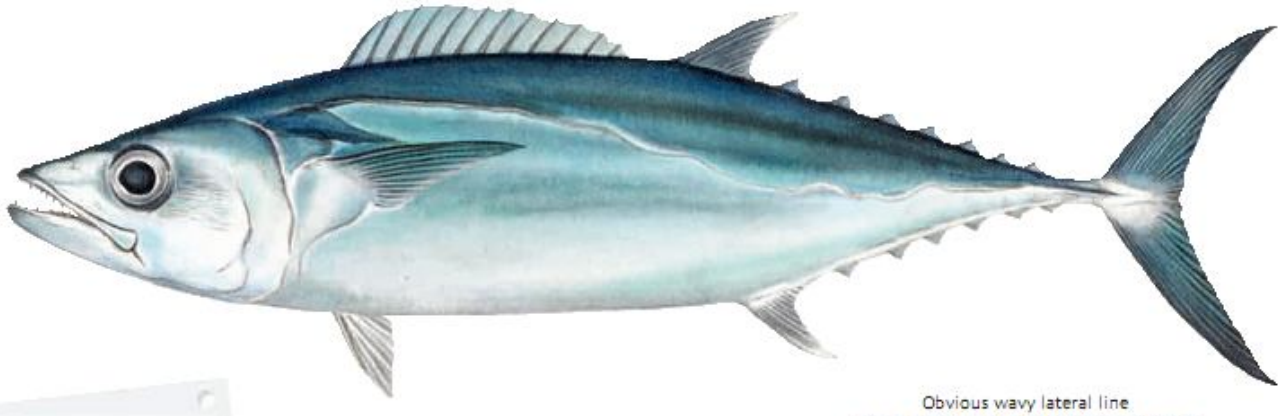


English: Kawakawa, Mackerel tuna
French: Thonine orientale
Japanese: Suma
Hawaiian: Kawakawa
Local:

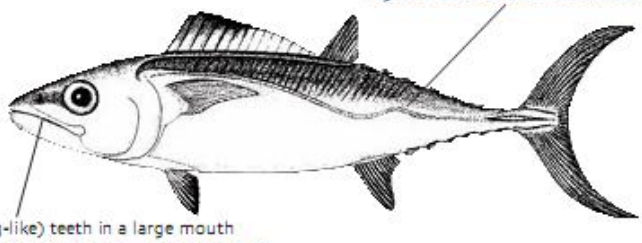


Gymnosarda unicolor

SPECIES CODE:DOT

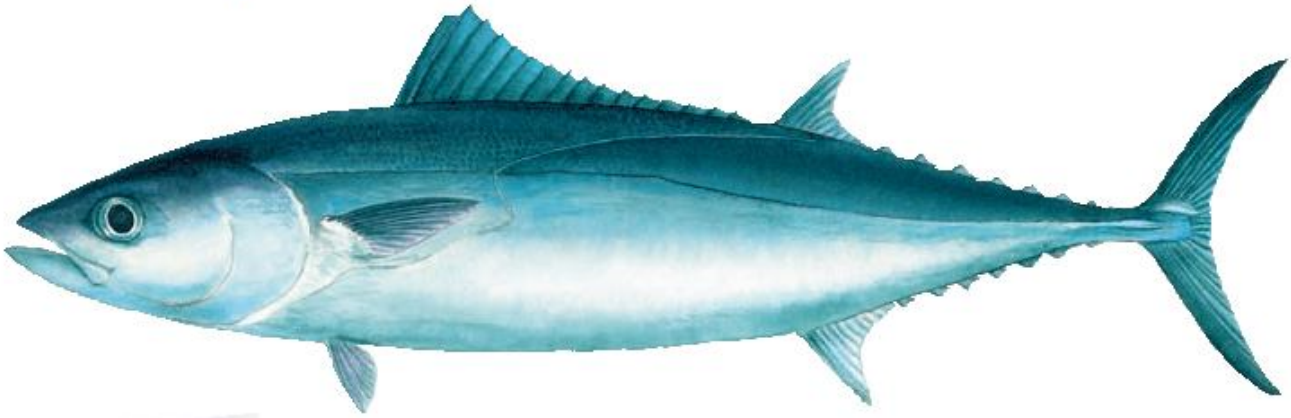


English: Dogtooth tuna
French: Bonite à gros yeux, Thon dents de chien
Japanese: Isomaguro
Local:

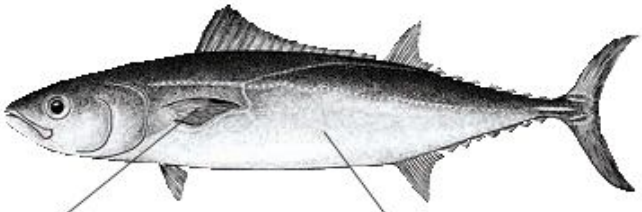


Allothunnus fallai

SPECIES CODE:SLT



English: Slender tuna
French: Thon élégant
Japanese: Hosogatsuo
Local:



Auxis rochei

SPECIES CODE:BLT

Bullet tuna

Photo by Randall J.E

Auxis thazard

SPECIES CODE:FRI

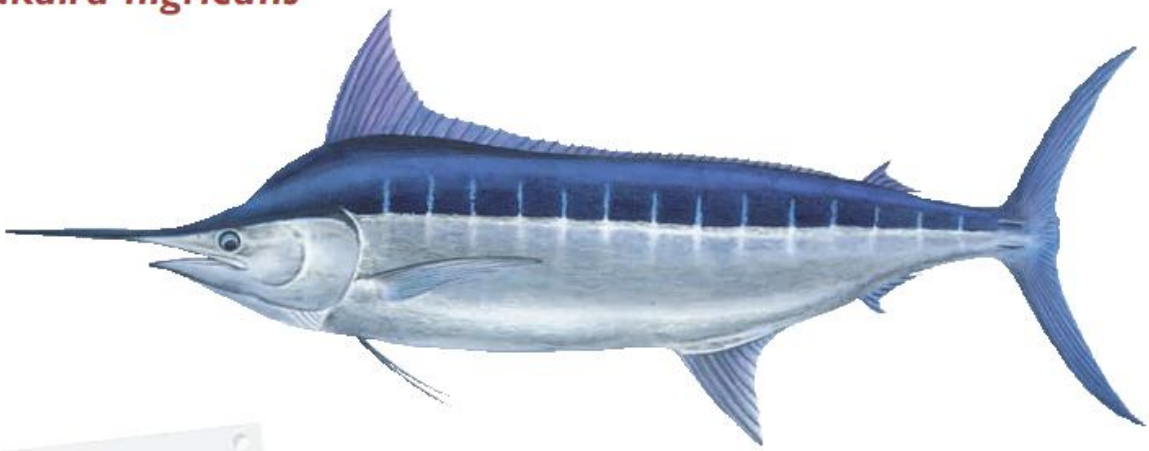
Frigate tuna

Photo by Randall J.E

BILLFISHES

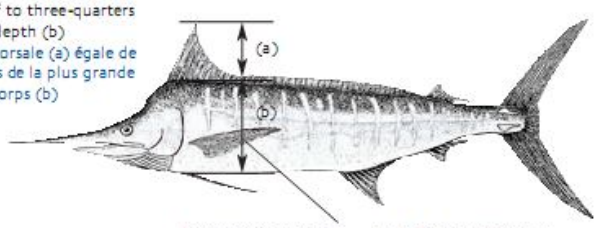
Makaira nigricans

SPECIES CODE:BUM



English: Blue marlin
French: Makaire bleu
Japanese: Nishikuro, Kuro kajiki
Hawaiian: Kajiki, A'u, Blue marlin
Local:

Dorsal fin height (a) half to three-quarters greatest body depth (b)
Hauteur de la nageoire dorsale (a) égale de la moitié aux trois quarts de la plus grande épaisseur du corps (b)



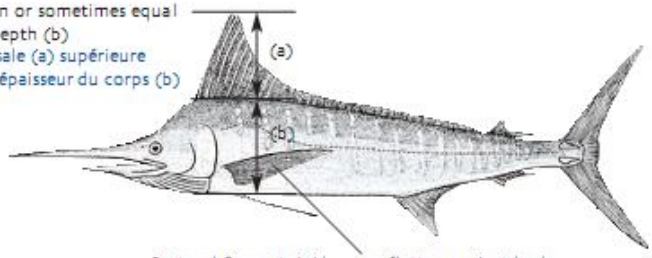
Pectoral fins not rigid — can flatten against body
Nageoires pectorales non rigides — peuvent se replier le long du corps

Tetrapturus audax

SPECIES CODE:MLS

English: Striped marlin
French: Marlin rayé
Japanese: Makajiki, Nairaigi
Hawaiian: Nairaigi, Striped marlin
Local:

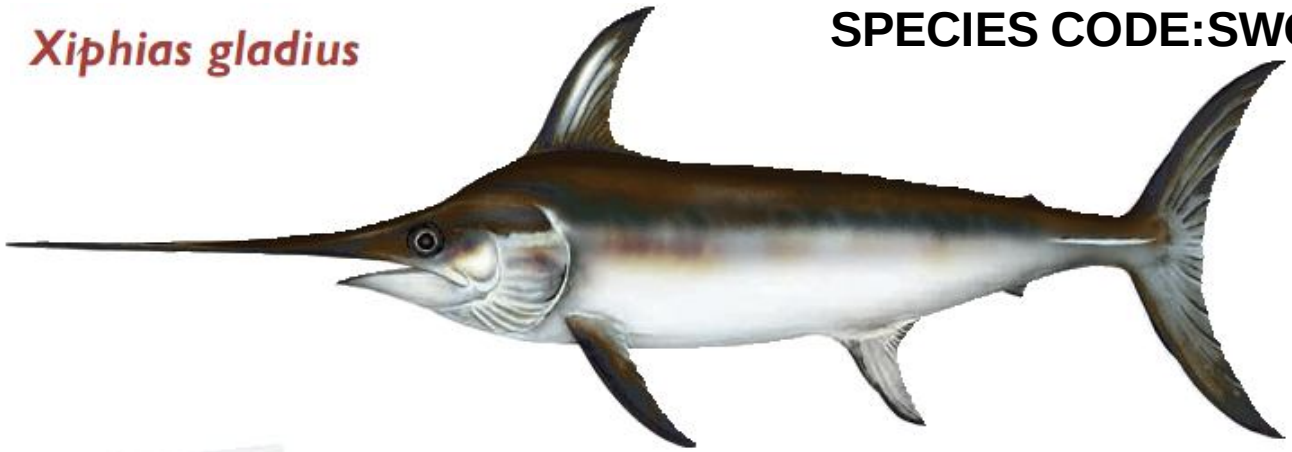
Dorsal fin height (a) higher than or sometimes equal to greatest body depth (b)
Hauteur de la nageoire dorsale (a) supérieure (parfois égale) à la plus grande épaisseur du corps (b)



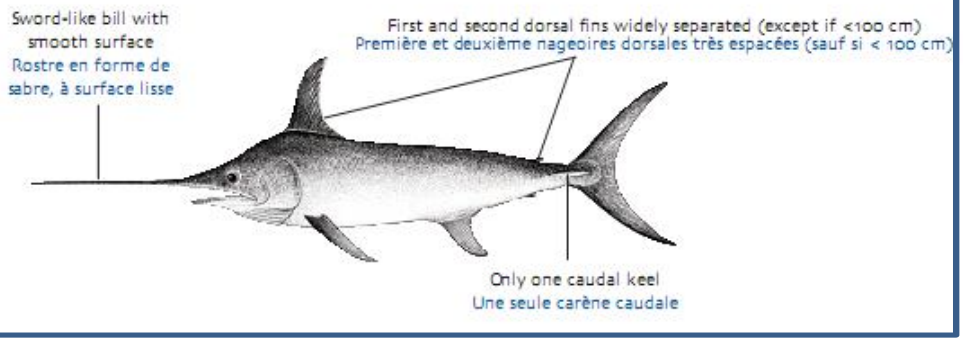
Pectoral fins not rigid — can flatten against body
Nageoires pectorales non rigides — peuvent se replier le long du corps

Xiphias gladius

SPECIES CODE:SWO

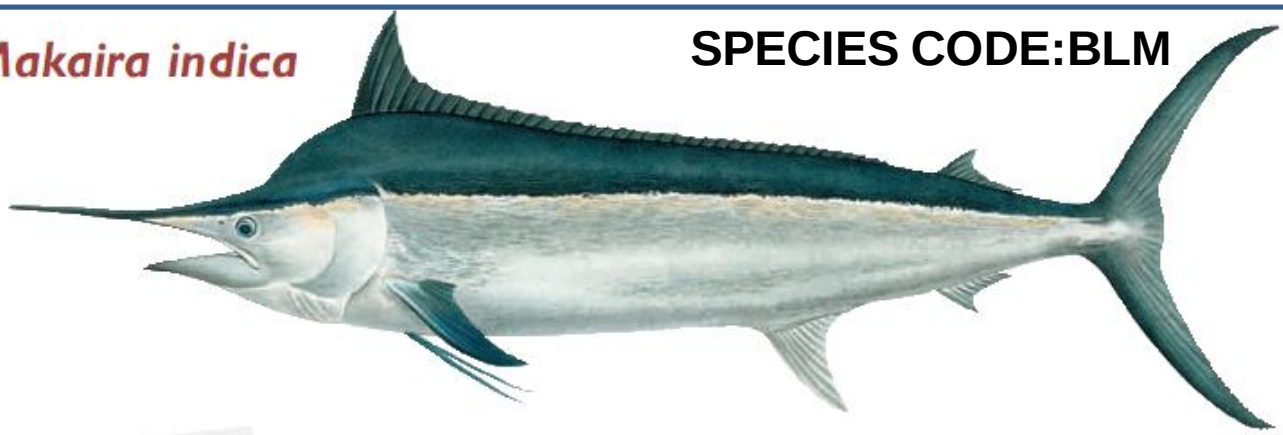


English: Swordfish, Broadbill swordfish
French: Espadon
Japanese: Dakuda, Mekajiki, Shutome
Hawaiian: A'uku, Broadbill, Shutome, Swordfish
Local:

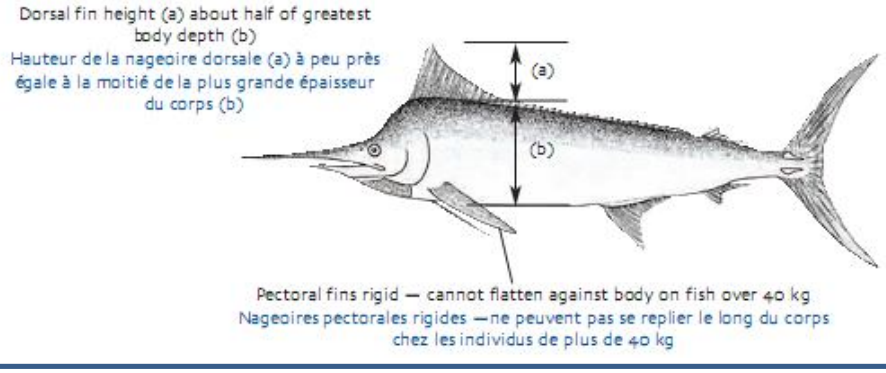


Makaira indica

SPECIES CODE:BLM

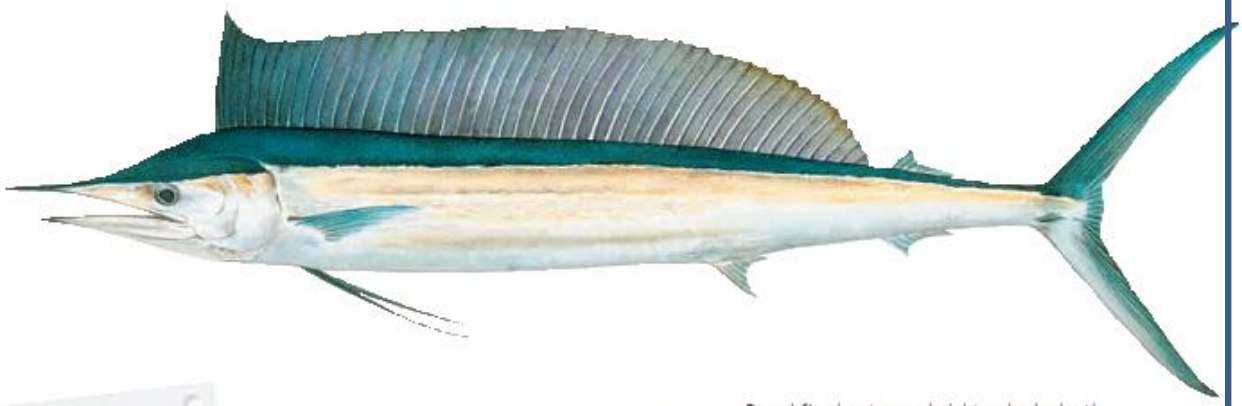


English: Black marlin
French: Makaire noir
Japanese: Shiro kajiki, Shirokawa
Hawaiian: Hida, Hira, A'u, Black marlin
Local:

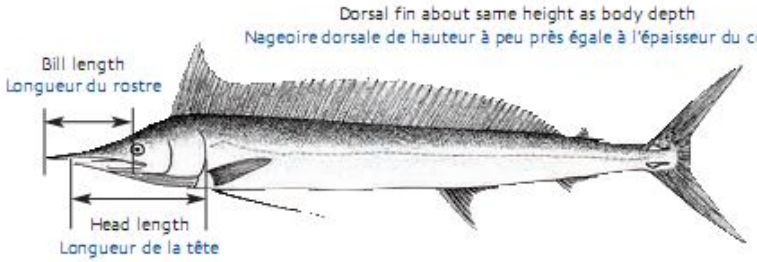


Tetrapturus angustirostris

SPECIES CODE:SSP



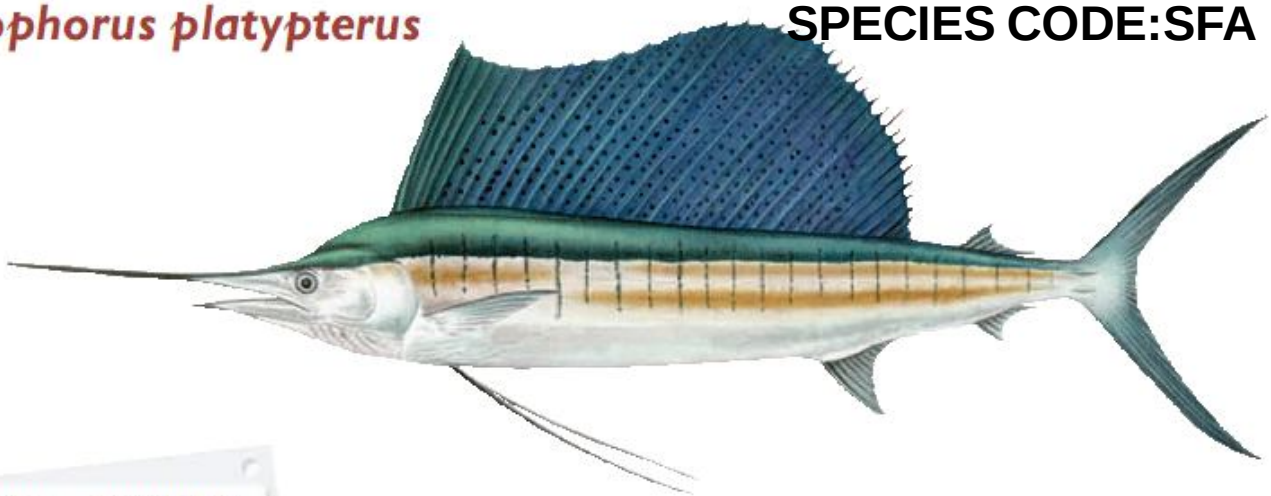
English: Shortbill spearfish
French: Makaire à rostre court
Japanese: Fuurai kajiki
Hawaiian: Hebi
Local:



Bill very short, equal to or shorter than head length
Rostre très court, de longueur égale ou inférieure à celle de la tête

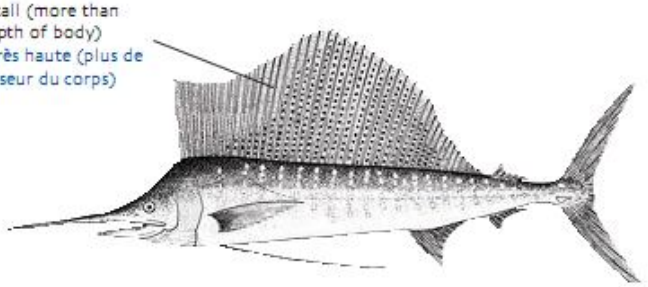
Istiophorus platypterus

SPECIES CODE:SFA



English: Indo-Pacific sailfish
French: Voilier de l'Indo-Pacifique
Japanese: Basho kajiki
Hawaiian: A'u lepe, Sailfish
Local:

Dorsal fin very tall (more than two times depth of body)
Nageoire dorsale très haute (plus de deux fois l'épaisseur du corps)



SHARKS

Carcharhinus falciformis

SPECIES CODE:FAL

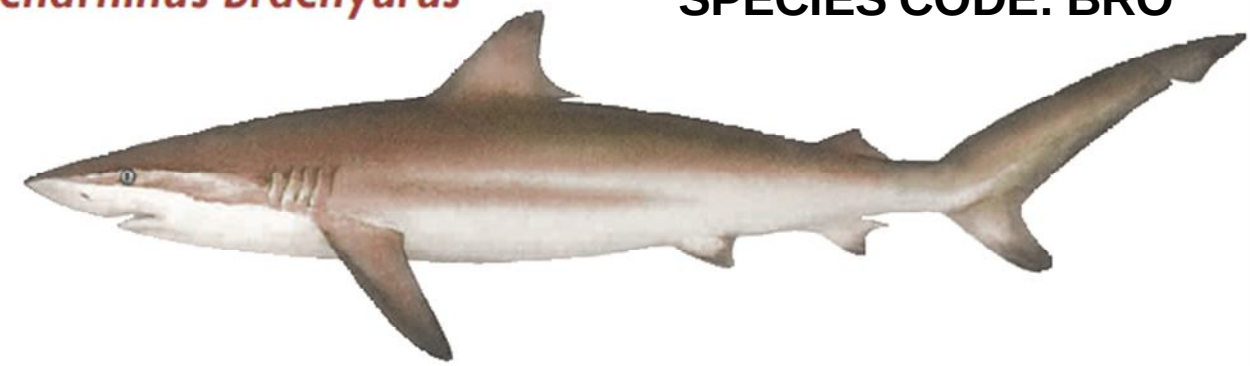
English: Silky shark
French: Requin soyeux
Japanese: Kurotogarizame
Hawaiian: Silk shark
Local:

Front of first dorsal fin clearly behind pectoral fin
Origine de la première nageoire dorsale nettement en arrière de la nageoire pectorale

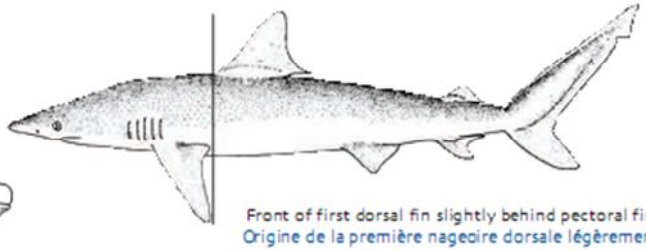
Shape of upper teeth
Forme des dents supérieures

Carcharhinus brachyurus

SPECIES CODE: BRO



English: Copper shark, Bronze whaler
French: Requin cuivre
Japanese: Kuroherimejirozame
Local:



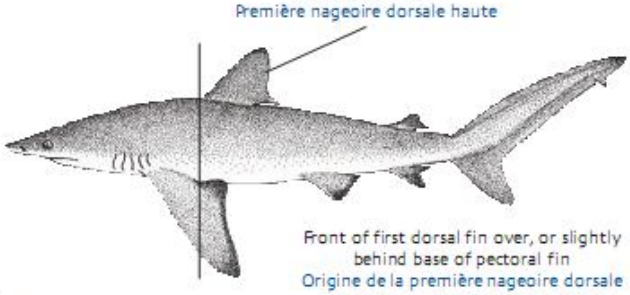
Front of first dorsal fin slightly behind pectoral fin
Origine de la première nageoire dorsale légèrement en arrière de la nageoire pectorale

Shape of upper teeth
Forme des dents supérieures

Carcharhinus altimus

SPECIES CODE:CCA

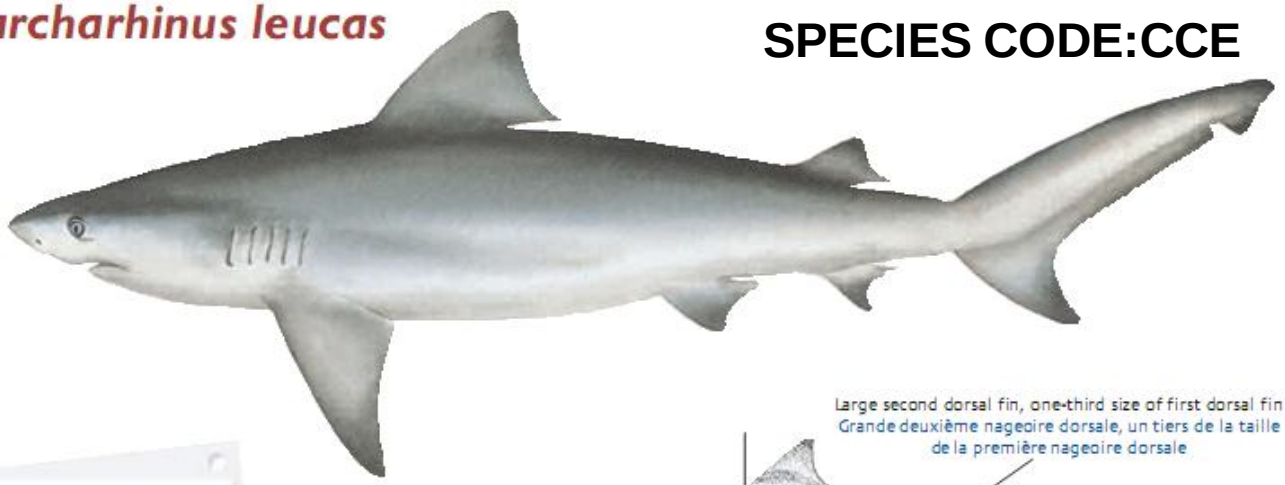
English: Bignose shark
French: Requin babosse
Japanese: Habire
Local:



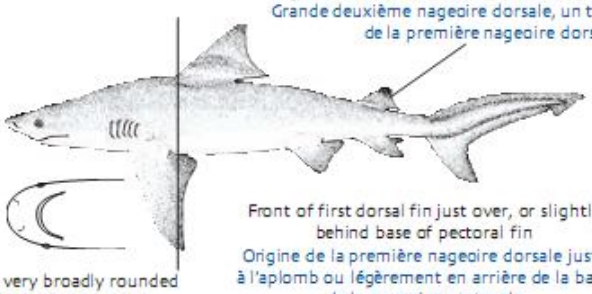
Shape of upper teeth
Forme des dents supérieures

Carcharhinus leucas

SPECIES CODE:CCE



English: Bull shark
French: Requin bouledogue
Japanese: Oomejirozame
Local:

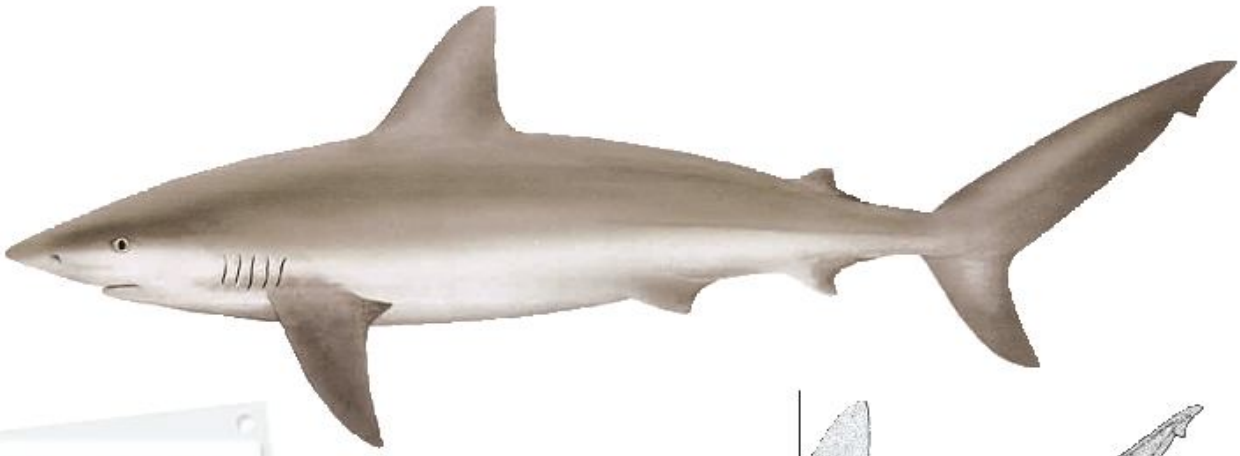


Shape of upper teeth
Forme des dents supérieures

Snout very broadly rounded and extremely short
Museau très largement arrondi et extrêmement court

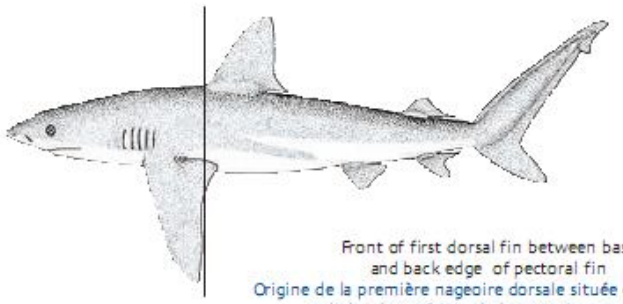
Carcharhinus galapagensis

SPECIES CODE:CCG



English: Galapagos shark
French: Requin des Galapagos
Japanese: Garapagosuzame
Hawaiian: Mano
Local:

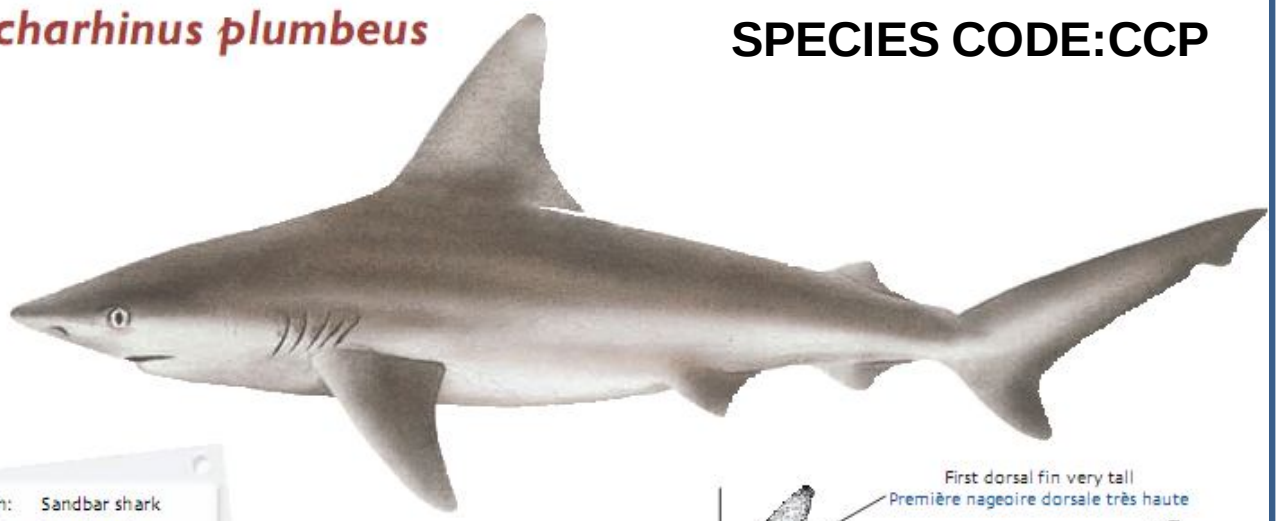
Shape of upper teeth
Forme des dents supérieures



Front of first dorsal fin between base and back edge of pectoral fin
Origine de la première nageoire dorsale située entre la base et le bord postérieur de la nageoire pectorale

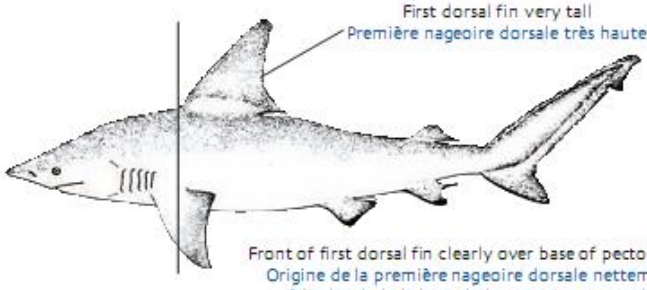
Carcharhinus plumbeus

SPECIES CODE:CCP



English: Sandbar shark
French: Requin gris, Requin gris à haute dorsale
Japanese: Mejirozame, Yajibuka
Hawaiian: Mano
Local:

Shape of upper teeth
Forme des dents supérieures



First dorsal fin very tall
Première nageoire dorsale très haute

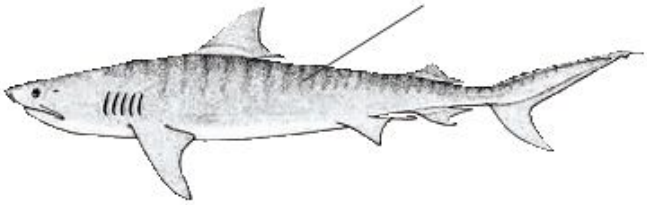
Front of first dorsal fin clearly over base of pectoral fin
Origine de la première nageoire dorsale nettement à l'aplomb de la base de la nageoire pectorale

Galeocerdo cuvier

SPECIES CODE:TIG

English: Tiger shark
French: Requin tigre
Japanese: Itachizame, Tora zame
Hawaiian: Niuhi, Manopa'ele
Local:

Shape of upper teeth
Forme des dents supérieures



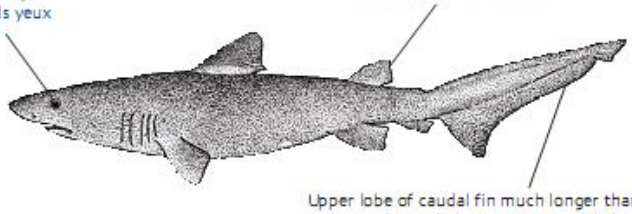
Dark, tiger-stripe markings that may be faded in large adults
Marques noires, tigrées, qui peuvent se décolorer chez les grands adultes

Odontaspis noronhai

SPECIES CODE: ODH

English: Bigeye sand tiger shark
French: Requin noronhai
Japanese: Burajiruwanizame
Local:

Shape of upper teeth
Forme des dents supérieures



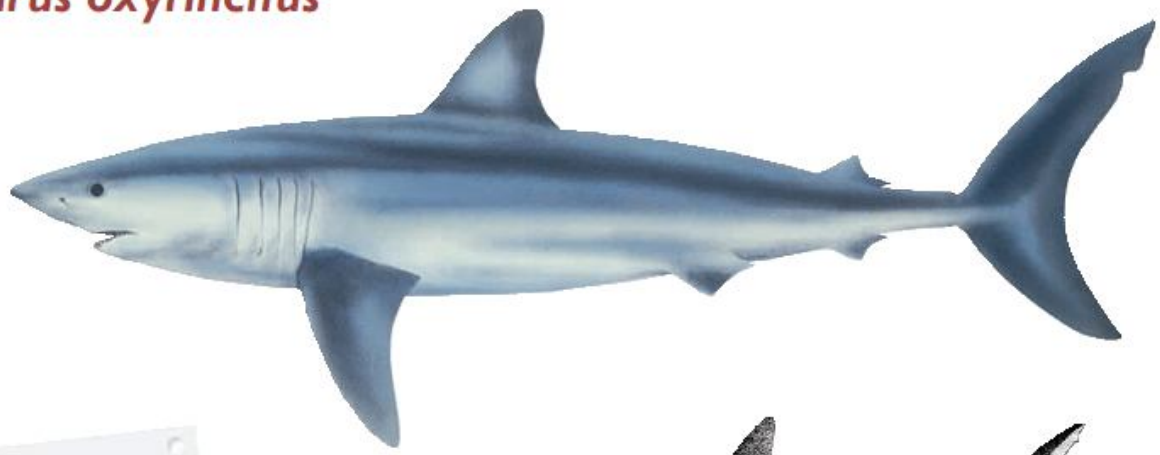
Large eyes
Grands yeux

Second dorsal fin over pelvic fin
Deuxième nageoire dorsale à l'aplomb de la nageoire pelvienne

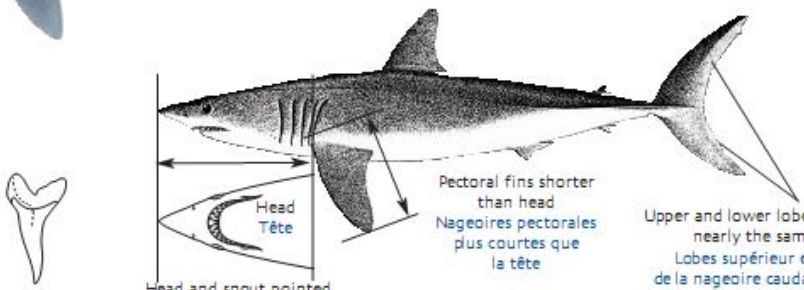
Upper lobe of caudal fin much longer than lower lobe
Lobe supérieur de la nageoire caudale beaucoup plus long que le lobe inférieur

