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False killer whales and fisheries interactions in Hawaiian waters: Evidence for sex bias and variation among populations and social groups

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Presentation to the FKW TRT, May 1, 2015

Stranding of false killer whale*, South Point
October 6, 2013

HIPc162
MHI insular
Cluster 3
Seen 2003, 2004, 2007, 2009, 2011

*Kristi West, HPU

Presentation to the FKW TRT, May 1, 2015

Line injuries on the dorsal fin as an indicator of fishery interactions

FIGURE 2. Hooked false killer whale from the Hawai'i long-line fishery, showing linear mark along side of body apparently as a result of long-line abrasion. Examination of a high-resolution scan of the original photo shows that the mark is not equally dark along the irregular surface of the body, and it clearly extends into the shadowed area of the back, indicating that the mark is not a shadow from the longline. Photo by Eric Forney, courtesy NOAA Fisheries, Pacific Islands Region.

Baird and Gorgone 2005

Data Sources

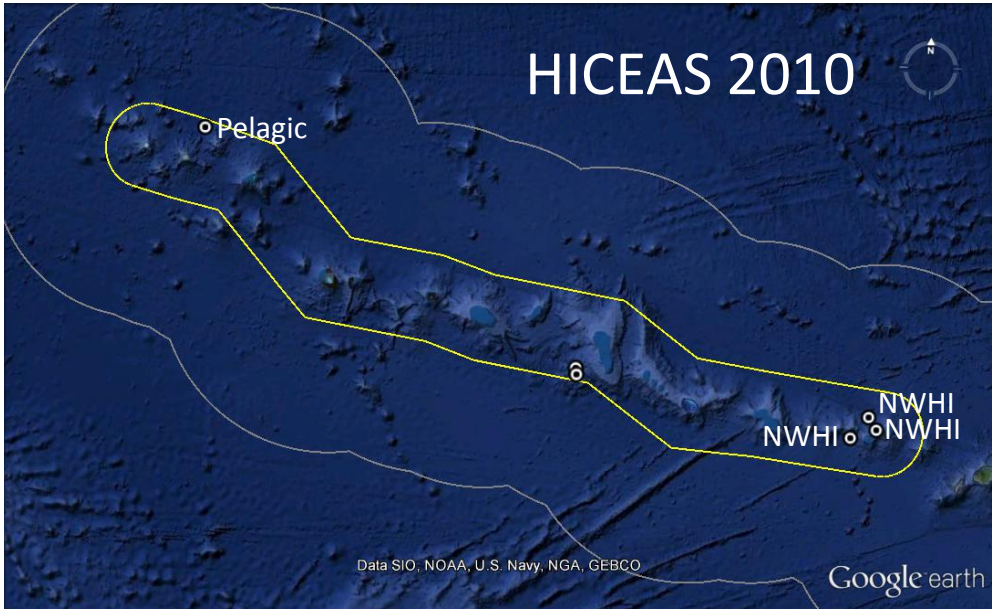
PIFSC/SWFSC

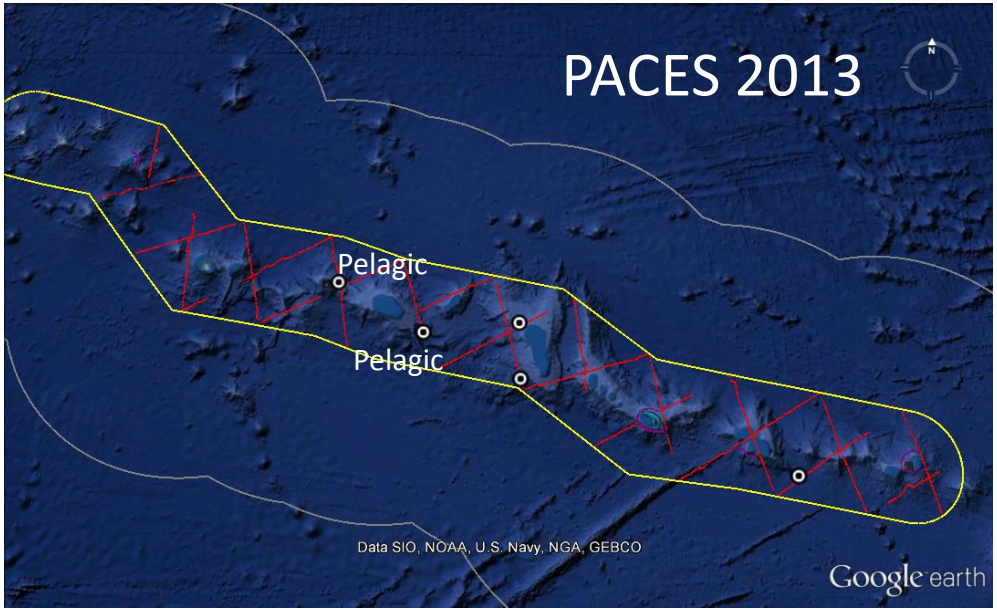
- HICEAS – 2010
- PACES – 2013

  encounters with photos and biopsies to confirm population identity, both pelagic and NWHI populations

CRC/WDF/WWRF

encounters with photos and biopsies to confirm population identity, pelagic, NWHI, and MHI insular populations





Catalog sizes*

