

# Status and Trends of Hawaiian Spinner Dolphins



Erin Oleson

NOAA Fisheries, Pacific Islands Fisheries Science Center  
Cetacean Research Program

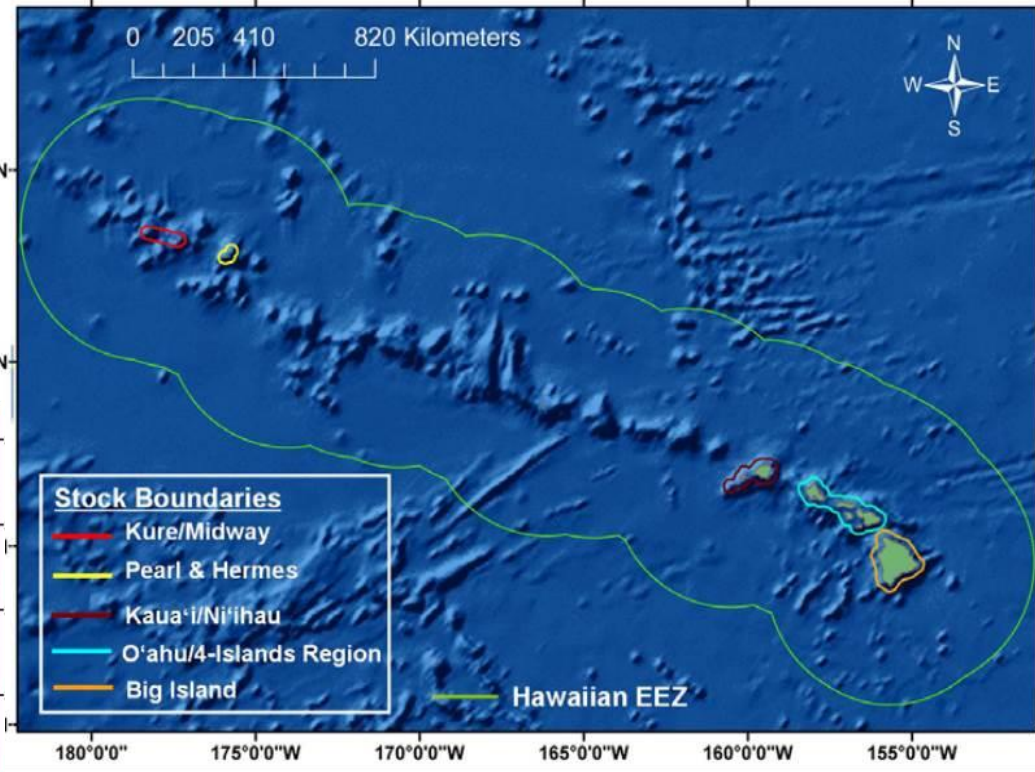
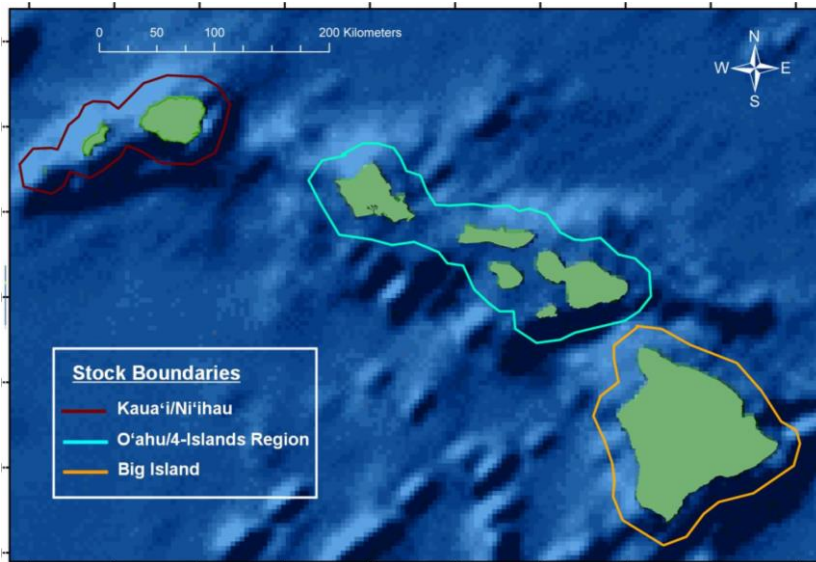
Marine Mammal Commission Annual Meeting, Kailua-Kona, HI, 21 May 2019



# Spinner Dolphin Population Structure

4 island-associated populations within Hawai'i, as well as pelagic population.