Isurus oxyrinchus

SPECIES CODE: SMA



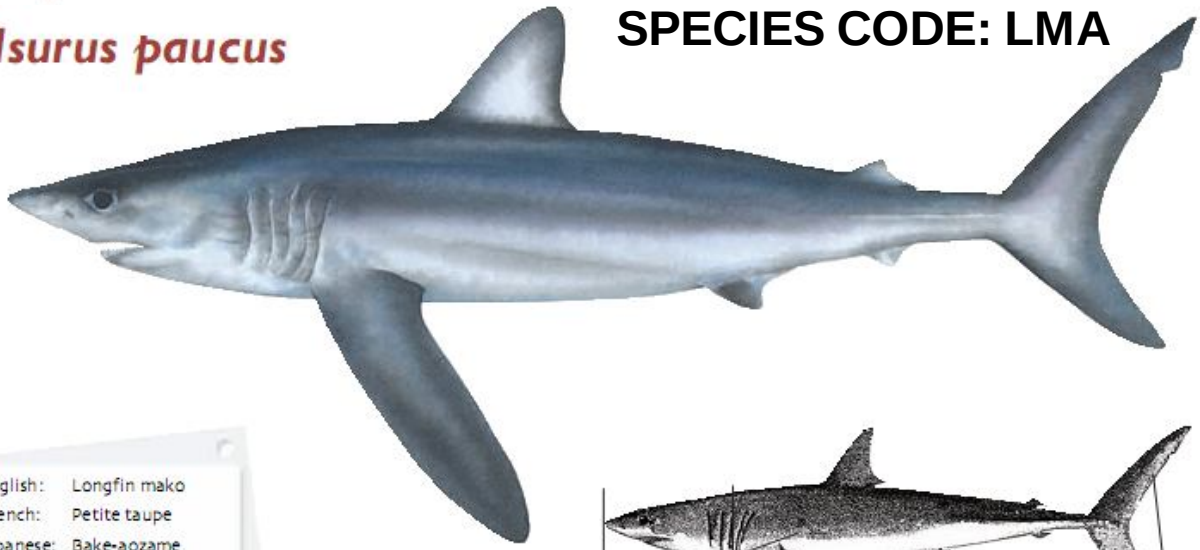
English: Shortfin mako
French: Taupe bleue
Japanese: Aozame
Hawaiian: Mano
Local:



Shape of upper teeth
Forme des dents supérieures

Isurus paucus

SPECIES CODE: LMA

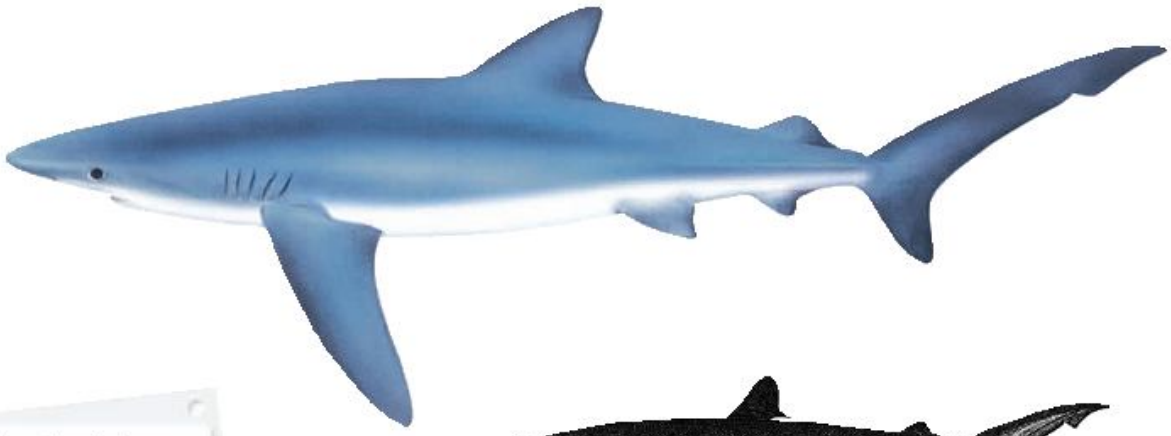


English: Longfin mako
French: Petite taupe
Japanese: Bake-aozame
Hawaiian: Mano
Local:

Shape of upper teeth
Forme des dents supérieures

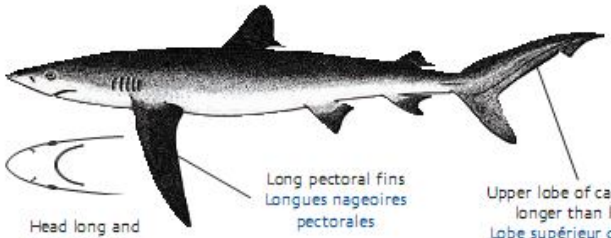
Prionace glauca

SPECIES CODE: BSH



English: Blue shark
French: Peau bleue
Japanese: Yoshikirizame, Mizubuka, Aota
Hawaiian: Mano
Local:

Shape of upper teeth
Forme des dents supérieures



Head long and snout rounded
Tête longue et museau arrondi

Long pectoral fins
Longues nageoires pectorales

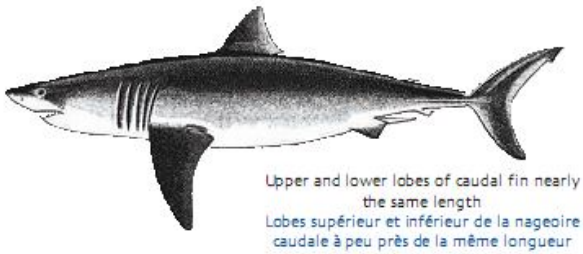
Upper lobe of caudal fin much longer than lower lobe
Lobe supérieur de la nageoire caudale beaucoup plus long que le lobe inférieur

Carcharodon carcharias

SPECIES CODE: WSH

English: Great white shark
French: Grand requin blanc
Japanese: Hohojirozame, Hohojiro, Iragi, Maira
Hawaiian: Niuhi
Local:

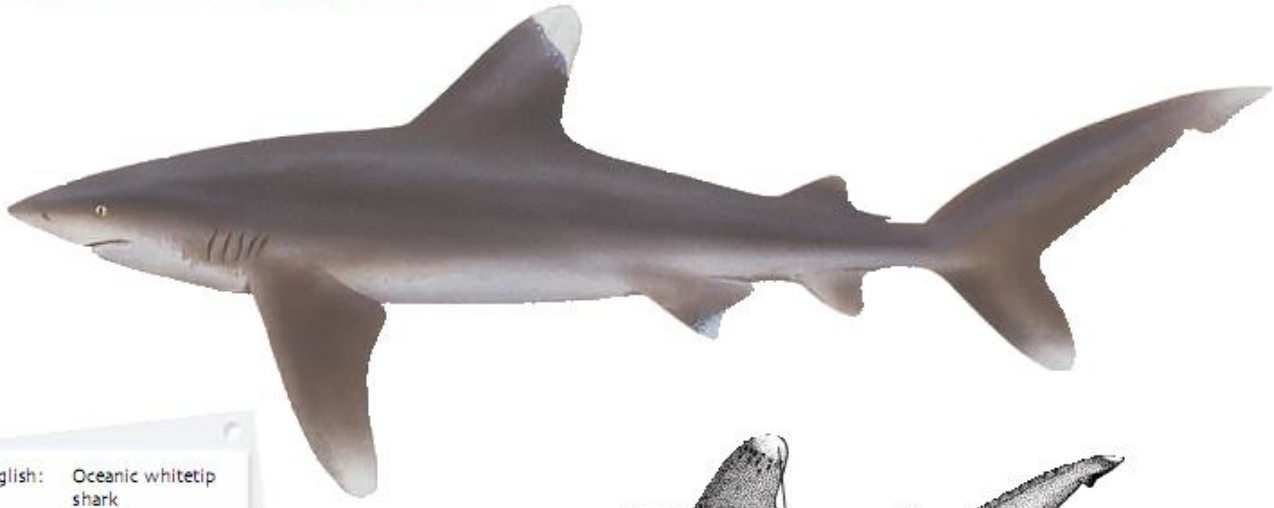
Shape of upper teeth
Forme des dents supérieures



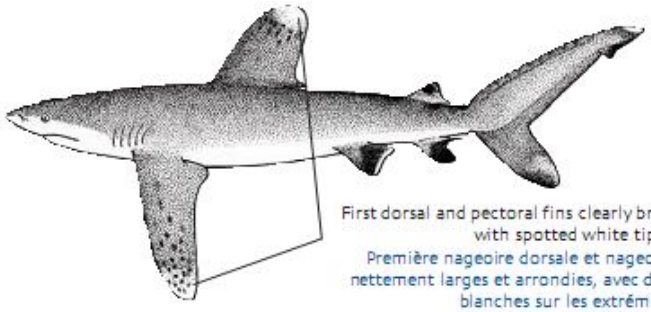
Upper and lower lobes of caudal fin nearly the same length
Lobes supérieur et inférieur de la nageoire caudale à peu près de la même longueur

Carcharhinus longimanus

SPECIES CODE: OCS



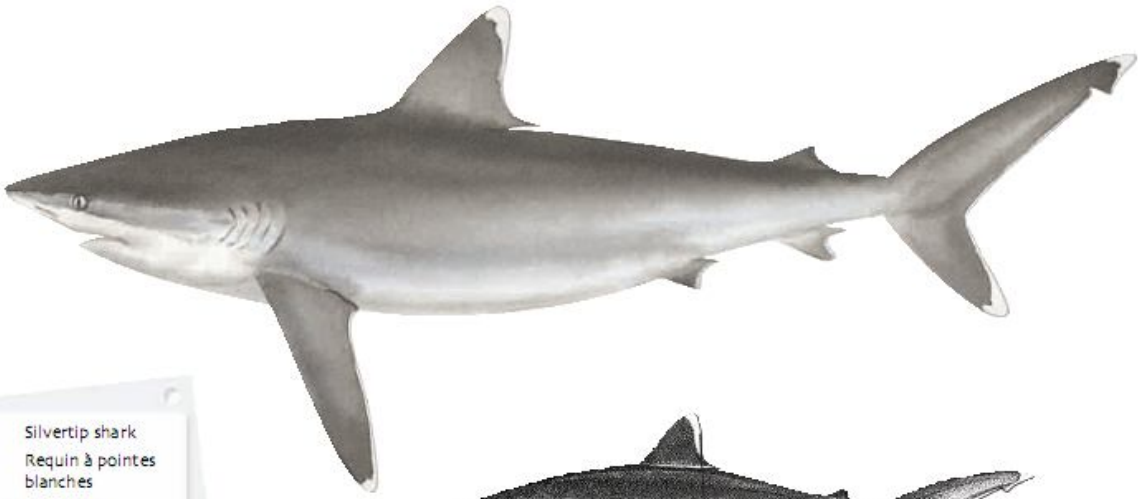
English: Oceanic whitetip shark
French: Requin océanique
Japanese: Yogore
Hawaiian: Mano nigano
Local:



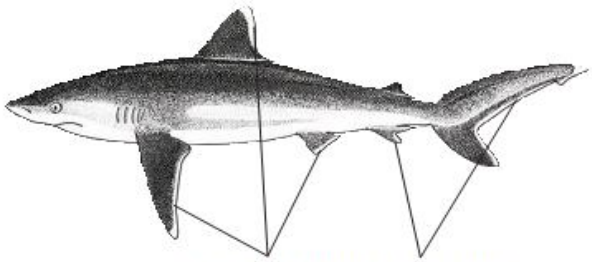
First dorsal and pectoral fins clearly broad and rounded, with spotted white tips
Première nageoire dorsale et nageoires pectorales nettement larges et arrondies, avec des petites taches blanches sur les extrémités

Carcharhinus albimarginatus

SPECIES CODE: ALS



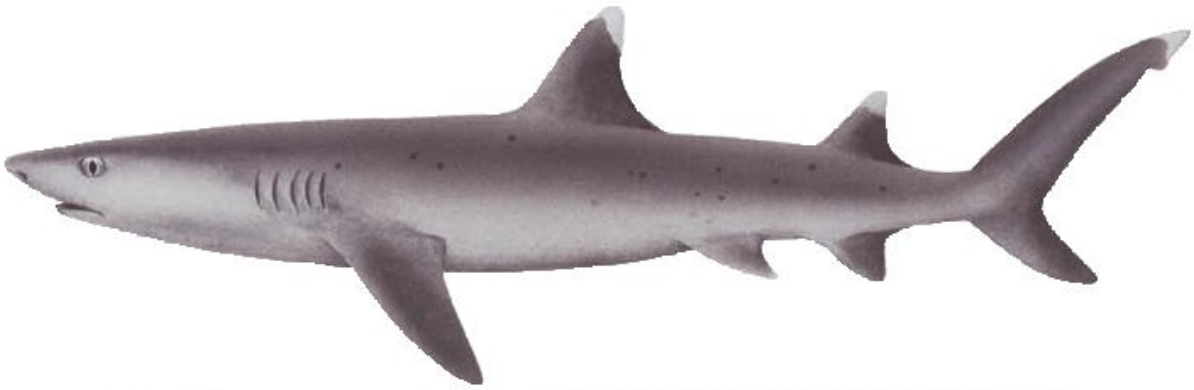
English: Silvertip shark
French: Requin à pointes blanches
Japanese: Tsumajiro
Local:



Back edge (not just tips) of all fins white
Bords postérieurs (pas seulement les extrémités) de toutes les nageoires blancs

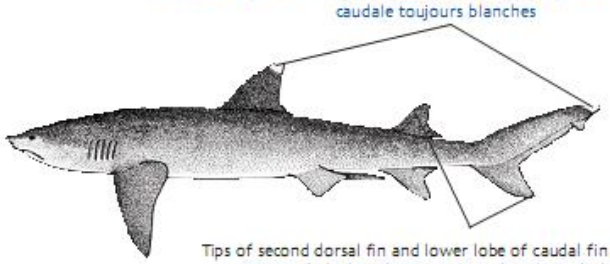
Triaenodon obesus

SPECIES CODE: CCQ



English: Whitetip reef shark
French: Requin corail
Japanese: Nemuribuka
Hawaiian: Mano lalakea
Local:

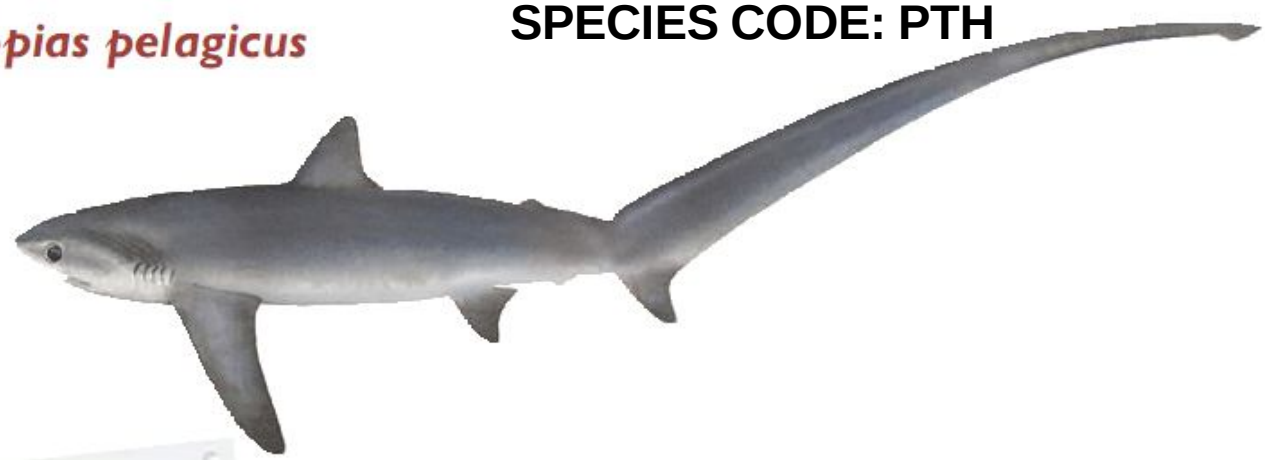
Tips of first dorsal fin and upper lobe of caudal fin always white
Pointes de la première nageoire dorsale et du lobe supérieur de la nageoire caudale toujours blanches



Tips of second dorsal fin and lower lobe of caudal fin sometimes white
Pointes de la deuxième nageoire dorsale et du lobe inférieur de la nageoire caudale parfois blanches

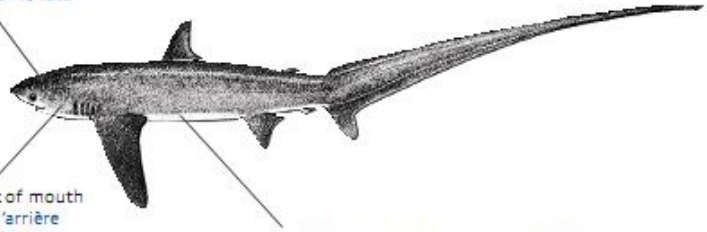
Alopias pelagicus

SPECIES CODE: PTH



English: Pelagic thresher
French: Renard pélagique
Japanese: Nitari
Hawaiian: Mano hi'uka, Thresher shark
Local:

No groove on head
Pas de sillon sur la tête



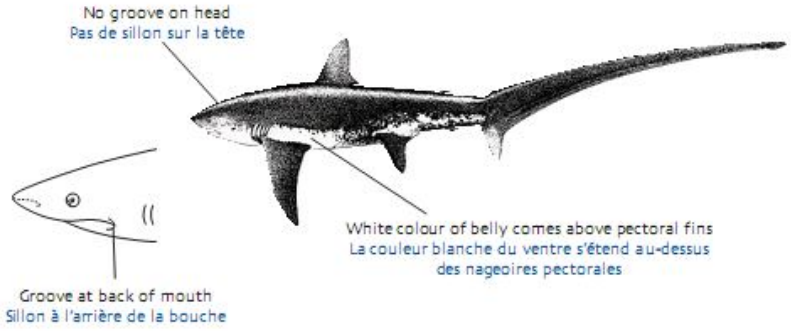
No groove at back of mouth
Pas de sillon à l'arrière de la bouche

Light belly colour only below pectoral fins
Ventre de couleur claire uniquement sous les nageoires pectorales

Alopias vulpinus

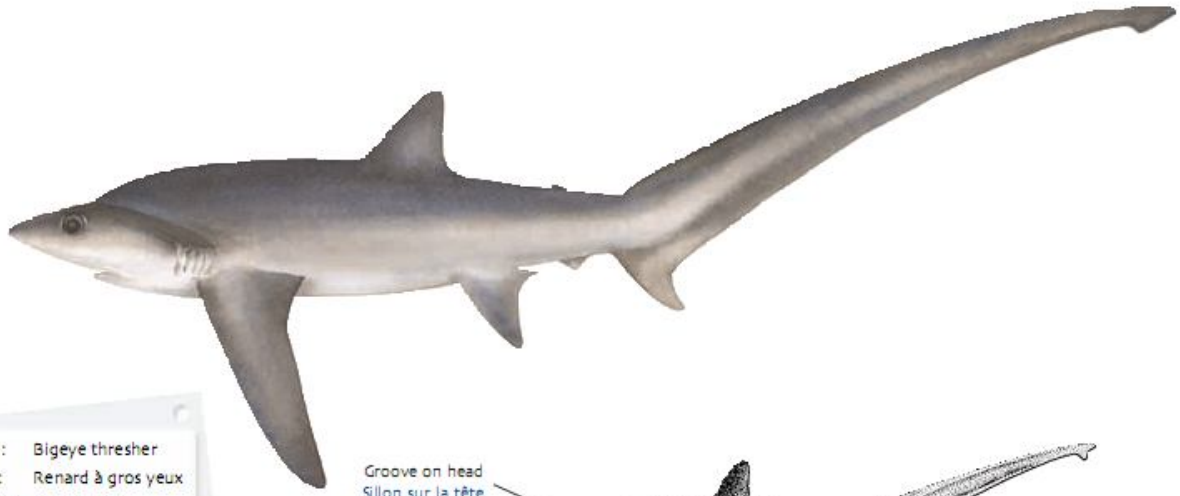
SPECIES CODE: ALV

English: Common thresher, Thintail thresher
French: Renard
Japanese: Ma-onaga, Onaga zame
Hawaiian: Thresher shark
Local:

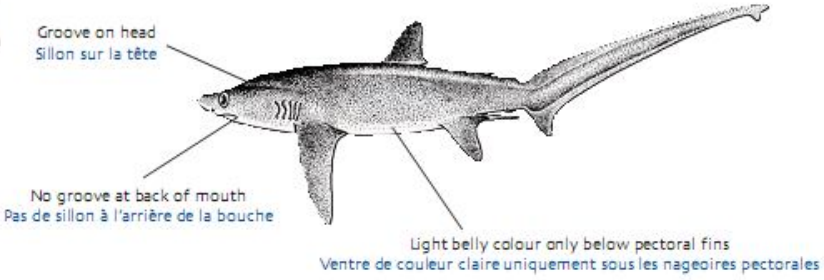


Alopias superciliosus

SPECIES CODE: BTH

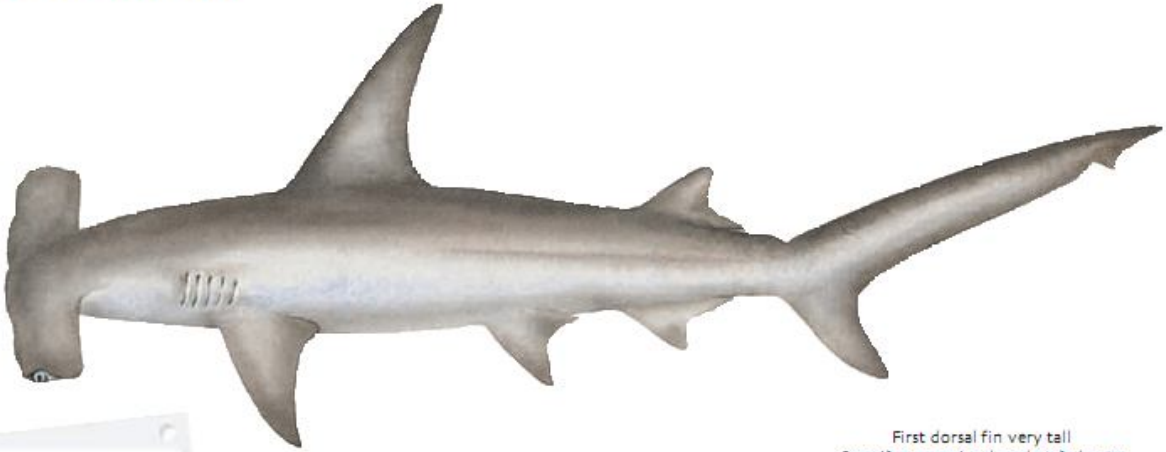


English: Bigeye thresher
French: Renard à gros yeux
Japanese: Hachiware
Hawaiian: Mano hi'uka, Thresher shark
Local:



Sphyrna mokarran

SPECIES CODE: SPK



English: Great hammerhead
French: Grand requin marteau
Japanese: Hirashumokuzame
Local:

Front of head nearly straight with slight dent in middle
Avant de la tête presque rectiligne, légèrement incurvé au milieu

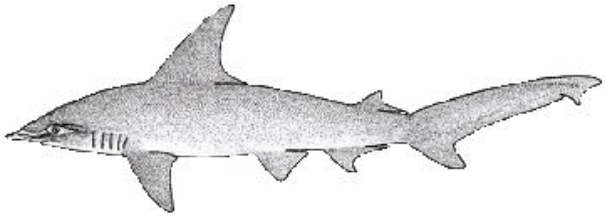
First dorsal fin very tall
Première nageoire dorsale très haute

Eusphyra blochii

SPECIES CODE: EUB

English: Winghead shark
French: Requin marteau planeur
Japanese: Indoshumokuzame
Local:

Head width nearly half of body length
Largeur de la tête égale à près de la moitié de la longueur du corps

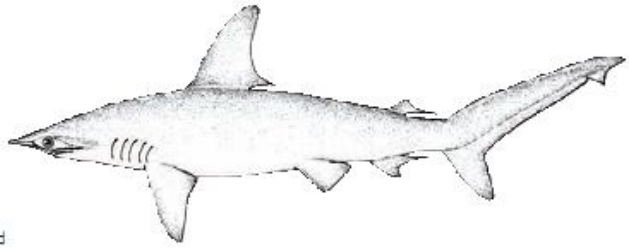


Sphyrna lewini

SPECIES CODE: SPL

English: Scalloped hammerhead
French: Requin marteau halicorne
Japanese: Akashumokuzame
Hawaiian: Mano kihikihi
Local:

Front of head curved with middle dent and a distinct lobe at each end
Avant de la tête courbe, incurvé au milieu, et lobe distinct à chaque extrémité

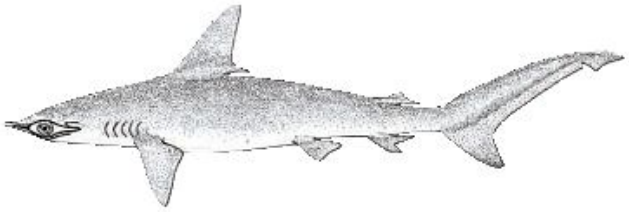


Sphyrna zygaena

SPECIES CODE: SPZ

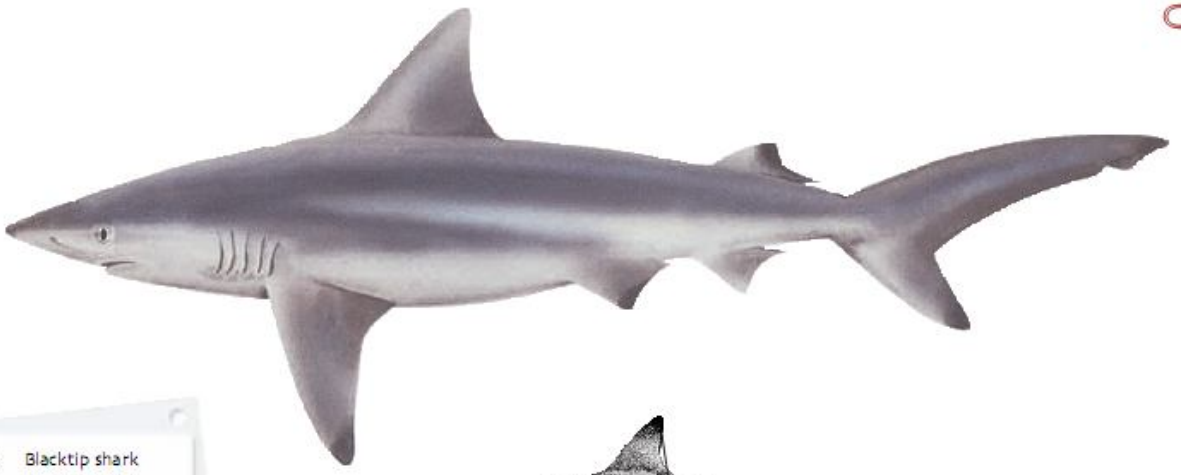
English: Smooth hammerhead
French: Requin marteau commun
Japanese: Shiroshumokuzame
Hawaiian: Mano kihikihi
Local:

Front of head curved with no middle dent
Avant de la tête courbe, non incurvé au milieu

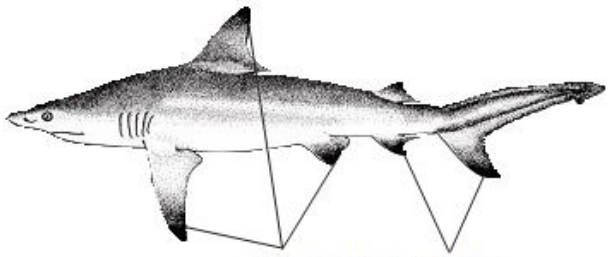


Carcharhinus limbatus

SPECIES CODE: CCL



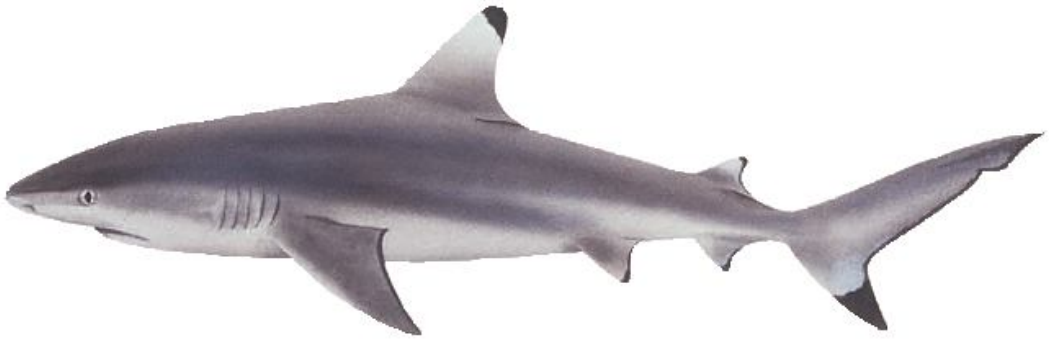
English: Blacktip shark
French: Requin bordé
Japanese: Kamasutogarizame
Hawaiian: Blackfin shark
Local:



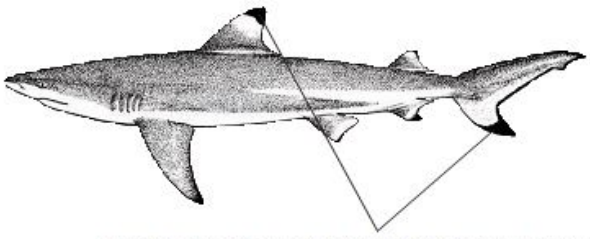
Dark-to-black tips on most fins
Pointes foncées à noires sur presque toutes les nageoires

Carcharhinus melanopterus

SPECIES CODE: BLR



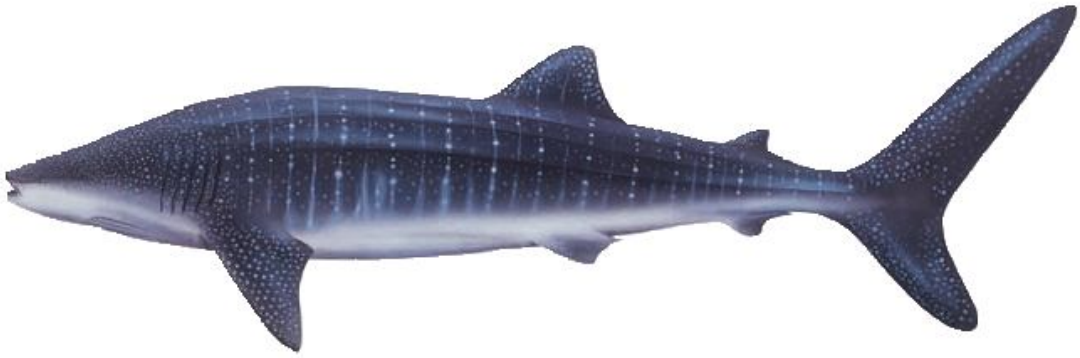
English: Blacktip reef shark
French: Requin à pointes noires
Japanese: Tsumaguro
Hawaiian: Mano pa'ele
Local:



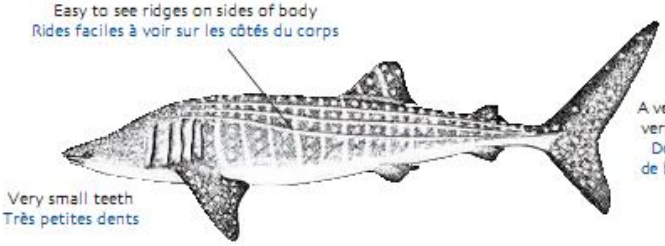
Distinct black markings on tips of first dorsal fin and lower lobe of caudal fin
Marques noires distinctes sur les pointes de la première nageoire dorsale et du lobe inférieur de la nageoire caudale

Rhincodon typus

SPECIES CODE: RHN



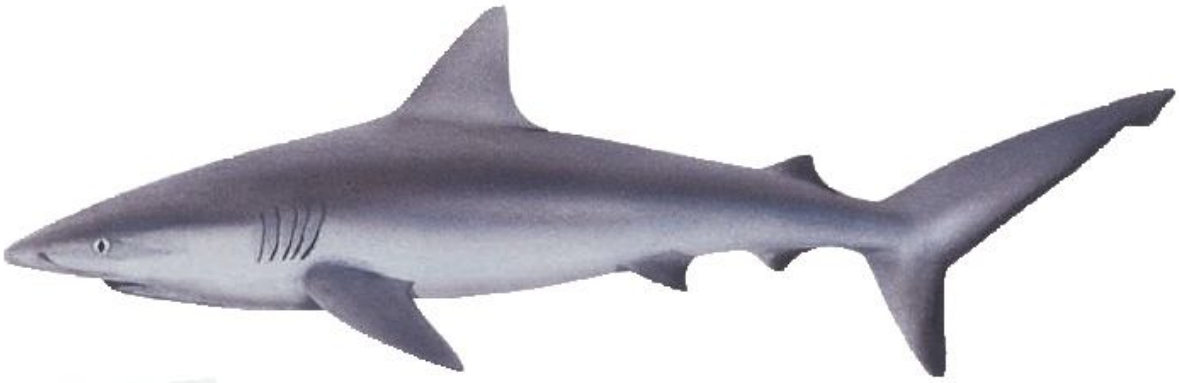
English: Whale shark
French: Requin baleine
Japanese: Jinbeizame
Local:



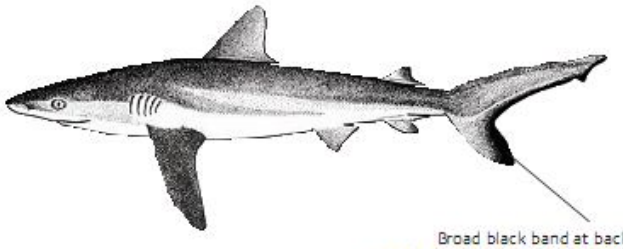
Maximum length: 18 m
Taille maximum : 18 m

Carcharhinus amblyrhynchos

SPECIES CODE: AML



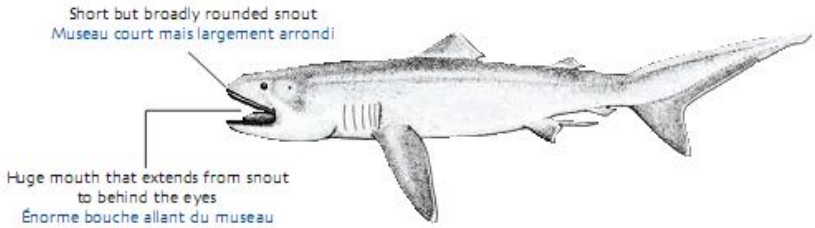
English: Grey reef shark
French: Requin dagsit, Requin gris de récif
Japanese: Oguromejirozame, Hairomejirozame
Hawaiian: Mano lalakea
Local:



Megachasma pelagios

SPECIES CODE: LMP

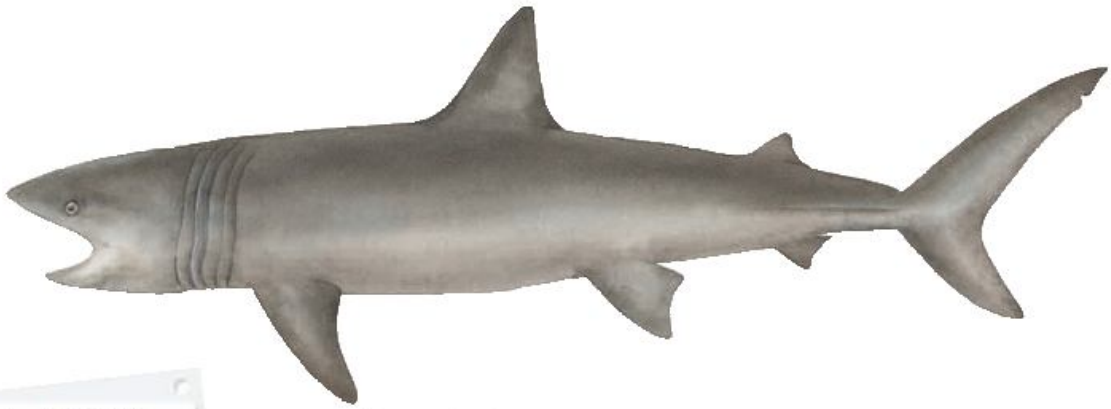
English: Megamouth shark
French: Requin grande gueule
Japanese: Megamausu
Local:



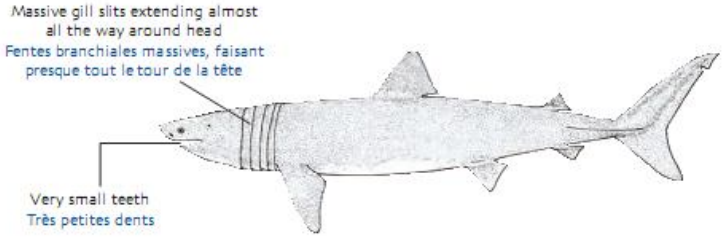
Maximum length: 6 m
Taille maximum : 6 m

Cetorhinus maximus

SPECIES CODE: BSK



English: Basking shark
French: Pèlerin
Japanese: Ubazame
Local:

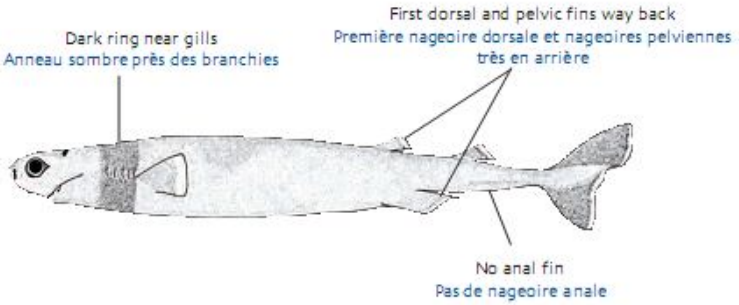


Maximum length: 12 m
Taille maximum : 12 m

Isistius brasiliensis

SPECIES CODE: ISB

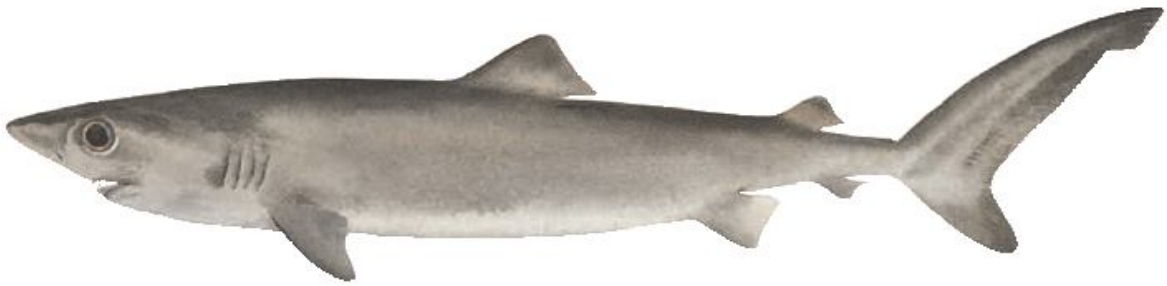
English: Cookie cutter shark
French: Squalelet féroce
Japanese: Darumazame
Hawaiian: Cookie cutter shark
Local:



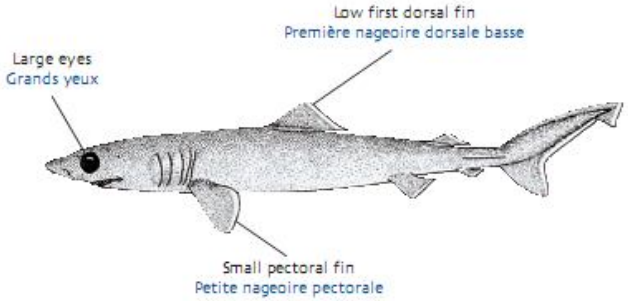
Maximum length: 50 cm
Taille maximum : 50 cm

Pseudocarcharias kamoharai

SPECIES CODE: PSK



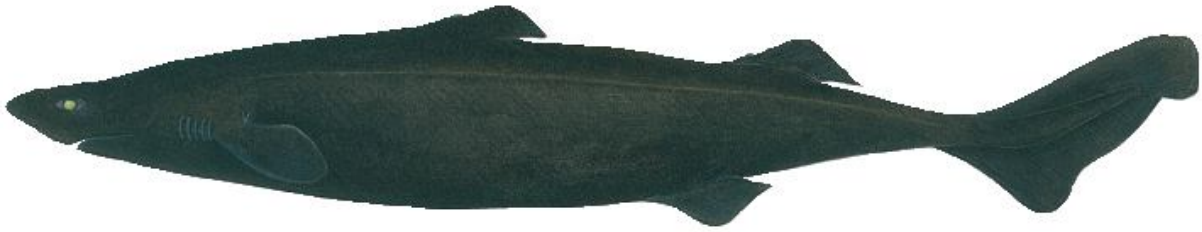
English: Crocodile shark
French: Requin crocodile
Japanese: Mizuwani, Shikkui, Tobituki
Local:



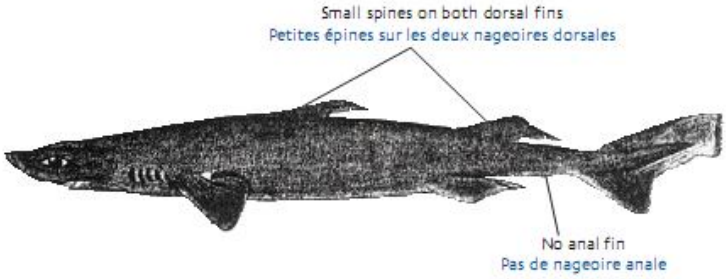
Maximum length: 110 cm
Taille maximum : 110 cm

Scymnodon squamulosus

SPECIES CODE: SSQ



English: Velvet dogfish
French: Squale grogneur velouté
Japanese: Birodozame
Local:

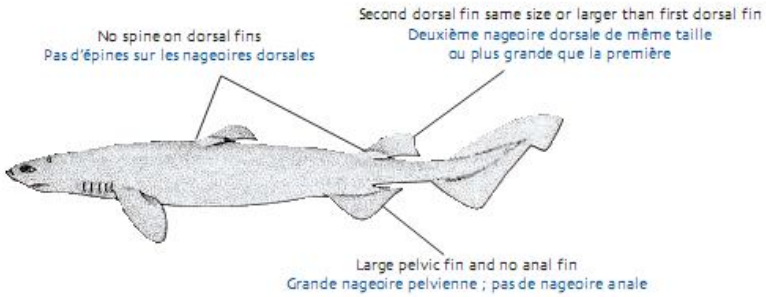


Maximum length: 85 cm
Taille maximum : 85 cm

Dalatias licha

SPECIES CODE: SCK

English: Kitefin shark, Seal shark
French: Squale liche
Japanese: Yoroizame
Local:



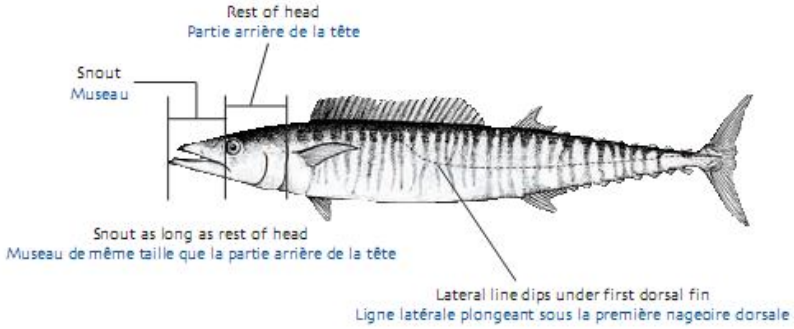
Maximum length: 160 cm
Taille maximum : 160 cm

OTHER FISH SPECIES

Acanthocybium solandri

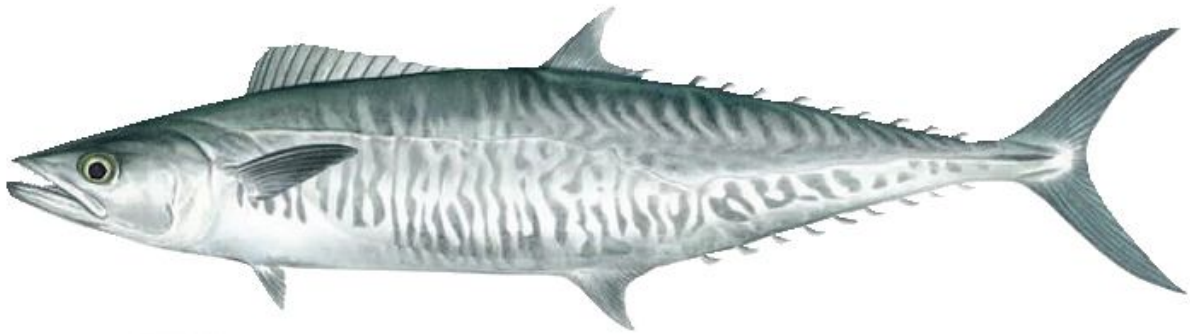
SPECIES CODE: WAH

English: Wahoo
French: Thazard-bâtard
Japanese: Kamasu-sawara
Hawaiian: Ono
Local:

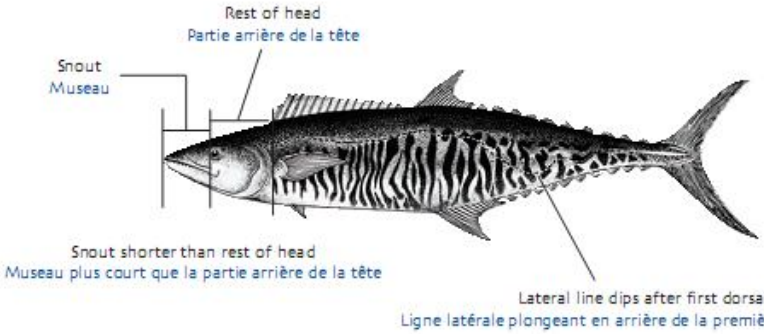


Scomberomorus commerson

SPECIES CODE: COM



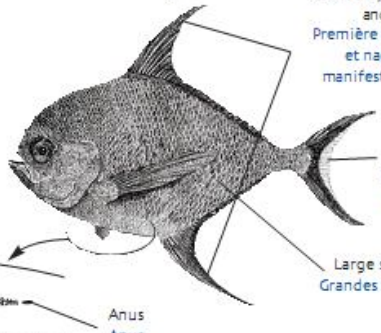
English: Narrow-barred Spanish mackerel
French: Thazard rayé indo-pacifique
Japanese: Yokoshima-sawara
Local:

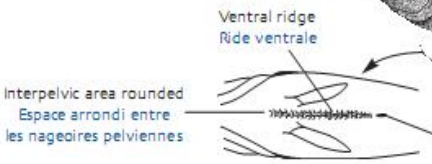


Taractichthys steindachneri

SPECIES CODE: TST

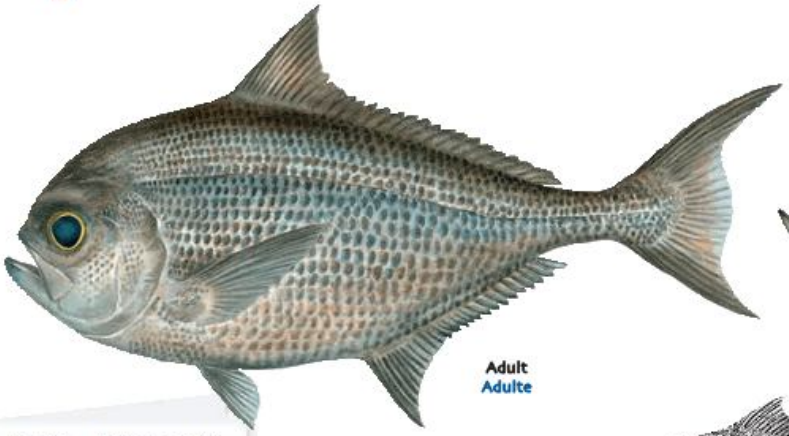
English: Sickle pomfret
French: Castagnole fauchoir, Brème noire
Japanese: Hirejiro-manzai-uo
Hawaiian: Monchong, Pomfret
Local:





Eumegistus illustris

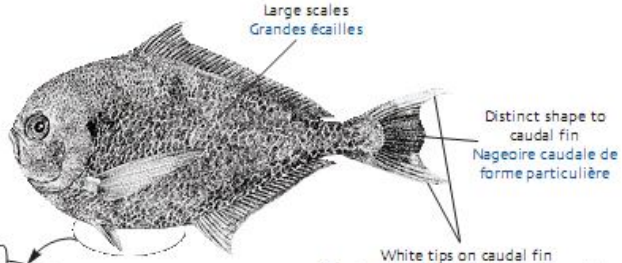
SPECIES CODE: EBS

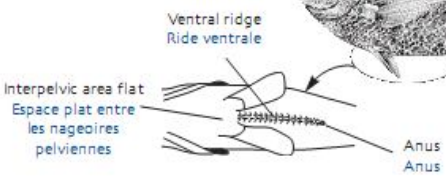


Juvenile (to 30 cm)
Juvénile (jusqu'à 30 cm)

Adult
Adulte

English: Brilliant pomfret, Lustrous pomfret
French: Brème noire brillante
Japanese: Chikame-echiopia
Hawaiian: Monchong, Pomfret
Local:

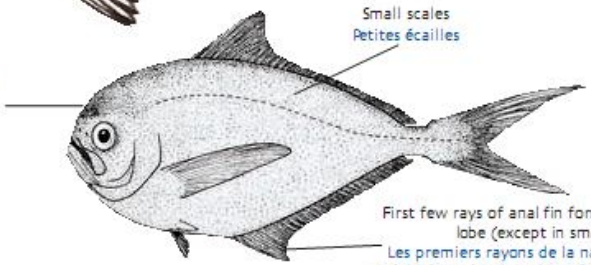




Brama brama

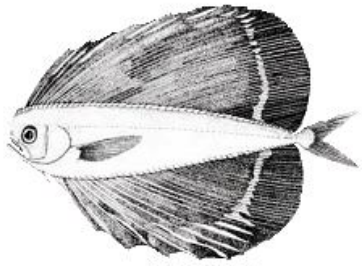
SPECIES CODE: POA

English: Atlantic pomfret, Ray's bream
French: Grande castagnole
Japanese: Echiopia, Shimagatsuo
Local:

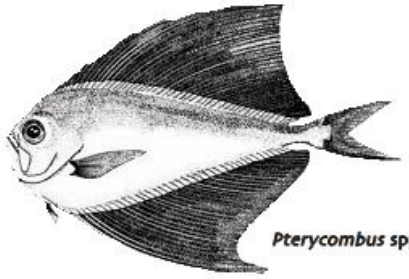


Bramidae (other)

SPECIES CODE: BRA



Pteraclis spp.



Pterycombus spp.

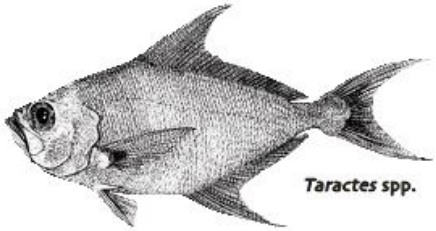
Species in this family have:

- Angle of jaw very slanted
- Single dorsal fin
- Caudal fin of adults strongly forked

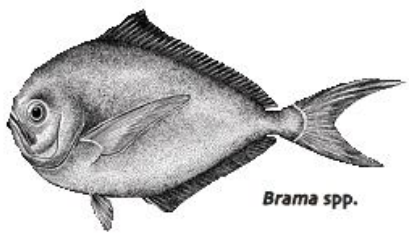
Caractéristiques des espèces de cette famille :

- Angle très prononcé de la mâchoire
- Une seule nageoire dorsale
- Nageoire caudale des adultes très fourchue

English: Other pomfrets and fanfishes
French: Autres Bramidae
Japanese: Shima-gatuo
Hawaiian: Monchong
Local:



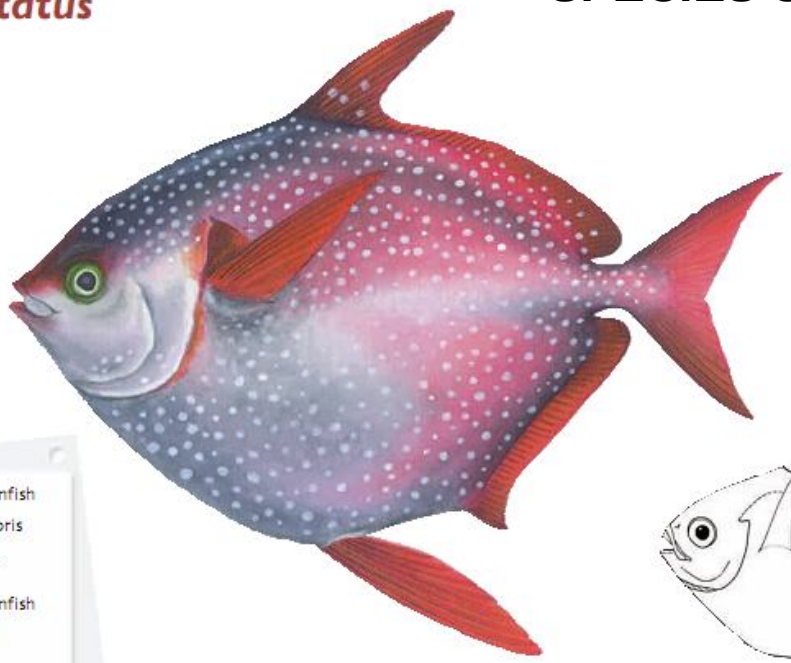
Taractes spp.



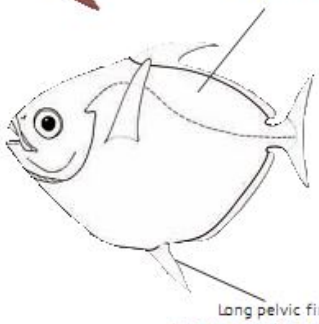
Brama spp.

SPECIES CODE: LAG

Lampris guttatus

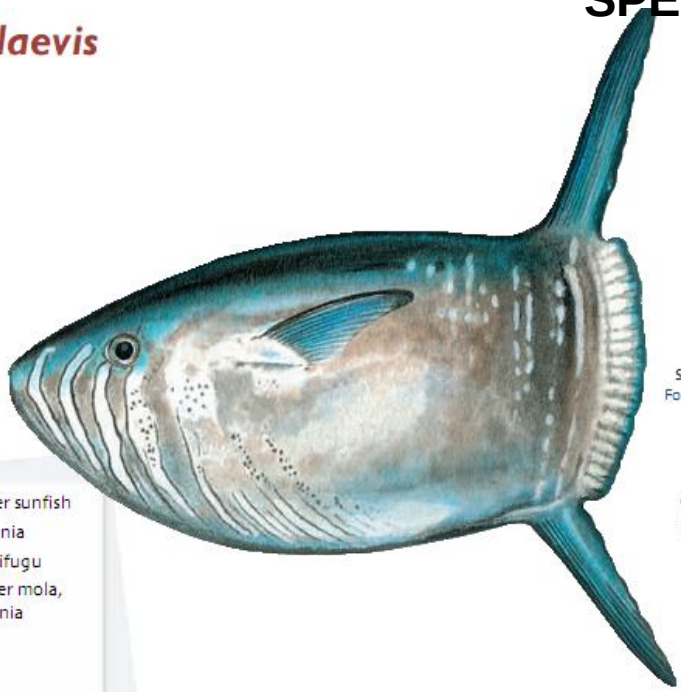


English: Opah, Moonfish
French: Opah, Lampris
Japanese: Akamanbo, Mandai
Hawaiian: Opah, Moonfish Mamendai
Local:

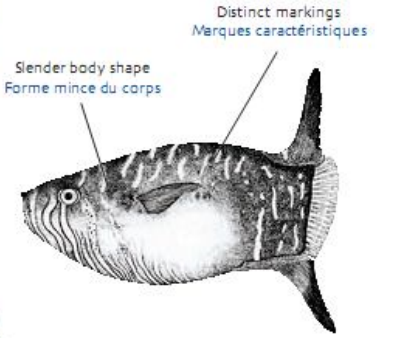


SPECIES CODE: RZV

Ranzania laevis



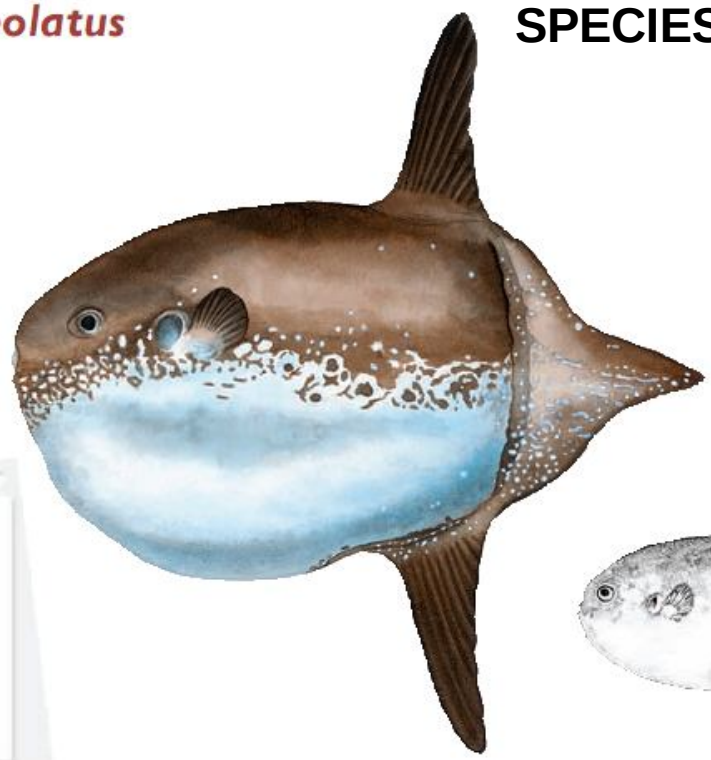
English: Slender sunfish
French: Ranzania
Japanese: Kusabifugu
Hawaiian: Slender mola, Ranzania
Local:

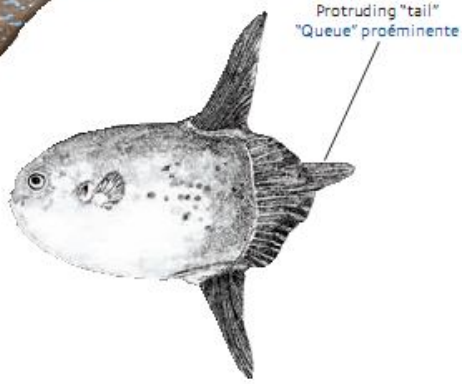


Maximum length: 80 cm
Taille maximum : 80 cm

Masturus lanceolatus

SPECIES CODE: MRW

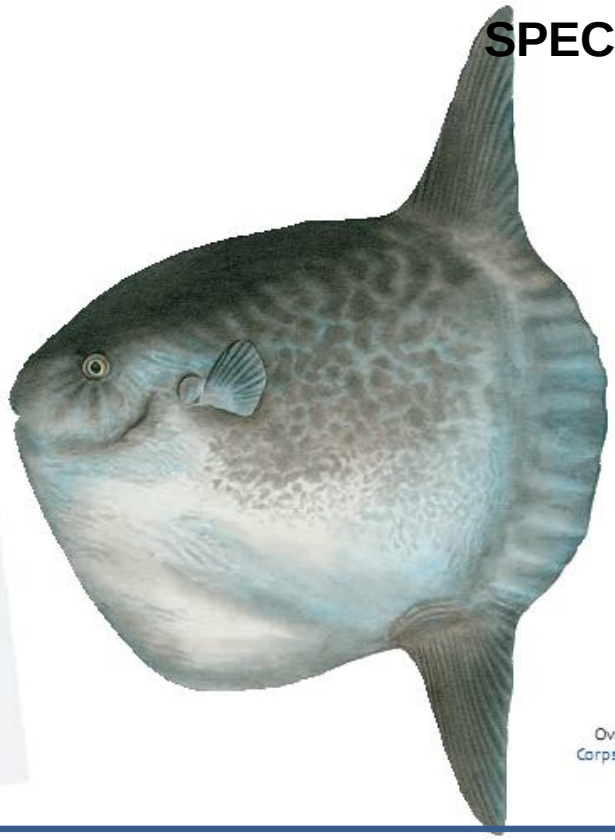


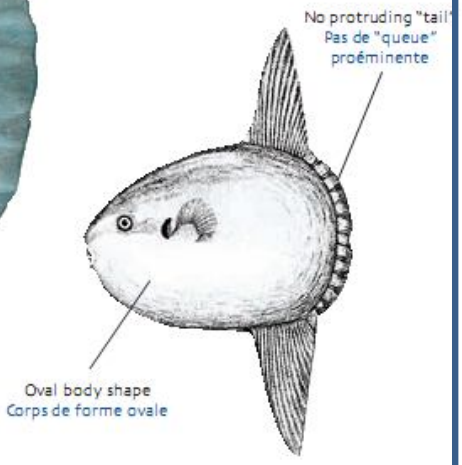


English: Sharptail mola, Sharptail sunfish
French: Poisson-lune à queue pointue
Japanese: Yarimanbo
Hawaiian: Mola, Sunfish
Local:

Mola mola

SPECIES CODE: MOX

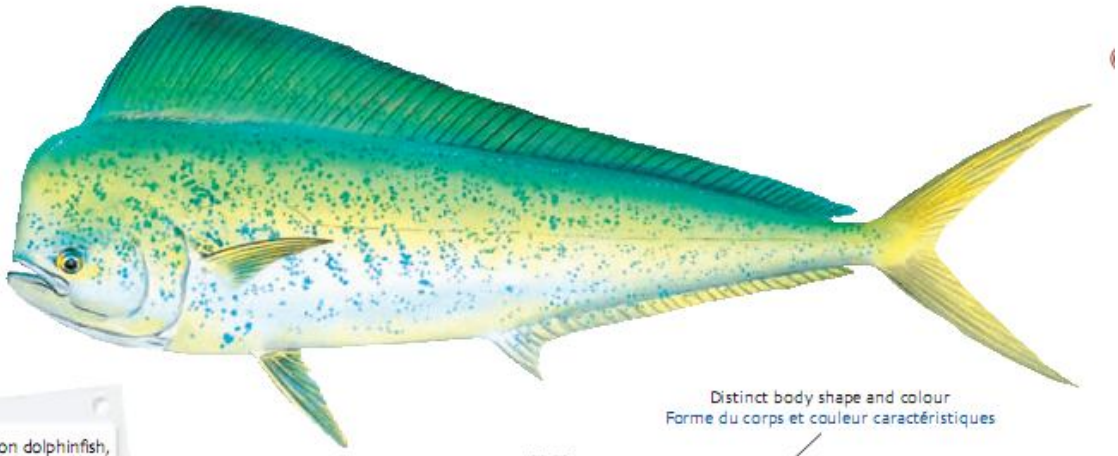




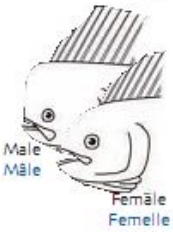
English: Ocean sunfish
French: Poisson-lune
Japanese: Manbo
Hawaiian: Mola mola, Makua, Sunfish
Local:

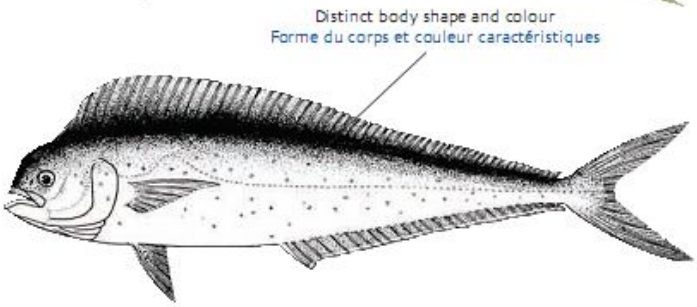
Coryphaena hippurus

SPECIES CODE: DOL



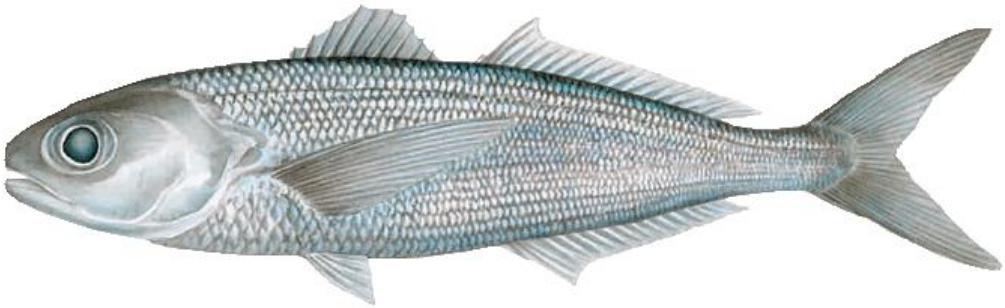
English: Common dolphinfish, Mahi mahi
French: Coryphène commune, Mahi mahi
Japanese: Shiira, Toohyaku
Hawaiian: Mahimahi, Oma, Lapa
Local:



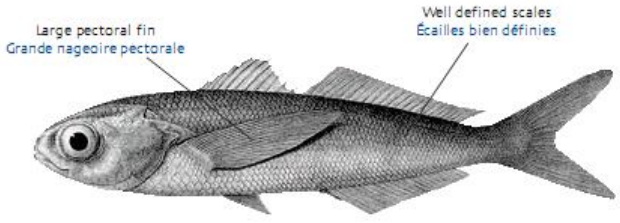


Cubiceps gracilis

SPECIES CODE: CBG



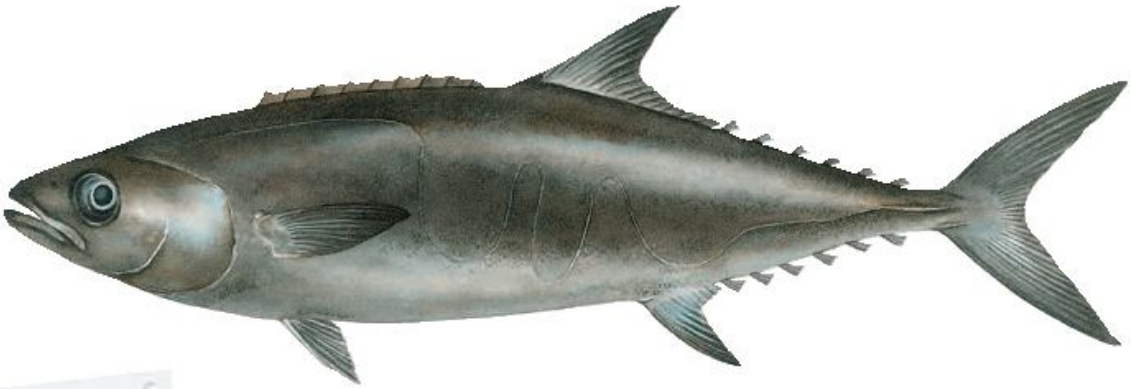
English: Driftfish
French: Dérivant
Japanese: Boozukonnyaku-zoku
Local:



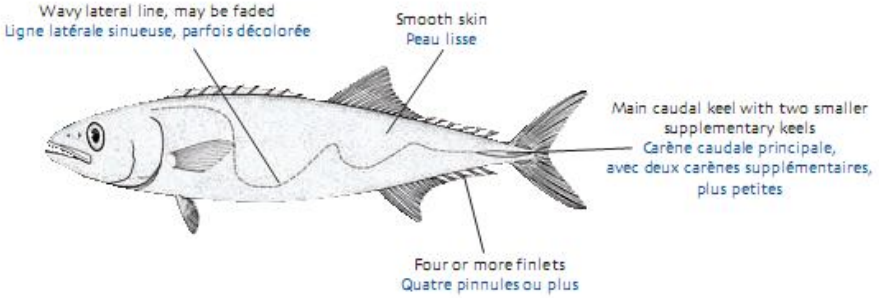
Maximum length: 107 cm
Taille maximum : 107 cm

Lepidocybium flavobrunneum

SPECIES CODE: LEC

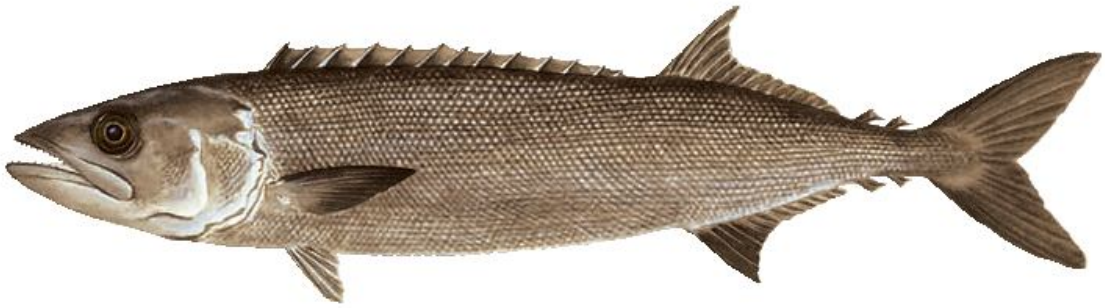


English: Escolar
French: Escolier noir
Japanese: Aburasokomutsu
Hawaiian: Smooth-skin walu, Hawaiian butterfish
Local:

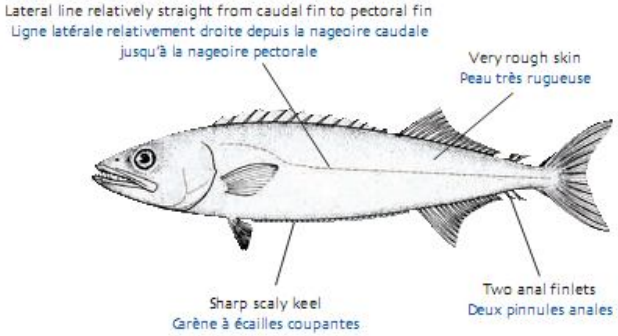


Ruvettus pretiosus

SPECIES CODE:OIL



English: Oilfish
French: Rouvet
Japanese: Baramutsu
Hawaiian: Walu, Rough walu, Hawaiian butterfish
Local:



Promethichthys prometheus

SPECIES CODE: PRP

English: Roudi escolar, Snake mackerel
French: Escolier clair
Japanese: Kuroshibikamasu
Hawaiian: Snake mackerel
Local:

Small pelvic fin, represented by a single very small spine and soft ray
Petite nageoire pelvienne, représentée par une seule épine très petite et un rayon mou

Single lateral line
Ligne latérale unique

Gempylus serpens

SPECIES CODE: GES

English: Snake mackerel
French: Escolier serpent
Japanese: Kurotachikamasu
Hawaiian: Snake mackerel
Local:

First dorsal fin very long, second dorsal fin short and followed by five or six finlets
Première nageoire dorsale très longue, deuxième nageoire dorsale courte, suivie de cinq ou six pinnules

Very small pelvic fin
Très petite nageoire pelvienne

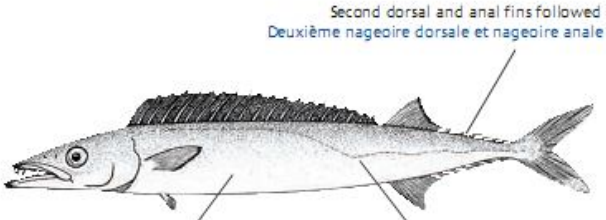
Two distinct lateral lines
Deux lignes latérales caractéristiques

Body very long and skinny
Corps très allongé et étroit

Thyrsites atun

SPECIES CODE: SNK

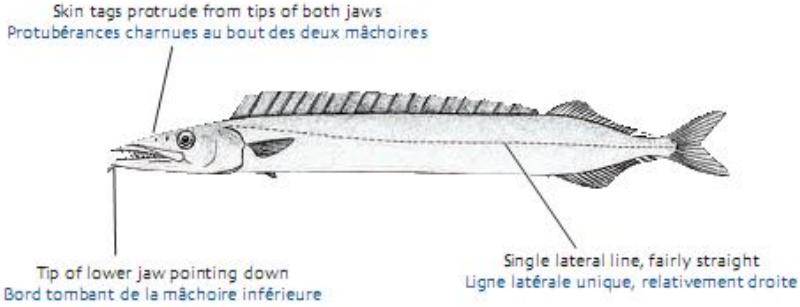
English: Snoek, Barracouta
French: Escolier
Japanese: Ooshibi-kamasu, Barakuta
Local:



Nesiarchus nasutus

SPECIES CODE: NEN

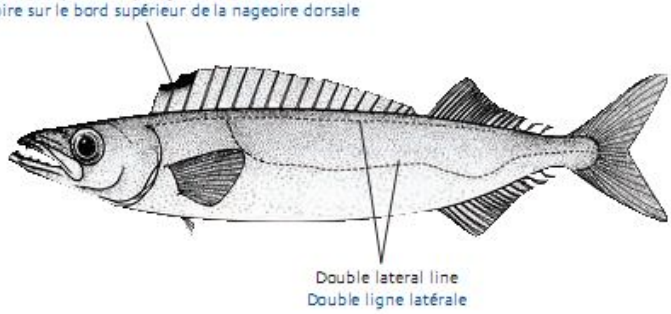
English: Black gemfish
French: Escolier long-nez
Japanese: Hashinagakurotachi
Local:



Rexea solandri

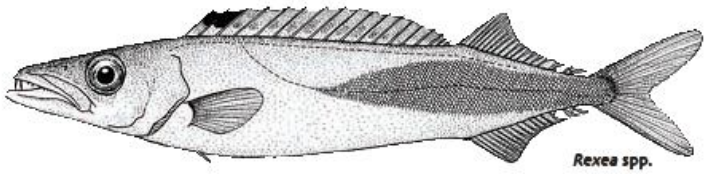
SPECIES CODE: GEM

English: Silver gemfish
French: Escolier tifiati
Japanese: Ookagokamasu
Local:

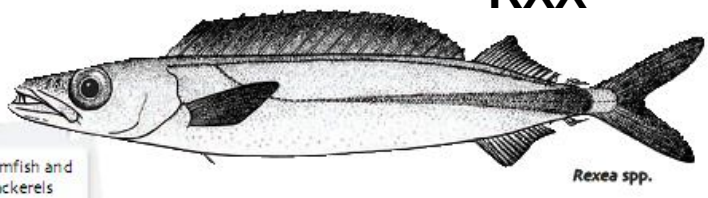


Gempylidae (other)

SPECIES CODE: GEP


Rexea spp.

RXX


Rexea spp.

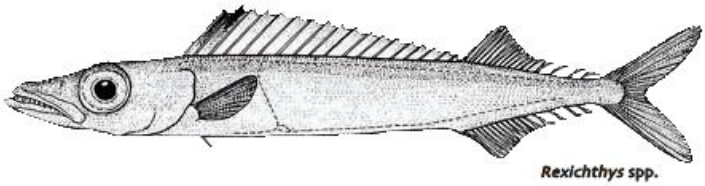
Species in this family have:

- Large mouth with strong teeth
- Two dorsal fins, second shorter than first
- Pelvic fin very small, often just a single spine with a few or no soft rays

Caractéristiques des espèces de cette famille :

- Grande gueule à dents puissantes
- Deux nageoires dorsales, la deuxième plus courte que la première
- Nageoire pelvienne très petite, souvent formée d'une seule épine, avec quelques rayons mous ou pas du tout

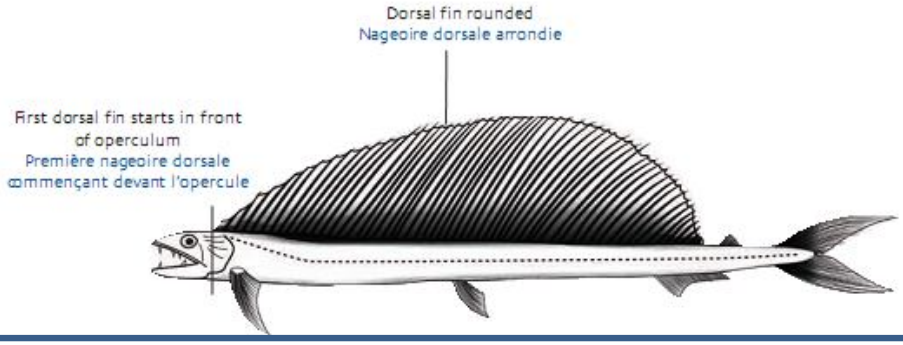
English: Other gemfish and snake mackerels
French: Autres Gempylidae
Japanese: Kurotachikamasu
Local:


Rexichthys spp.

