

Pre-Take Reduction Team Meeting
Nov 19-20, 2009 - Honolulu, Hawaii

Pacific Islands false killer whale
Stock Assessment Reports



Presented by
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False Killer Whale Assessment History

- 1995: first assessment- no abundance estimate, no PBR
- 2000: abundance for Main Hawaiian Islands, and estimate of fisheries interactions
 - > false killer whales strategic
- 2002: Hawaii EEZ survey results in new abundance estimate
 - > false killer whales strategic
- 2005: Palmyra & High-seas survey = new EEZ estimates
 - 2 stocks: Hawaii & Palmyra
 - > Hawaii false killer whales strategic
- 2005: Intensive nearshore surveys suggest separate population, result in new nearshore abundance estimate
- 2007: Genetics analysis reveals differences between insular and pelagic false killer whales
 - > Hawaii false killer whales strategic



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Genetic variation and evidence for population structure in eastern North Pacific false killer whales (*Pseudorca crassidens*)

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Abstract: False killer whales (*Pseudorca crassidens* (Owen, 1846)) are incidentally taken in the North Pacific pelagic long-line fishery, but little is known about their population structure to assess the impact of these takes. Using mitochondrial DNA (mtDNA) control region sequence data, we quantified genetic variation for the species and tested for genetic differentiation among geographic strata. Our data set of 124 samples included 115 skin-biopsy samples collected from false killer whales inhabiting the eastern North Pacific Ocean (ENP), and nine samples collected from animals sampled at sea or on the beach in the western North Pacific, Indian, and Atlantic oceans. Twenty-four (24) haplotypes were identified, and nucleotide diversity was low ($\pi = 0.31\%$) but comparable with that of closely related species. Phylogeographic concordance in the distribution of haplotypes was revealed and a demographically isolated population of false killer whales associated with the main Hawaiian Islands was identified ($\Phi_{ST} = 0.47$, $p < 0.0001$). This result supports recognition of the existing management unit, which has geo-political boundaries corresponding to the USA's exclusive economic zone (EEZ) of Hawaii. However, a small number of animals sampled within the EEZ but away from the near-shore island area, which is defined as <25 nautical miles (1,852 km) from shore, had haplotypes that were the same or closely related to those found elsewhere in the ENP, which suggests that there may be a second management unit within the Hawaiian EEZ. Biologically meaningful boundaries for the population(s) cannot be identified until we better understand the distribution and ecology of false killer whales.

Résumé : Les fausses orques (*Pseudorca crassidens* (Owen, 1846)) sont à l'occasion capturées dans les péchés à la palangre dans le Pacifique Nord, on connaît cependant trop peu la structure de la population pour évaluer l'impact de ces captures. Des données de séquençage de la région de contrôle de l'ADN mitochondrial (mtDNA) nous ont permis de mesurer la variation génétique chez cette espèce et d'évaluer la différenciation génétique entre les strates géographiques. Nos données comprennent 124 échantillons, dont 115 prélèvements de biopsie de la peau chez des fausses orques de l'est du Pacifique Nord (ENP) et neuf échantillons provenant d'individus capturés en mer ou sur la plage dans l'ouest du Pacifique Nord, l'Atlantique et l'Océan Indien. Il est possible d'identifier 24 haplotypes; la diversité des nucléotides est basse ($\pi = 0,31\%$), mais semblable à celle d'espèces fortement apparentées. Il y a une concordance phylogéographique dans la répartition des haplotypes, une population isolée démographiquement de fausses orques est associée avec les îles principales d'Hawaï ($\Phi_{ST} = 0,47$, $p < 0,0001$). Cette observation vient appuyer la reconnaissance de l'unité de gestion actuelle qui possède des frontières géographiques qui correspondent à la zone économique exclusive des É.-U. (EEZ) à Hawaï. Cependant, un petit nombre d'individus capturés dans l'EEZ, mais loin de la zone à proximité des îles (celle située à <25 milles nautiques (1 852 km) des rivages) possèdent des haplotypes identiques ou presque à ceux trouvés ailleurs dans l'ENP, il peut donc y avoir une seconde unité de gestion au sein de l'EEZ d'Hawaï. Il n'est pas possible de définir des frontières de signification biologique pour la ou les populations tant que la répartition et l'écologie des fausses orques ne seront pas mieux comprises.