- Insular structure based on genetic differences, genetic assignment tests, and photo-ID re-sight data



Andrews et al. 2010. Molecular Ecology  
Karczmarski et al. 2005. Behavioral Ecology

# Abundance and Trends

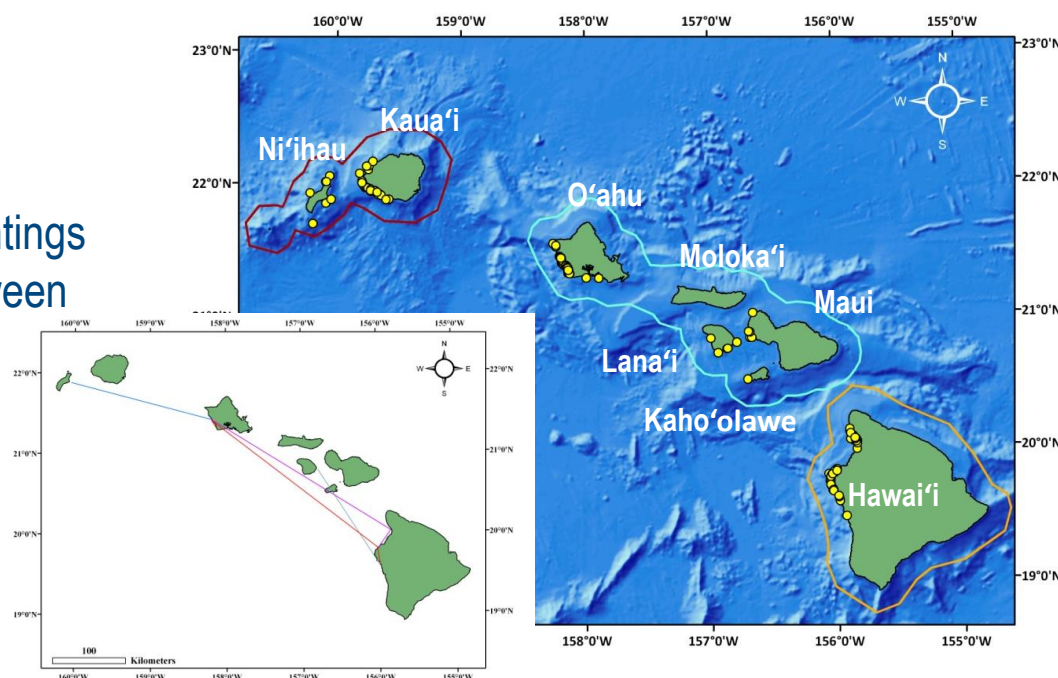
Recent abundance data come primarily from two studies:

- PIPIN: Pacific Islands Photo-Identification Network
  - Established 2006 as a collaborative spinner dolphin photo-ID catalog integrating the efforts of researchers working in Hawai'i
- SAPPHIRE
  - Intensive year-round survey of resting bays off Kona coast 2010-2012

# PIPIN DATASET

- Over 16,000 photos from 217 sightings in the main Hawaiian Islands between 2000 and 2009.

