

What studies in the main Hawaiian Islands can tell us about the whales and dolphins of Papahānaumokuākea

Robin W. Baird

Cascadia Research Collective, Olympia, WA, USA



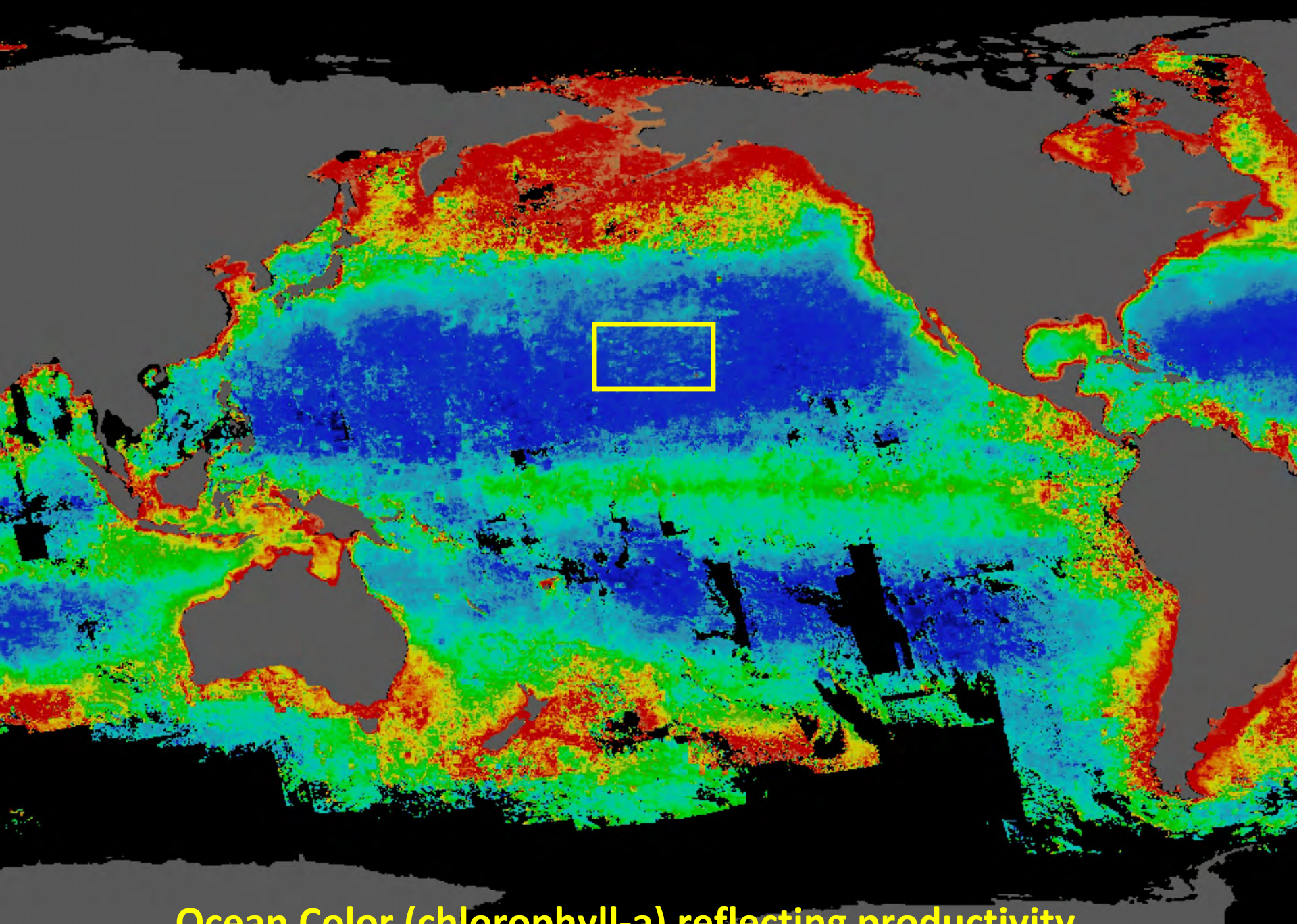
MHI Cascadia team

- Sabre Mahaffy
- Annie Gorgone
- Jordan Lerma
- Brittany Guenther
- Colin Cornforth
- Alex Vanderzee
- Annette Harnish
- Daniel Webster
- Kim Wood
- David Anderson
- Michaela Kratofil
- many collaborators
- a lot of citizen scientists!

