SEA TURTLE BYCATCH IN THE CARIBBEAN

STATE OF KNOWLEDGE AND GAP ANALYSIS
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BYCATCH, A MAJOR FACTOR FOR SEA TURTLES

- Lewison et al. (2004)
  - 200,000 loggerheads
  - 50,000 leatherbacks annually
- Wallace et al. (2010)
  - ~1,000,000 (1990-2008)

Source: NOAA image library
Project GloBAL
Global Bycatch Assessment of Long-Lived Species
METHODOLOGY

- Literature review
- Analysis of fisheries and bycatch datasets
- Expert and stakeholder consultation
- Rapid bycatch assessment case studies
  - Southeast Asia
  - West Africa
  - Jamaica

INDUSTRIAL LONGLINE FISHERIES

- US and Venezuelan Fleets main fleets within the basin
- Mexican Fleet in the Gulf of Mexico
- Cuba’s fleet in international waters significantly reduced/ halted
LONGLINE OBSERVED SETS

LEGEND

- US Longline Fleet (log book)
- VPLOP observed sets

VPLOP OBSERVED EFFORT, 1991-2006

Fishing effort (1000 hooks)

- 15 - 9.77
- 9.78 - 28.4
- 28.5 - 52.0
- 52.1 - 124.0
- 124.1 - 200.14
VPLOP OBSERVED BYCATCH (1991-2006)

- 80 animals in 67 sets

US EFFORT
SPECIES CAPTURED IN LONGLINES

  - US fleet bycatch ~ 11,888 (8554-16,253)
  - Venezuelan bycatch ~ 1899
  - Bycatch in the CLME sub-area similar (1500 vs 1126)

- Dearth of information on bycatch in artisanal/semi industrial longlines
  - Bottom longlines for demersal fish taxa in Venezuela capture a relatively large number of loggerheads. Generalizable for continental areas in the WCR?
# Trawl Fisheries

- Assessments/information from:
  - French Guiana
  - Venezuela*
  - Belize*
  - Cuba
  - Guyana
  - Suriname
  - Nicaragua
  - Central America (multiple territories)

* Banned trawl fisheries

### Trawl Fishery Bycatch Rates

<table>
<thead>
<tr>
<th>Country</th>
<th>Spp.</th>
<th>Rates</th>
<th>Time</th>
<th>Source</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belize</td>
<td>Ei, Cc, Cm</td>
<td>1 turtle/trawl hr</td>
<td>?</td>
<td>experimental fishing trials</td>
<td>Pers com R. Carcamo</td>
</tr>
<tr>
<td>Guyana</td>
<td>Mainly L. olivacea</td>
<td>-</td>
<td>1992</td>
<td>interview data</td>
<td>1300 per annum (Tambiah, 1994)</td>
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<tr>
<td>Suriname</td>
<td>Mainly L. olivacea</td>
<td>-</td>
<td>1992</td>
<td>interview data</td>
<td>3200 per annum (Tambiah 1994)</td>
</tr>
<tr>
<td>Venezuela</td>
<td>Ei, Cm, Cc, Dc</td>
<td>0.0011-0.00137 turtles trawl hr</td>
<td>1991-1993, 2000</td>
<td>Observer data</td>
<td>Alio et al. (2010)</td>
</tr>
<tr>
<td>Cuba</td>
<td>Mainly Cm</td>
<td>-</td>
<td>2000-2001</td>
<td>Interviews/landings data</td>
<td>619 turtles per annum</td>
</tr>
<tr>
<td>Nicaragua</td>
<td>Unsp.</td>
<td>-</td>
<td>1994</td>
<td></td>
<td>140 per annum (Arauz, 1996)</td>
</tr>
<tr>
<td>Central America</td>
<td>-</td>
<td>-</td>
<td>1994</td>
<td></td>
<td>514 per annum (Arauz, 1996)</td>
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</table>
TRAWL FISHERIES