→ 673 cataloged individuals



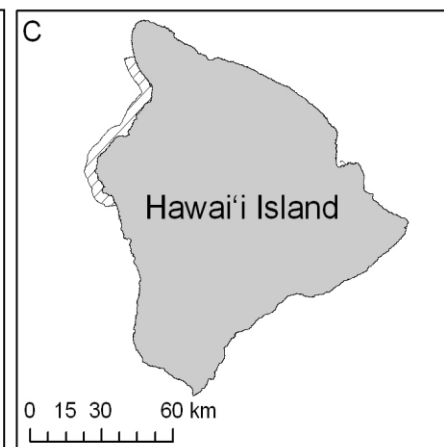
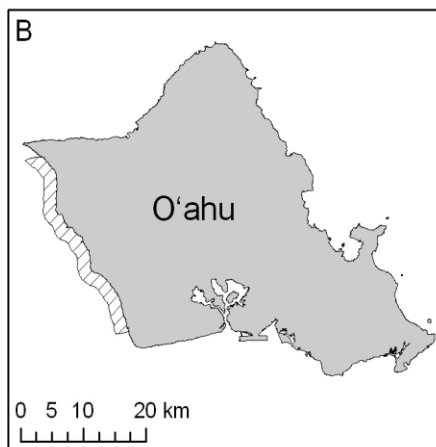
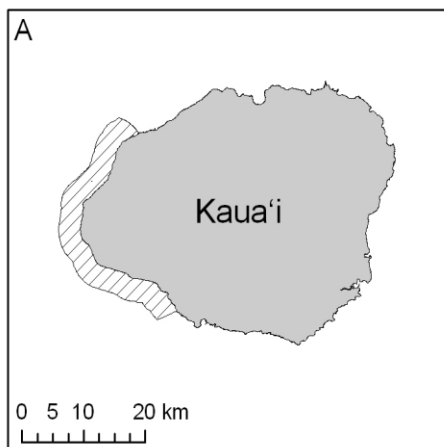
Stock	# Sightings	# Cataloged	Years	Contributors
Kaua'i/Ni'ihau	55	185	2003-2007	CRC, HAMER PIFSC
O'ahu/4-Islands	81	272	2001-2007, 2009	CRC, HAMER, HIMB, PIFSC, TDI
Hawai'i	83	216	2003-2007	CRC, KNF, HMMC

**CRC**-Cascadia Research Collective, **HAMER**-Hawai'i Association for Marine Education & Research, **HIMB**-Hawai'i Institute of Marine Biology, **HMMC**-Hawai'i Marine Mammal Consortium, **KNF**-Kula Nai'a Foundation, **PIFSC**-Pacific Islands Fisheries Science Center, **TDI**-The Dolphin Institute

# PIPIN Abundance Estimates

Minimum seasonal closed-capture estimates

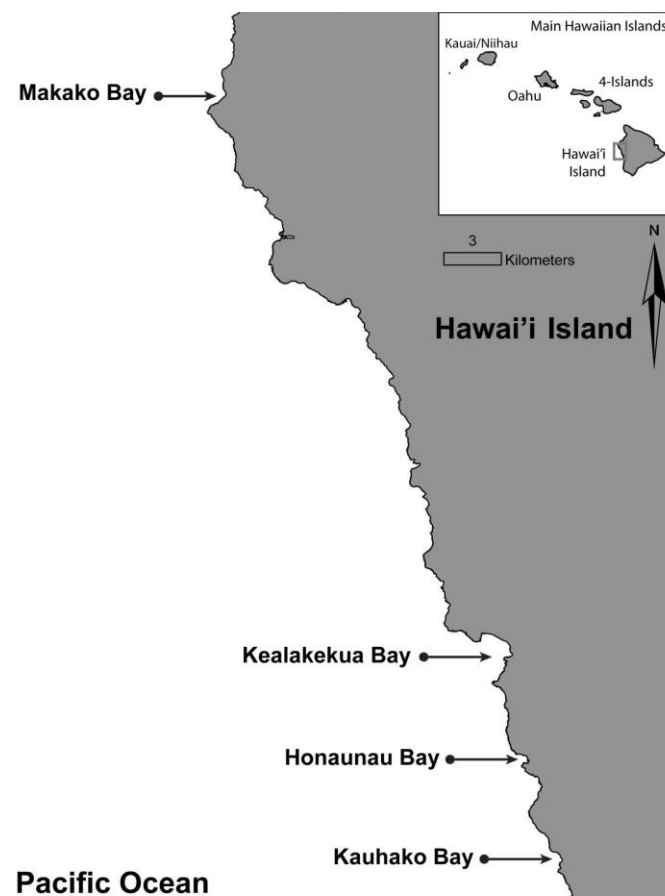
Island	Year	Months	N	95% CI
Kaua'i	2005	Oct-Nov	601	407-887
O'ahu	2002	Jun-Jul	160	121-211
O'ahu	2007	Jul-Sep	355	300-420
Hawai'i	2003	May-Jul	790	571-1092
Hawai'i	2005	Jan-Mar	280	186-421
Hawai'i	2006	Jan-Mar	205	149-281