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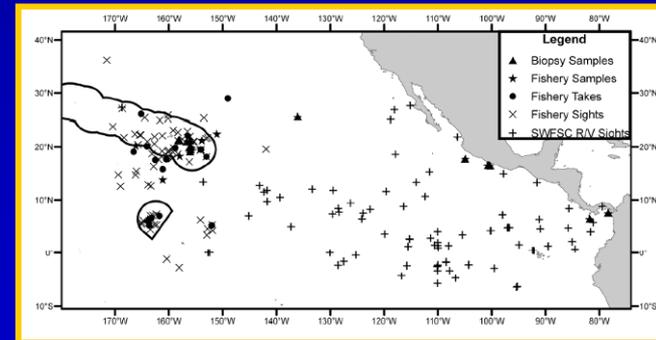
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Stock Structure

Chivers et al. 2007, Canadian Journal of Zoology

- Nearshore Main Hawaiian Islands population is genetically distinct.
 → Hawaiian Insular Stock
- Offshore animals are more diverse. Samples insufficient to resolve broad-scale structure.



- Comparison to related species (esp. pilot whales) suggests existence of discrete island-associated stocks.

Current False Killer Whale Assessment

- 2008 (Current SAR): False killer whale stocks split- Hawaii insular, Hawaii pelagic, & Palmyra
 - Pelagic and insular stocks split at Feb-Sep longline exclusion boundary
 - > Hawaii pelagic false killer whales strategic

False Killer Whale Stocks

Chivers et al. 2008, SWFSC Administrative Report LJ-08-04

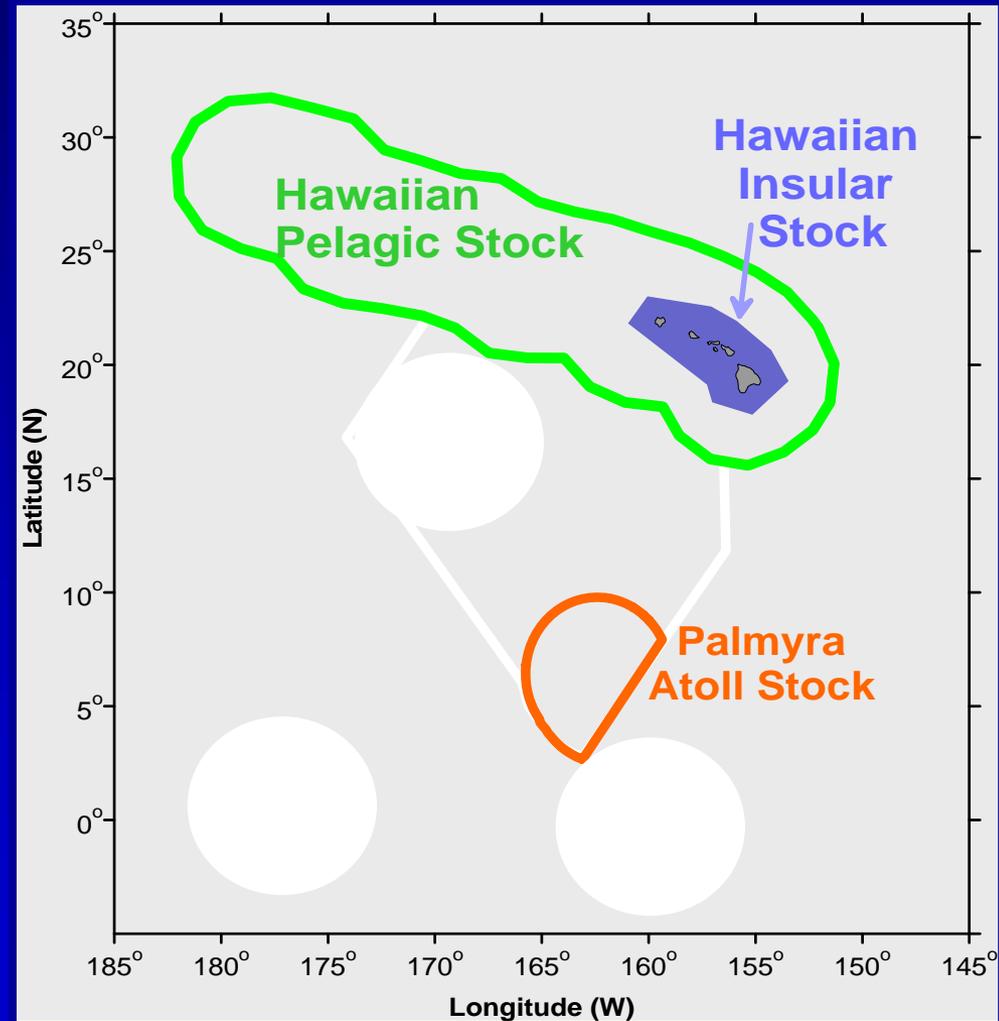
2008 SAR: 3 Pacific Islands false killer whale stocks