Pelagic – 76 individuals (2005-2013)

NWHI insular – 51 individuals (2006-2013)

MHI insular – 168** individuals (2006-2013)

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*Distinctive and very distinctive individuals only, excluding re-sightings
**Since over 8-year span likely includes individuals born since 2006 and those that died before 2013

Baird et al. (2014)

Scoring of dorsal fin injuries for consistency with fisheries interactions

Choosing all photos from each catalog of animals with possible line-related injuries visible in a typical photo

Independent scoring by seven* individuals as:
3 – consistent
2 – possibly consistent
1 – not consistent

Using average of scores for each whale

***Robin Baird, Amanda Bradford, Annie Gorgone, Ed Lyman, Sabre Mahaffy, Erin Oleson, Andy Read**

Baird et al. (2014)

False killer whale fisheries interaction scoring

19 individual whales (6.4%) chosen for scoring

Average score varied significantly by population (Kruskall-Wallis one-way ANOVA, p = 0.007)

- **Pelagic median = 2.29**
- **NWHI median = 2.21**
- **MHI median = 2.71**

3 – consistent
2 – possibly consistent
1 – not consistent

Baird et al. (2014)

False killer whale fisheries interaction scoring

Chose >2.5 as cutoff (at least 4 out of 7 "consistent" and 3 "possibly consistent")

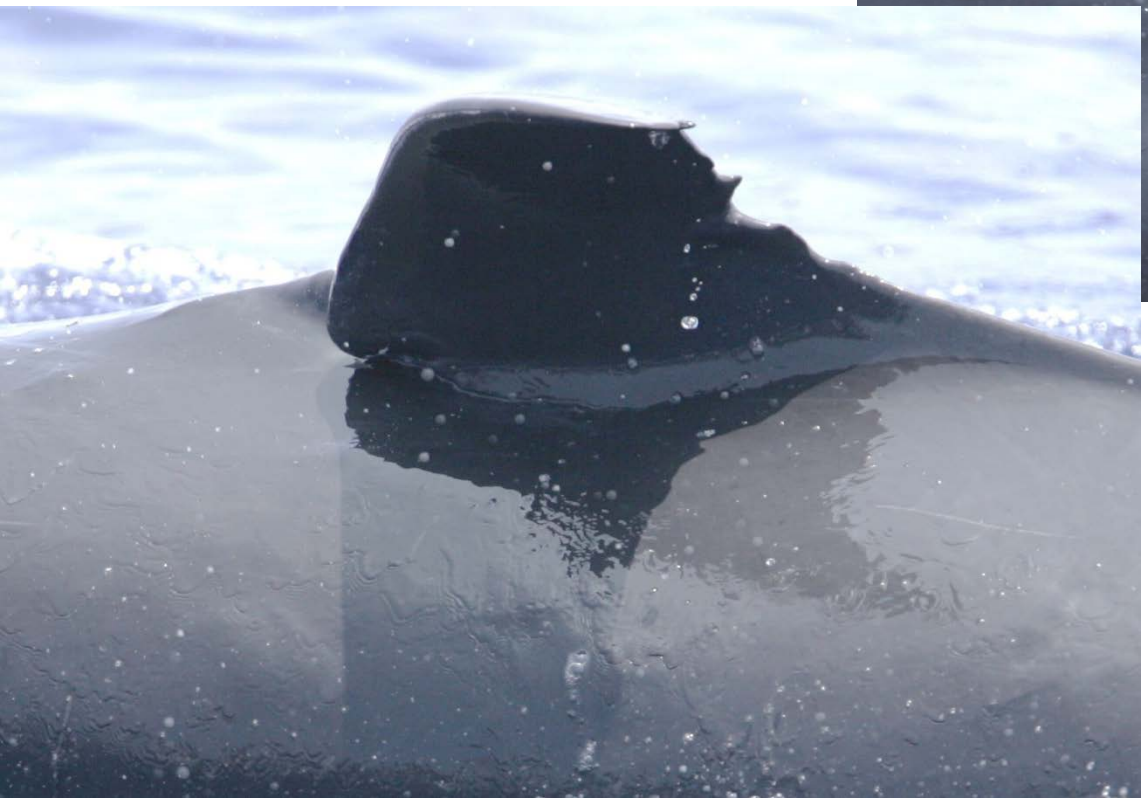
Proportion > 2.5 varied significantly by population (Fisher's exact test, p = 0.032)