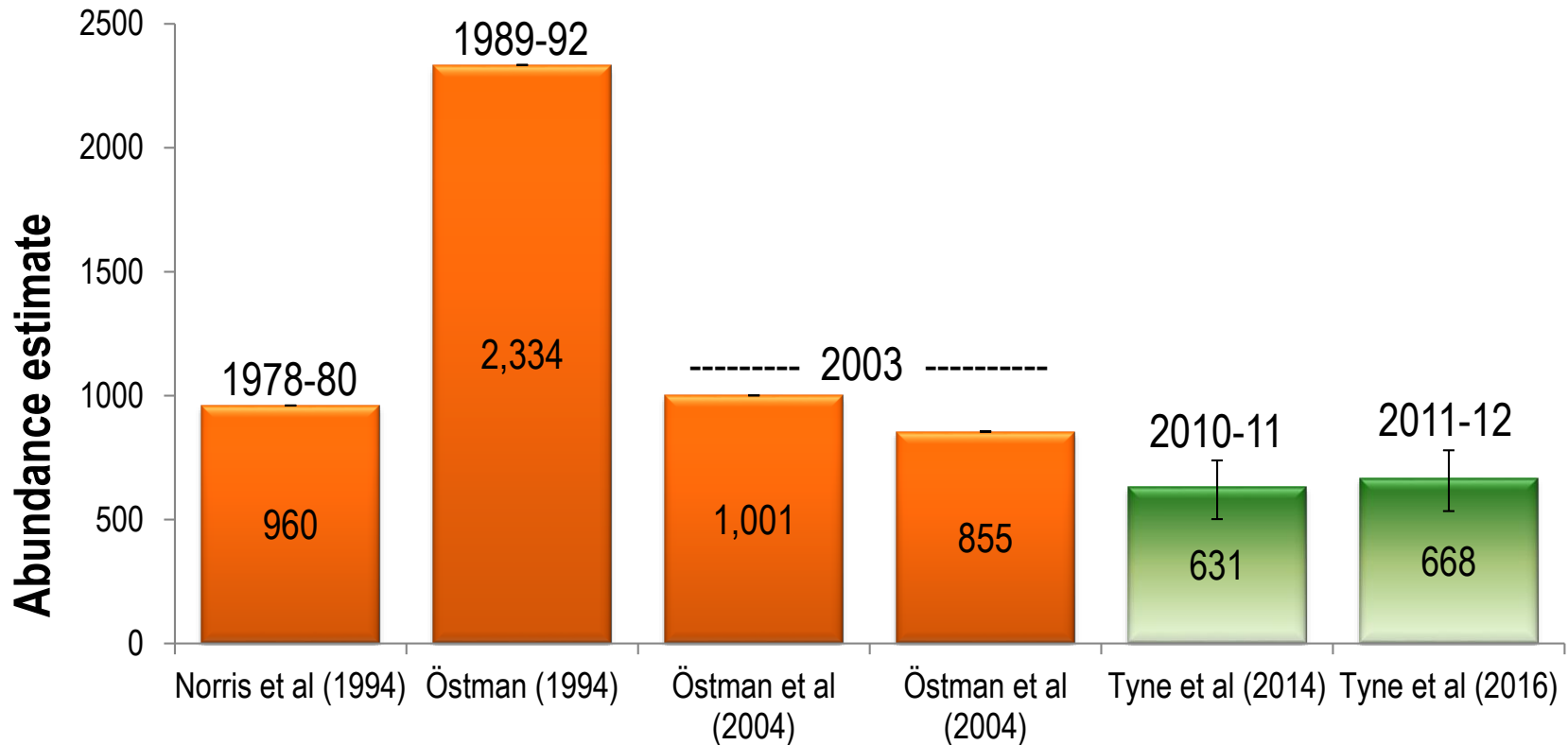
# SAPPHIRE Dataset

- Study area: leeward Kona Coast, Hawai'i Island
- Known as important resting bays for spinner dolphins (Thorne *et al.* 2012. PLoS One)
- Systematic boat-based photo-id surveys
  - Two-years (276 survey days)
  - Year-round, began September 2010
  - Consistent effort
- Two consecutive within-year mark-recapture estimates