→ Hawaiian Insular Stock

(Within ~75nmi from islands based on available biological data; SAR used outer longline fishery exclusion boundary).

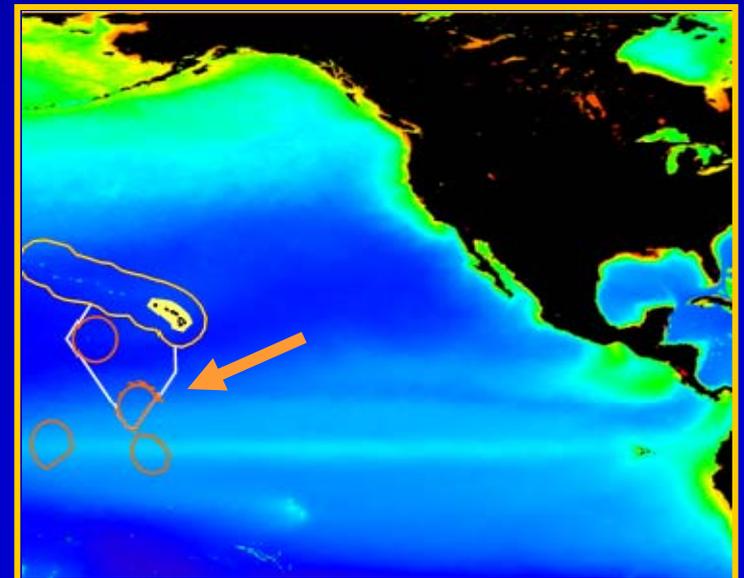
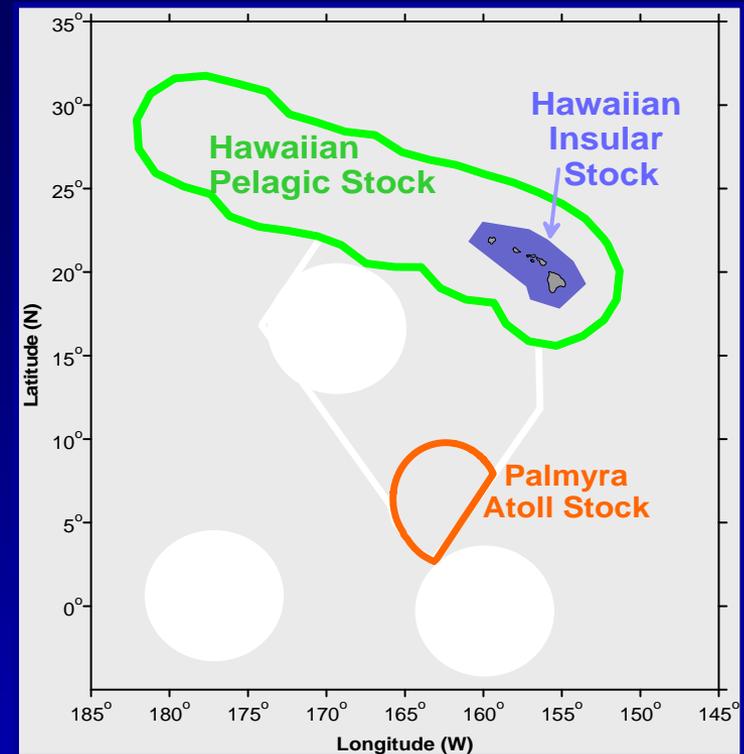
→ Hawaiian Pelagic Stock

