The Direct and Indirect Contributions of Cephalopods to Marine Fisheries

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Introduction

Cephalopod fisheries

Northern shortfin squid *Illex argentinus*
Introduction

FAO Landings Data (Caddy and Rodhouse 1998)

Map: www.obis.org.au

Landings (mt x 1000)

Year

Cephalopods
Groundfish

FAO Landings Data (Caddy and Rodhouse 1998)
Introduction

Cephalopods

Marine Mammals

Fish

Seabirds

Crustaceans

Juvenile fish

Cephalopods
What are the trade-offs associated with harvesting cephalopods?
## Introduction

### Valuation of cephalopods

<table>
<thead>
<tr>
<th>Landings (MT)</th>
<th>Economic value ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct</td>
<td>Direct</td>
</tr>
<tr>
<td>Indirect</td>
<td>Indirect</td>
</tr>
</tbody>
</table>

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*Image of fish and boats.*
Introduction

Objectives

Evaluate the direct and indirect contributions of cephalopods to fisheries in Large Marine Ecosystems (LMEs)

1. Contribution to fisheries landings (MT)
2. Contribution to fisheries economic value ($)
Large Marine Ecosystems

LME landings and market values estimated by Reg Watson and Rashid Sumaila
University of British Columbia
Data collection
## Data Analysis

<table>
<thead>
<tr>
<th>Species list</th>
<th>Average Landings (MT)</th>
<th>Cephalopods in diet (%)</th>
<th>Indirect contribution (MT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuna</td>
<td>20,000</td>
<td>10</td>
<td>2,000</td>
</tr>
<tr>
<td>Hake</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Squid</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weakfish</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dogfish</td>
<td>Total landings (MT)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mackerel</td>
<td>Total indirect contribution (MT)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Data Analysis

<table>
<thead>
<tr>
<th>Species list</th>
<th>Market value</th>
<th>Cephalopods in diet</th>
<th>Indirect contribution ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuna</td>
<td>$50 million</td>
<td>10%</td>
<td>$500,000</td>
</tr>
<tr>
<td>Hake</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Squid</td>
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<td>Total market value ($)</td>
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</tbody>
</table>
Results

Direct contribution to landings (%)

Large Marine Ecosystem
• Cephalopods one of the top landed species. i.e. CA current, S. Brazil
• Multiple cephalopods landed
- Cephalopods are not top landed species
- Many species compose landings, i.e. NW Atlantic
- Low or no landings recorded for cephalopods (not in top 95%)
- Fisheries dominated by one fish species, i.e. Gulf of CA 80% pilchard
Landings composed of high trophic level species (apex predators)
- Top landed species consume cephalopods
- A few species consume a lot of cephalopods (salmon)
• Little or no consumption of cephalopods by top landed species
• Low trophic level species compose majority of landings.
• Extreme cases
Large Marine Ecosystem

Total contribution to landings (%)

Indirect
Direct

Patagonian shelf
California current
S. Brazil
W. Bering Sea
New Zealand
N.W. Atlantic
Arabian Sea
Central N. Pacific
Gulf of Mexico
Aguilhas current
Newf/Labrador
S. E. Atlantic
Scotian shelf
Gulf of California
E. Bering Sea
Gulf of Alaska
North Sea
Benguela current
E. Tropical Pacific
Greatest contribution to fisheries in which high trophic level species dominate landings, i.e. Central N. Pacific and E. Tropical Pacific.

In fisheries dominated by low trophic level species, cephalopods may play more important role as predator.

Total contributions to landings and market values may be quite high.
Marine Mammals and Seabirds

- Difficult to define value for non-market goods
- Cephalopods (squid) are valuable prey item
- Need to consider in valuation of cephalopods
Acknowledgements

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