Whale Conservation on the US West Coast:
Decreasing the risk of deadly ship strikes and entanglements in fishing gear

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Annual whale stock assessment by NOAA

Blue whales
Minimum population = 1,551
Suggested take by U.S. = 2.3 whales

Humpback whales
Minimum population = 1,876
Suggested take by U.S. = 11 whales
Where are whales struck?

- Blue Whale: 18 deaths
- Humpback Whale: 22 deaths
- Fin Whale: 43 deaths
What can we do?
Focus on high-risk regions
Where are the whales?

Blue Whale

Humpback Whale

Whales/km²

0.03
0.025 - 0.029
0.022 - 0.024
0.018 - 0.021
0.014 - 0.017

0.0096 - 0.013
0.0059 - 0.0095
0.0021 - 0.0058
0 - 0.002

0.083 - 0.087
0.072 - 0.082
0.062 - 0.071
0.051 - 0.061
0.04 - 0.05

0.03 - 0.039
0.019 - 0.029
0.0077 - 0.018
0 - 0.0076
Trends in abundance and mortality

Local abundance has increased 2012 → 2017

↑ abundance = ↑ strikes
Where are the strikes?

Blue Whale
2.7 deaths.

Humpback Whale
7 deaths
Potential management solutions

- Vessel speed reduction
- Seasonal management areas

- Blue whale
- Humpback
## VSR in Northern vs. Southern California

<table>
<thead>
<tr>
<th>Year</th>
<th>Northern</th>
<th></th>
<th></th>
<th>Southern</th>
<th></th>
<th></th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Percent Change</td>
<td></td>
<td></td>
<td>Percent Change</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pre-VSR to Active</td>
<td>Inactive- Pre-VSR to Active</td>
<td>Inactive- Pre-VSR to Active</td>
<td></td>
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<tr>
<td>2015</td>
<td>1.9%</td>
<td>7.7%</td>
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<td>2015</td>
<td>1.4%</td>
<td>4.7%</td>
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<tr>
<td>2016</td>
<td>-13.0%</td>
<td>-7.3%</td>
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<td>2016</td>
<td>-3.5%</td>
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<tr>
<td>2017</td>
<td>-10.6%</td>
<td>-4.8%</td>
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<td>2017</td>
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<td>2.4%</td>
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<tr>
<td>2015</td>
<td>3.1%</td>
<td>8.3%</td>
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<td>2015</td>
<td>2.7%</td>
<td>5.9%</td>
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<tr>
<td>2016</td>
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<tr>
<td>2017</td>
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<td>-3.3%</td>
<td></td>
<td>2017</td>
<td>-1.3%</td>
<td>2.0%</td>
</tr>
</tbody>
</table>
Success so far... and targets to improve

13-16% decrease in deaths in 2016 & 2017

Improved cooperation from ships = 23 – 24% fewer deaths

Speed limits at ends of the lanes = 30 – 35% fewer deaths
Strikes in Southern California

0-4% decrease in deaths in 2016 & 2017

Improved cooperation from ships = 19 – 32% fewer deaths
# Mortality by vessel type

## Northern

<table>
<thead>
<tr>
<th>Vessel type</th>
<th>blue whale</th>
<th>humpback whale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Container</td>
<td>63%</td>
<td>59%</td>
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<tr>
<td>Oil</td>
<td>13%</td>
<td>15%</td>
</tr>
<tr>
<td>Ro-Ro Cargo</td>
<td>6%</td>
<td>8%</td>
</tr>
<tr>
<td>Bulk Dry</td>
<td>6%</td>
<td>6%</td>
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</tbody>
</table>

## Southern

<table>
<thead>
<tr>
<th>Vessel type</th>
<th>blue whale</th>
<th>humpback whale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Container</td>
<td>60%</td>
<td>70%</td>
</tr>
<tr>
<td>Oil</td>
<td>14%</td>
<td>8%</td>
</tr>
<tr>
<td>Ro-Ro Cargo</td>
<td>8%</td>
<td>8%</td>
</tr>
<tr>
<td>Bulk Dry</td>
<td>6%</td>
<td>6%</td>
</tr>
</tbody>
</table>
In the last five years, 246 whales were ‘confirmed’ entangled off US West Coast.

- 8 blue whales < 2.3 annual take
- 157 humpback whales > 11 annual take
- 1 fin whales
Entanglement in fishing gear is increasing

NOAA confirmed entanglements
Humpback whales are arriving earlier

Earlier arrival of whales exposes them to fishing gear for a longer period of time

New Closure 2020
Crab fishing CLOSED
Crab pot gear in warm and cold years

Crab fishers work into May/June during warm years, and retreat early in cold years

Warm/poor productivity years
(2010, 2013)

Cold/good productivity years
Entanglement risk for humpback whales

Whales at greater risk during warm years, than during cold years

Warm/poor productivity years
(2010, 2013)

Cold/good productivity years
Summary recommendations

Recommendations to decrease deadly ship strikes and entanglements

• Decrease deadly ship strikes
  – Increase vessel cooperation in VSR program through increased outreach or mandatory speed regulations
  – Establish seasonal management areas at the end of the lanes and implement VSR in these high-risk regions

• Decrease risk of entanglements
  – Decrease co-occurrence of whales and crab pot fishing gear by closing the fishing season before whale migration and by limiting fishing effort in high whales use areas
Thank You

Cordell Bank NMS
Greater Farallones NMS
Angell Family Foundation
Battery Powered
Elinor Patterson Baker Trust

Firedoll Foundation
Gordon and Betty Moore Foundation
Moore Family Foundation
Thelma Doelger Trust for Animals
ACCESS volunteers and donors
Thank You
Strikes in Southern California

- Blue Whale
- Fin Whale
- Humpback Whale (summer)
- Humpback Whale (winter)