Alepisaurus brevirostris

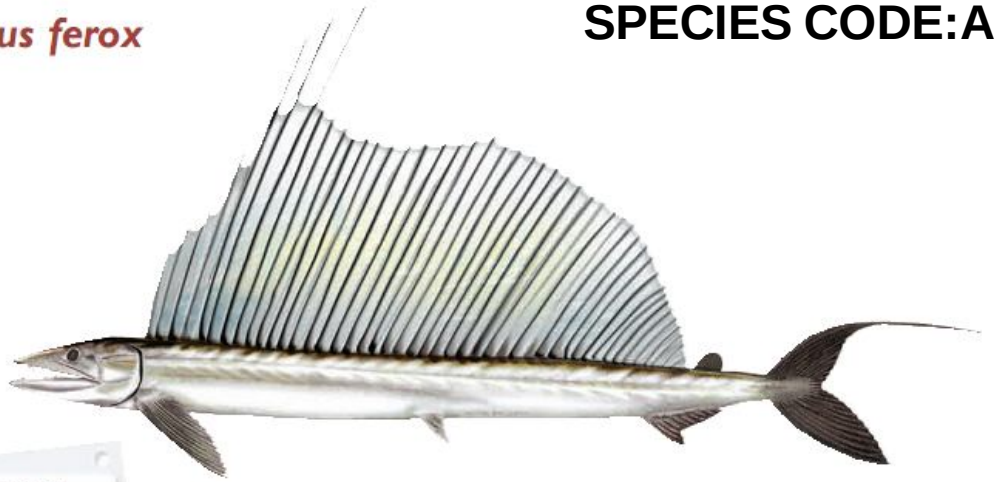
SPECIES CODE: ALO

English: Short snouted (shortnose) lancetfish
French: Lancier à nez court
Japanese: Tsumarimizuuo
Hawaiian: Alepisaurus
Local:

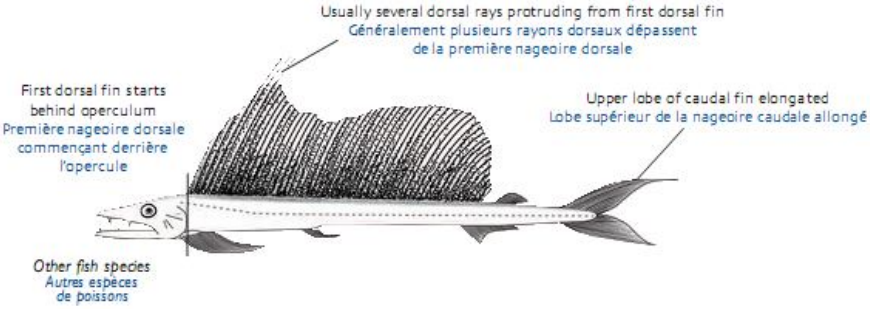


Alepisaurus ferox

SPECIES CODE: ALX

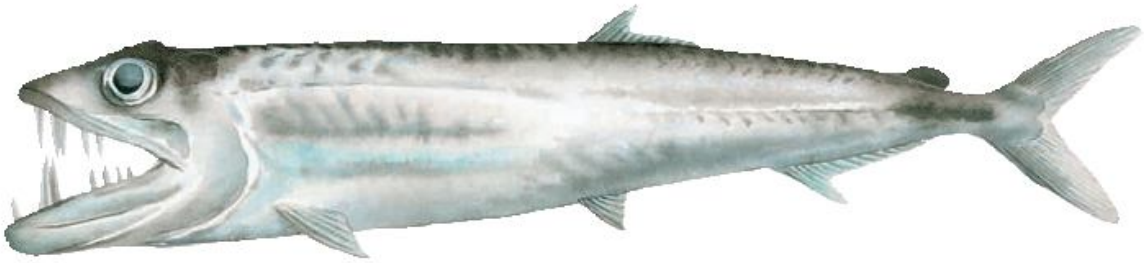


English: Long snouted (longnose) lancetfish
French: Lancier long-nez
Japanese: Mizu-uo, Yoro
Hawaiian: Alepisaurus
Local:

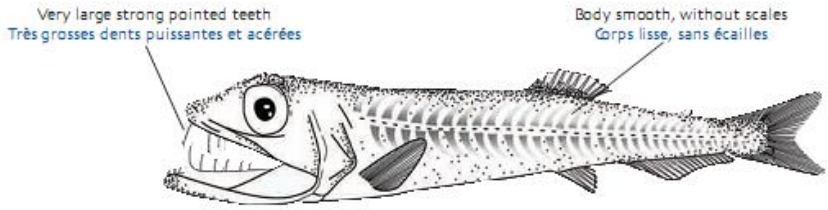


Omosudis lowei

SPECIES CODE: OMW



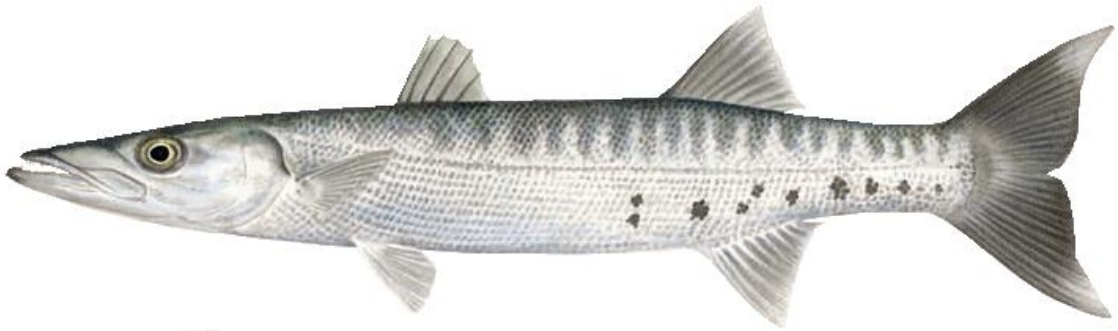
English: Omosudid, Hammerjaw
French: Omosudide
Japanese: Kiba-hadaka
Local:



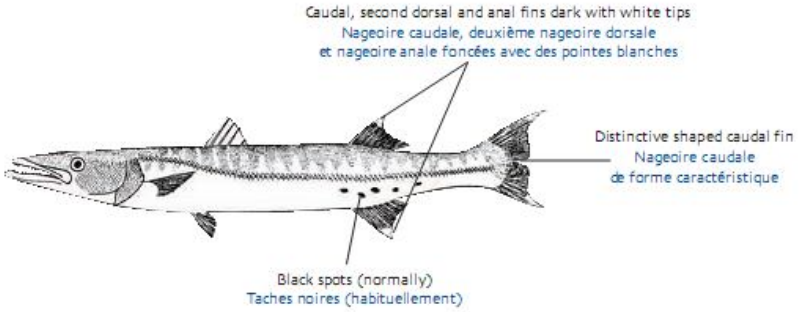
Maximum length: 30 cm
Taille maximum : 30 cm

Sphyraena barracuda

SPECIES CODE: GBA



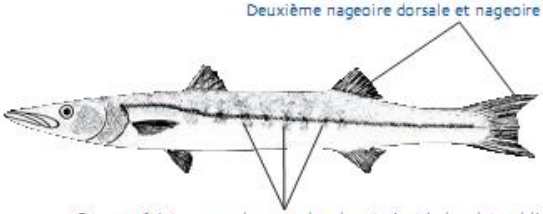
English: Great barracuda
French: Barracuda
Japanese: Oni-kamasu
Hawaiian: Kaku, Barracuda
Local:



Sphyraena jello

SPECIES CODE: BAC

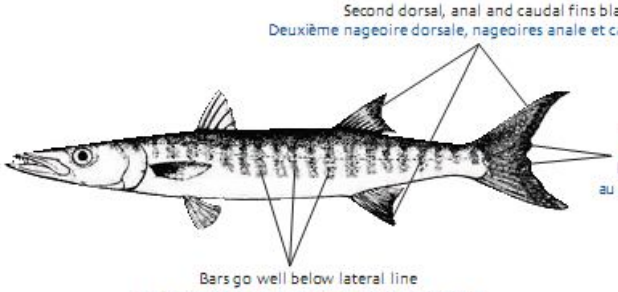
English: Pickhandle barracuda
French: Bécune jello
Japanese: O-kamasu
Local:



Sphyraena qenie

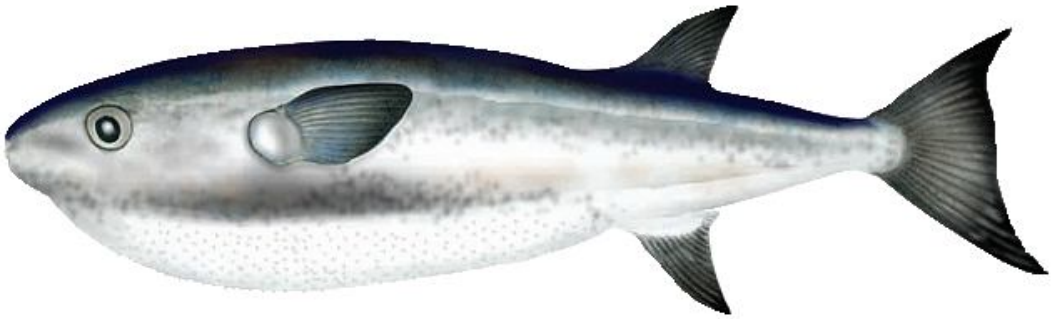
SPECIES CODE:BAB

English: Blackfin barracuda
French: Barracuda à queue noire
Japanese: Burakkufinbarakuda
Local:

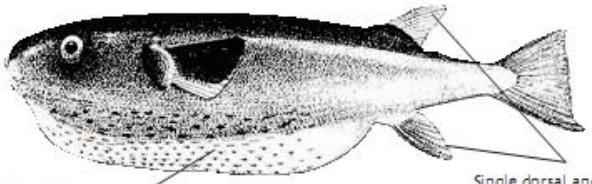


Lagocephalus lagocephalus

SPECIES CODE: LGH



English: Rabbit puffer, Oceanic puffer
French: Compère lièvre
Japanese: Kumasakafugu
Hawaiian: Pelagic puffer
Local:



Rough skin on belly
Peau rugueuse du ventre

Single dorsal and anal fin, roughly in line with each other
Une seule nageoire dorsale et une seule nageoire anale, à peu près dans le même axe

Maximum length: 65 cm
Taille maximum : 65 cm

Grammistes sexlineatus

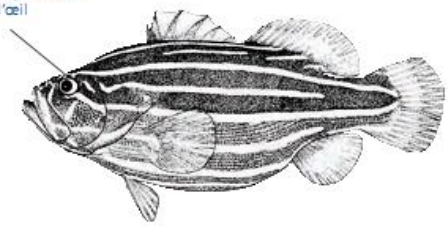
SPECIES CODE: GSE

Adult
Adulte

Juvenile (to 12 cm)
Juvénile (jusqu'à 12 cm)

English: Goldenstriped soapfish, Sixline soapfish
French: Savon rayé d'or
Japanese: Nunosarashi
Local:

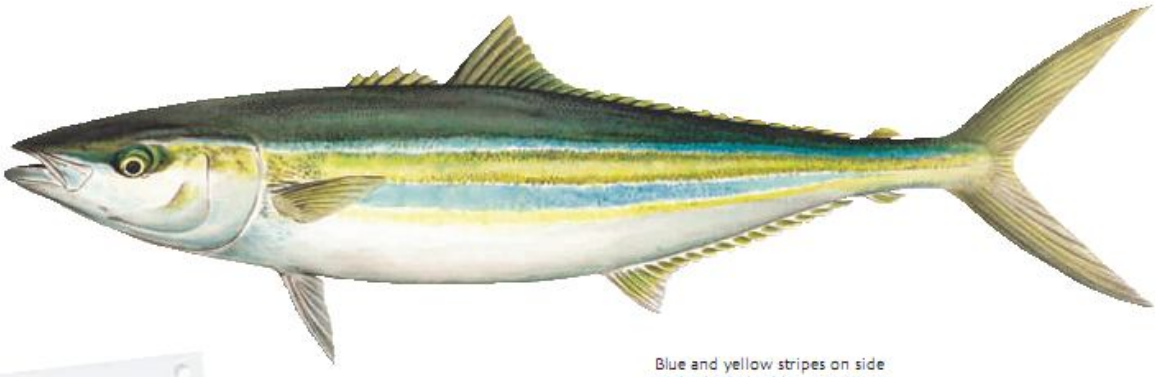
Adult has slight recess above eye
L'adulte présente un léger creux au-dessus de l'œil



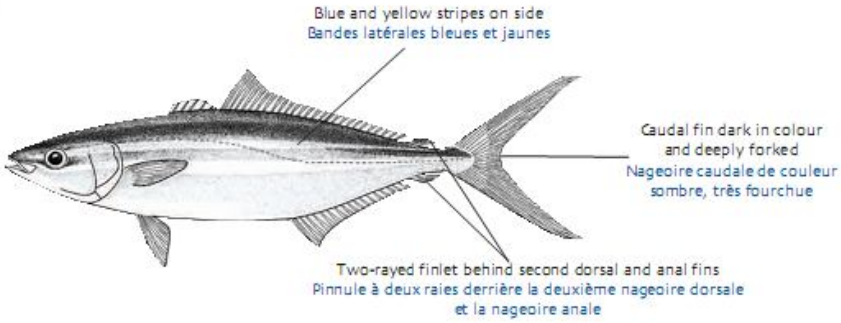
Maximum length: 35 cm
Taille maximum : 35 cm

Elagatis bipinnulata

SPECIES CODE: RRU

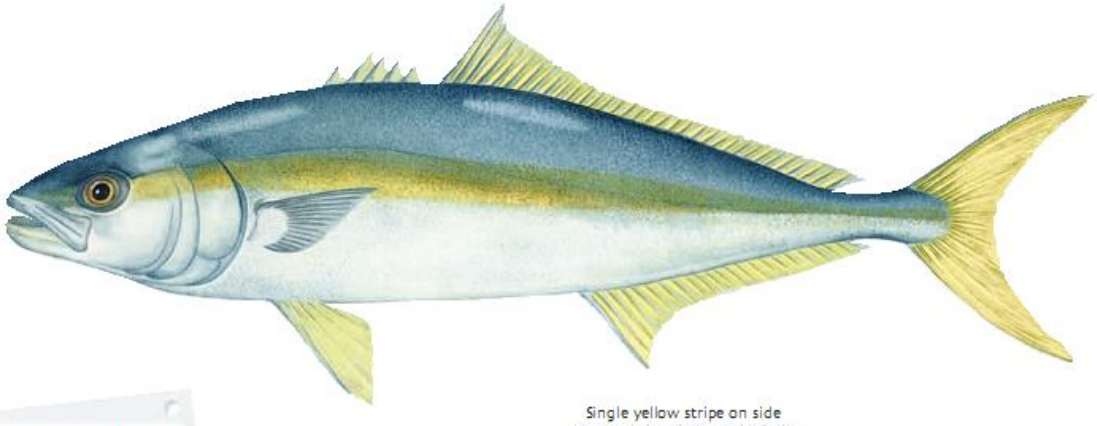


English: Rainbow runner
French: Comète saumon
Japanese: Tsumuburi, Okiburi
Hawaiian: Kamanu, Hawaiian salmon
Local:

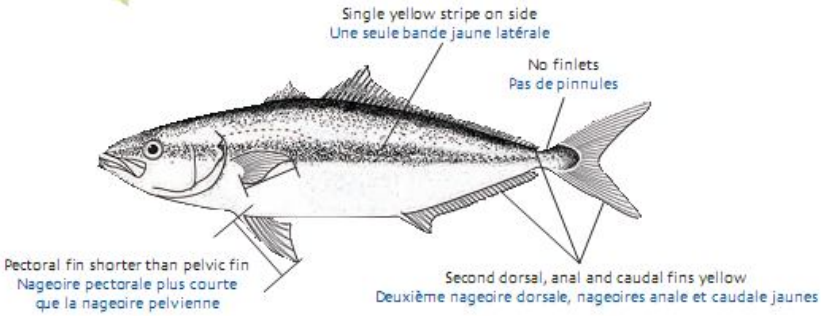


Seriola lalandi

SPECIES CODE: YTC



English: Yellowtail amberjack
French: Sériole chinchard
Japanese: Hiramasa
Local:



Seriola dumerili

SPECIES CODE:AMB

Greater amberjack

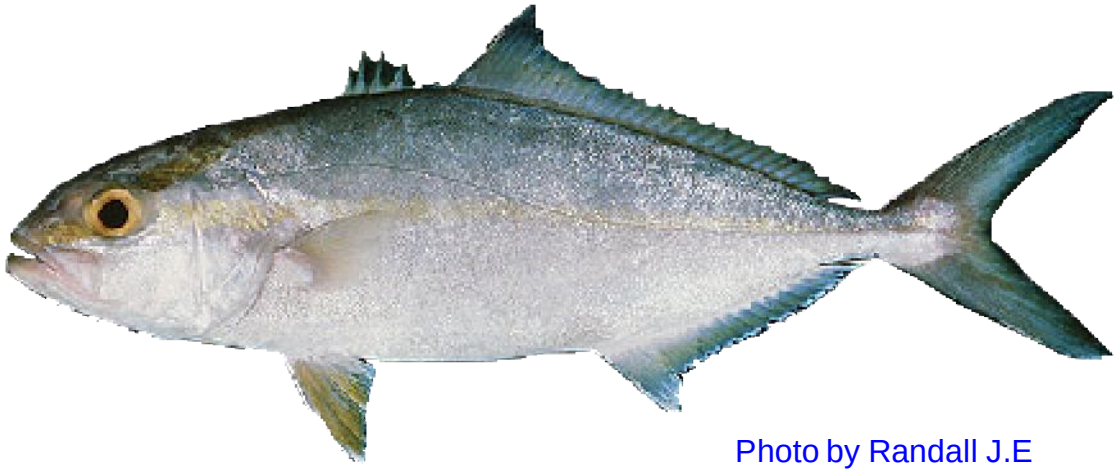


Photo by Randall J.E

Uraspis secunda

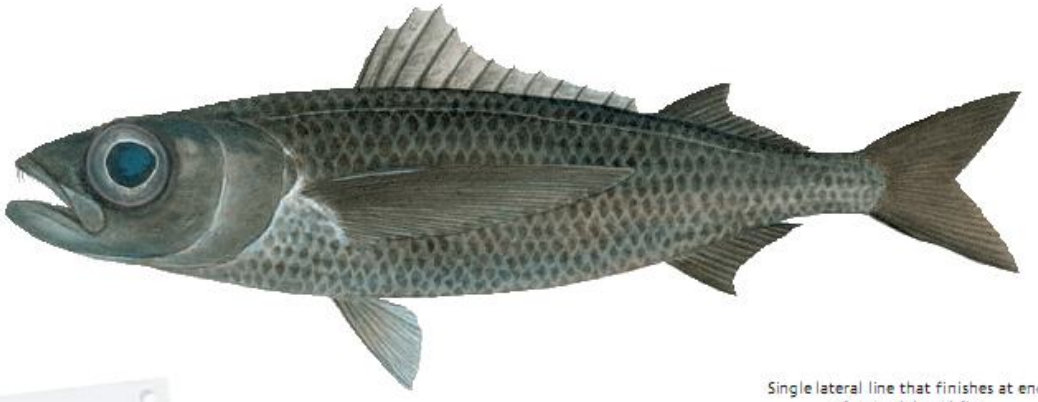
SPECIES CODE:USE

Cottonmouth jack

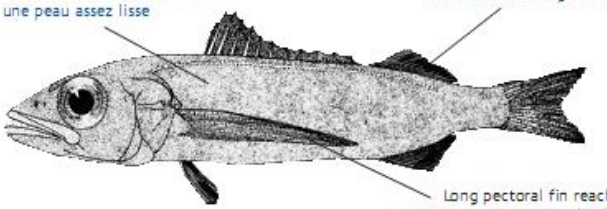
Photo by Cambria Duarte P.M.N.

Scombrolabrax heterolepis

SPECIES CODE: SXH



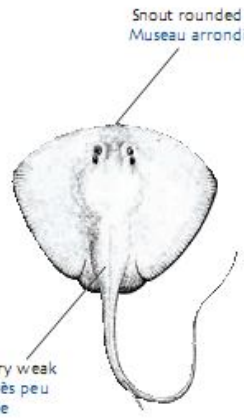
English: Longfin escolar, Black mackerel
French: Escolier aile longue
Japanese: Mukashikurotachi
Local:



Maximum length: 30 cm
Taille maximum : 30 cm

Dasyatis violacea

SPECIES CODE: PLS

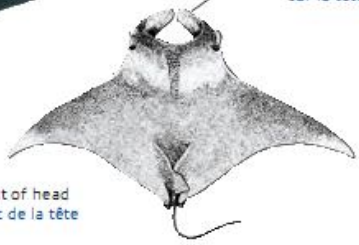


English: Pelagic stingray
French: Pastenague violette
Japanese: Karasu-ei
Hawaiian: Pelagic stingray
Local:

Manta birostris

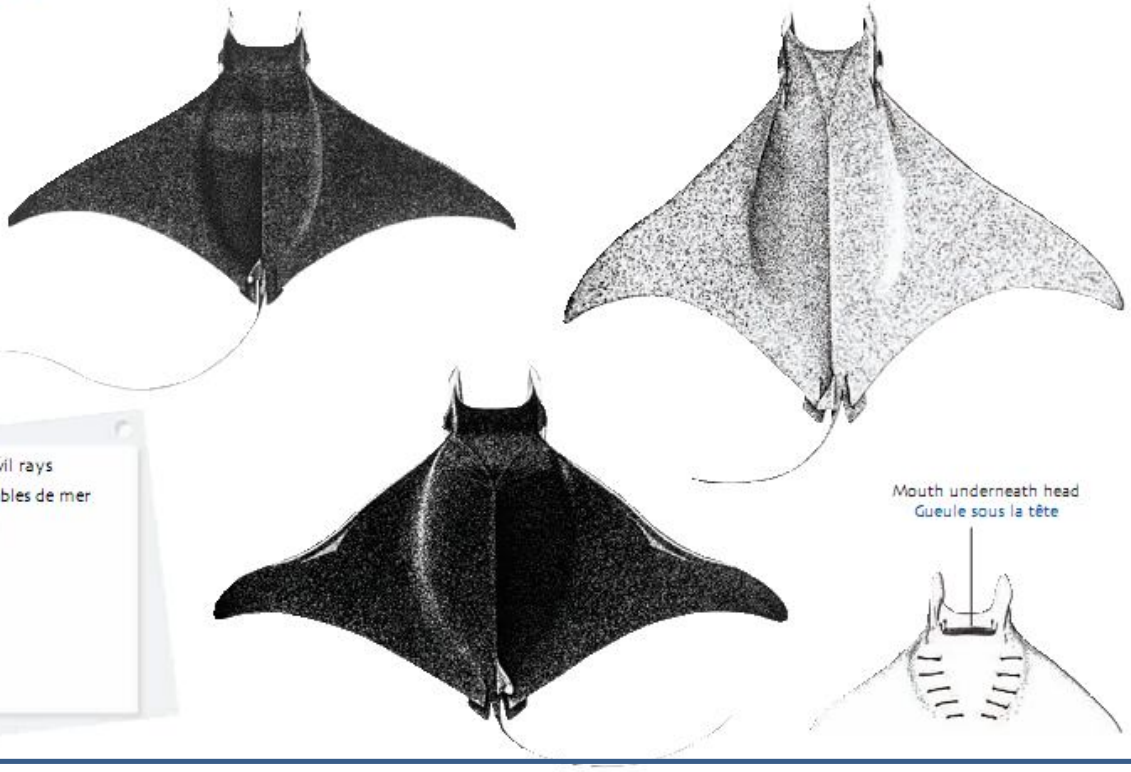
SPECIES CODE: RMB

English: Giant manta
French: Mante géante
Japanese: Oni-itomaki-ei
Hawaiian: Manta ray, Hahalua, Devilray
Local:



Mobula spp.

SPECIES CODE: RMV

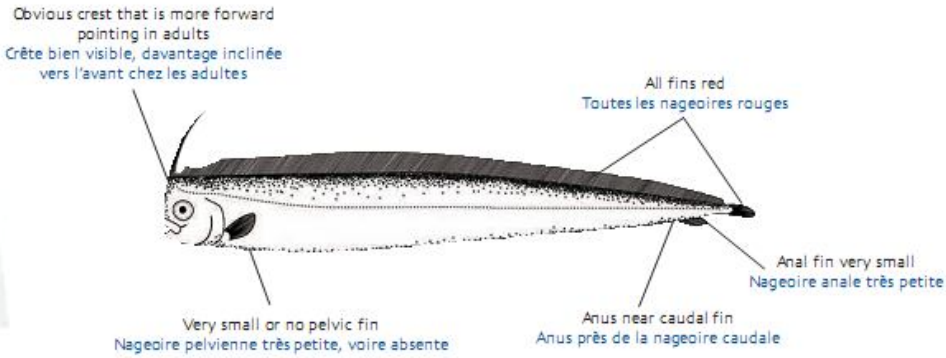


English: Devil rays
French: Diables de mer
Japanese: Ei
Local:

Lophotus capellei

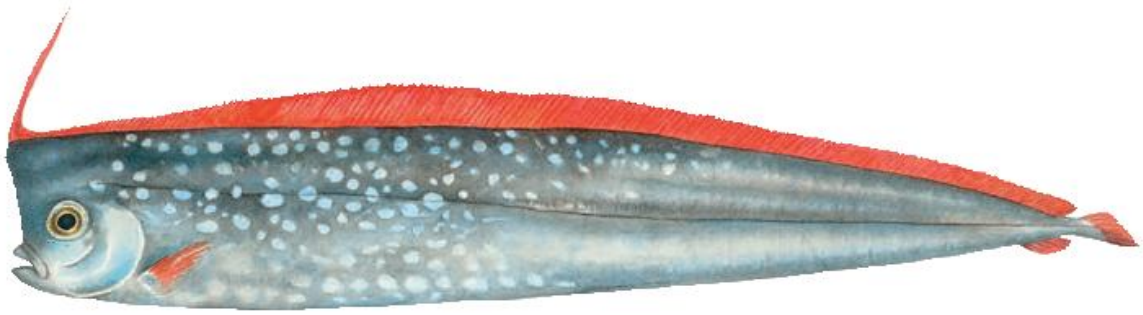
SPECIES CODE: LOP

English: Unicornfish
French: Lophote chevelu
Japanese: Akanamada
Local:

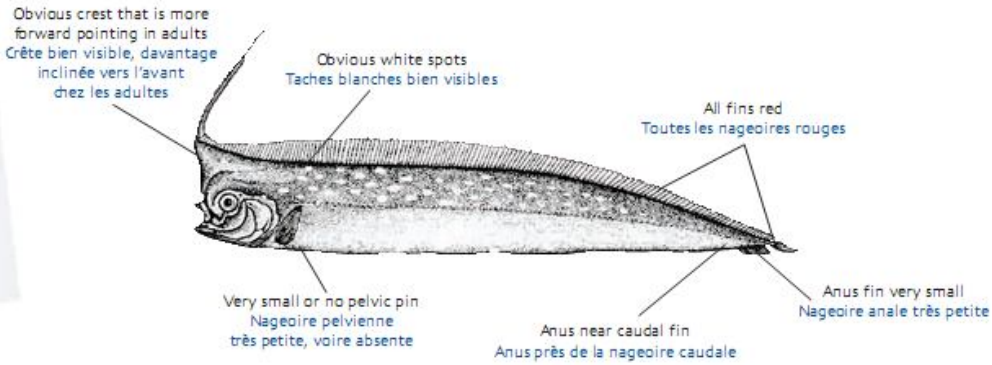


Lophotus lacepede

SPECIES CODE: LLL



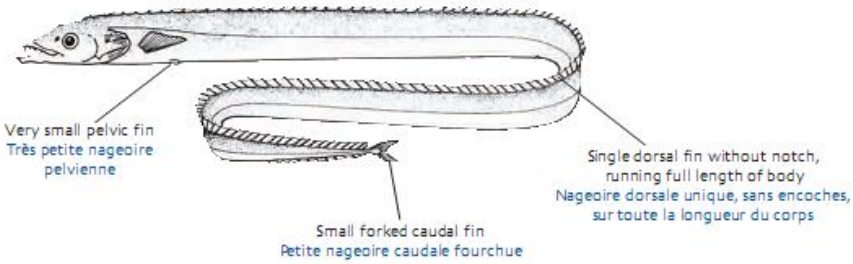
English: Crested oarfish, Crestfish
French: Lophote à crête
Japanese: Akanamada-zoku
Hawaiian: Crestfish
Local:



Assurger anzac

SPECIES CODE: ASZ

English: Razorback scabbardfish
French: Poisson sabre rasoir
Japanese: Nagayumetachi-modoki
Local:



Trichiuridae (other)

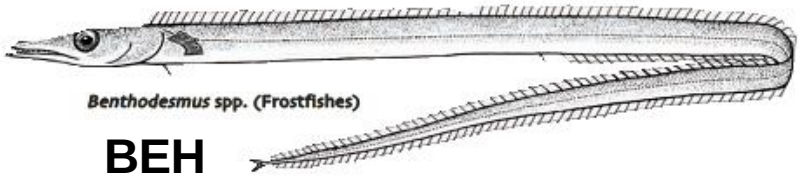
SPECIES CODE: CUT

Species in this family have:

- Strong fang-like teeth
- No red fins
- Body shape long and thin

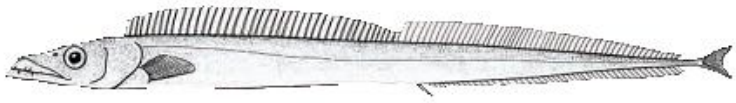
Caractéristiques des espèces de cette famille

- Puissantes dents comme des crochets
- Pas de nageoires rouges
- Corps long et mince



***Benthodesmus* spp. (Frostfishes)**

BEH

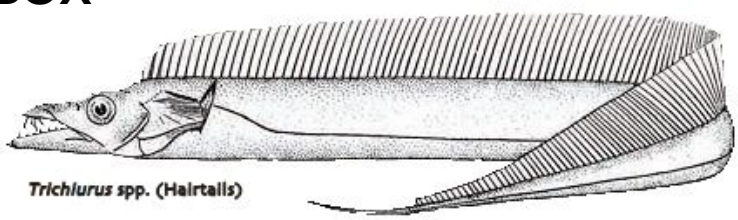


***Aphanopus* spp. (Scabbardfishes)**

BOX

English: Other Frostfishes, Scabbardfishes, Hairtails
French: Autres poissons sabres
Japanese: Tachiuo, Oshiroitachi
Local:

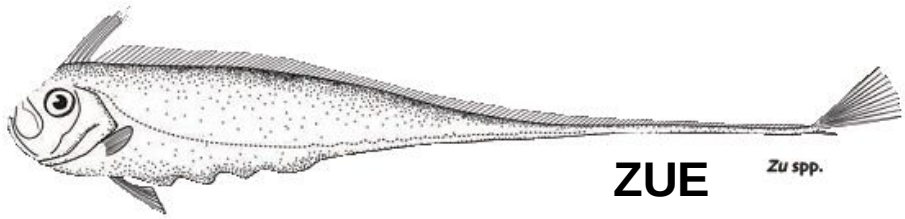
TCW



***Trichiurus* spp. (Hairtails)**

Trachipteridae

SPECIES CODE: TRX



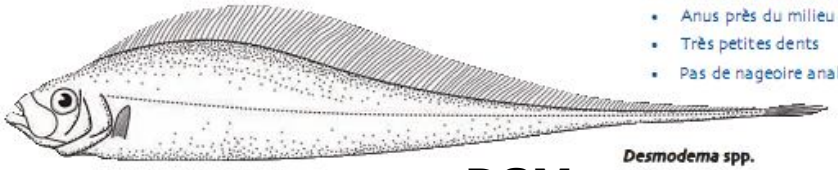
ZUE *Zu* spp.

Species in this family have:

- Red dorsal fin
- Anus near middle of body
- Very small teeth
- No anal fin in adults

Caractéristiques des espèces de cette famille :

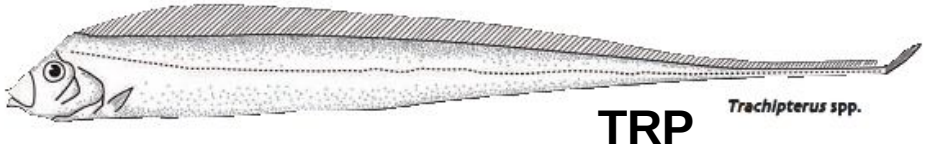
- Nageoire dorsale rouge
- Anus près du milieu du corps
- Très petites dents
- Pas de nageoire anale chez les adultes



Desmodema spp.

DSM

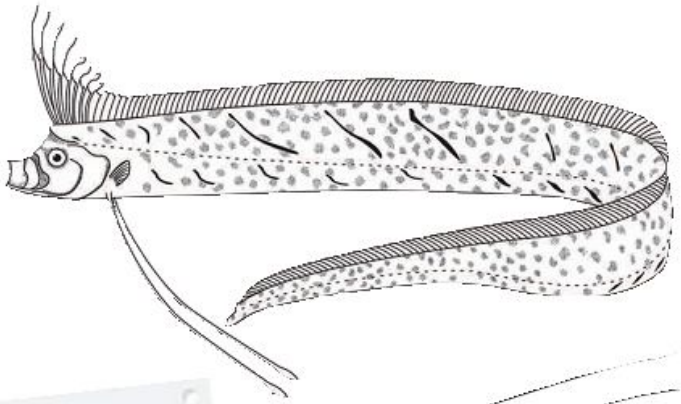
English: Ribbonfish, Dealfish
French: Poissons-rubans
Japanese: Tachiuo, Furisodeuo
Local:



TRP *Trachipterus* spp.

Regalecidae

SPECIES CODE: RRG



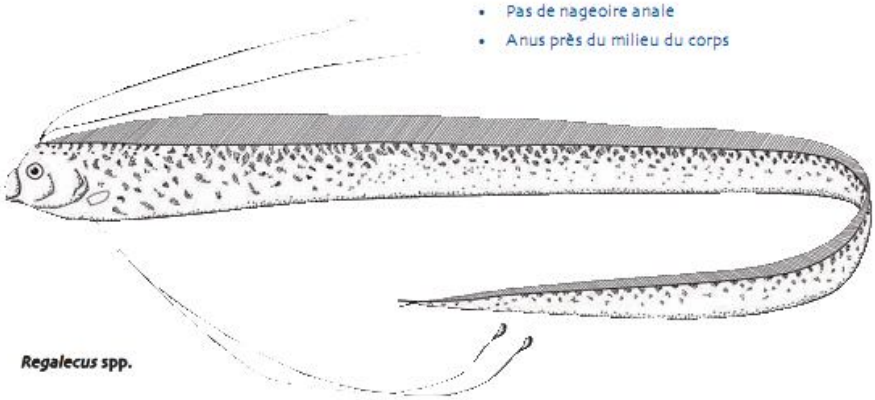
Species in this family have:

- Extremely small teeth
- Red dorsal and pelvic fins
- Pelvic fins very long in adults
- No anal fin
- Anus near middle of body

Caractéristiques des espèces de cette famille :

- Dents extrêmement petites
- Nageoires dorsale et pelvienne rouges
- Nageoires pelviennes très longues chez les adultes
- Pas de nageoire anale
- Anus près du milieu du corps

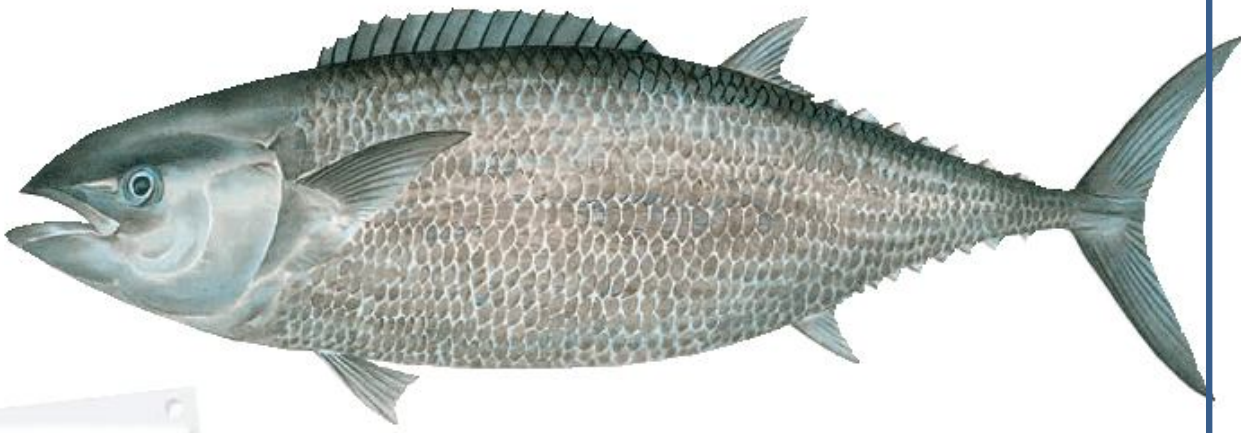
English: Oarfish
French: Régalecs
Japanese: Ryuguno-tsukai
Local:



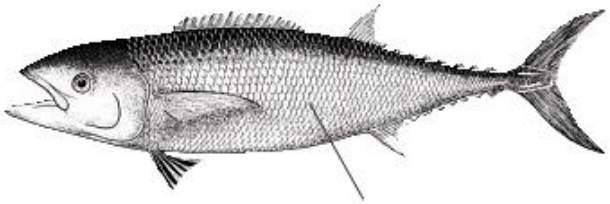
Regalecus spp.