- **Pelagic = 1 of 76 (1.3%)**
- **NWHI = 0 of 51 (0%)**
- **MHI = 12 of 168 (7.1%)**

3 – consistent
2 – possibly consistent
1 – not consistent

Baird et al. (2014)

HIPc316



3 – consistent
2 – possibly consistent
1 – not consistent

Mean score = 2.86 consistent with fishery interaction

Baird et al. (2014)

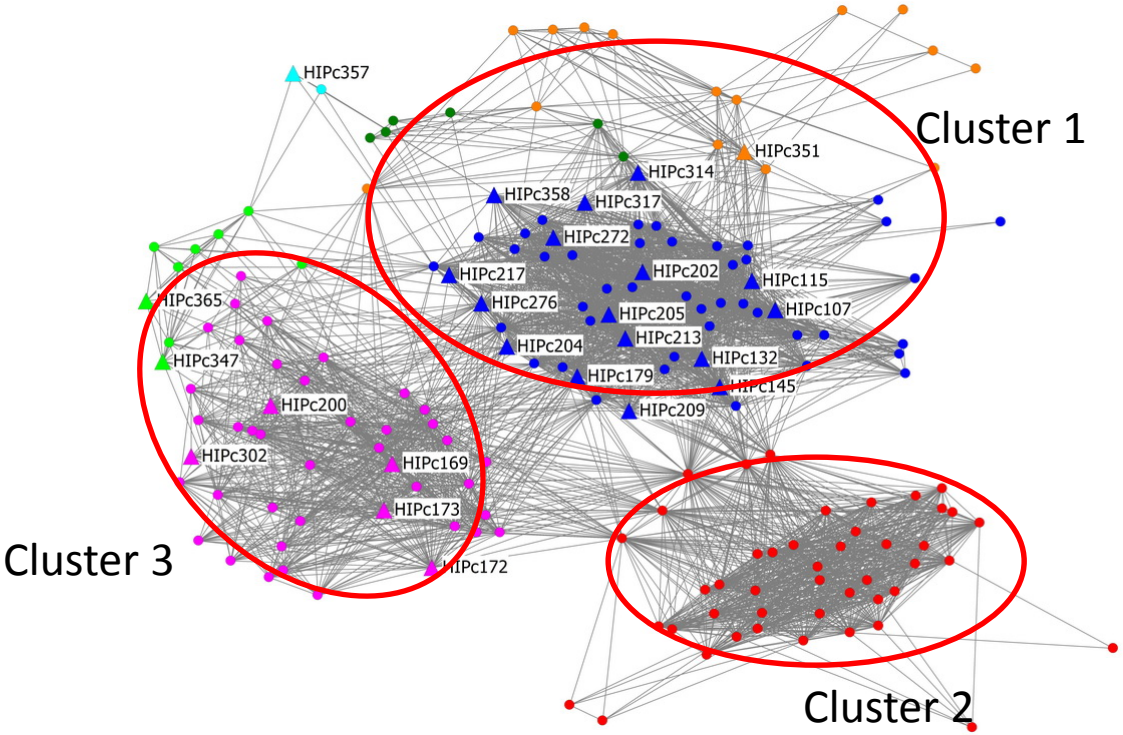
Scores > 2.5 by MHI social cluster

Cluster 1 – 3 individuals (4.2%)

Cluster 2 – 3 individuals (7.1%)

Cluster 3 – 6 individuals (12.8%)

Differences not statistically significant



3 – consistent
2 – possibly consistent
1 – not consistent

Baird et al. (2014)

What does this mean?