→ Palmyra Atoll Stock

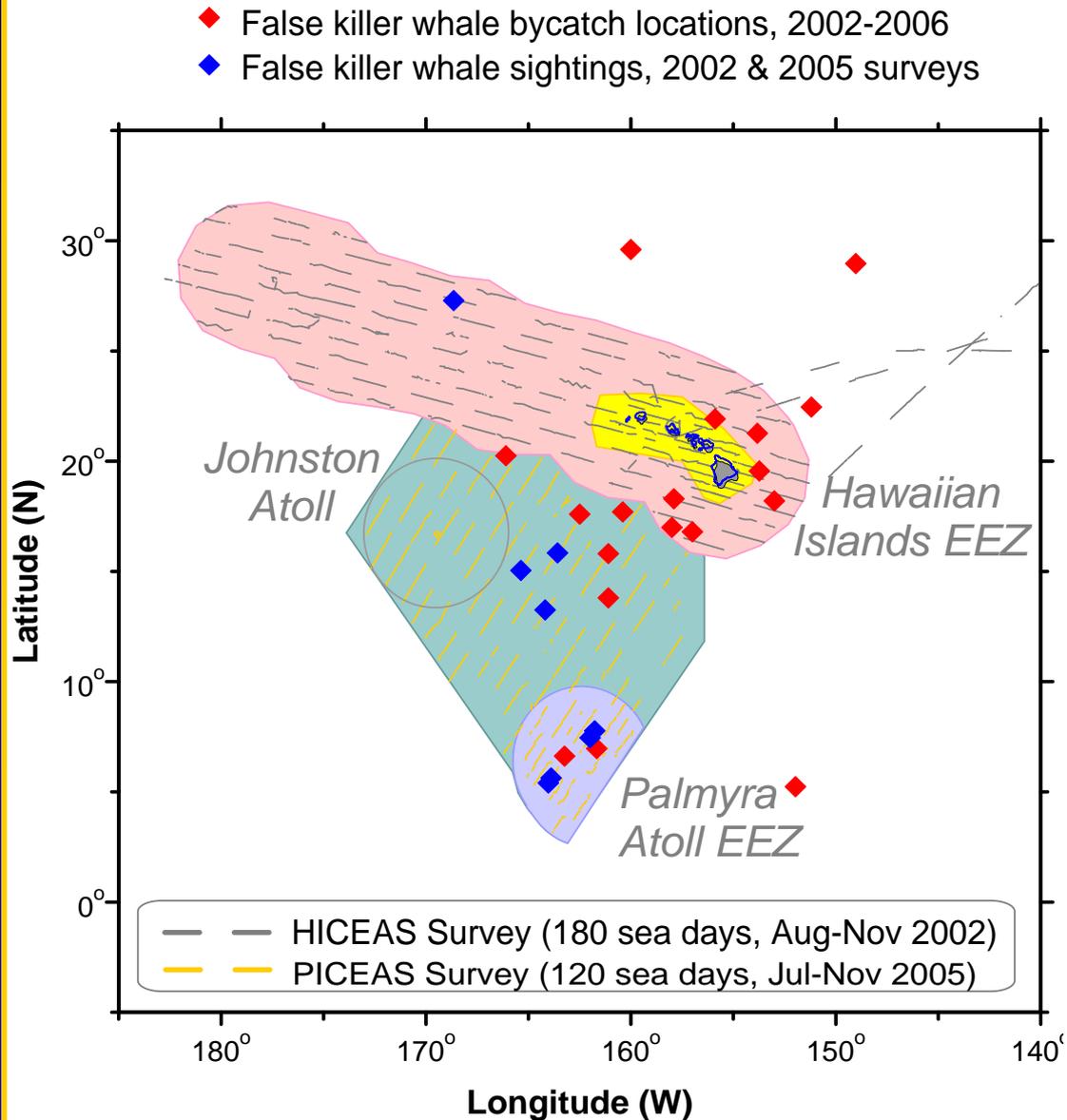


False Killer Whale Stock Abundance

- Hawaiian Insular Stock
 - 123 (CV=0.72) - photo ID
Baird et al. 2005
 - 121 (CV=0.47) - aerial surveys
Mobley et al. 2000
 - None seen on effort (*Barlow 2006, Main Islands Stratum*)
- Hawaiian Pelagic Stock
 - 484 (CV=0.93)
> 75 nmi from Main HI
Barlow and Rankin 2007, Barlow 2006
- Palmyra Atoll Stock