Gasterochisma melampus

SPECIES CODE:BUK



English: Butterfly kingfish
French: Thon papillon
Japanese: Urokomaguro
Local:



Body covered in large shiny scales
Corps couvert de grandes écailles luisantes

Kyphosus cinerascens

SPECIES CODE:KYC

Blue Seachub

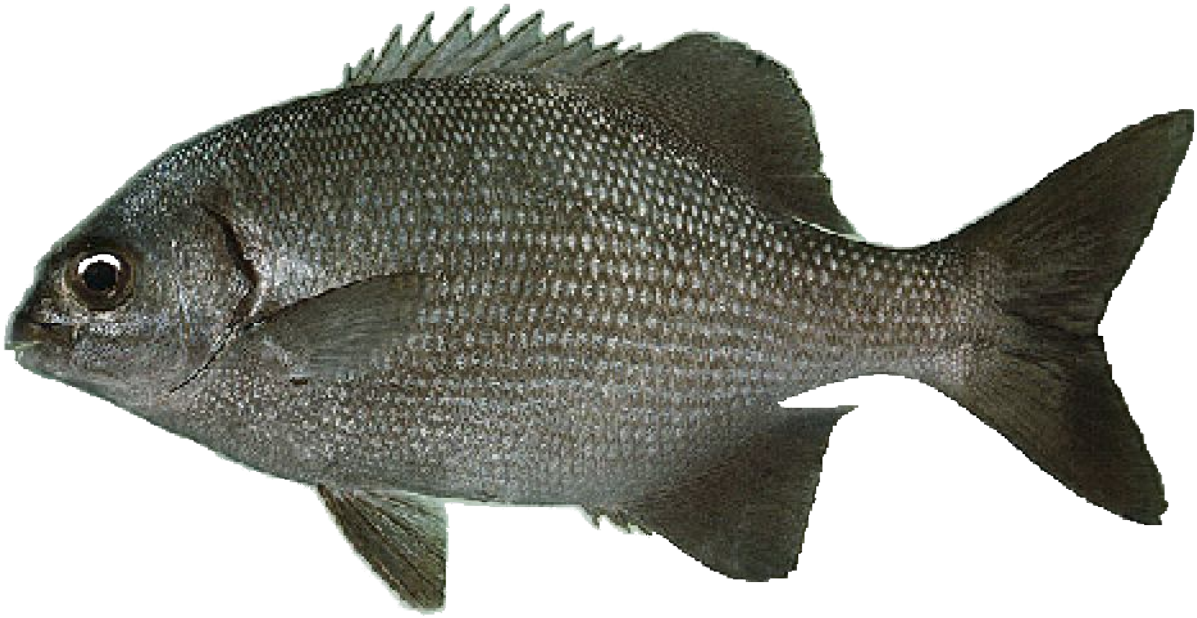


Photo by Randall J.E.

Gnathanodon speciosus

SPECIES CODE:GLT

Golden trevally

Photo by Randall J.E.

Caranx sexfasciatus

SPECIES CODE:CXS

Bigeye trevally

Photo by Randall J.E.

Canthidermis maculates

SPECIES CODE:CNT

Spotted oceanic triggerfish

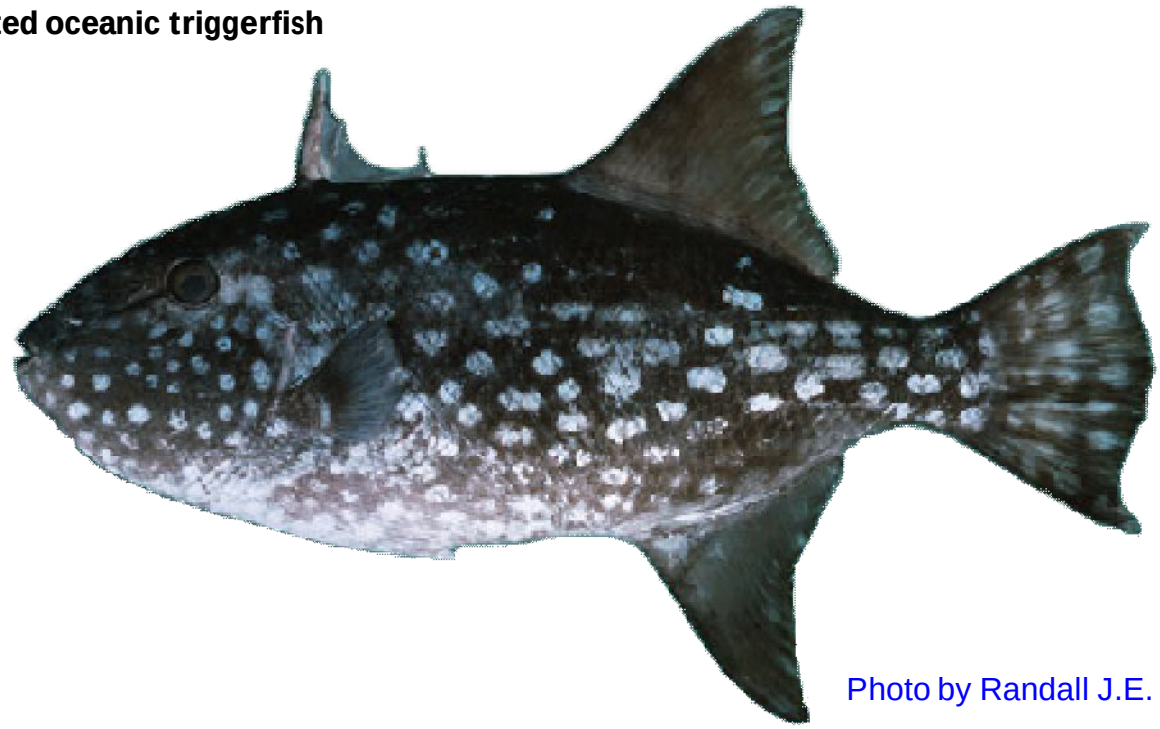


Photo by Randall J.E.

Lobotes surinamensiserascens

SPECIES CODE:LOB

Tripletail

Photo by Lord, R.

Platax tiera

SPECIES CODE:BAO

Longfin batfish

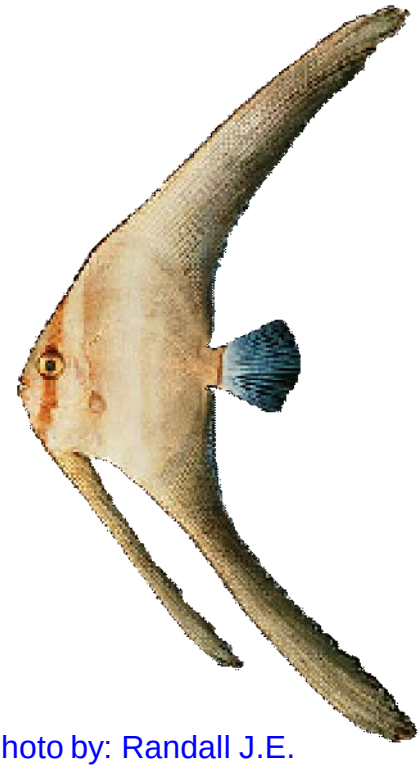


Photo by: Randall J.E.

Scomberoides spp.

SPECIES CODE:QUE

Quenfishes

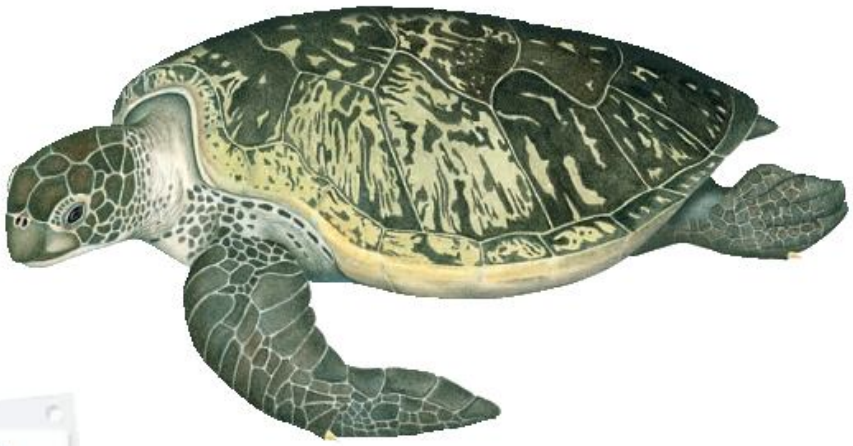
Scomberoides lysan Photo by Hermosa, Jr. G.V.

Scomberoides tol Photo by Gloerfelt-Tarp, T.

SEA TURTLES

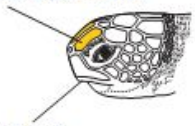
Chelonia mydas

SPECIES CODE: TUG

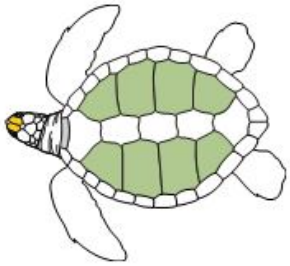


English: Green turtle
French: Tortue verte
Japanese: Ao-umigame
Hawaiian: Honu
Local:

One pair of prefrontal scales
Une paire d'écailles préfrontales



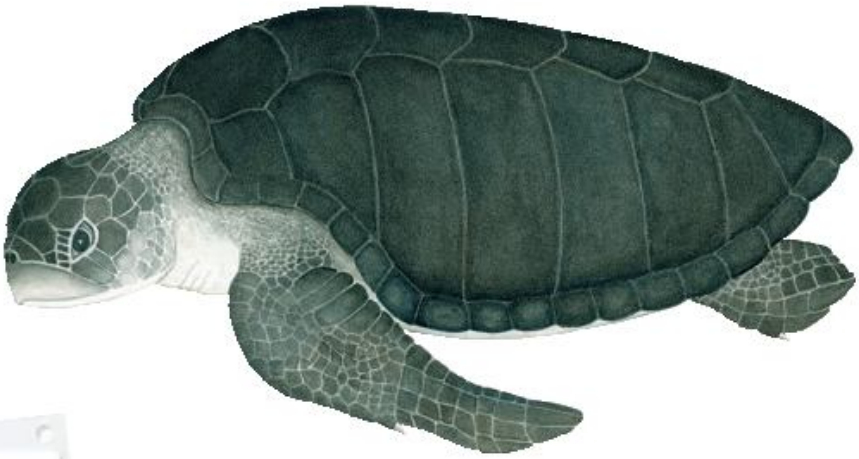
Toothed beak
Bec denticulé



Four pairs of costal scutes; the first pair is not in contact with the nuchal scute
Quatre paires d'écailles costales ; la première paire n'est pas en contact avec l'écaille nucale

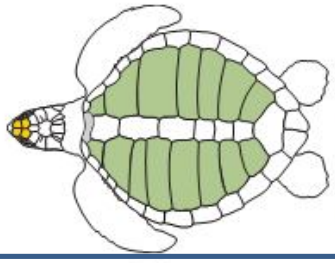
Lepidochelys olivacea

SPECIES CODE: LKV



English: Olive ridley turtle
French: Tortue olivâtre
Japanese: Hime-umigame
Local:

Two pairs of prefrontal scales
Deux paires d'écailles préfrontales



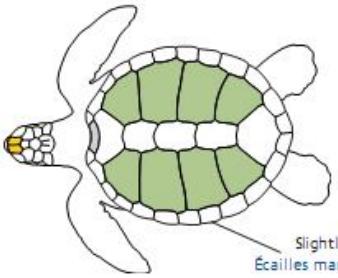
(not necessarily the same number on either side); the first pair is in contact with the nuchal scute.
Cinq à neuf paires d'écailles costales (pas forcément le même nombre de chaque côté) ; la première paire est en contact avec l'écaille nucale.

Natator depressus

SPECIES CODE: FBT

English: Flatback turtle
French: Tortue à dos plat
Japanese: Hirataumigame
Local:

One pair of prefrontal scales
Une paire d'écailles préfrontales



Four pairs of costal scutes; the first pair is not in contact with the nuchal scute
Quatre paires d'écailles costales ; la première paire n'est pas en contact avec l'écaille nucale

Slightly upturned lateral margins
Écailles marginales légèrement retroussées

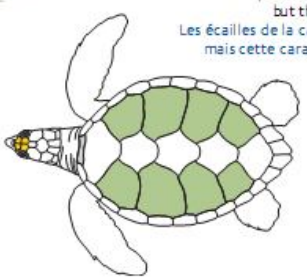
Eretmochelys imbricata

SPECIES CODE: TTH

English: Hawksbill turtle
French: Tortue imbriquée
Japanese: Taimai
Hawaiian: Ea, Honu'ea
Local:

Two pairs of prefrontal scales
Deux paires d'écailles préfrontales

Pointed hooked beak
Bec pointu et crochu

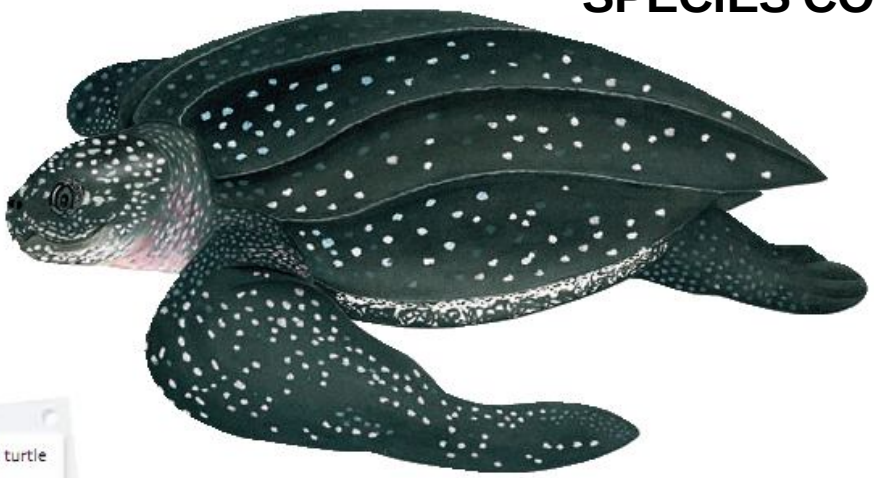


Carapace scutes are generally overlapping but this trait fades with age.
Les écailles de la carapace sont en général imbriquées, mais cette caractéristique s'estompe avec l'âge.

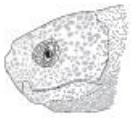
Four pairs of costal scutes; the first pair is not in contact with the nuchal scute
Quatre paires d'écailles costales ; la première paire n'est pas en contact avec l'écailles nucale

Dermochelys coriacea

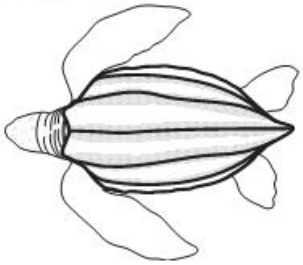
SPECIES CODE: DKK



English: Leatherback turtle
French: Tortue luth
Japanese: Osa-game
Local:



No scales on head
Tête dépourvue d'écailles



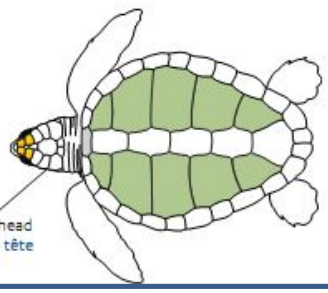
Back (pseudocarapace):
no scales (simply covered by a kind of leather) and divided by seven longitudinal ridges.
Dossière (pseudocarapace) :
dépourvue d'écailles (simplement recouverte d'une sorte de cuir) et divisée par sept carènes longitudinales.

Caretta caretta

SPECIES CODE: TTL

English: Loggerhead turtle
French: Tortue caouanne
Japanese: Aka-umigame
Local:

Two pairs of prefrontal scales
Deux paires d'écailles préfrontales



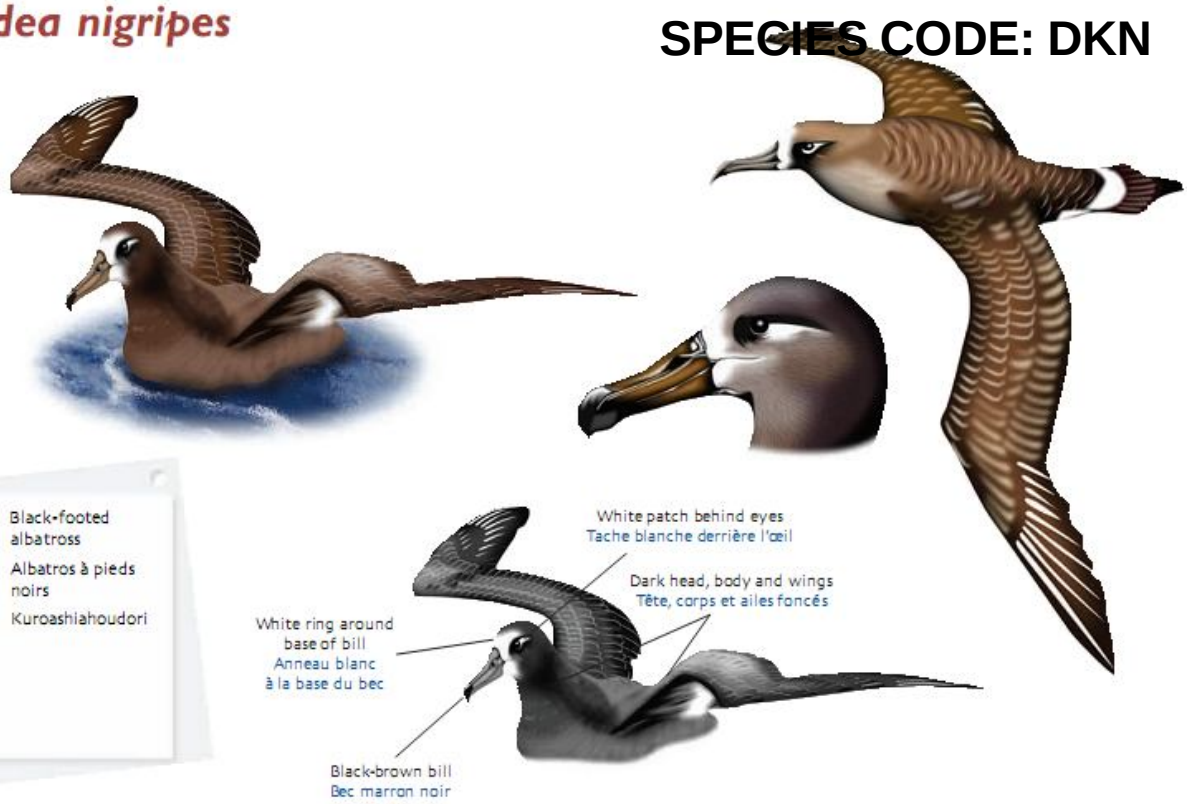
Large head
Grosse tête

Five pairs of costal scutes; the first pair is in contact with the nuchal scute.
Cinq paires d'écailles costales ; la première paire est en contact avec l'écaille nucale.

SEA BIRDS

Diomedea nigripes

SPECIES CODE: DKN



English: Black-footed albatross
French: Albatros à pieds noirs
Japanese: Kuroashiahoudori
Local:

White patch behind eyes
Tache blanche derrière l'œil
Dark head, body and wings
Tête, corps et ailes foncés
White ring around base of bill
Anneau blanc à la base du bec
Black-brown bill
Bec marron noir

Diomedea immutabilis

SPECIES CODE: DIZ

English: Laysan albatross
French: Albatros de Laysan
Japanese: Koahoudori
Local:

Dark upper wings and back
Dos et parties supérieures des ailes sombres
Dark ring around eyes
Anneau foncé autour de l'œil
Flesh coloured bill with grey tip
Bec couleur chair avec extrémité grise
White head, neck and stomach
Tête, cou et ventre blancs

Diomedeidae

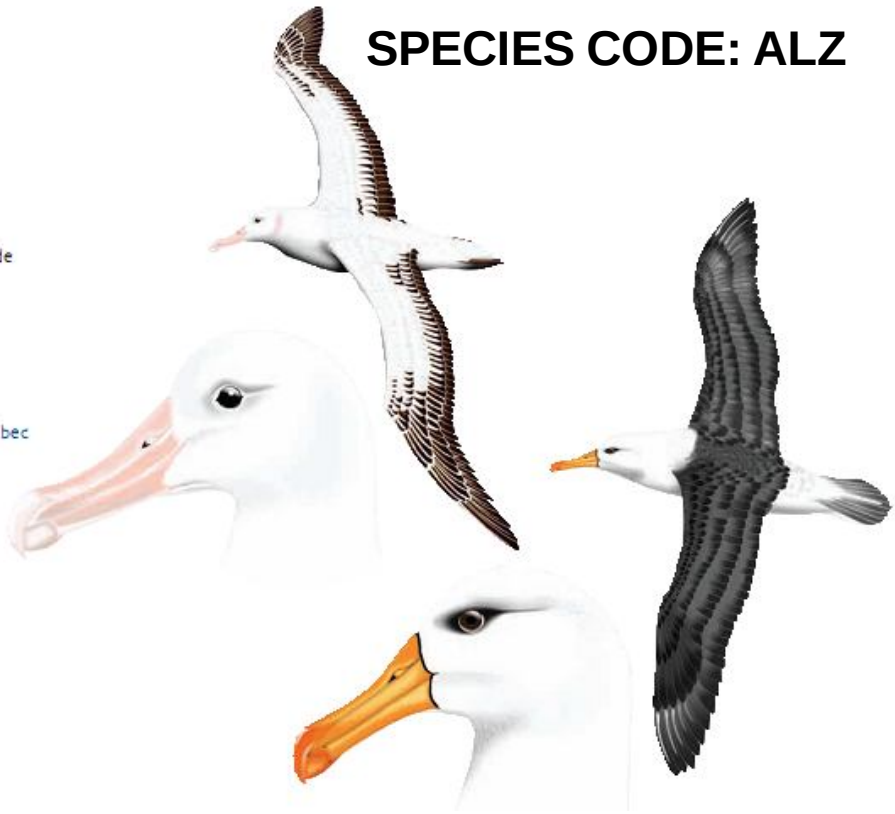
SPECIES CODE: ALZ

Species in this family have:

- Large hooked bill
- Large birds
- Wing span up to 3.5 m
- External nostrils at base of bill, one on each side

Caractéristiques des espèces de cette famille :

- Long bec crochu
- Grands oiseaux
- Jusqu'à 3,5 mètres d'envergure
- Narines externes de chaque côté à la base du bec



English: Albatrosses
French: Albatros
Japanese: Ahoudori
Local:

Sulidae

SPECIES CODE: SZV

Species in this family have:

- Large birds
- Long wings with wing span up to 2.2 m
- Wedge-shaped tail
- Stout conical bill

Caractéristiques des espèces de cette famille :

- Grands oiseaux
- Longues ailes d'une envergure pouvant aller jusqu'à 2,2 mètres
- Queue cunéiforme
- Puissant bec conique

English: Boobies and Gannets
French: Fous
Japanese: Katuodori-ka
Local:

Procellariidae

SPECIES CODE: PTZ

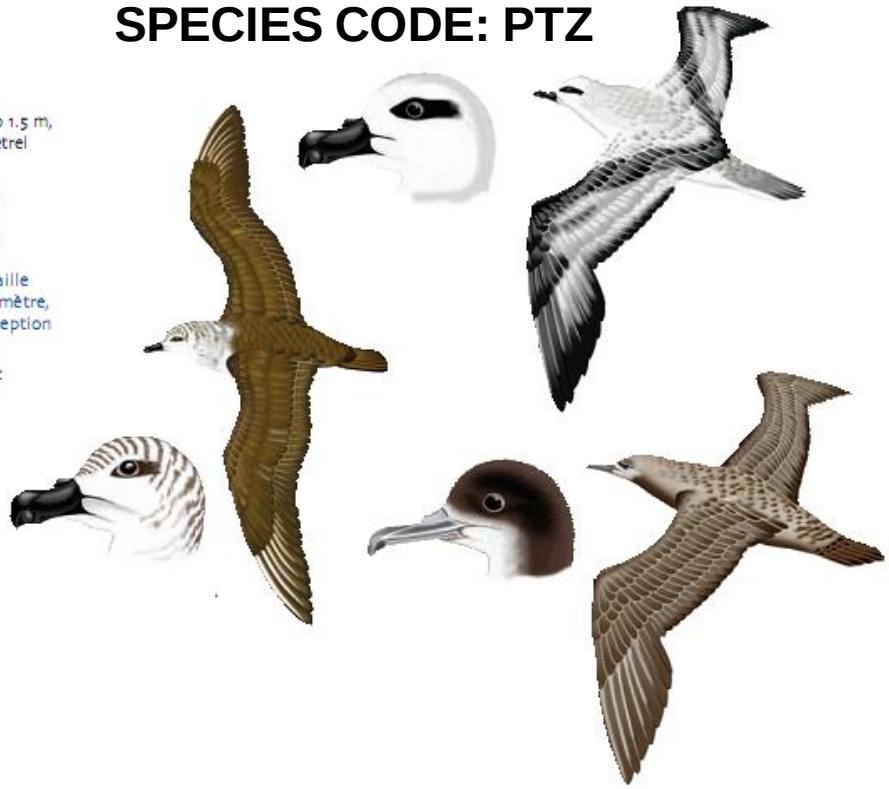
Species in this family have:

- Most species smaller in size (wing span up to 1.5 m, but mainly less than 1 m) except for giant petrel (wing span up to 2.5 m)
- Nostrils united in a single tube on top of bill

Caractéristiques des espèces de cette famille :

- La plupart des espèces sont de plus petite taille (avec une envergure pouvant atteindre 1,5 mètre, mais en général inférieure au mètre) à l'exception du pétrel géant (envergure de 2,5 mètres)
- Les narines se rejoignent au sommet du bec pour former une cavité tubulaire.

English: Petrels and Shearwaters
French: Pétrels et Puffins
Japanese: Kuromizunagodori-rui
Local:



Laridae

SPECIES CODE: LRD

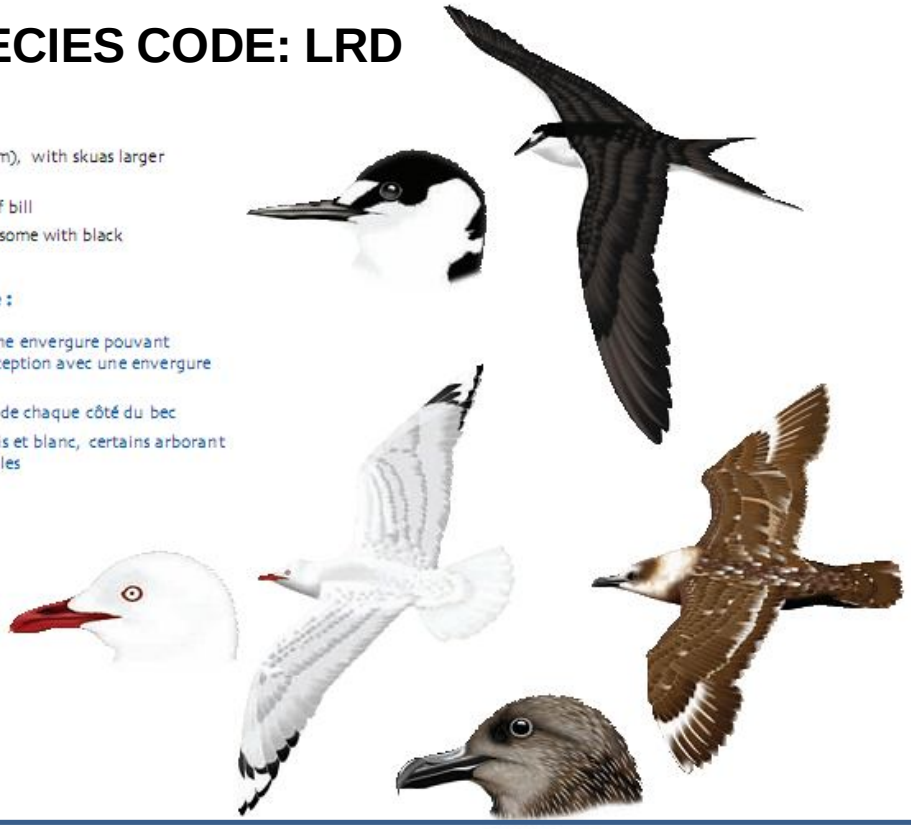
Species in this family have:

- Generally smaller birds (wing span up to 1 m), with skuas larger (wing span up to 1.8 m)
- Nostrils are plain openings on either side of bill
- Most birds have grey and white plumage, some with black on head and wings

Caractéristiques des espèces de cette famille :

- Oiseaux généralement plus petits (avec une envergure pouvant atteindre un mètre), les labbes faisant exception avec une envergure possible de 1,8 mètre
- Les narines sont de simples orifices situés de chaque côté du bec
- La plupart des oiseaux ont un plumage gris et blanc, certains arborant quelques taches noires sur la tête et les ailes

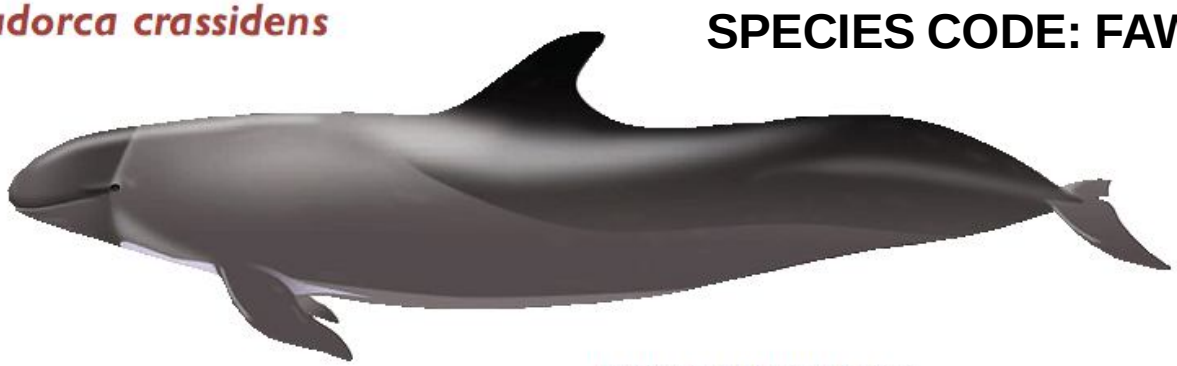
English: Gulls, Terns and Skuas
French: Goélands, Sternes et Labbes
Japanese: Kamome-ka
Local:



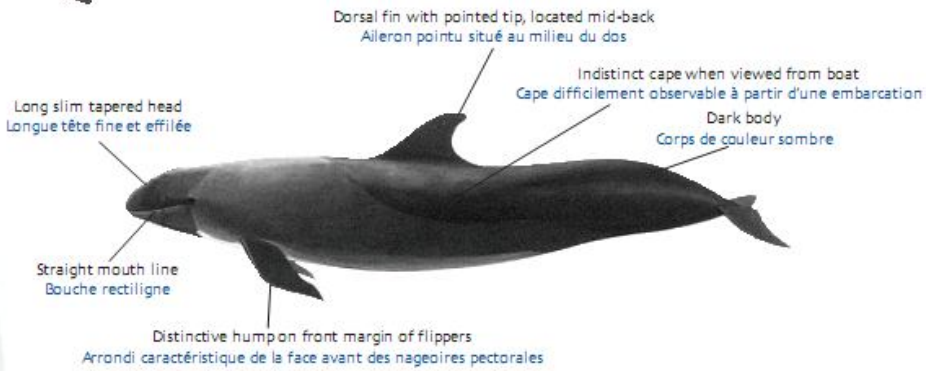
TOOTHED WHALES

Pseudorca crassidens

SPECIES CODE: FAW



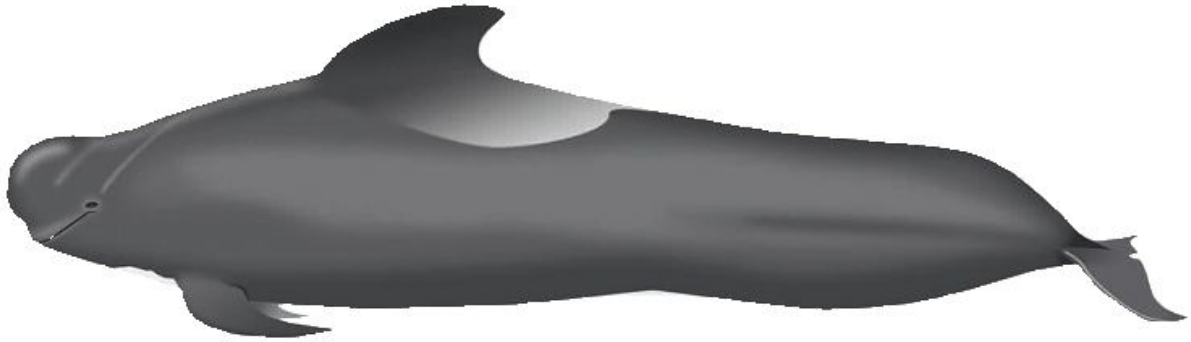
English: False killer whale
French: Faux-orque
Japanese: Oki-gondo
Local:



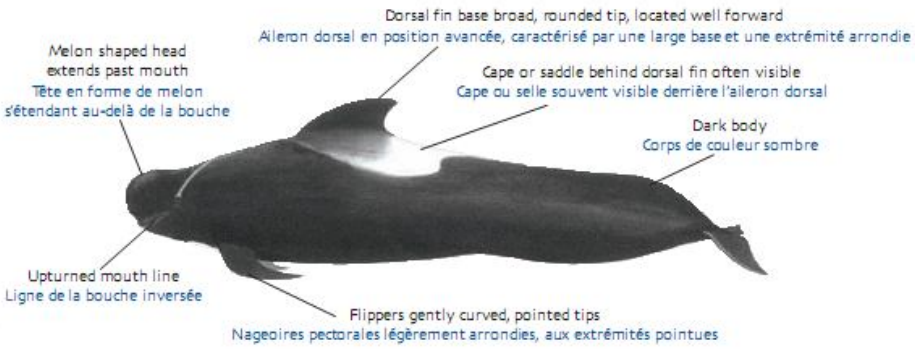
Maximum length: 6 m
Taille maximum : 6 m

Globicephala macrorhynchus

SPECIES CODE: SHW



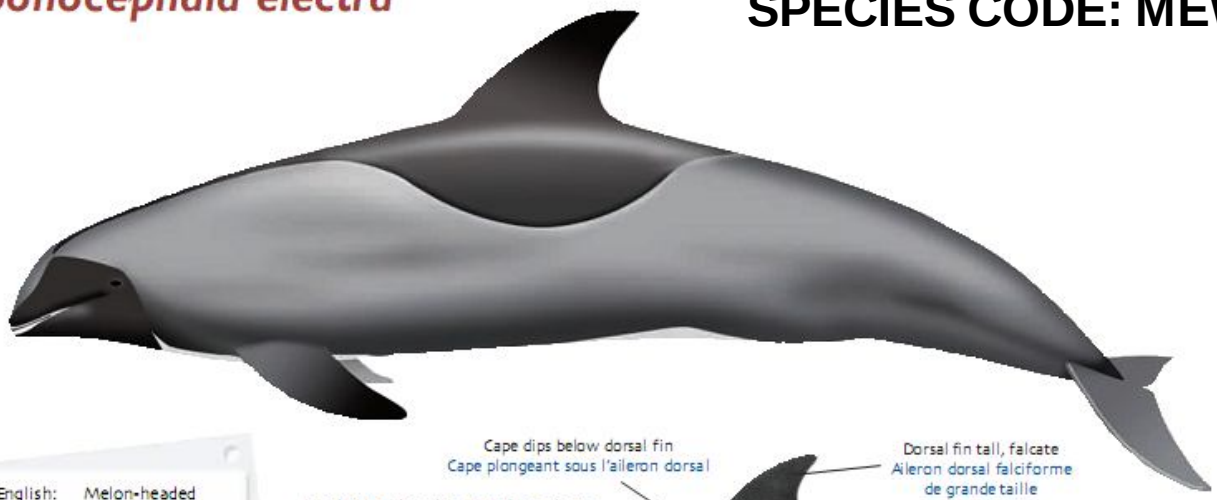
English: Short-finned pilot whale
French: Globicéphale tropical
Japanese: Kobire-gondo
Local:



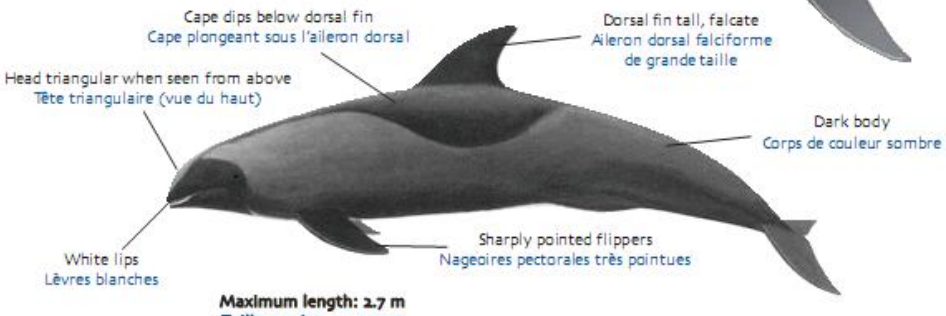
Maximum length: 6 m
Taille maximum : 6 m

Peponocephala electra

SPECIES CODE: MEW



English: Melon-headed whale
French: Péponocéphale
Japanese: Kazuha-gondo
Local:

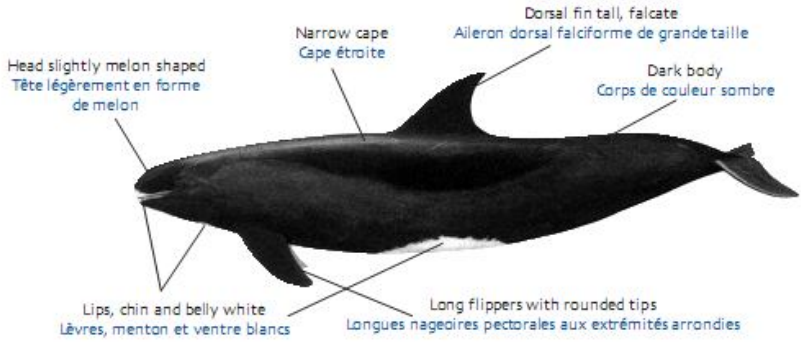


Maximum length: 2.7 m
Taille maximum : 2,7 m

Feresa attenuata

SPECIES CODE: KPW

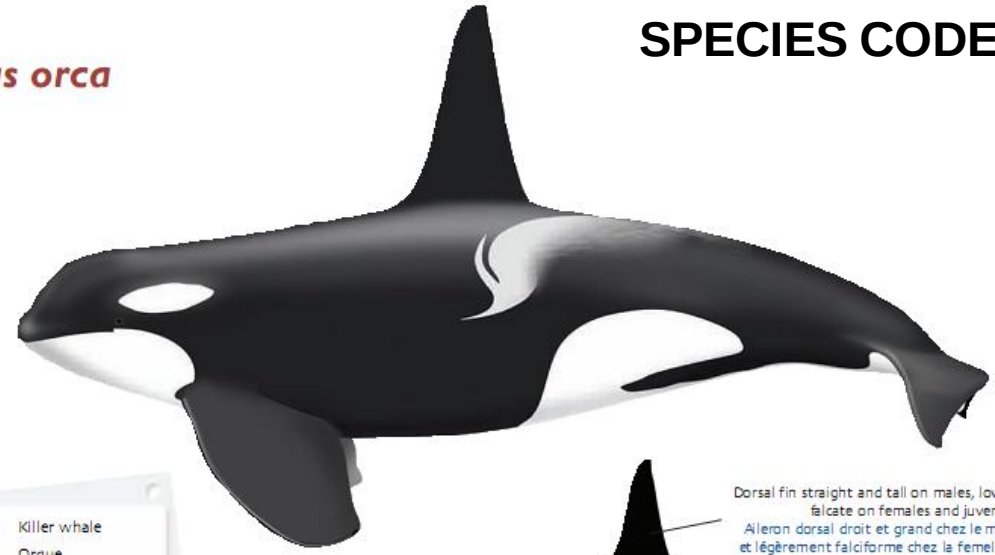
English: Pygmy killer whale
French: Orque pygmée
Japanese: Yume-gondo
Local:



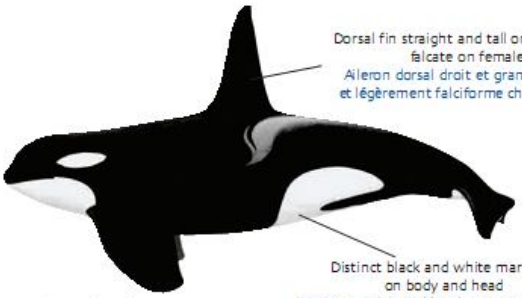
Maximum length: 3 m
Taille maximum : 3 m

Orcinus orca

SPECIES CODE: KIW



English: Killer whale
French: Orque
Japanese: Shachi, Sakamata
Local:



Dorsal fin straight and tall on males, lower and slightly falcate on females and juveniles
Aileron dorsal droit et grand chez le mâle, plus petit et légèrement falciforme chez la femelle et les jeunes

Distinct black and white markings on body and head
Marques noires et blanches caractéristiques sur le corps et la tête

Maximum length: 9 m
Taille maximum : 9 m

Physeter macrocephalus

SPECIES CODE: SPW

English: Sperm whale
French: Cachalot
Japanese: Makko-kujira
Local:

Unique "blow" for a cetacean, with blow directed at an angle forward and to the left
Évent particulier pour un cétacé, le souffle étant orienté vers l'avant et vers la gauche

Low dorsal hump followed by a series of knuckles
Petite bosse dorsale suivie d'une série de protubérances

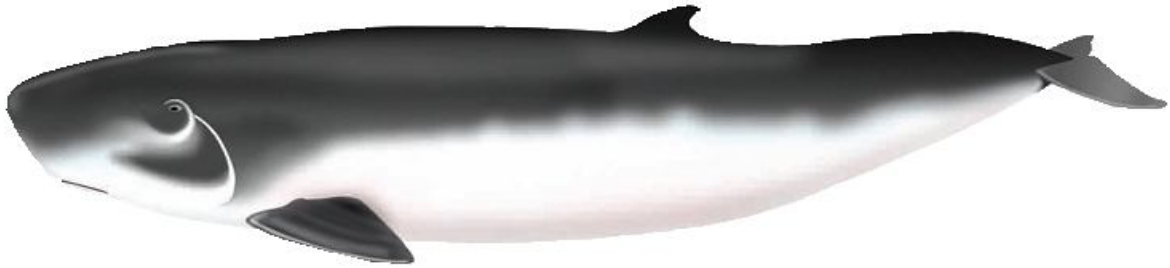
Huge square head
Grosse tête carrée

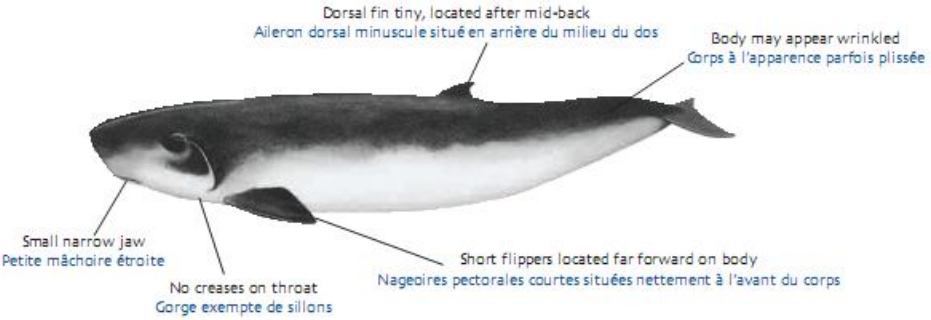
Body appears wrinkled
Corps à l'apparence plissée

Maximum length: 18 m
Taille maximum : 18 m

Kogia breviceps

SPECIES CODE: PYW



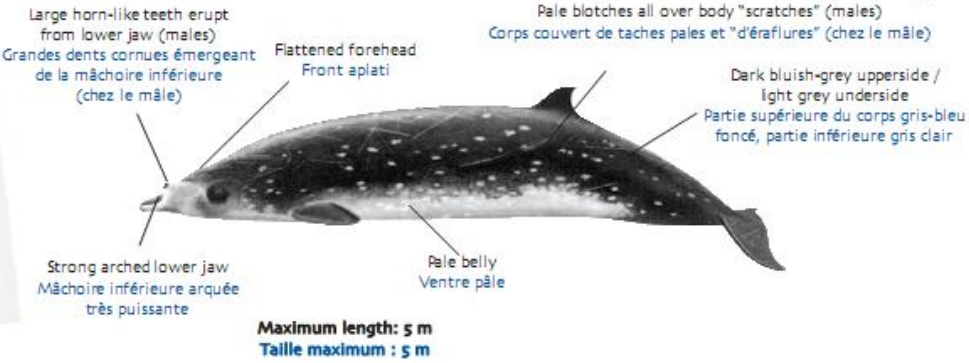


English: Pygmy sperm whale
French: Cachalot pygmée
Japanese: Komakko-kujira
Local:

Maximum length: 3.7 m
Taille maximum : 3,7 m

Mesoplodon densirostris

SPECIES CODE: BBW



English: Blainville's beaked whale
French: Baleine à bec de Blainville
Japanese: Kobuha-kujira
Local:

Maximum length: 5 m
Taille maximum : 5 m

Mesoplodon ginkgodens

SPECIES CODE: TGW

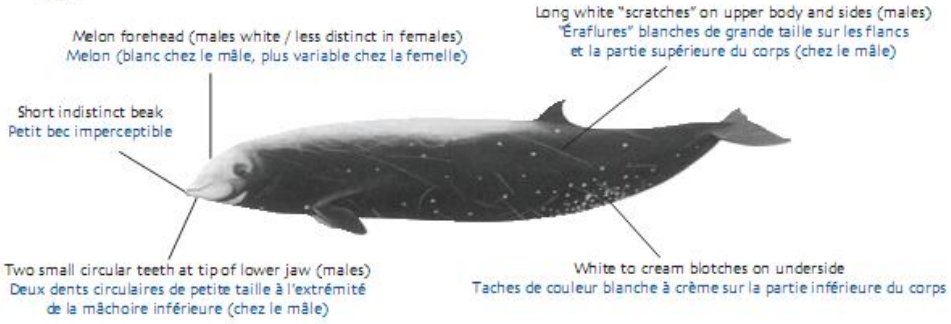
English: Ginkgo-toothed beaked whale
French: Baleine à bec de Nishiwaki
Japanese: Ichoha-kujira
Local:

Maximum length: 5 m
Taille maximum : 5 m

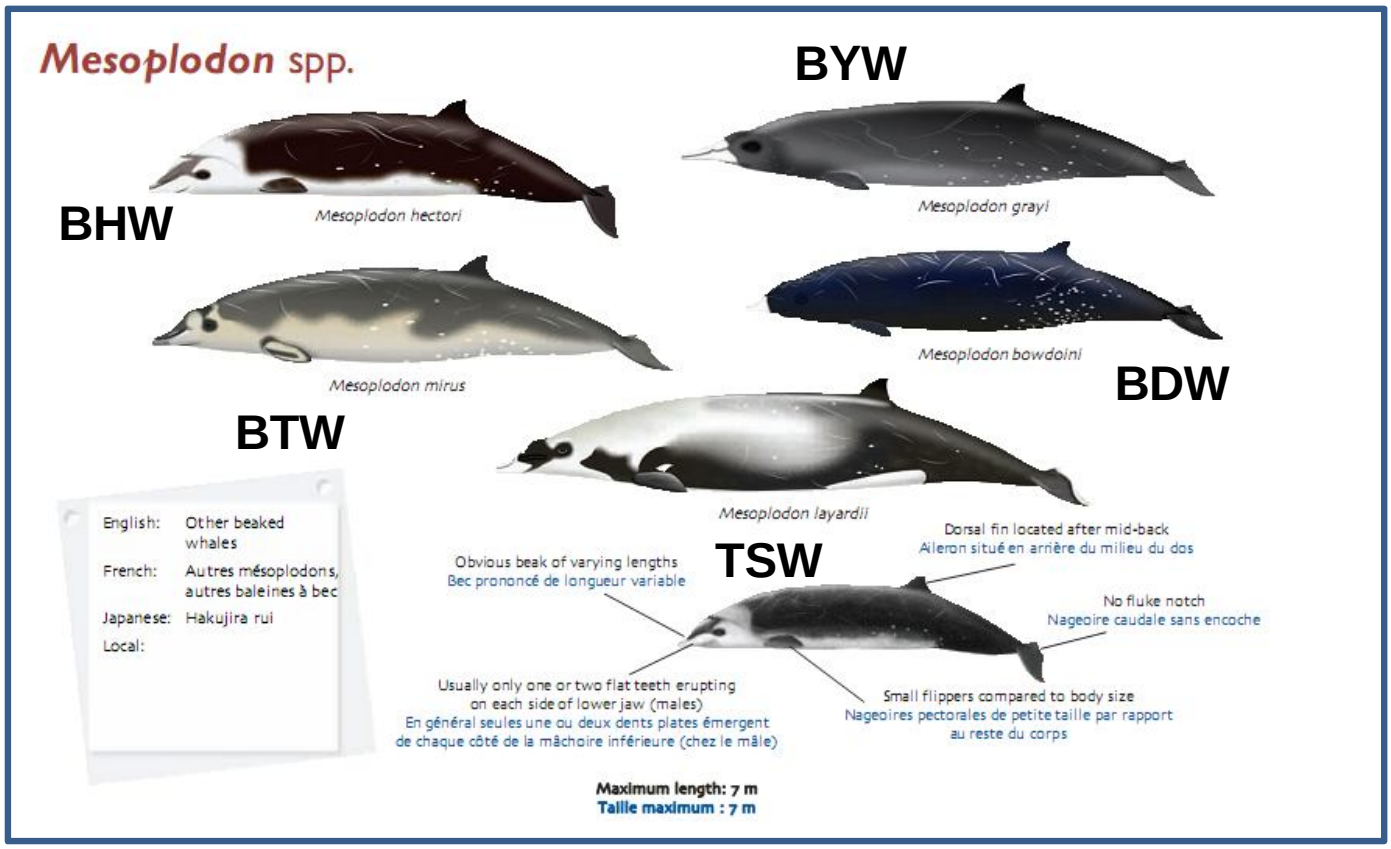
Ziphius cavirostris

SPECIES CODE: BCW

English: Cuvier's beaked whale
French: Ziphius
Japanese: Akabo-kujira
Local:



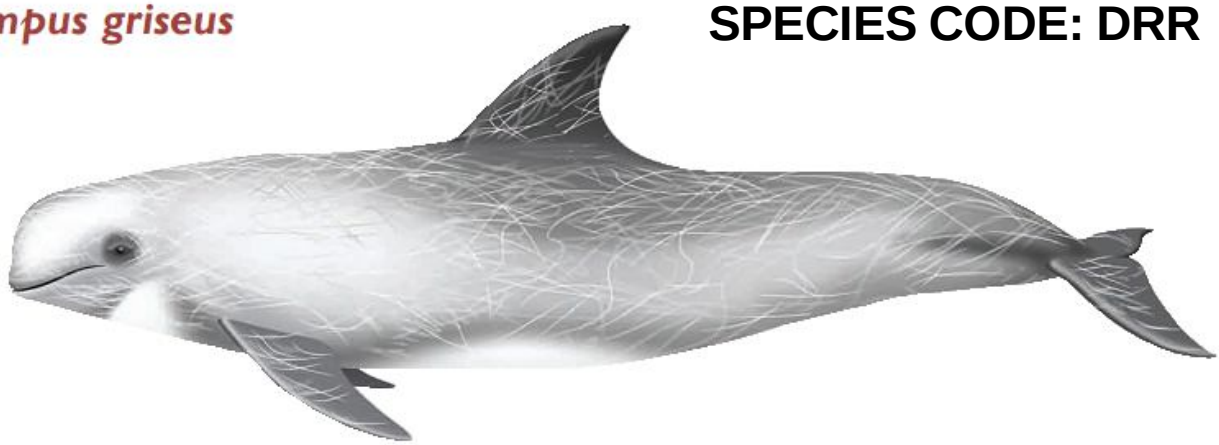
Maximum length: 7 m
Taille maximum : 7 m


Mesoplodon spp.
BYW
BHW
Mesoplodon hectori
Mesoplodon grayi
Mesoplodon bowdoini
BDW
Mesoplodon mirus
BTW
Mesoplodon layardii
English: Other beaked whales
French: Autres mésoplodons, autres baleines à bec
Japanese: Hakujira rui
Local:
TSW
Dorsal fin located after mid-back
Aileron situé en arrière du milieu du dos
Obvious beak of varying lengths
Bec prononcé de longueur variable
No fluke notch
Nageoire caudale sans encoche
Usually only one or two flat teeth erupting on each side of lower jaw (males)
En général seules une ou deux dents plates émergent de chaque côté de la mâchoire inférieure (chez le mâle)
Small flippers compared to body size
Nageoires pectorales de petite taille par rapport au reste du corps
Maximum length: 7 m
Taille maximum : 7 m

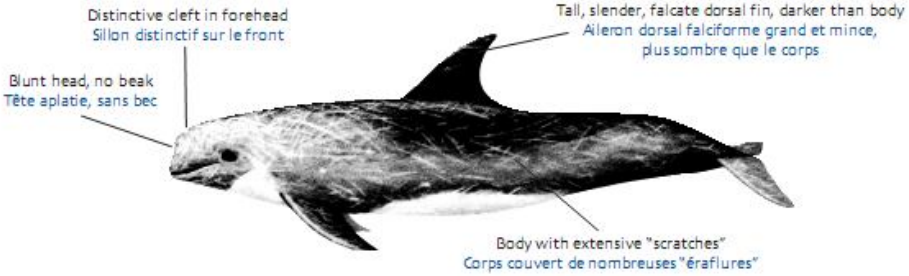
DOLPHINS

Grampus griseus

SPECIES CODE: DRR



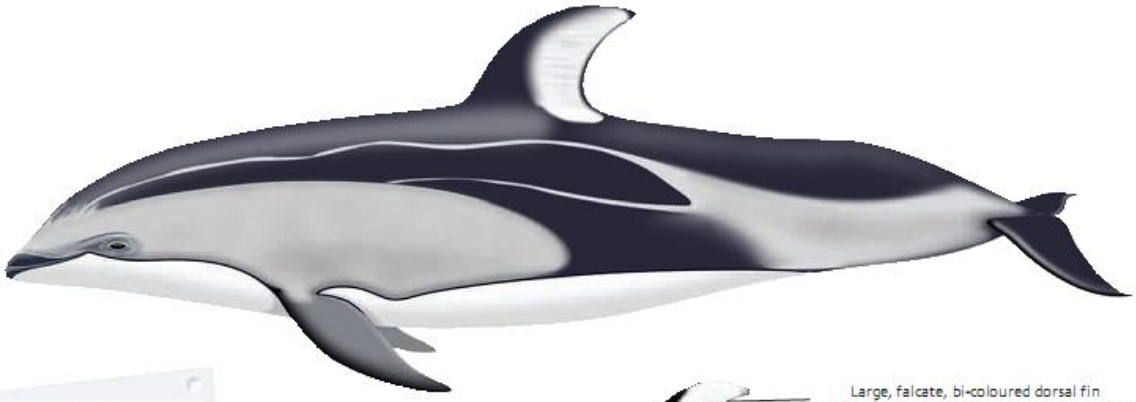
English: Risso's dolphin
French: Grampus
Japanese: Hana-gondo
Local:



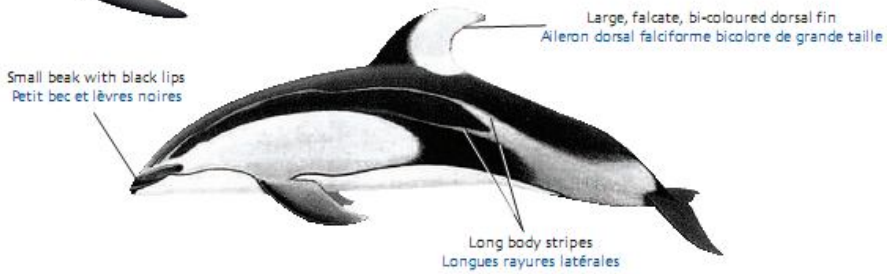
Maximum length: 4 m
Taille maximum : 4 m

Lagenorhynchus obliquidens

SPECIES CODE: DWP



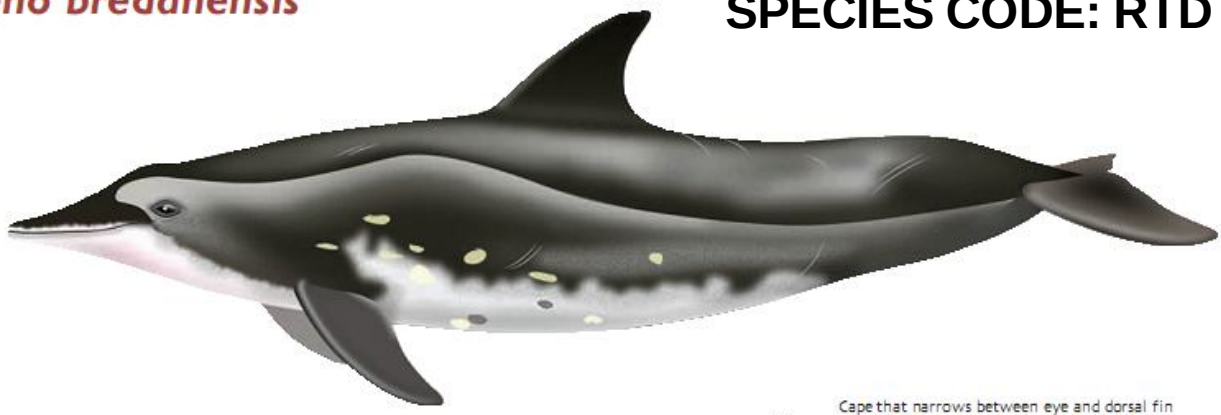
English: Pacific white-sided dolphin
French: Dauphins à flancs blancs du Pacifique
Japanese: Kama-iruka
Local:



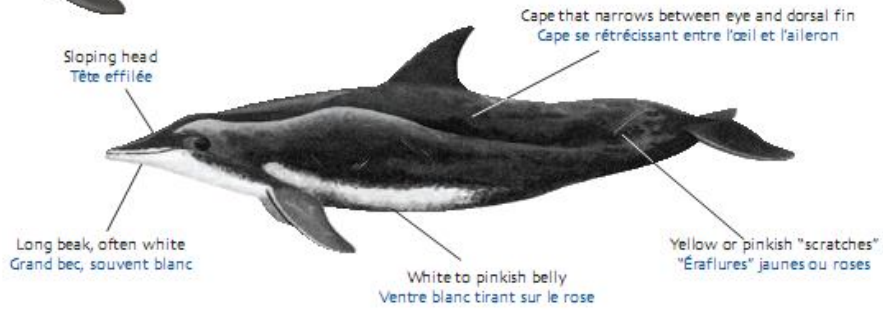
Maximum length: 2.5 m
Taille maximum : 2,5 m

Steno bredanensis

SPECIES CODE: RTD



English: Rough-toothed dolphin
French: Sténo
Japanese: Shiwaha-iruka
Local:



Maximum length: 2.8 m
Taille maximum : 2,8 m

Lagenodelphis hosei

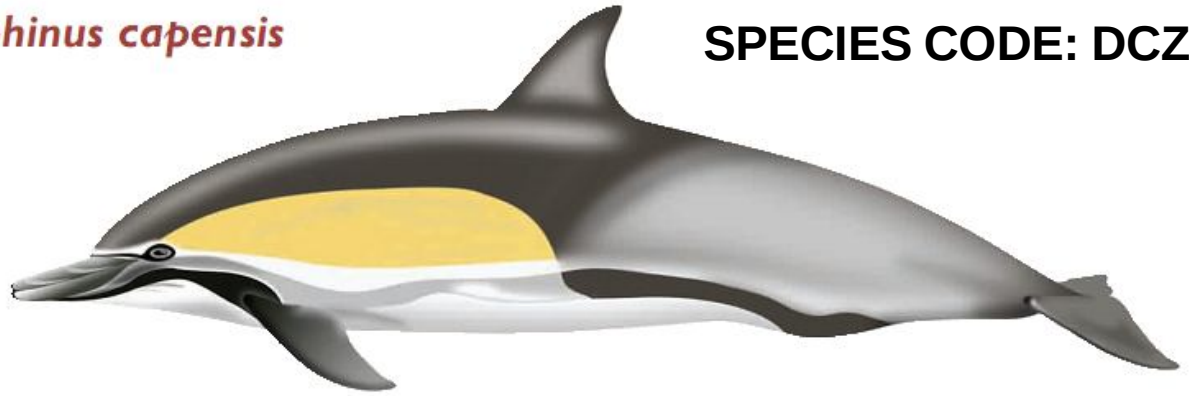
SPECIES CODE: FRD

English: Fraser's dolphin
French: Dauphin de Fraser
Japanese: Sawaraku-iruka
Local:

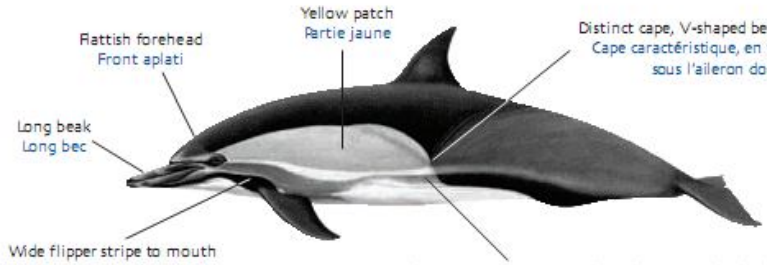
Maximum length: 2.7 m
Taille maximum : 2,7 m

Delphinus capensis

SPECIES CODE: DCZ



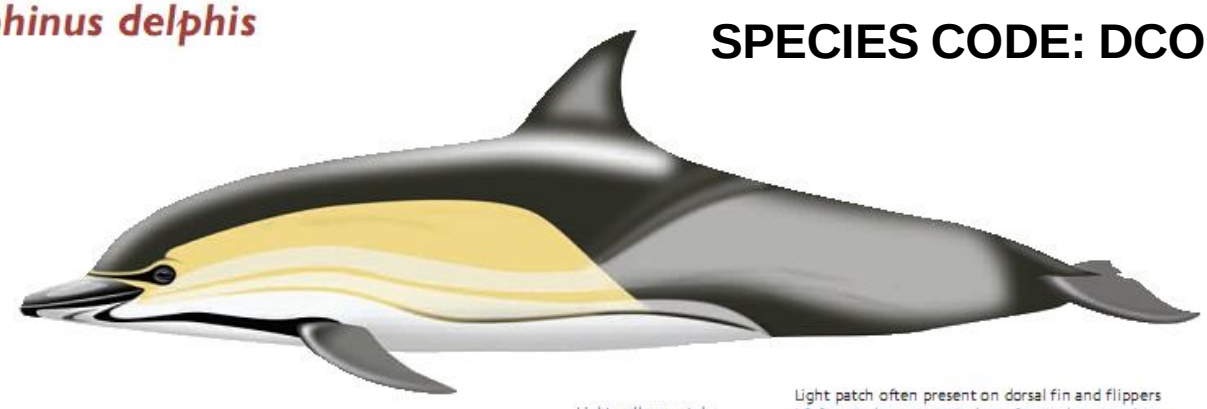
English: Long-beaked common dolphin
French: Dauphin commun à long bec
Japanese: Hase-iruka
Local:



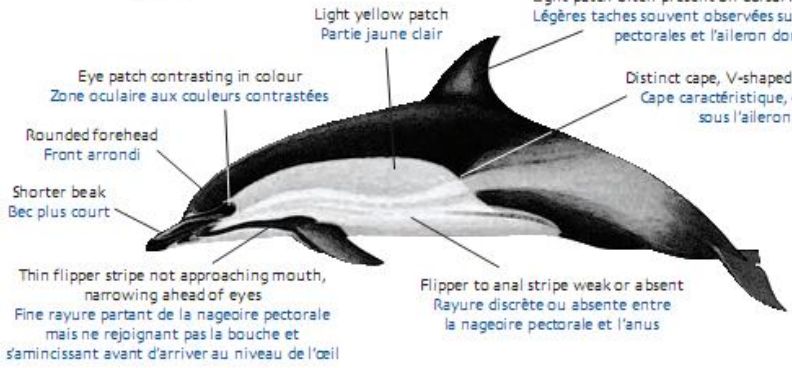
Maximum length: 2.4 m
Taille maximum : 2,4 m

Delphinus delphis

SPECIES CODE: DCO



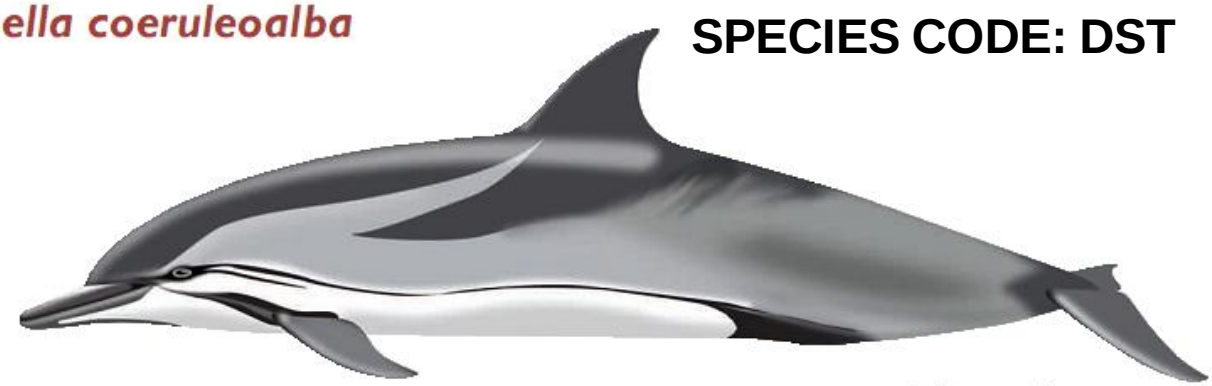
English: Short-beaked common dolphin
French: Dauphin commun
Japanese: Ma-iruka
Local:

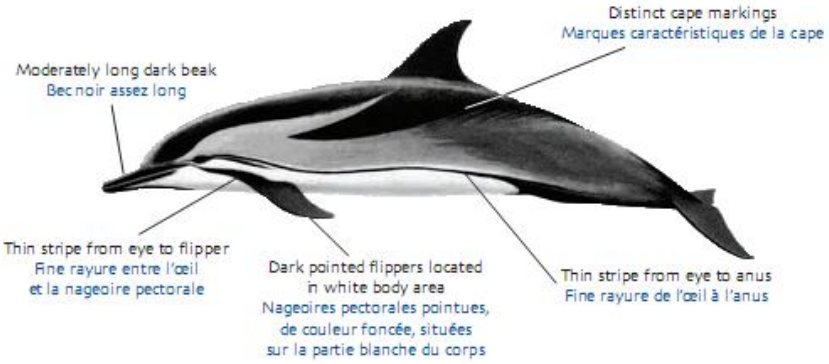


Maximum length: 2 m
Taille maximum : 2 m

Stenella coeruleoalba

SPECIES CODE: DST



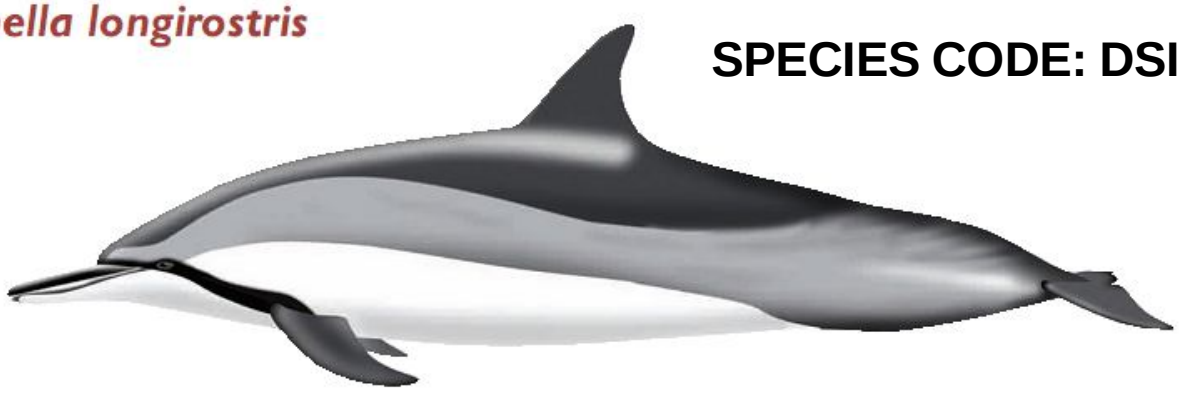


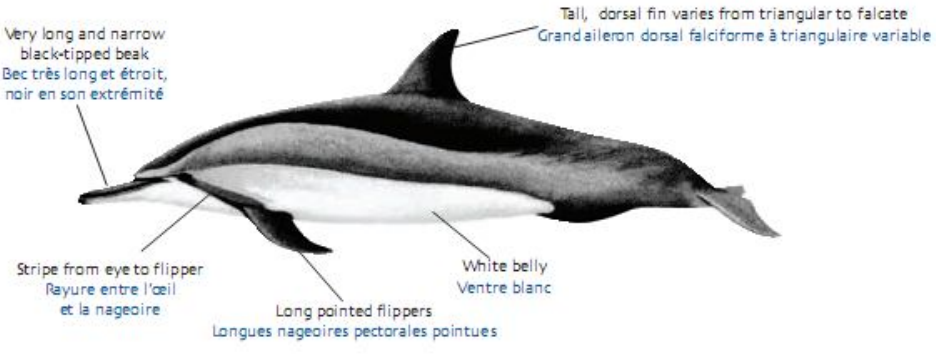
English: Striped dolphin
French: Dauphin bleu et blanc
Japanese: Suji-iruka
Local:

Maximum length: 2.6 m
Taille maximum : 2,6 m

Stenella longirostris

SPECIES CODE: DSI



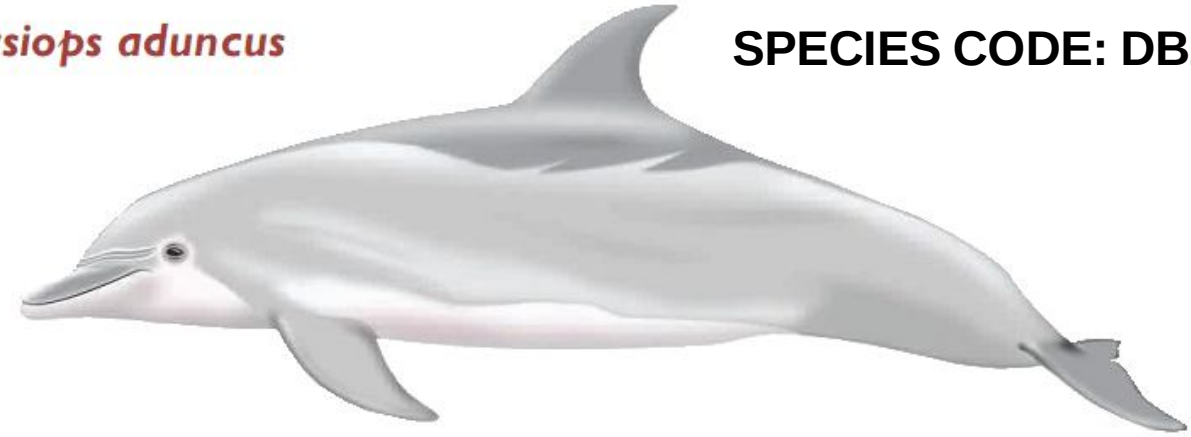


English: Spinner dolphin
French: Dauphin longirostre
Japanese: Hashinaga-iruka
Local:

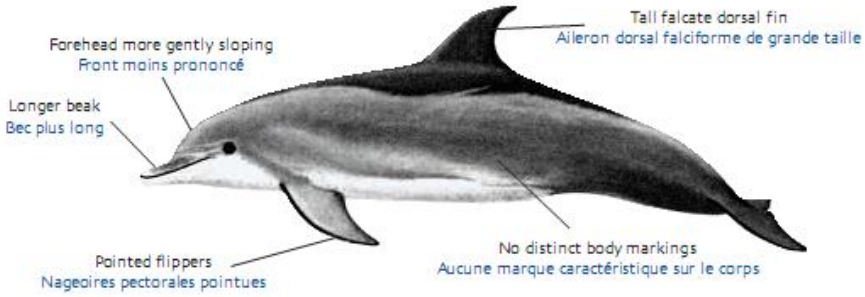
Maximum length: 2.1 m
Taille maximum : 2,1 m

Tursiops aduncus

SPECIES CODE: DBZ



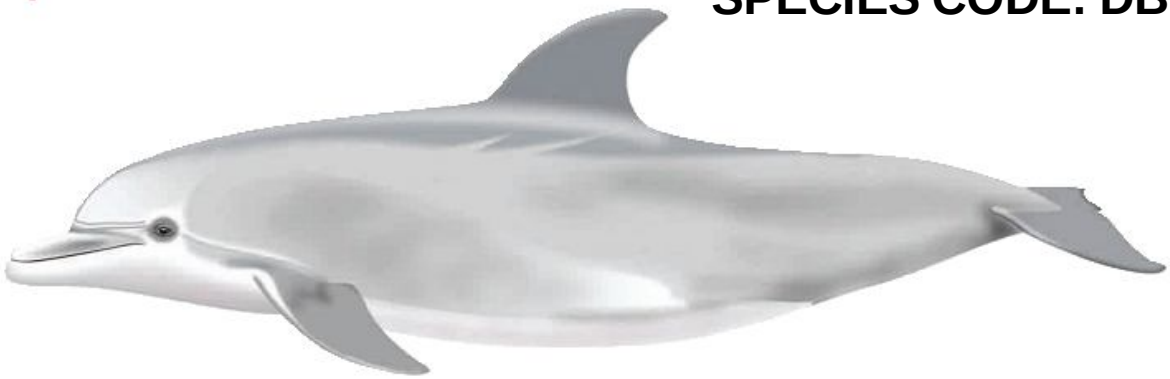
English: Indo-Pacific bottle-nose dolphin
French: Grand dauphin de l'Indo-Pacifique
Japanese: Minamibandou-iruka
Local:



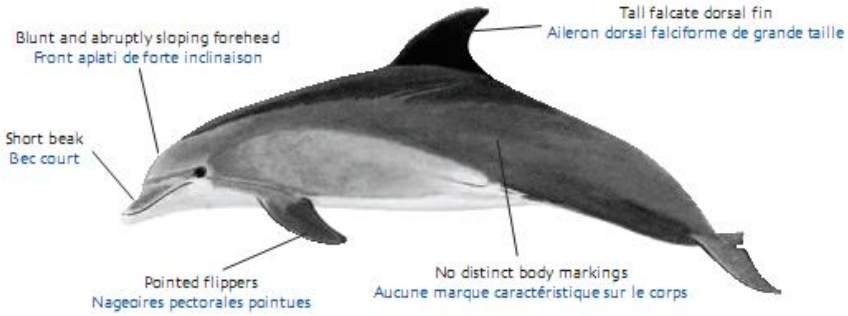
Maximum length: 2.7 m
Taille maximum : 2,7 m

Tursiops truncatus

SPECIES CODE: DBO



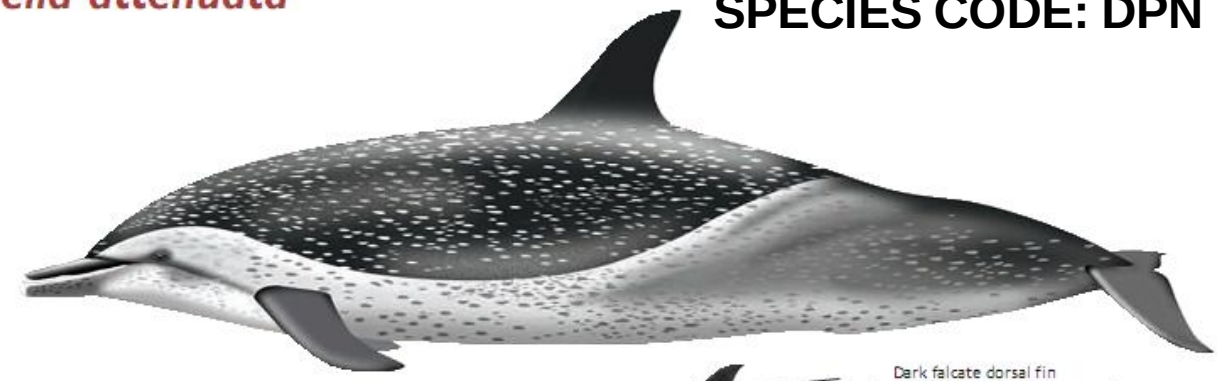
English: Common bottle-nose dolphin
French: Grand dauphin
Japanese: Bando-iruka, Taiseiyo
Local:

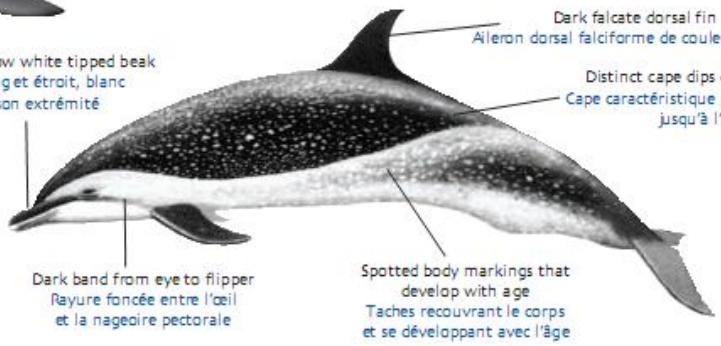


Maximum length: 3.8 m
Taille maximum : 3,8 m

Stenella attenuata

SPECIES CODE: DPN





English: Pantropical spotted dolphin

French: Dauphin tacheté pantropical

Japanese: Madara-iruka

Local:

Maximum length: 2.6 m
Taille maximum : 2,6 m

DAMAGED FISH

Toothed whale damage
Dégâts dus aux baleines à dents

Common characteristics:

- Jagged bite edges often accompanied by long strips of skin and tendons
- Often only the fish's head or mouthparts left on hook
- "Crushed and torn" appearance
- Tooth puncture marks widely spaced
- Damage often found on multiple fish in same set
- Usually appears to be a single bite

Caractéristiques communes :

- Contours irréguliers laissés par une morsure et souvent accompagnés de longs morceaux de peau et de tendons
- Souvent, seules la tête ou des parties de la bouche restent accrochées à l'hameçon
- Apparence écrasée et déchiquetée
- Traces de morsure très espacées
- Dégâts généralement constatés sur plusieurs poissons d'une même calée
- Généralement, le résultat d'une seule morsure

Shark damage
Dégâts dus aux requins

Common characteristics:

- Large bites; few, if any, long strips of tissue
- Gouge marks from individual teeth sometimes seen over surface of wound
- Teeth marks look more like cuts and lacerations than punctures
- Sometimes slashes and superficial cuts
- Often appears to have several bites

Caractéristiques communes :

- Morsures importantes ; peu, voire aucun grand lambeau de chair
- L'entaille de chaque dent est parfois visible à la surface de la blessure
- Les traces de morsure s'apparentent davantage à des coupures et des lacérations qu'à des perforations
- Parfois des écorchures et des coupures superficielles
- Souvent le résultat de plusieurs morsures

Cookie cutter shark damage
Dégâts dus aux squalelets féroces

Common characteristics:

- Circular or oval shaped wounds with clean edges
- Hemispherical and highly concave
- Can be found anywhere, but more common on lower rear of body

Caractéristiques communes :

- Blessures circulaires ou ovales aux bords nets
- Hémisphérique et très concave
- Peut se situer sur n'importe quelle partie du corps, mais le plus souvent sur la partie inférieure

Seabird damage
Dégâts dus aux oiseaux

Common characteristics:

- Jagged wound edges and surfaces
- Many short strips of skin and muscle left on wound edges
- Many scratch marks from beaks on skin around wound edge and on fish's body
- Usually occur on softer parts of fish's body

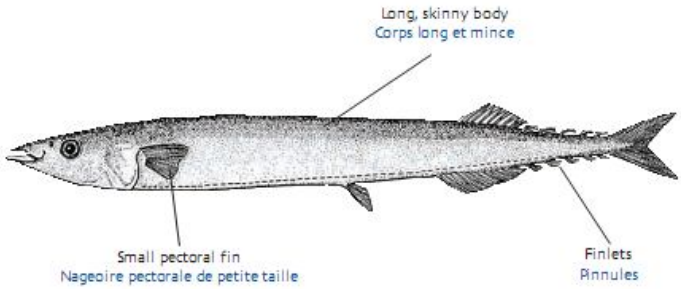
Caractéristiques communes :

- Surface et bords irréguliers de la blessure
- De nombreux lambeaux de peau et de muscle subsistent sur les bords de la blessure
- De nombreuses marques de coups de bec sur la peau au bord de la blessure et sur le corps du poisson
- Se situe en général sur les parties les plus souples du corps du poisson

BAIT FISH

Cololabis saira

SPECIES CODE: SAP

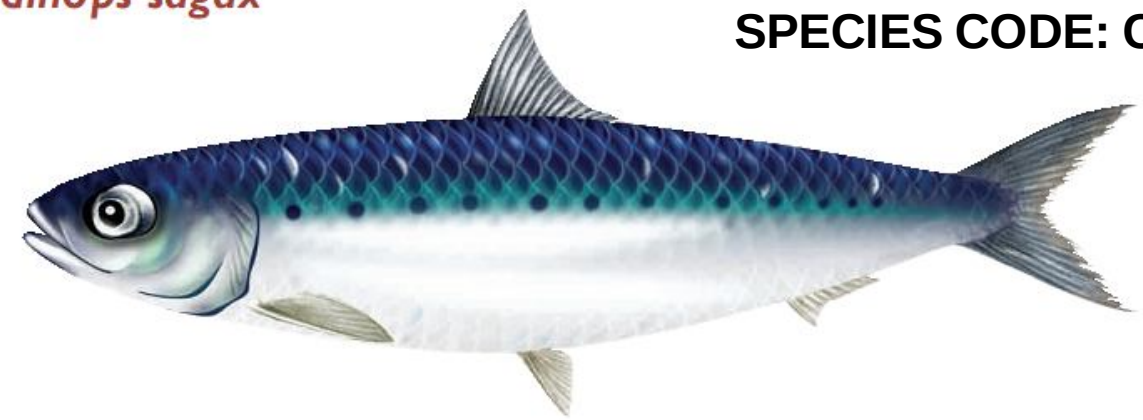


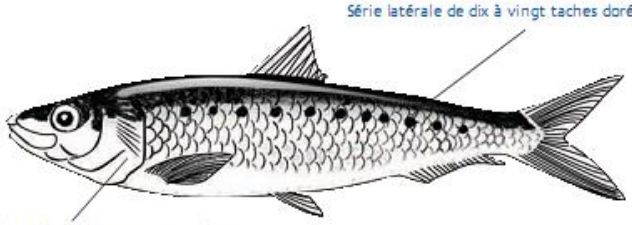
English:	Pacific saury, Sanma
French:	Balaou du Japon, Balaou du Pacifique
Japanese:	Sanma
Hawaiian:	Sanma
Local:	

Maximum length: 45 cm
Taille maximum : 45 cm

Sardinops sagax

SPECIES CODE: CHP



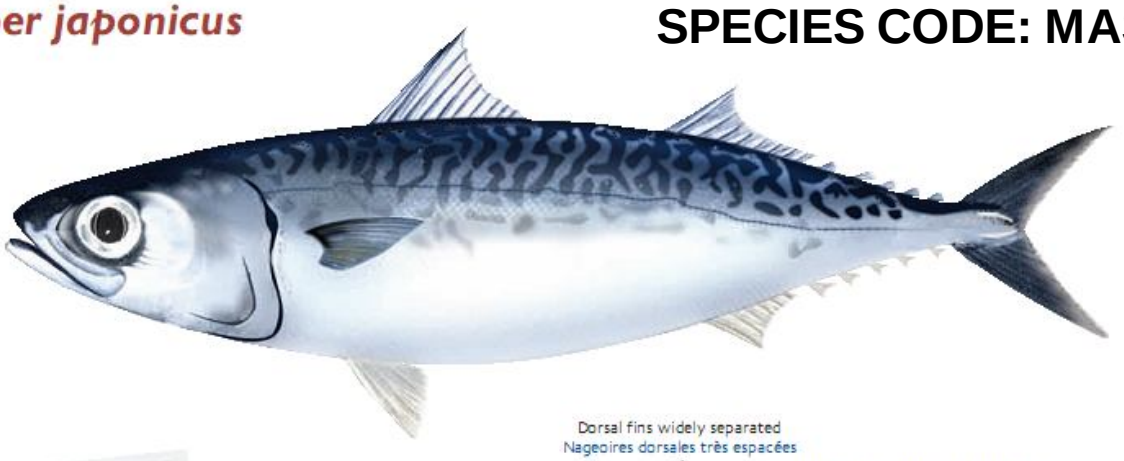


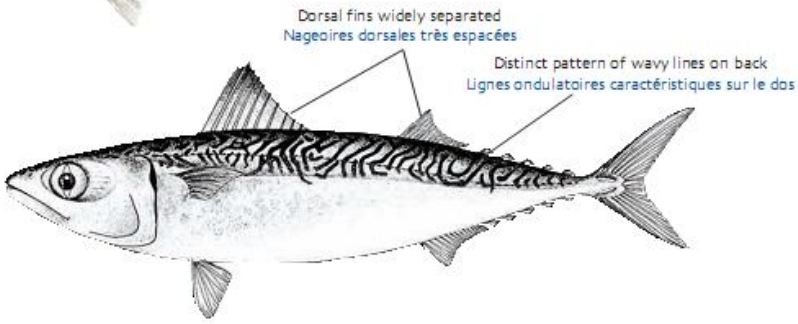
English:	South American pilchard
French:	Pilchard du Pacifique, Pilchard sud-américain
Japanese:	Ma-iwashi
Hawaiian:	Makiawa, Sardine
Local:	

Maximum length: 25 cm
Taille maximum : 25 cm

Scomber japonicus

SPECIES CODE: MAS



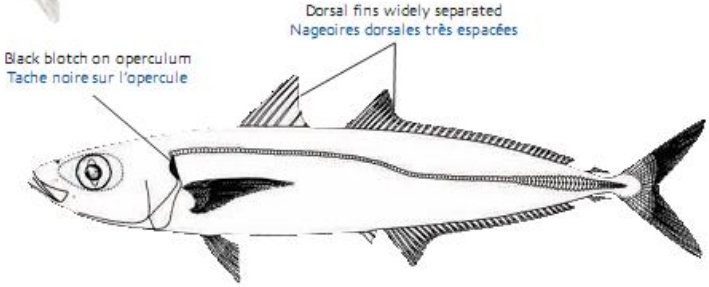


English: Chub mackerel
French: Maquereau espagnol
Japanese: Ma-saba
Hawaiian: Saba, Mackerel
Local:

Maximum length: 50 cm
Taille maximum : 50 cm

Decapterus macarellus

SPECIES CODE: MSD

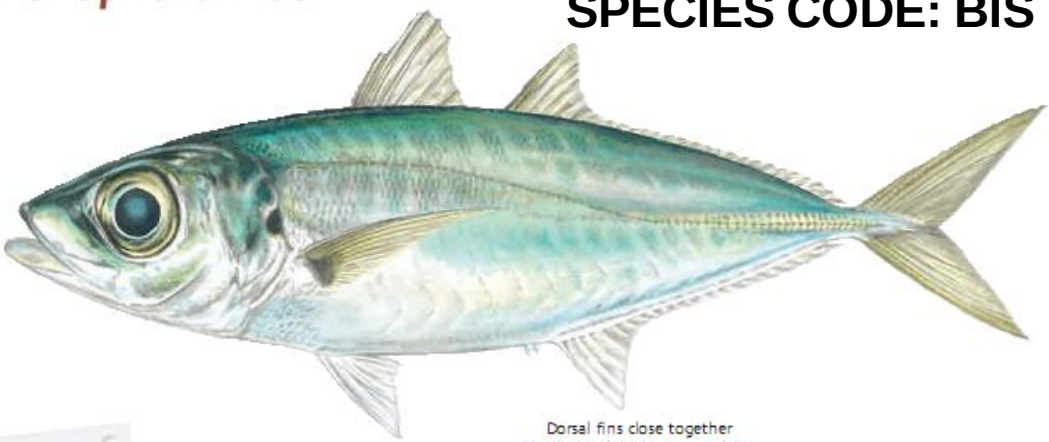


English: Mackerel scad
French: Comète maquereau
Japanese: Kusayamoro, Muro aji
Hawaiian: Opelu, Opelu-mama
Local:

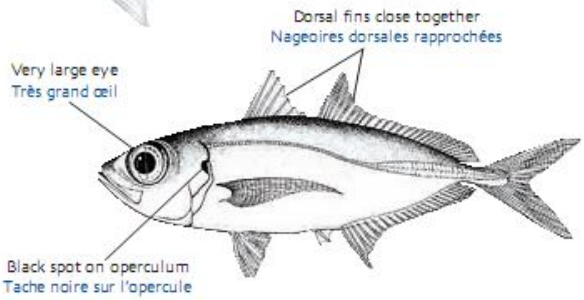
Maximum length: 40 cm
Taille maximum : 40 cm

Selar crumenophthalmus

SPECIES CODE: BIS



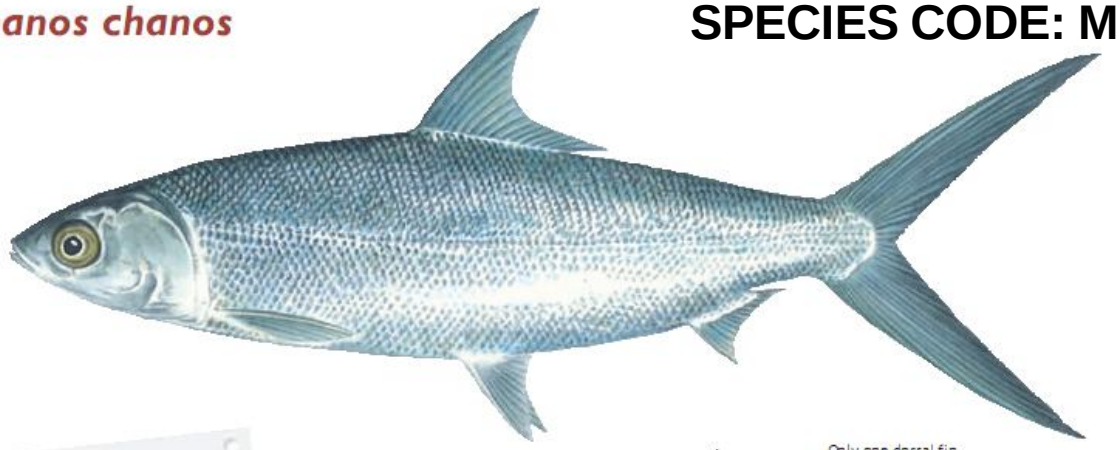
English: Bigeye scad
French: Sélar coulisou
Japanese: Me-aji
Hawaiian: Akule (large), Halalu (medium), Pa'a'a (small)
Local:



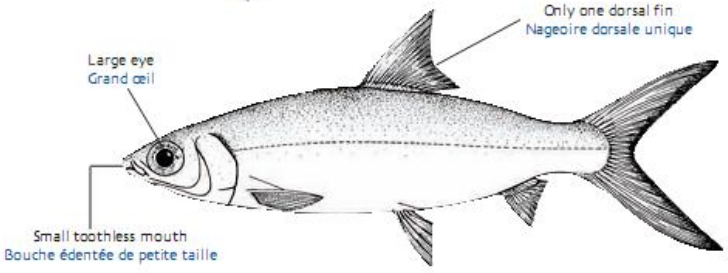
Maximum length: 50 cm
Taille maximum : 50 cm

Chanos chanos

SPECIES CODE: MIL



English: Milkfish
French: Chano, Poisson lait
Japanese: Sabahii, Miruku
Hawaiian: Awa
Local:

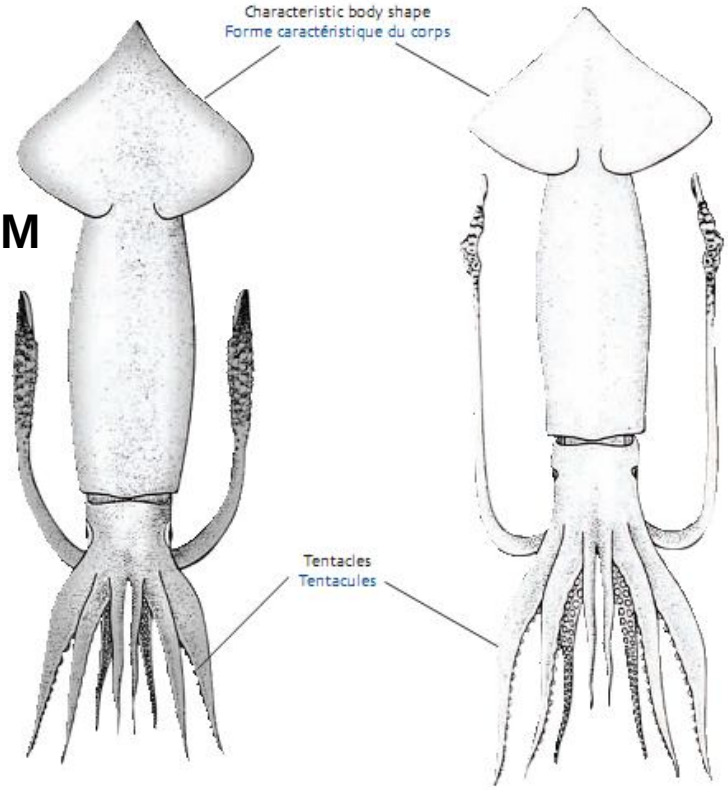


Maximum length: 110 cm
Taille maximum : 110 cm

Ommastrephidae

SPECIES CODE: OMM

English: Squid
French: Encornets
Japanese: Ika-rui
Hawaiian: Mu'hee, Ika, Squid
Local:



MACKERELS

Short Mackerel

Rastrilleger brachyosoma

Local Name : Hasa-hasa/Karavallas
TL: 34.5 cm
FL: 20.0 cm
Species Code: **RAB**

Photo by Gloerfelt-Tarp, T.

Island Mackerel

Rastrilleger faughni

Local Name : Anduhaw/Kabalyas
TL:20.0 cm
Species Code: **RAF**

Photo by Reyes, R.B.

Indian Mackerel

Rastrilleger kanagurta

Local Name : Alumahan/Anduhaw
TL: 35.0 cm
FL: 25.0 cm
Species Code: **RAG**

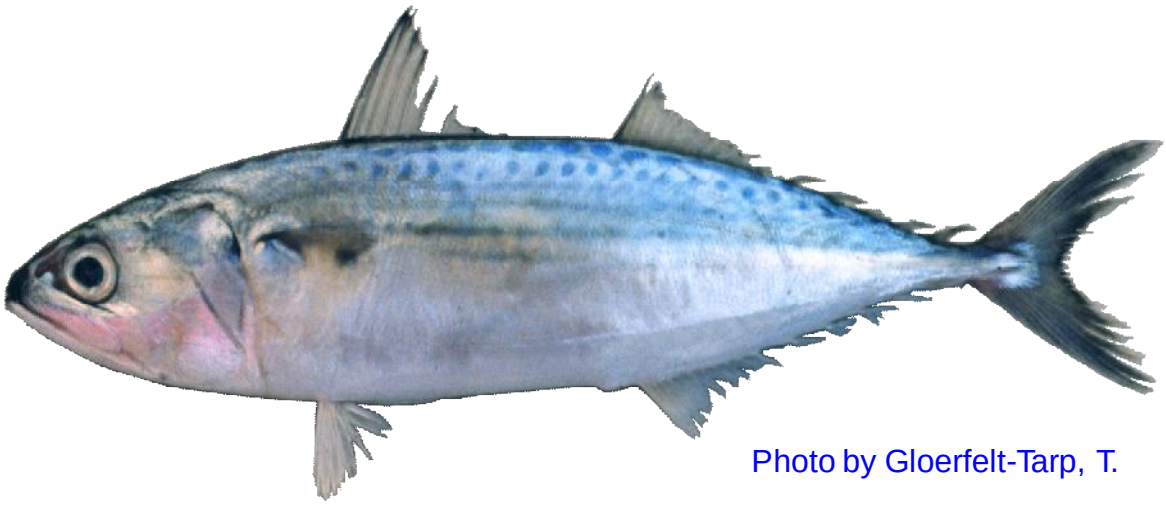


Photo by Gloerfelt-Tarp, T.

SCADS

Shrimp Scad

Alepes djedaba

Local Name : Talakitok/Salay-salay ginto
TL: 40.0 cm
FL: 25.0 cm
Species Code: **LSJ**

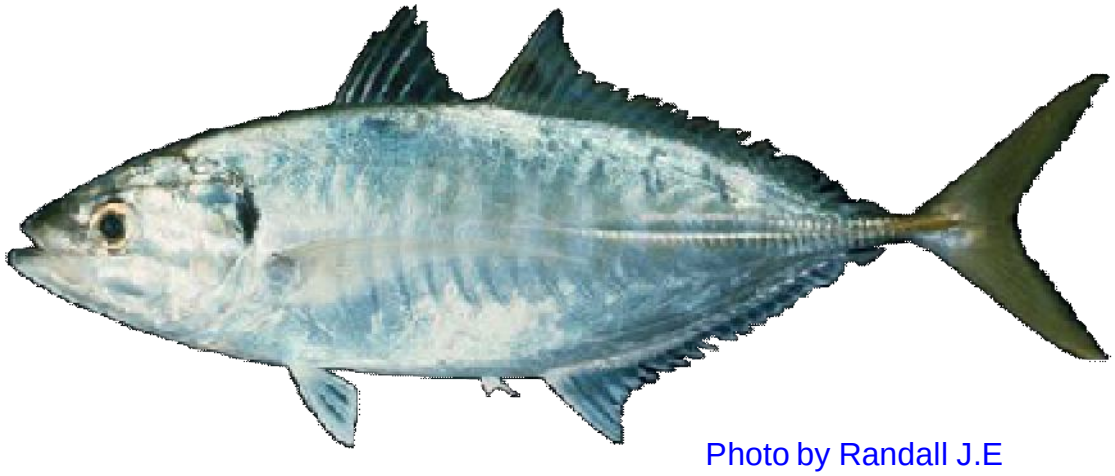


Photo by Randall J.E

Yellowtail Scad

Atule mate

Local Name : Salay-salay
TL30.0 cm
FL: 26.0 cm
Species Code: **TUM**

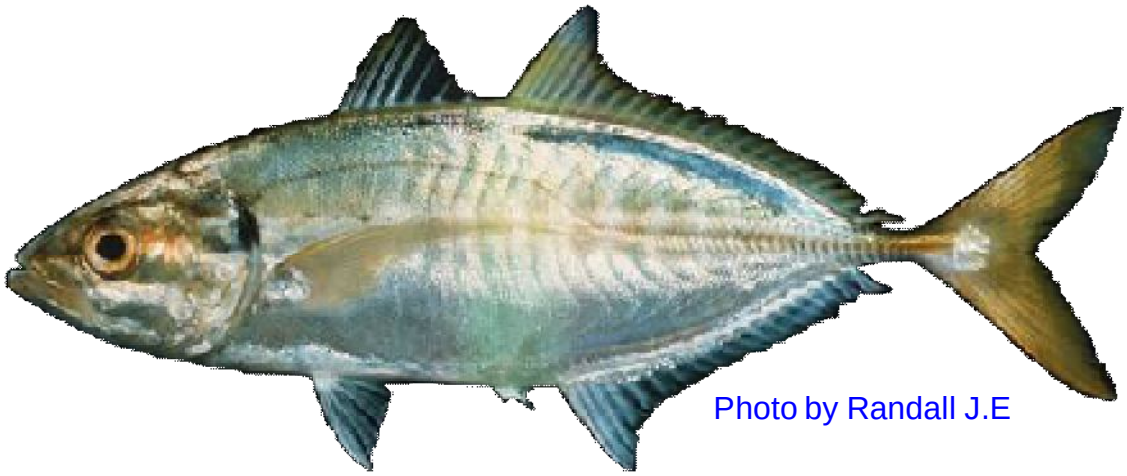


Photo by Randall J.E

Blackfin scad

Alepes melanoptera

Local Name : Talakitok/Salay-salay
TL: 25.0 cm
Species Code: **LSN**

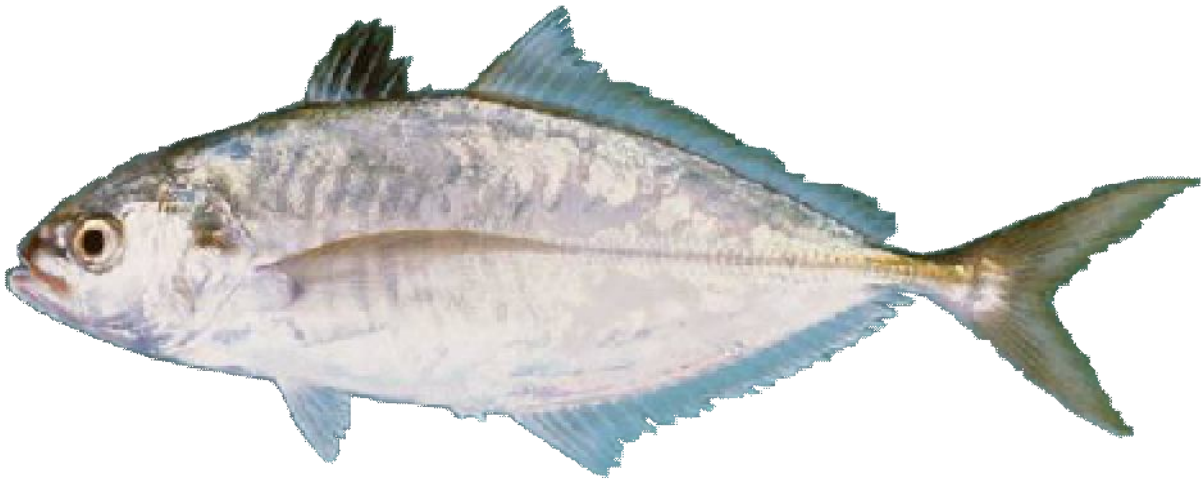


Photo by Randall J.E

Redtail scad

Decapterus kurroides

Local Name : Burot/Galunggong
TL: 45.0 cm
FL: 30.0 cm
Species Code: **DCK**

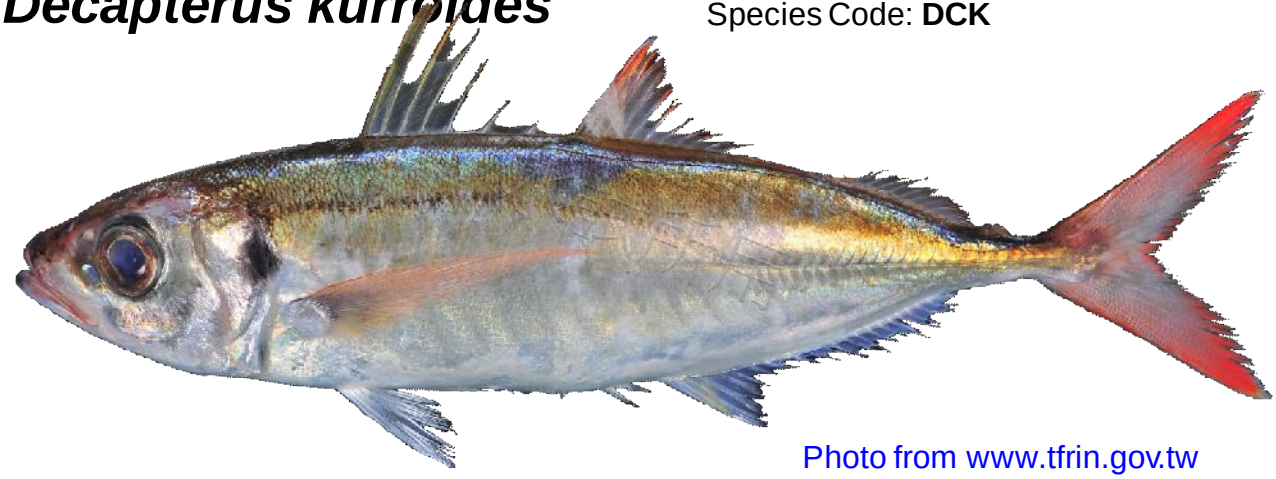


Photo from www.tfrin.gov.tw

Mackerel Scad

Decapterus macarellus

Local Name : Burot/Galunggong
TL: 46.0 cm
FL: 30.0 cm
Species Code: **MSD**

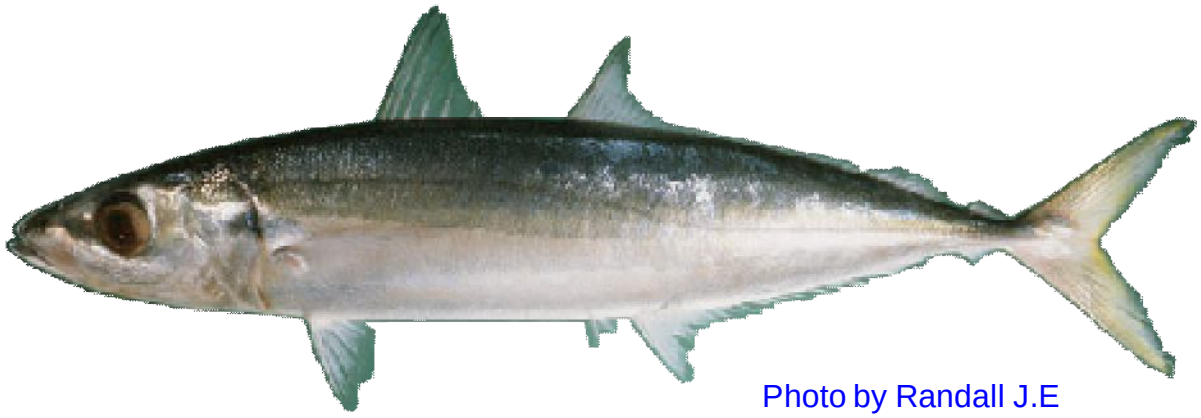


Photo by Randall J.E

Shortfin Scad

Decapterus macrosoma

Local Name : Burot/Galunggong
TL: 35.0 cm
FL: 25.0 cm Species Code: **DCC**

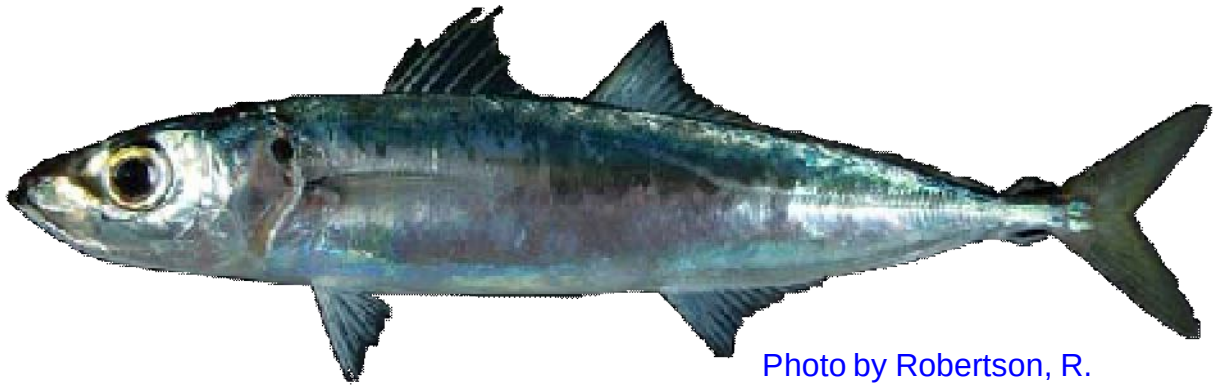


Photo by Robertson, R.

Japanese Scad

Decapterus maruadsi

Local Name : Moro-moro/Galunggong
TL: 50.0 cm
FL: 30.0 cm
Species Code: **RSA**

Photo by: Shao, K.T.

Amberstripe Scad

Decapterus muroadsi

Local Name : Burot/Galunggong
TL: 60.0 cm
FL: 30.0 cm
Species Code: **DCD**

Photo by Randall J.E

Indian Scad

Decapterus russelli

Local Name : Borot/Galunggong
TL: 46.0 cm
FL: 30.0 cm
Species Code: **RUS**

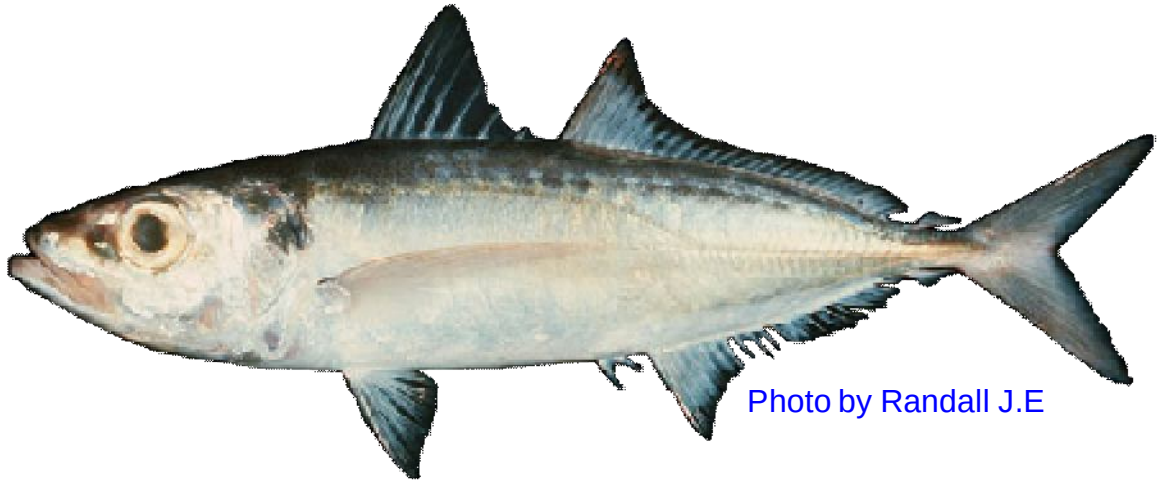


Photo by Randall J.E

Oxeye Scad

Selar boops

Local Name :Matangbaka
TL: 26.0 cm
FL: 22.0 cm
Species Code: **LRO**

Photo by Sainsbury, K.

Bigeye Scad

Selar crumenopthalmus

Local Name : Bulao/Matangbaka
TL: 30.0 cm
Species Code: **BIS**

Photo by Randall J.E

Torpedo Scad

Megalaspis cordyla

Local Name : Tulay/Pak-an/Balangoan
TL: 45.0 cm
Species Code: **HAS**

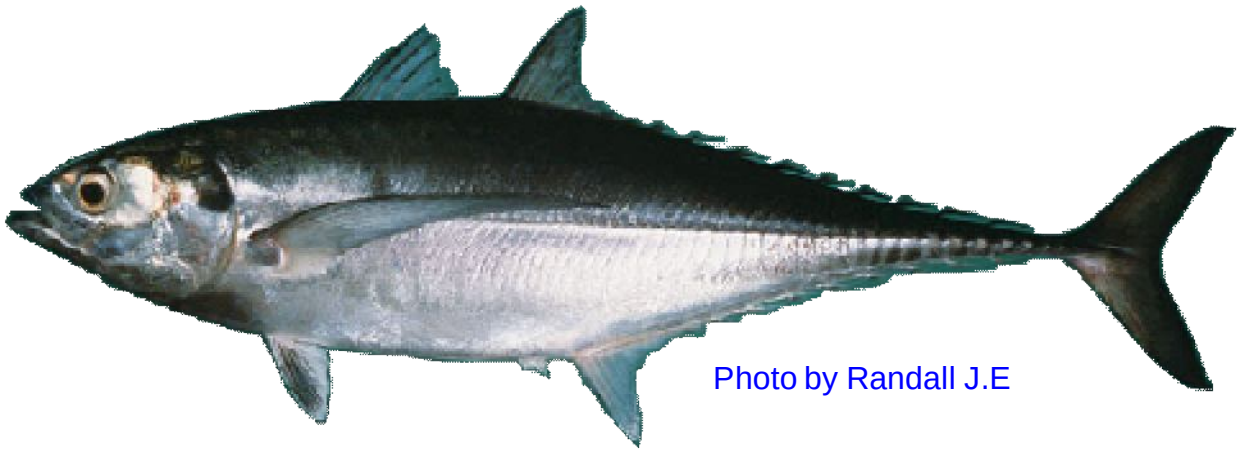


Photo by Randall J.E

SARDINES

Spotted sardinella

Amblygaster sirm

Local Name : Tamban/Tuloy
TL: 27.0 cm
FL: 20.0 cm
Species Code: **AGS**

Photo by Gloerfelt-Tarp, T.

White sardinella

Sardinella albella

Local Name : Tunsoy
TL: 14.0 cm
FL: 10.0 cm
Species Code: **SDB**

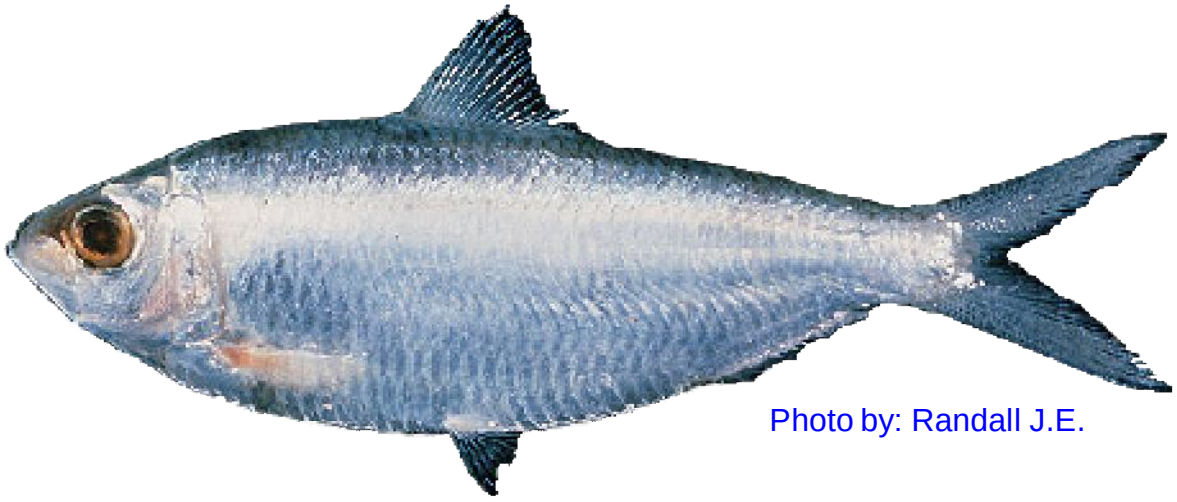


Photo by: Randall J.E.

