References


References


References


References


References


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### COMPARISON OF VARIABLES FROM OBSERVER PROGRAMMES

#### TABLE A1.1

**Trip data**

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<thead>
<tr>
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<th>IATTC</th>
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<td>Sonar present</td>
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<td>Ring Stripper present</td>
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<td>Number of Screws</td>
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## TABLE A1.2

**Sets data**

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<td>Set Type</td>
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<td>Set Date</td>
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<tr>
<td>LetGo time</td>
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<td>RingsUp time</td>
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<td>Endset time</td>
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<td>Begin/end brailing</td>
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<td>Tuna catch of set</td>
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<td>Yes</td>
<td>Yes</td>
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<td>Tuna discards of set</td>
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<td>Cumulative tuna catch</td>
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<td>Tuna estimation before the set</td>
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<td>Sonar tuna readings</td>
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<td>Net depth at rings up</td>
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<td>Reason a set is not made</td>
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## TABLE A1.3

**Effort data**

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<td>Helicopter take-off/landing times</td>
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TABLE A1.4
Capture and bycatch

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<td>Billfish, shark, turtles: identification characteristic</td>
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<td>Non-tuna spp. Siza measurements</td>
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<td>Utilization of bycatch (discarded, treated as catch, etc)</td>
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<td>Tag information (turtles, tuna, fish)</td>
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TABLE A1.5
Floating objects

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<td>Date and Time</td>
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<td>Position</td>
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<td>Object origin</td>
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<td>Object type</td>
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<td>Object disposition (eg. Left in water, removed)</td>
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<td>Locate method</td>
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<td>Object soak time</td>
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<td>Hanging net information</td>
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<td>Turtle presence</td>
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<td>Turtle Entanglement</td>
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<td>Other spp. Presence</td>
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<td>Transmission capabilities of location equipment</td>
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Bycatch and non-tuna catch in the tropical tuna purse seine fisheries of the world

This report provides a review of our knowledge of the bycatches, defined as discarded dead, from the tropical tuna purse seine fisheries of the world. The major fishing grounds involved (eastern and western Pacific, eastern Atlantic, and western Indian Oceans) share the gear, the ways of fishing, and the structure of the pelagic communities. Because of that, the species taken in association with tuna schools tend to be the same in all regions.

After describing the gear and fishing operations, it discusses the reasons why bycatches happen, and explores the options to mitigate them.

The types of sets used to capture tunas and the detection methods used to locate the schools are a major factor to determine which are the catches and the bycatches. The main bycatches are tunas, sharks and rays, pelagic bony fishes, billfishes, and sea turtles. The total discards amount to one to five percent of the total tonnage captured, and tunas of the species targeted amount to over 90-95 percent of those bycatches. The silky shark is the most common shark species by far, followed by the oceanic whitetip sharks. Marlins and sailfishes are also taken but in reduced numbers. Olive ridley sea turtles are the most common turtle captured, but the majority of them are released alive and unharmed. Rainbow runners, mahi-mahis, wahoos and amberjack yellowtail are the major pelagic bony fishes taken with the tunas. They are being retained in increasing numbers for utilization.

Besides discussing problems of estimation, the report presents most of the ideas proposed or in different stages of testing, to mitigate those bycatches, including ways to avoid the captures, or to release the individuals from the net or from the deck.

Finally, the known or potential ecological impacts of the rapidly increasing fishery on fish aggregating devices (FADs) are reviewed, emphasizing some of the uncertainties that still prevail.