 - 1,329 (CV=0.65)
Barlow and Rankin 2007



False Killer Whale Stocks (2008 SAR)

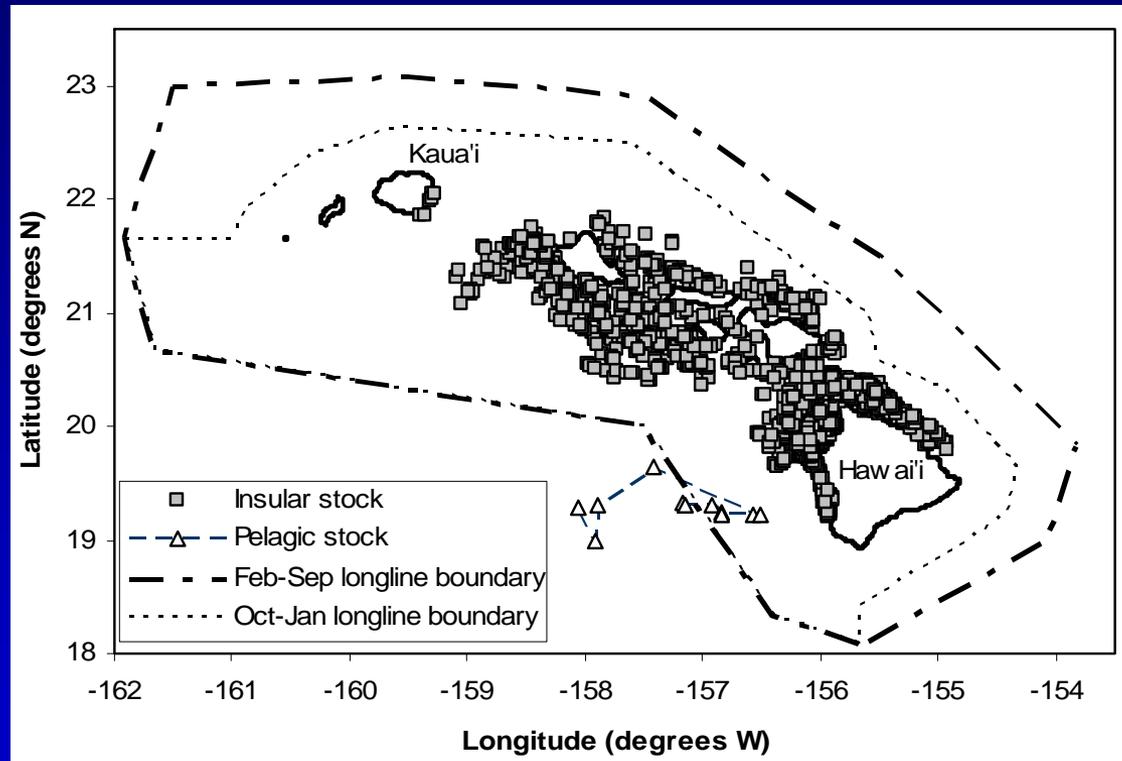


False killer whale Draft 2009 SARs

- Text reflects new research (suggested decline of insular stock, movements from telemetry studies, pollutants) and potential overlap between insular stock and longline fishery.
- Presented bycatch estimates separately for SSL and DSSL