Year	N
2010-11	631
2011-12	668



# SAPPHIRE estimates relative to prior assessments




Tyne *et al.* 2014 PLoS ONE  
Tyne *et al.* 2016 Biological Conservation



# Current Population Estimates

Stock	Population size	Nmin	PBR	Trend	Year of most recent data
Kaua'i/Ni'ihau	601 (CV= 0.20)	509	N/A	Unknown	2005
O'ahu/4-Islands	335 (CV = 0.09)	329	N/A	Unknown	2007
Hawai'i Island	665 (CV = 0.09)	617	6.2	Unknown	2011-12



No quantitative analyses to date.  
Prior studies had different study area  
& did not include year-round surveys



# Known Human-caused Mortality or Serious Injury (since 2005)

Stock	Description	Year
O'ahu/4-Islands	Alive at sea. Entangled in fishing gear.	2006
	Alive at sea. Hook embedded in lower jaw & through the tongue, preventing the dolphin from closing its mouth.	2009
	Alive at sea. Plastic bag through its mouth and wrapped behind head/in front of dorsal.	2013
	Alive at sea. Entangled in line around rostrum and extending behind pectoral flipper.	2014
Hawai'i Island	Alive at sea. Entangled in fishing line.	2005
	Alive at sea. Entangled with twine netting around rostrum and trailing down side. Swimming behind the group & may not have been able to open its mouth.	2011
	Alive at sea. Observed with a ring of debris around its rostrum preventing mouth from opening. Dolphin was slightly emaciated.	2012
	Alive at sea. Dolphin trailing 300ft+ of line, including float, glowstick, and hook. Swimmer removed bulk of trailing gear, with a few wraps remaining around the tail, trimmed close.	2013
	Stranded dead. Entangled in netting around rostrum and peduncle. Death likely result of drowning due to entanglement	2014
	Alive at sea. Unidentified line wrapped around rostrum likely restricting feeding.	2014
	Alive at sea. Single tight wrap of braided polyethylene line cutting into tail stock, trailing ~50ft of line. Diver cut trailing line to 6'.	2016



Pacific Islands Region Marine Mammal Response Network & Hawaiian Islands Entanglement Response Network

# Current NMFS Efforts to address assessments and disturbance

In 2018 PIFSC convened a small work group (PIFSC, PIRO, HIMB, Sanctuary) to develop a research program to address two high priority topics:

1. Generate stock-wide abundance estimates for each of the MHI island-associated stocks, with Hawaii Island and Oahu/4-Islands stocks being highest priority.
2. Assess the impact of swimming-with and approaching spinner dolphins relative to the overall health of the spinner dolphin population at each focal island, and therefore the impact of a 50-yard approach (or alternative) rule on population health

# Four priority projects

1. Line-transect abundance surveys at Hawai'i Island, O'ahu, and in the Maui Nui region
  - Rapid assessment using passive acoustic devices to aid survey design
  - Design to incorporate photo-ID and sampling in previously un-sampled regions
  - Leverage NOAA vessel resources when possible
2. Examine occurrence and time spent resting before and after the rule is implemented using passive acoustic monitoring
  - Monitoring underway at Hawai'i Island, O'ahu, and in the Maui Nui region
3. One-year follow up to SAPPHIRE to provide new mark-recapture estimates for the Kona coast prior to final rule implementation.
4. Examine age-structure to evaluate whether each population has a stable and healthy age distribution using UAS-based photogrammetry
  - PCOD research has identified deviations in age structure, including reduced juvenile survival, as important metrics for assessing impacts of disturbance
  - UAS photogrammetry calibration currently underway at Sea Life Park and Dolphin Quest.



