Statistical Assessment of Cetacean Stranding Events in Cape Cod area

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The International Fund for Animal Welfare (IFAW) provided summary records of their responses to Mass Stranded (MS) cetaceans in Cape Cod, Massachusetts.

(Mass Stranding: 2+ animals in proximity, during one tidal cycle, not mother/calf pair)
## IFAW MS Event Data Summary for Cape Cod

<table>
<thead>
<tr>
<th>Years:</th>
<th>1999 - 2014</th>
</tr>
</thead>
<tbody>
<tr>
<td># Events:</td>
<td>165</td>
</tr>
<tr>
<td># Animals:</td>
<td>924</td>
</tr>
<tr>
<td>Mean # Anim / Event:</td>
<td>5.6</td>
</tr>
<tr>
<td>Mean # Events / Yr:</td>
<td>10.4</td>
</tr>
<tr>
<td>Mean # Animals / Yr:</td>
<td>58</td>
</tr>
<tr>
<td>Species:</td>
<td></td>
</tr>
<tr>
<td>Delphinus delphis</td>
<td>57.1%</td>
</tr>
<tr>
<td>Lagenorhynchus ac.</td>
<td>32.9%</td>
</tr>
<tr>
<td>Globicephala melas</td>
<td>8.3%</td>
</tr>
<tr>
<td>Grampus griseus</td>
<td>1.2%</td>
</tr>
<tr>
<td>S. coeruleoalba</td>
<td>0.2%</td>
</tr>
<tr>
<td>Tursiops truncatus</td>
<td>0.2%</td>
</tr>
</tbody>
</table>

### Locations of MS Animals

- Map of MS event locations around Cape Cod.

### Aggregated MS Events By Month

- Bar chart showing the number of MS events by month.
  - January: 35 events
  - February: 30 events
  - March: 25 events
  - April: 20 events
  - May: 15 events
  - June: 10 events
  - July: 5 events
  - August: 10 events
  - September: 15 events
  - October: 5 events
  - November: 10 events
  - December: 15 events
Avg Monthly Wind Correlates to MS Events

Wind Data from Buoy Station 44013

Time-Shifted Correlation

Avg. Wind Speed (m/s)

Avg Monthly Wind: Stn 44013

Linear Regression w/ One-Month Shift

y = 7.98 x + 0.10
R² = 0.93

0 1 2 3 4 5
0 10 20 30 40

0 1 2 3 4 5
0 5 10 15

0 1 2 3 4 5 6 7 8 9 10 11 12
0 1 2 3 4

Num. MS Events

Wind Month Offset

Correlation Value (R)

Wind Magnitude (m/s)

Month

0.97
Summary

• Avg. monthly aggregated wind correlates strongly with aggregated MS events.
  – Other parameters were investigated for correlation, but none were as strongly correlated.

• Cannot conclude that wind is a factor in MS events based on this data alone.
  – Correlation is not causation.
  – We cannot say that the wind is causing mass strandings.

• Additional data, concepts and alternate approaches are welcome.