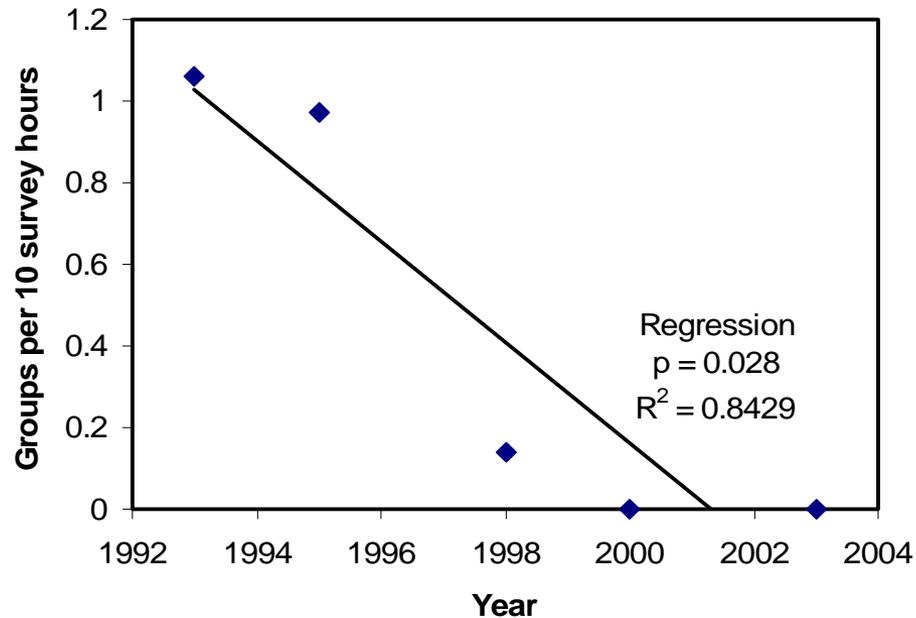
Stock	N	CV (N)	Nmin	PBR	2003-2007		Status
					<u>Mort & SI</u> 5-yr Avg	CV	
HI Insular	123	0.72	76	0.8	0	n/a	
HI Pelagic	484	0.93	249	2.5	7.4	0.19	Strategic
Palmyra Atoll	1,329	0.65	806	6.4	0.3	1.01	
"High seas"	906	0.68	539	5.2	5.4	0.45	Strategic

Insular and Pelagic Stocks Overlap



Satellite-tagging studies indicate overlap between pelagic and insular populations between 42km and 96km (Baird *et al* 2009)

Apparent Decline of Insular Stock



- Aerial surveys sighting rates from late 1980s to present suggest decline in false killer whales
- Other species have not shown similar decline

Table 3. Aerial survey effort and sighting data from J. Mobley, University of Hawai'i (pers. comm.).

Year	Effort (km)	Effort (hrs)	Mean Beaufort sea state	# false killer whale sightings	Sighting rate (per 10 on-effort survey hours)				
					False killer whale	Bottlenose dolphin	Pantropical spotted dolphin	Spinner dolphin	Short-finned pilot whale
1993	13,618	75.5	3.00	8	1.06	0.662	0.132	1.060	1.457
1995	17,091	92.3	2.83	9	0.975	2.492	0.542	2.167	1.625
1998	13,174	71.1	3.08	1	0.141	0.985	1.266	1.266	4.782
2000	11,007	59.4	3.43	0	0	1.178	2.020	1.347	1.347
2003	11,925	64.4	3.43	0	0	1.863	0.621	1.087	0.776

Current Situation

1. Hawaii pelagic stock of false killer whales remains strategic under MMPA.
2. Stock structure uncertainties do not change this conclusion

Draft 2010 Hawaii SAR -

- Reviewed by Scientific Review Group (Nov 2009)
 - Assessing overlap of insular and pelagic stocks and revising stock boundaries
- Expected to be released for public comment ~May 2010

New 2010 American Samoa SAR -

- No abundance estimate or PBR
 - Fisheries take suggests may exceed PBR based on comparison to abundance in other regions

Questions?