- Higher proportion of individuals with injuries consistent with fisheries interactions (FI) for MHI suggests either FIs may be occurring more often (per individual) than for pelagic or NWHI individuals, or when interactions occur, there is higher likelihood of mortality for pelagic animals

- Higher proportion of FI line injuries for Cluster 3 (12.8%) and Cluster 2 (7.1%) individuals suggest FIs may be occurring disproportionately in those social groups

Baird et al. (2014)

Sex was known (6) or inferred (1) for 7 of 12 MHI individuals scoring > 2.5

All seven were females (Sign test, $p = 0.016$)

- Females may depredate more
- Male interactions may be more likely to be lethal

- A female bias in fisheries interactions may reduce population recovery potential
- Females killed in fisheries interactions with dependent calves may also result in loss of the calf

Baird et al. (2014)

Preliminary assessment of false killer whale mouthline injuries as an indicator of fisheries interactions

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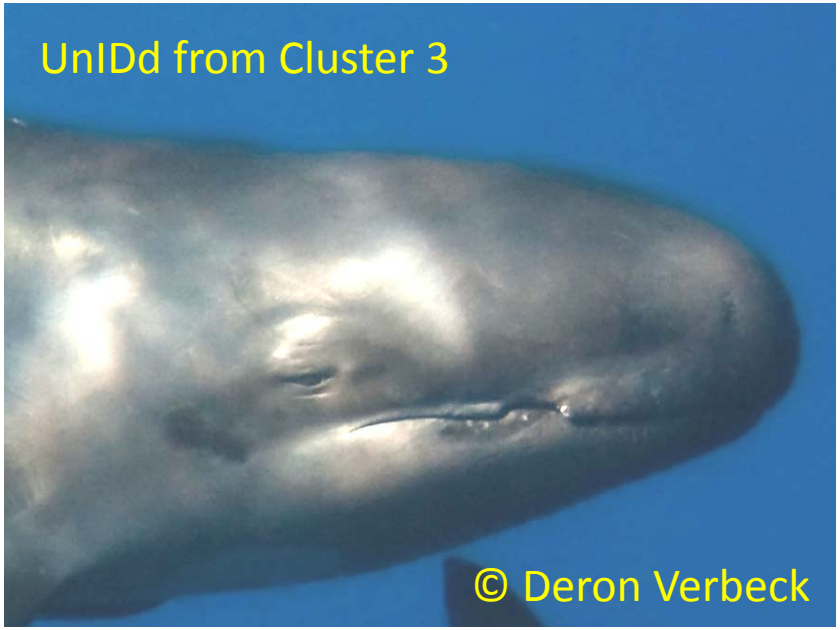
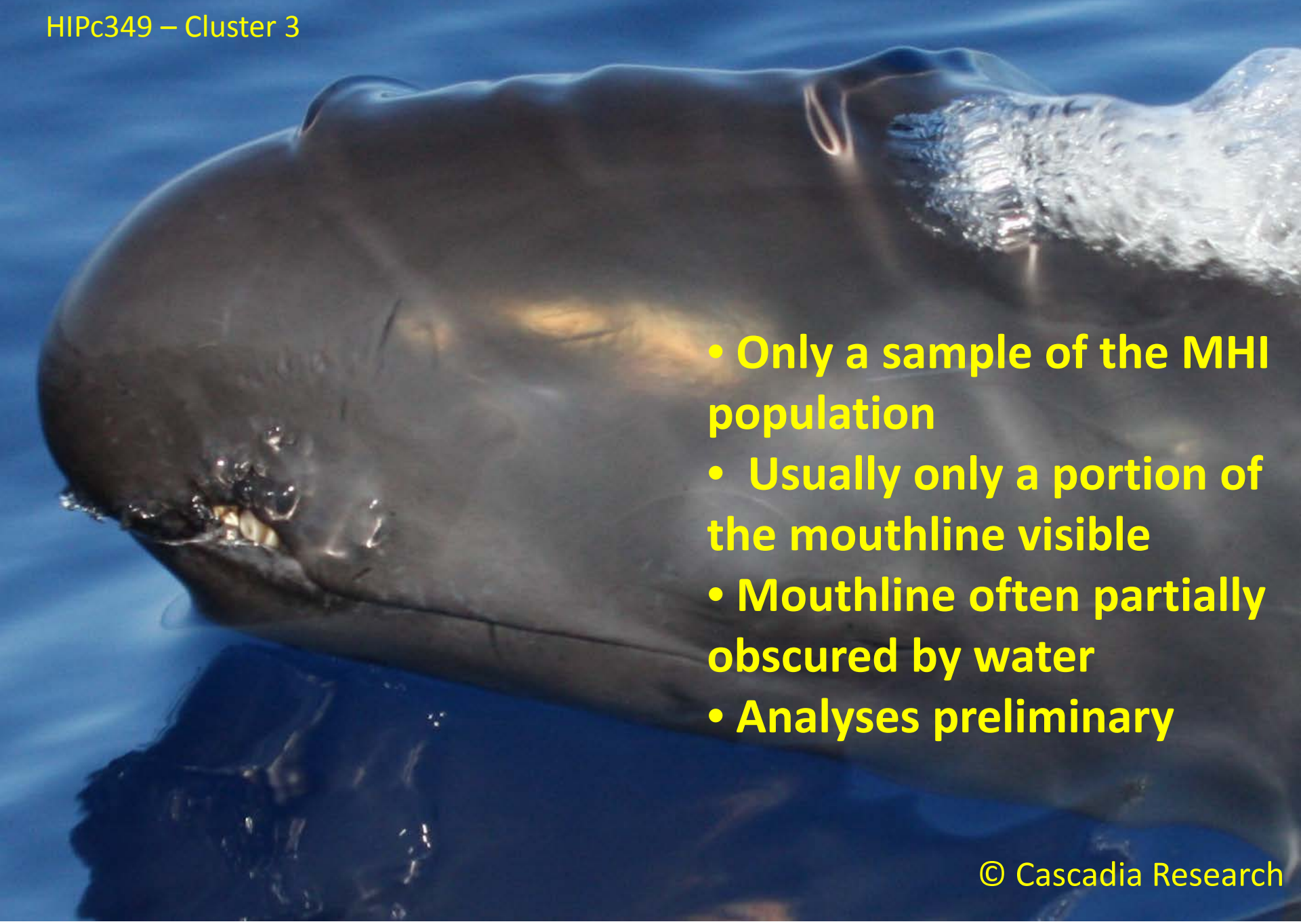
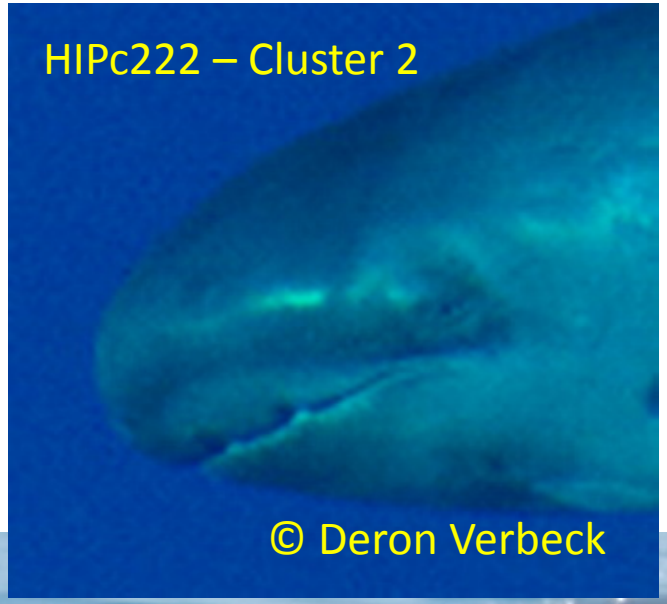


Presentation to the FKW TRT, May 1, 2015 – do not cite without permission


HIPc349 – Cluster 3
• Only a sample of the MHI population
• Usually only a portion of the mouthline visible
• Mouthline often partially obscured by water
• Analyses preliminary
© Cascadia Research