Fringescale sardinella

Sardinella fimbriata

Local Name : Tunsoy
TL: 13.0 cm
FL: 11.0 cm
Species Code: **FRS**

Photo by Devarapalli, Padmayathi

Bali Sardinella

Sardinella lemuru

Local Name : Tamban/Tunsoy
TL: 23.0 cm
FL: 20.0 cm
Species Code: **SAM**

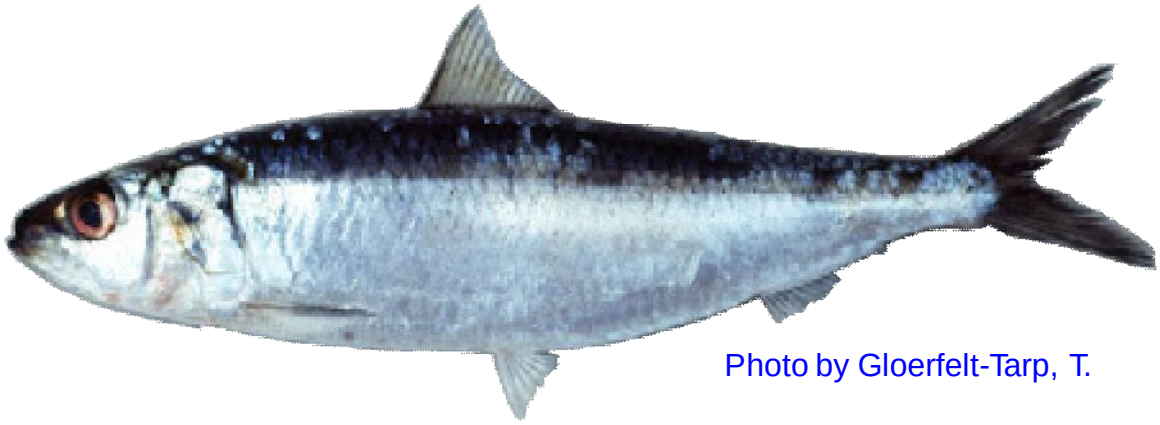


Photo by Gloerfelt-Tarp, T.

Goldstripe Sardinella

Sardinella gibbosa

Local Name : Tamban/Tunsoy
TL: 17.0 cm
FL: 15.0 cm
Species Code: **SAG**

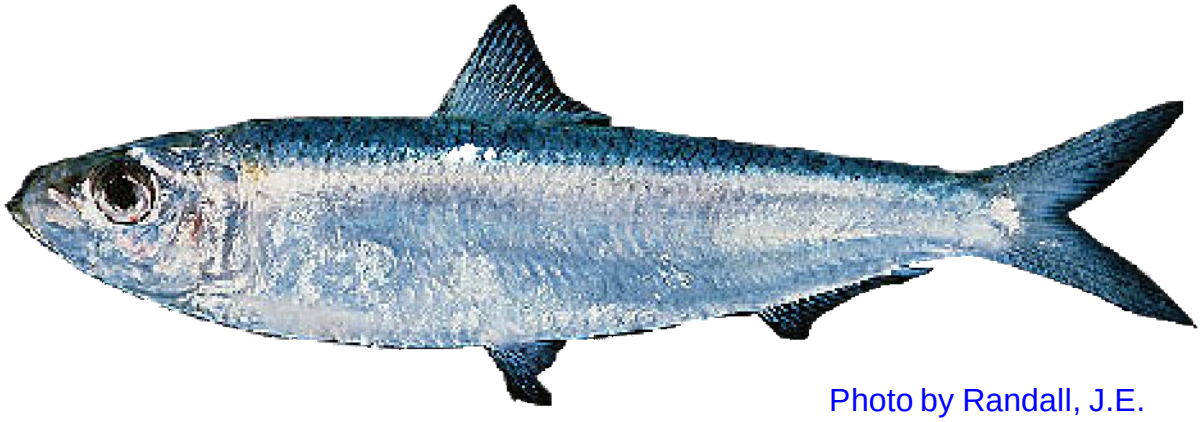


Photo by Randall, J.E.

White sardine

Escualosa thorocata

Local Name : Tamban
TL: 15.2 cm
FL: 10.0 cm
Species Code: **EST**

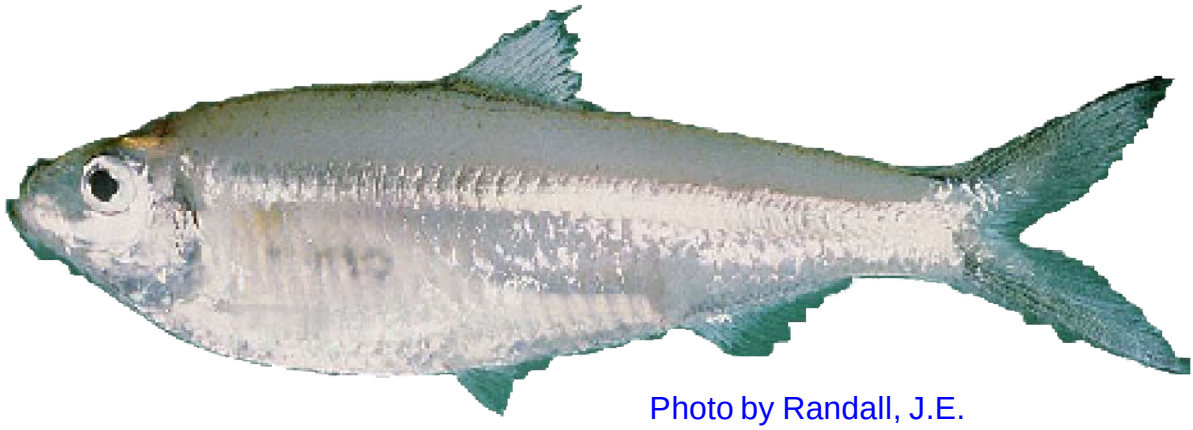


Photo by Randall, J.E.

Bluestripe herring

Herklotsichthys quadrimaculatus

Local Name : Dilat
TL: 15.2 cm
FL: 10.0 cm
Species Code: **HES**

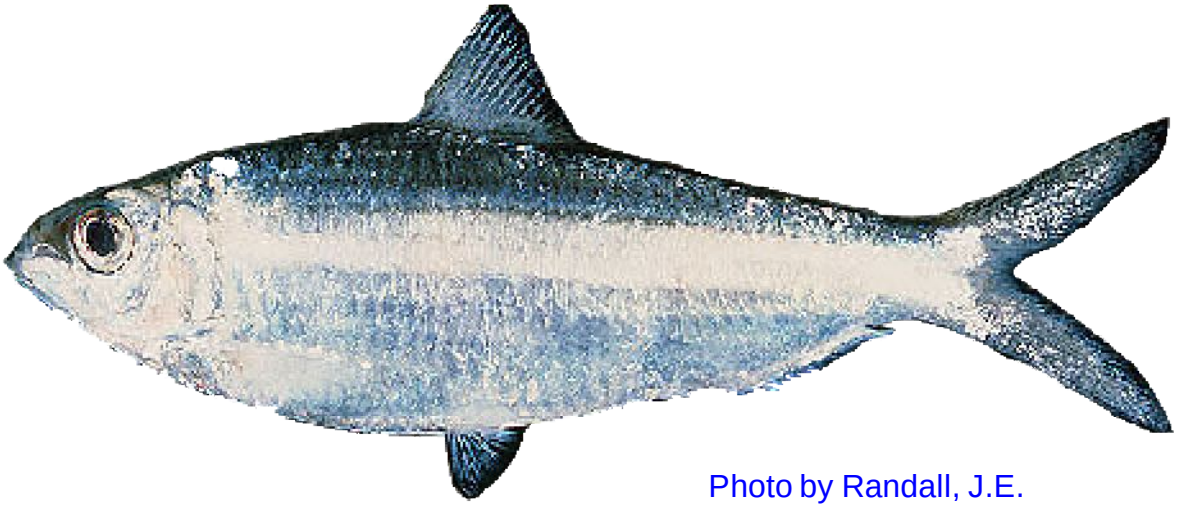


Photo by Randall, J.E.

Blacksaddle herring

Herklotsichthys dipilonotus

Local Name :Dilat
TL: 15.2 cm
FL: 10.0 cm
Species Code: **HKD**

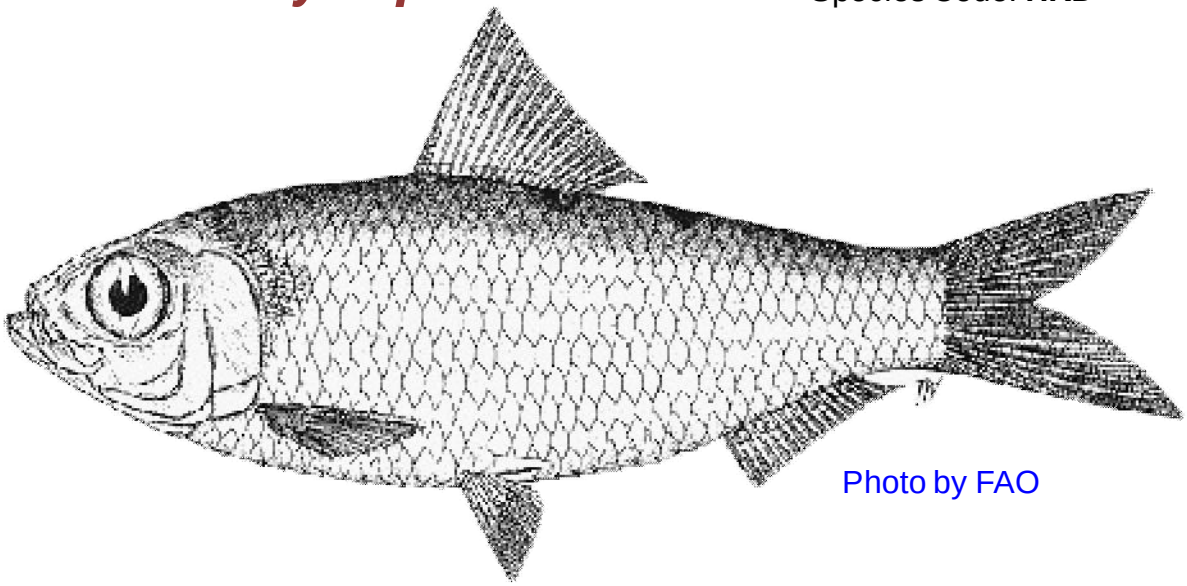


Photo by FAO

Rainbow sardine

Dussumieria acuta

Local Name : Tamban/Tamban-Hilos
TL: 20.0 cm
FL: 15.0 cm
Species Code: **RAS**

Photo by Randall, J.E.

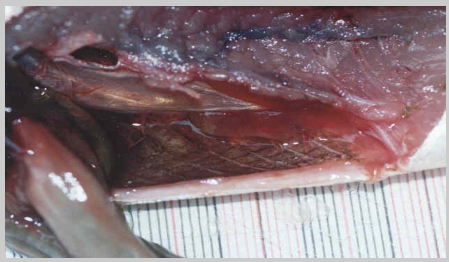
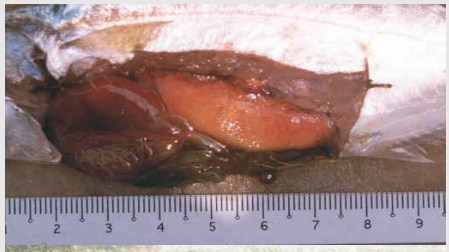
Taiwan sardinella

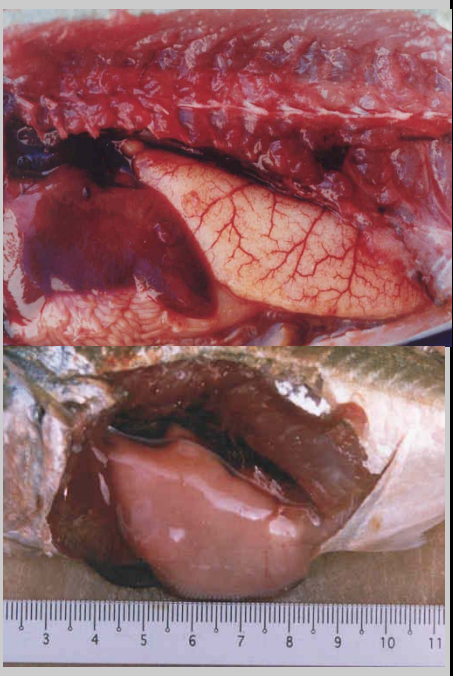
Sardinella hualiensis

Local Name : Tamban
TL: 15.2 cm
FL: 10.0 cm
Species Code: **JSS**

Photo by Shao, K.T.

5 POINT MATURITY SCALE

STAGE	STATE	DESCRIPTION	
I	Immature	Ovary and testis about 1/3 length of body cavity. Ovaries pinkish, translucent; testis whitish. Ova not visible to naked eye.	
II	Maturing	Ovary and testis about ½ length of body cavity. Ovary pinkish, translucent; testis whitish, more or less symmetrical. Ova not visible to naked eye.	 
III	Ripening	Ovary and testis is about 2/3 length of body cavity. Ovary pinkish-yellow colour with granular appearance, testis whitish to creamy. No transparent or translucent ova visible.	 

STAGE	STATE	DESCRIPTION	
IV	Ripe	Ovary and testis from 2/3 to full length of body cavity. Ovary orange-pink in colour with conspicuous superficial blood vessels. Large transparent, ripe ova visible. Testis whitish-creamy soft.	
V	Spent	Ovary and testis shrunken to about ½ length of body cavity. Walls loose. Ovary may contain remnants of disintegrating opaque and ripe ova, darkened or translucent. Testis blood shot and flabby.	

YELLOWFIN AND BIGEYE TUNA IDENTIFICATION

Excerpt from "A Handbook for the Identification of Yellowfin and Bigeye Tunas in *Fresh Condition* (v2)" by David G. Itano

Identification of Yellowfin and Bigeye Tuna by Visual Criteria

Even though tuna are easiest to distinguish in fresh condition, misidentifications and lumping of both species commonly occurs in surface fisheries. The pictures in this handbook should serve as a "best case" scenario for identifying yellowfin from bigeye tuna at all sizes. These examples can then be used to help differentiate samples that are in a less optimal condition, such as those pictured below.

Juvenile yellowfin and bigeye tuna in fresh condition can be reliably identified using a combination of the following features:

Photo: R. Gillett

- Internal characteristics
  - liver appearance and morphology
  - swim bladder morphology
- External characteristics
  - body markings
  - body morphology
  - head and eye morphology
  - pectoral fin characteristics
  - caudal fin characteristics
  - finlet coloration

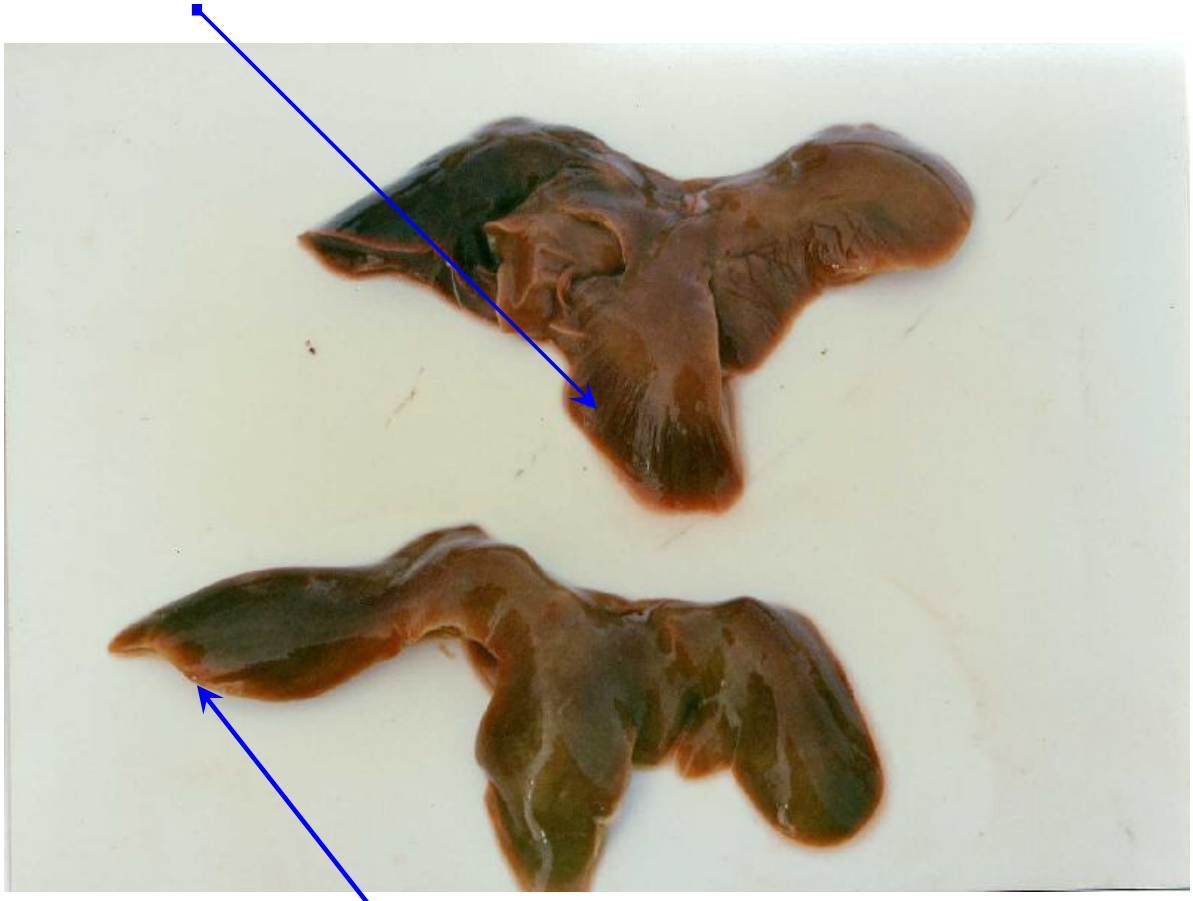
Internal Characteristics

▪ Liver morphology and appearance

- Large, conspicuous organ along anterior, ventral portion of gut cavity

➢ **Bigeye**

- Three rounded lobes of about equal size
- Ventral surface striated



➢ **Yellowfin**

- Right lobe longer and thinner than rounded medial and left lobes
- Lobes smooth, clear. No striations.

Internal Characteristics

- **Swim bladder**

➢ **Bigeye**

– occupies almost entire body cavity

– large, conspicuous, often inflated

➢ **Yellowfin**

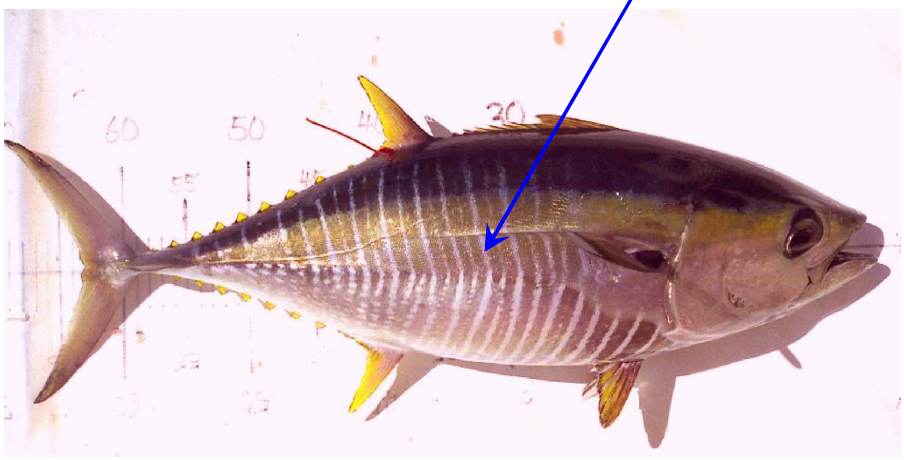
- only in anterior half of body cavity
- inconspicuous, usually deflated or slightly inflated

External Characteristics

▪ Body markings

➢ Yellowfin

- Conspicuous chevron pattern of closely spaced silvery lines
- Solid lines alternate with rows of dots
- Line pattern extends from tail, forward to beneath pectoral fin and to above mid-lateral line



➢ Bigeye

- Irregular vertical, widely spaced white lines or marks
- Some rows of dots but few and irregular
- Line pattern irregular, broken, confined mostly to below mid-lateral line

External Characteristics

- **Coloration**

➢ Yellowfin

- Fresh yellowfin show a bright yellow mid-lateral band
- Dark black back may be separated from the gold by a thin blue band
- Fins yellow to yellowish, anal fin sometimes tinged with silver
- Flanks and belly silvery white

➢ Bigeye

- Golden to brassy mid-lateral band, less distinct
- Dark black back edged with bright metallic blue line
- Fins dusky yellowish with anal fin tinged with silver
- Caudal fin often dusky black
- Flanks and belly pearly white

External Characteristics

- **Body morphology**

➢ **Yellowfin**

- body elongate, long tail
- body outline flat between second dorsal and caudal fin and between anal and caudal fin

➢ **Bigeye**

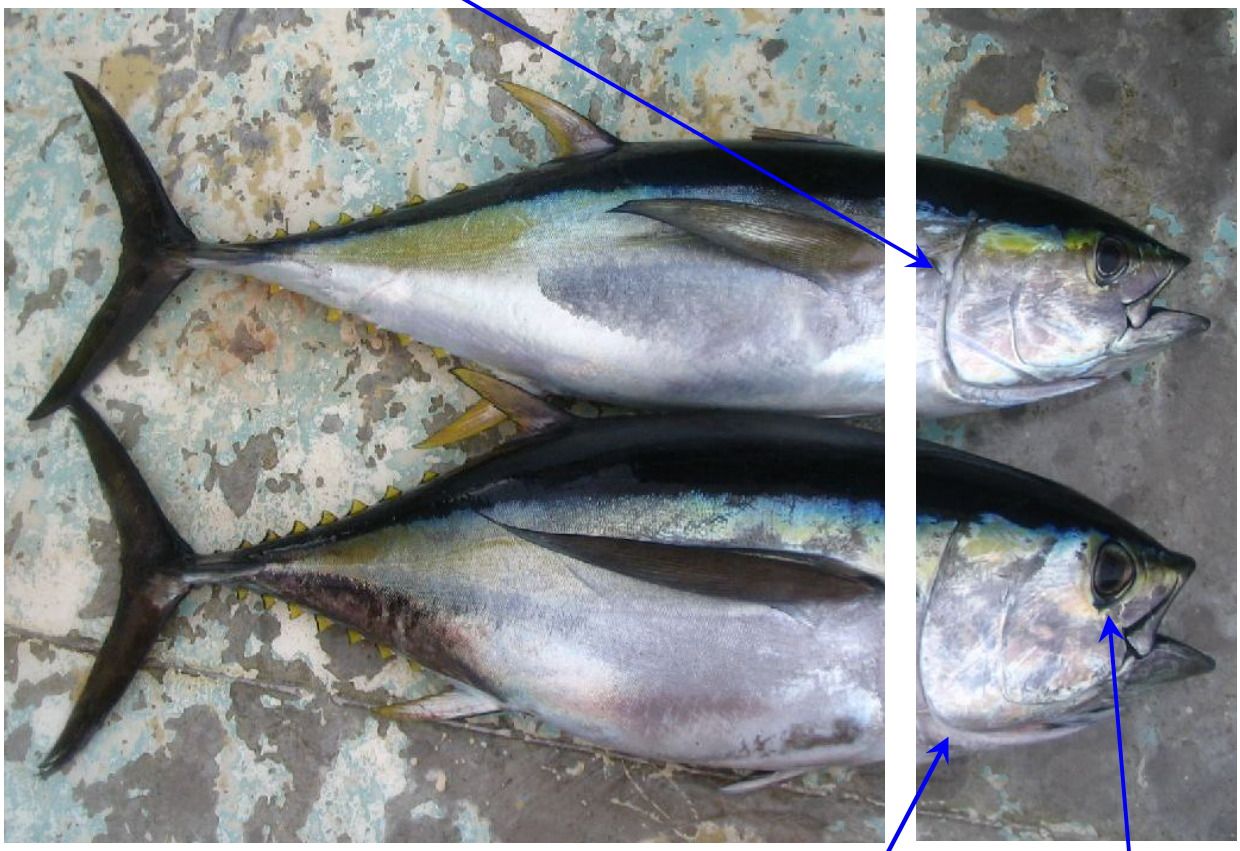
- body deep, rounded
- body outline rounded, forming a smooth dorsal and ventral arc between snout and caudal peduncle

External Characteristics

- **Head and eye morphology**

➢ **Yellowfin**

- shorter head length and depth vs Fork Length than bigeye
- smaller eye diameter compared to bigeye of same Fork Length



➢ Bigeye

- greater head length and depth vs Fork Length than yellowfin
- greater eye diameter compared to yellowfin of same Fork Length

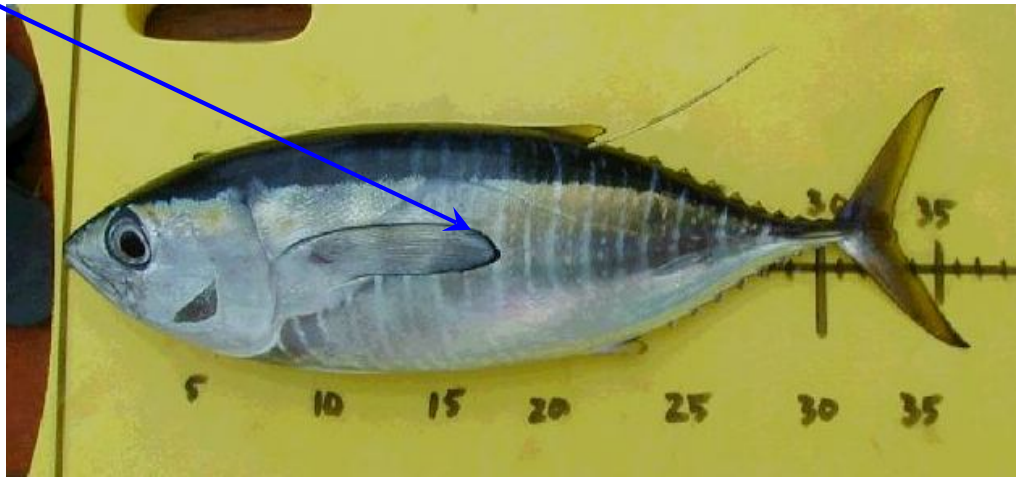
External Characteristics

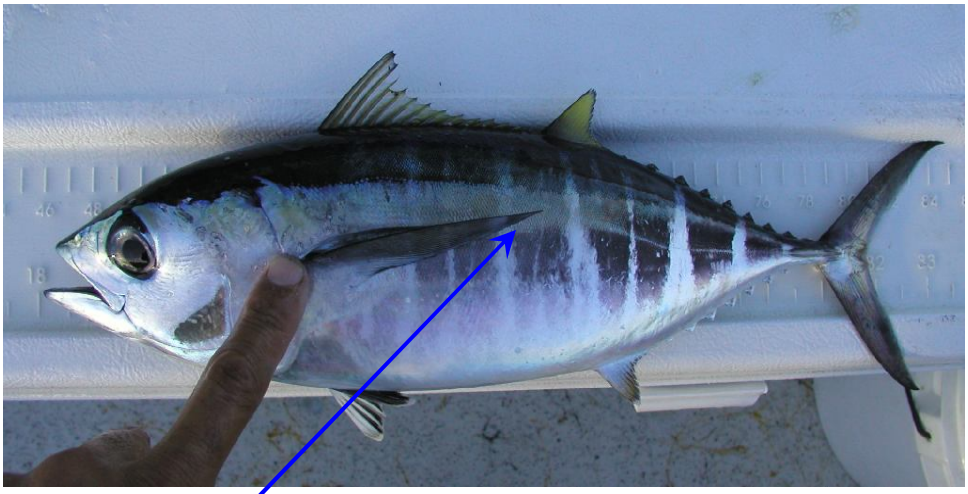
- **Pectoral fin length and characteristics**

(for small fish less than ~ 40 cm Fork Length)

➢ **Yellowfin**

- pectoral fin short, just reaching insertion of second dorsal fin
- pectoral fin thicker, stiffer and rounded at tip





➢ **Bigeye**

- pectoral fin slightly longer reaching second dorsal fin
- pectoral fin thin, flexible and pointed at the tip

However, pectoral fin lengths are not that different for such small fish. Other features are more distinct such as body markings and morphology

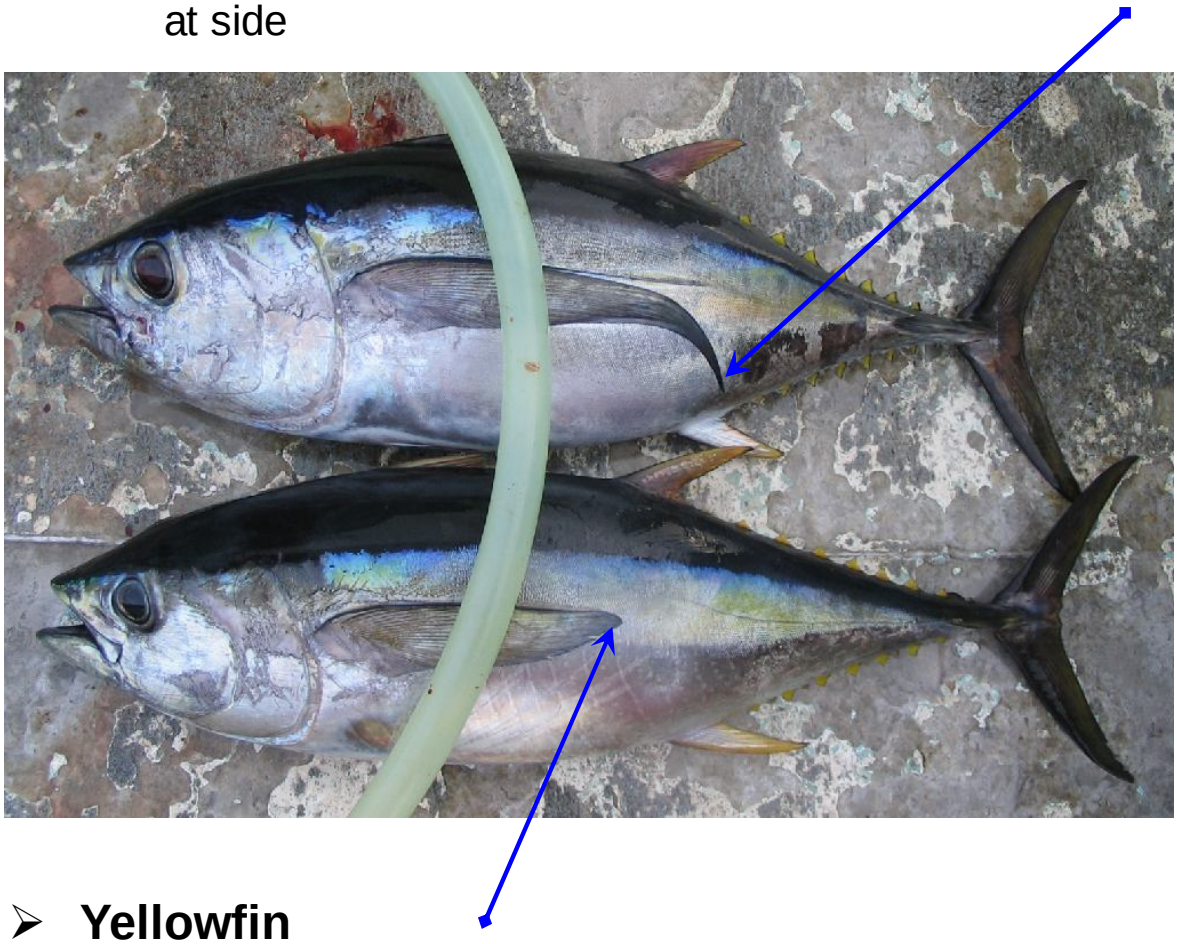
External Characteristics

- **Pectoral fin length and characteristics**

(for medium sized fish ~ 45 – 110 cm Fork Length)

➢ **Bigeye**

- pectoral fin long, extending beyond the second dorsal fin base
- pectoral tapers to thin point, flexible, often curves ventrally at side



➢ **Yellowfin**

- pectoral fin short, extending to base of second dorsal fin
- pectoral fin thicker, stiff, blade-like

For large bigeye and yellowfin above 150 cm, the pectoral fins become similar in size and shape.

External Characteristics

▪ Pectoral fin characteristics

➢ Yellowfin

- pectoral fin shorter, thicker, “blade-like” compared to bigeye

Yellowfin 104 cm

Bigeye 99 cm

➢ Bigeye

- Pectoral fin longer, thinner, pointed at tip

Bigeye 96 cm

Yellowfin 104 cm

Bigeye pectoral fin forms smooth arc with “floppy” tips.
Yellowfin pectoral fins are straight and stiff.

External Characteristics

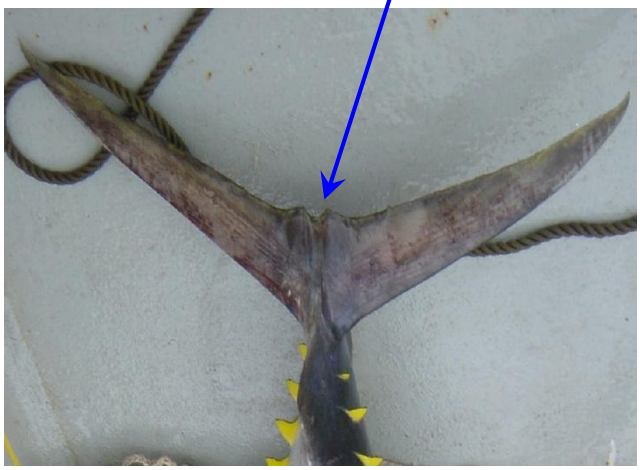
- **Caudal fin**

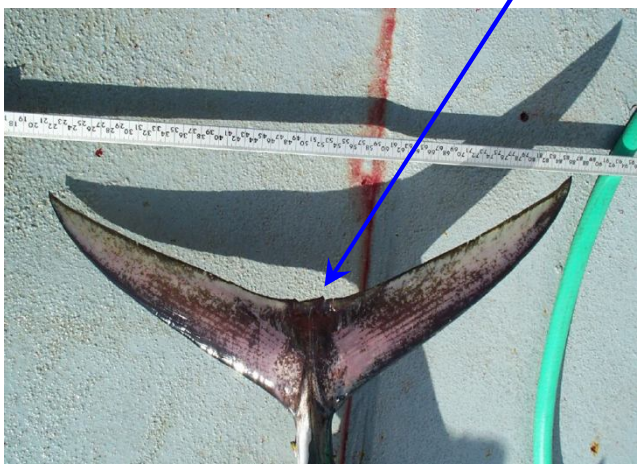
➢ **Yellowfin**

- Central portion of trailing edge forms distinct notch
- Two distinctly raised ridges present that form the “V” notch

➢ **Bigeye**

- Central portion of trailing edge forms a flat or slightly crescent shaped area
- Central area of caudal fin flat with two inconspicuous low mounds present.





External Characteristics

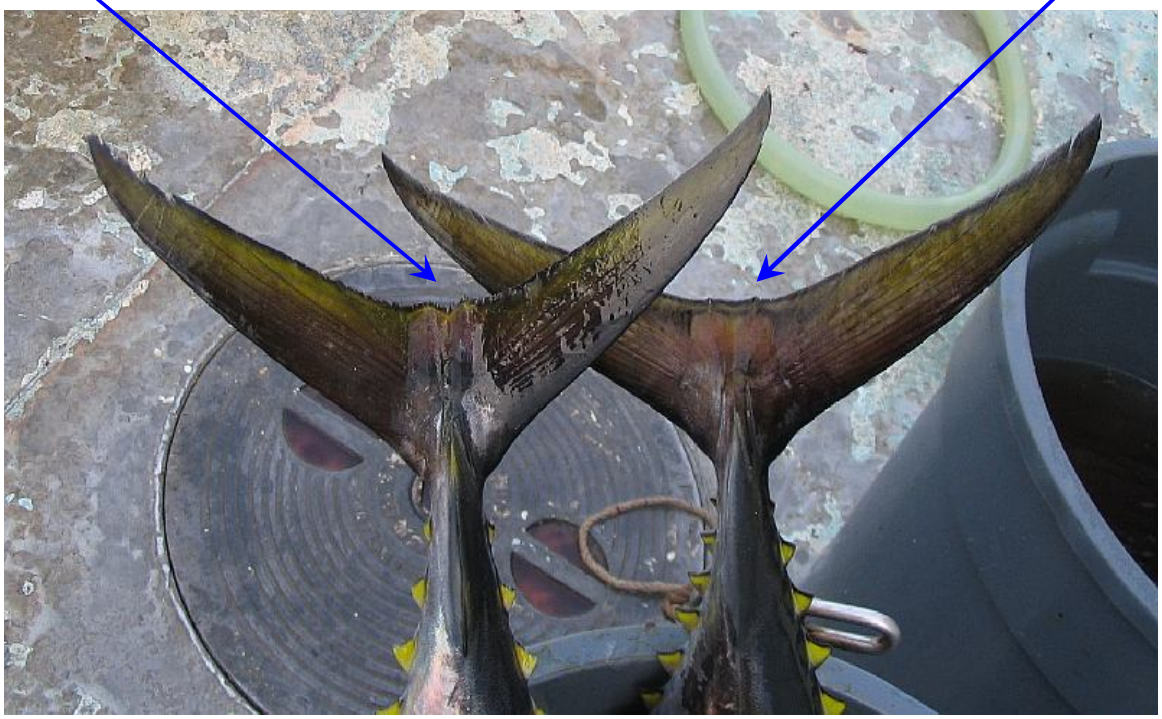
- **Caudal fin – center of trailing edge**

Yellowfin

Forms "V or M" shaped notch

Bigeye

Forms flat or slightly rounded cup



External Characteristics

- **Finlet coloration**

➢ **Yellowfin**

- bright yellow with no or slight black edging

➢ **Bigeye**

- yellowish color edged with black