NEFSC Protected Species Programs

Aerial Surveys and Analyses of Serious Injuries and Mortalities

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NE Right Whale Surveys

Reduce right whale ship strike deaths

Monitor the population

Provide distribution data of other megafauna
Broad scale survey coverage 2002-2006

350 flights
Ship strike reduction

NEFSC survey data submitted to Consortium database

Consortium sightings used to delineate vessel speed restriction zones
Seasonal Management Areas reflect right whale seasonal distribution observed 1980-2006
Right whale groups outside SMAs trigger Dynamic Management Areas

Vessels requested to reduce speed in DMAs
New survey design in 2007 focused in areas where whales seen and DMAs triggered

Provides increased photo capture rates for monitoring

Increased likelihood of detecting injuries
The new survey design improved our sightings rate.
NEFSC contributes significantly to the right whale catalogue (photo recapture)

2012
364 individuals captured

Southeast US

Bay of Fundy
97 individual whales

Cape Cod Bay
238 individual whales

Gulf of Maine (NEFSC)
237 individual whales

66 seen only by NEFSC
All survey data submitted to the Right Whale Consortium and OBIS SEAMAP
Strengths
Long-term data set
Extensive spatial coverage
Adaptive
Multi-mission (RW distribution, m/r, injury detection, disentanglement)

Challenges
Changing distribution of whales
Vagaries in NOAA budget

Recommendations
Adapt design to maximize RW photo-id rate (sightings/hr)
Incorporate acoustic monitoring
Serious Injury & Mortality Determination

Consistent accounting of baleen whale injuries

Estimate cause-specific mortality

Evaluate efficacy of ALWTRP and ship strike reduction measures

Assign country of origin to entangling gear
Entanglement Mortality Determination Criteria

- constricting fishing gear with associated subdermal hemorrhaging or extensive necrosis
- extensive entanglement evident
- entanglement prevented feeding
- code 2 (fresh dead) carcass pulled up during fishing operations
Vessel Strike Mortality Determination Criteria

- large linear lacerations
- large areas of subdermal hemorrhaging
- extensive skeletal fracturing
- code 2 (fresh dead) carcass found on the bow of a ship
Serious Injury (SI)

Any injury that is more likely than not to result in mortality

>50%
Identified 16 scenarios that accommodate all types of injury event reports

Used proportion of events resulting in death or significant health decline from all events with known outcomes

Binomial test of >50%

<table>
<thead>
<tr>
<th></th>
<th>Events</th>
<th>Known outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vessel Strikes</td>
<td>124</td>
<td>77</td>
</tr>
<tr>
<td>Entanglements</td>
<td>228</td>
<td>160</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>352</strong></td>
<td><strong>237</strong></td>
</tr>
</tbody>
</table>

Data from US west and east coasts, Alaska, Hawaii and Atlantic Canadian Maritimes, 2004-2008
<table>
<thead>
<tr>
<th>Injury Category</th>
<th>Injury Determination</th>
<th>Value to compare against PBR</th>
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</thead>
<tbody>
<tr>
<td>Constricting wrap</td>
<td>Serious Injury</td>
<td>1</td>
</tr>
<tr>
<td>Loose wrap</td>
<td>NSI</td>
<td>0</td>
</tr>
<tr>
<td>Deep laceration</td>
<td>Serious Injury</td>
<td>1</td>
</tr>
<tr>
<td>Superficial laceration</td>
<td>NSI</td>
<td>0</td>
</tr>
<tr>
<td>Vessel &gt; 65’ and &gt; 10 kts</td>
<td>Serious Injury</td>
<td>1</td>
</tr>
<tr>
<td>Vessel &gt; 65’ and speed unknown</td>
<td>Prorate</td>
<td>0.56</td>
</tr>
<tr>
<td>Evidence of EN</td>
<td>Prorate</td>
<td>0.75</td>
</tr>
<tr>
<td>Vessel strike observed</td>
<td>Prorate</td>
<td>0.36</td>
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</table>
Original SI criteria required high quality information and near certainty of death

New criteria accommodates low quality information, which is prevalent

<table>
<thead>
<tr>
<th></th>
<th>Original criteria SI Rate</th>
<th>New criteria SI Rate</th>
<th>PBR</th>
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<tbody>
<tr>
<td>Right whales</td>
<td>2.4</td>
<td>2.85</td>
<td>0.9</td>
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<tr>
<td>Humpback whales</td>
<td>4.2</td>
<td>7.8</td>
<td>2.7</td>
</tr>
<tr>
<td>Finback whales</td>
<td>0.2</td>
<td>1.3</td>
<td>5.6</td>
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<tr>
<td>Minke whales</td>
<td>0.8</td>
<td>3.25</td>
<td>162</td>
</tr>
</tbody>
</table>

DETECTED INJURIES ONLY
**Strengths**
Known injury outcomes used to inform Serious Injury guidelines

**Challenges**
Unknown fraction of injuries and mortalities not seen
Difficulty in identifying gear to fishery or country (US/Canada)

**Recommendations**
Continue refining SI guidance with injury outcome results
Develop means to estimate actual human-caused mortality