HIPc398 – Cluster 2
© Cascadia Research


HIPc222 – Cluster 2
© Deron Verbeck

HIPc210– Cluster 1
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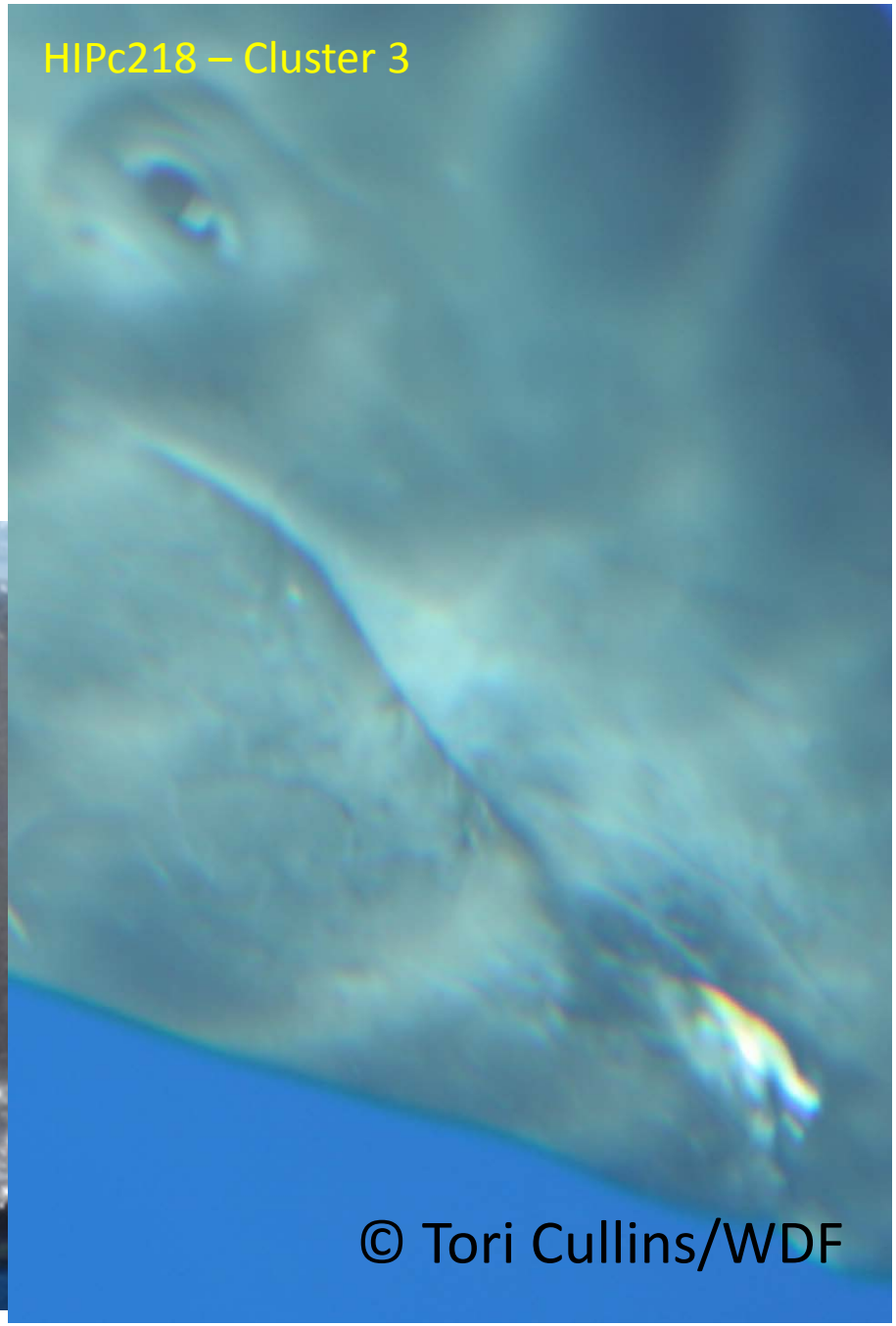
HIPc218 – Cluster 3
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- 39 individuals with mouthline images with from 25%-100% of mouthline visible (mean = 64%)
- 4 of 39 (10.2%) with NO evidence of injuries (with 50-100% of mouthline visible, mean = 81%)
- 16 of 39 (41%) with mouthline injuries consistent with fisheries interactions (mean visible = 63%)
- 19 of 39 (48.8%) with “possible” mouthline injuries consistent with fisheries interactions

Unidentified individual from Cluster 3

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“our results, combined with the evidence from the stranded individual with a variety of hooks in the stomach, suggest there is a need to broaden the scope of the Take Reduction Plan, which currently focuses only on the longline fisheries, to include nearshore fisheries”

Baird et al. 2014. Marine Mammal Science.