- Sea turtle bycatch rates and numbers in shrimp trawl fisheries on the continental margins are among the lowest reported.
  - In some areas (e.g., Trinidad) - maybe related to the relatively low spatio-temporal overlap fisheries and sea turtle migratory corridors*
- Challenges: sensitivity of government agencies regarding data on bycatch in trawls?
- Several governments have banned or made significant changes (Belize, Venezuela)

* Kuruvilla, S. 2001 Impact of shrimp fisheries in Trinidad and Tobago, FAO Fisheries Circular No. 974

GILLNETS

- Some form of assessment/information in
  - French Antilles
  - French Guiana
  - Suriname
  - Trinidad & Tobago
  - Dominican Republic
  - Mexico
  - Jamaica
COMPOSITION OF GILLNET BYCATCH

- Species assemblage in gillnets bycatch is less about the gear and more about where and when.
- Proximity to nesting beaches will catch the nesting species, proximity to nearshore foraging habitat will catch foragers, e.g.
  - Leatherbacks and olive ridleys in Trinidad and the Guianas, Hawksbills in Mexico, Dominican Republic, Guadeloupe.

GILLNET RATES

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<td>Dominican Republic</td>
<td>0.03 turtles/hr in a 640 m</td>
<td>2006</td>
<td>experimental fishing, direct observation,</td>
<td>Effort calculated as ranging from 18-28 days/month - individual monthly rates averaged</td>
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<td></td>
<td>long gillnet</td>
<td></td>
<td>trials and interviews</td>
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<tr>
<td>Guadeloupe</td>
<td>1-10 turtles/net/year</td>
<td>2003</td>
<td>interview data for annual estimate</td>
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<td>Suriname</td>
<td>0.035-0.048 turtles/boat day</td>
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<td>interview</td>
<td>Calculated from estimates of effort and bycatch numbers. Symposium abstract</td>
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<td>Venezuela</td>
<td>&gt;0.0186 turtles/boat day</td>
<td>1997-1998</td>
<td>interview data</td>
<td>Calculated from estimates of effort (20 boat days per month per boat for 6 months) and sea turtle bycatch numbers</td>
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<td>French Guiana</td>
<td>0.001-0.101 turtles/boat day</td>
<td>2004-2005</td>
<td>interview</td>
<td>Calculated 217 gillnet fishers, 16-20 days/month and 7000 captures (Lum, 2006)</td>
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<td>0.157-0.196 turtles/boat day</td>
<td>2001-2002</td>
<td>interview</td>
<td>Calculated from statistical data. Calculation based on 38 reported captures in 2 months (10 fishers at 32-40 boat days each)</td>
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<td>0.04 turtles/net m hr.</td>
<td>1992</td>
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### Other Gear

- Trap fisheries?
- Hook and line fisheries
- Beach seine
SUMMARY

- WCR limited in number of bycatch studies
  - fisheries and independent, on-board monitoring is limited
  - Need multi-gear studies such as undertaken in Yucatan, Mexico
- Fishery-wide estimates unavailable for most fisheries
  - Annual estimates for at least one gear in 14 non-US territories, representing ~37,000 sea turtles
- Within the Caribbean basin,
  - gillnet fisheries in proximity to nesting beaches, in shallow soft bottom habitats and longlines targeting demersal resources may warrant greatest focus
SUMMARY: ASSESSMENT CHALLENGES

- Opportunistic take confounds assessment
- Very little information available on turtle bycatch rates for those countries now using TEDs
- Very little information out of Mesoamerica
- Hard to extract the gear effect (differing effort metrics)
- Ghost of bycatch past
  - Low numbers in fishery concurrent declining population trends hint at bycatch in the past
  - E.g. olive ridleys in the Guianas

SUMMARY (CON’T)

- Sea turtle bycatch widespread and highly variable
- Insufficient information on other taxa to formulate multi-taxa approach
- Productivity of LMEs, proportion of shelf to total area maybe be indicators of fishing pressure and hence bycatch risk.
WCR LARGE MARINE ECOSYSTEMS

From Dunn et al. (2010). A regional analysis of coastal and domestic fishing effort in the wider Caribbean. Fish. Res.
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  - Karen and Scott Eckert
  - Turtle Team,
  - Daniel Dunn
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Thank you