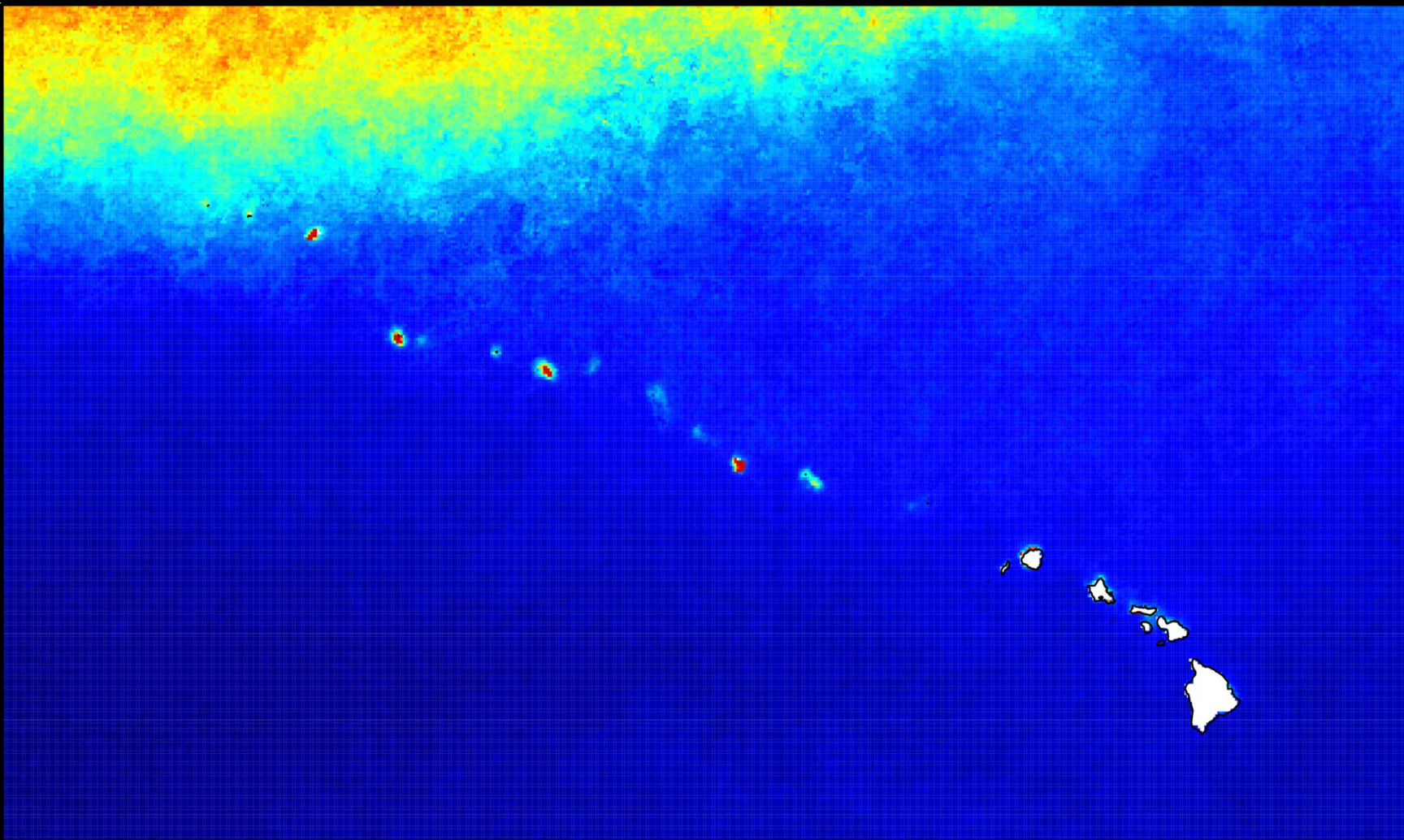
NWHI researchers

- Erin Oleson, Kym Yano, Marie Hill, Amanda Bradford and others from NOAA Pacific Islands Fisheries Science Center
- Jay Barlow, Jeff Moore and others from NOAA Southwest Fisheries Science Center
- Marc Lammers, OSI & Hawaiian Islands Humpback Whale National Marine Sanctuary

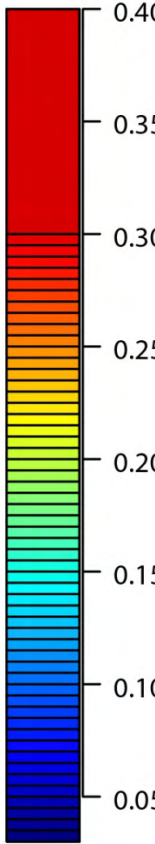




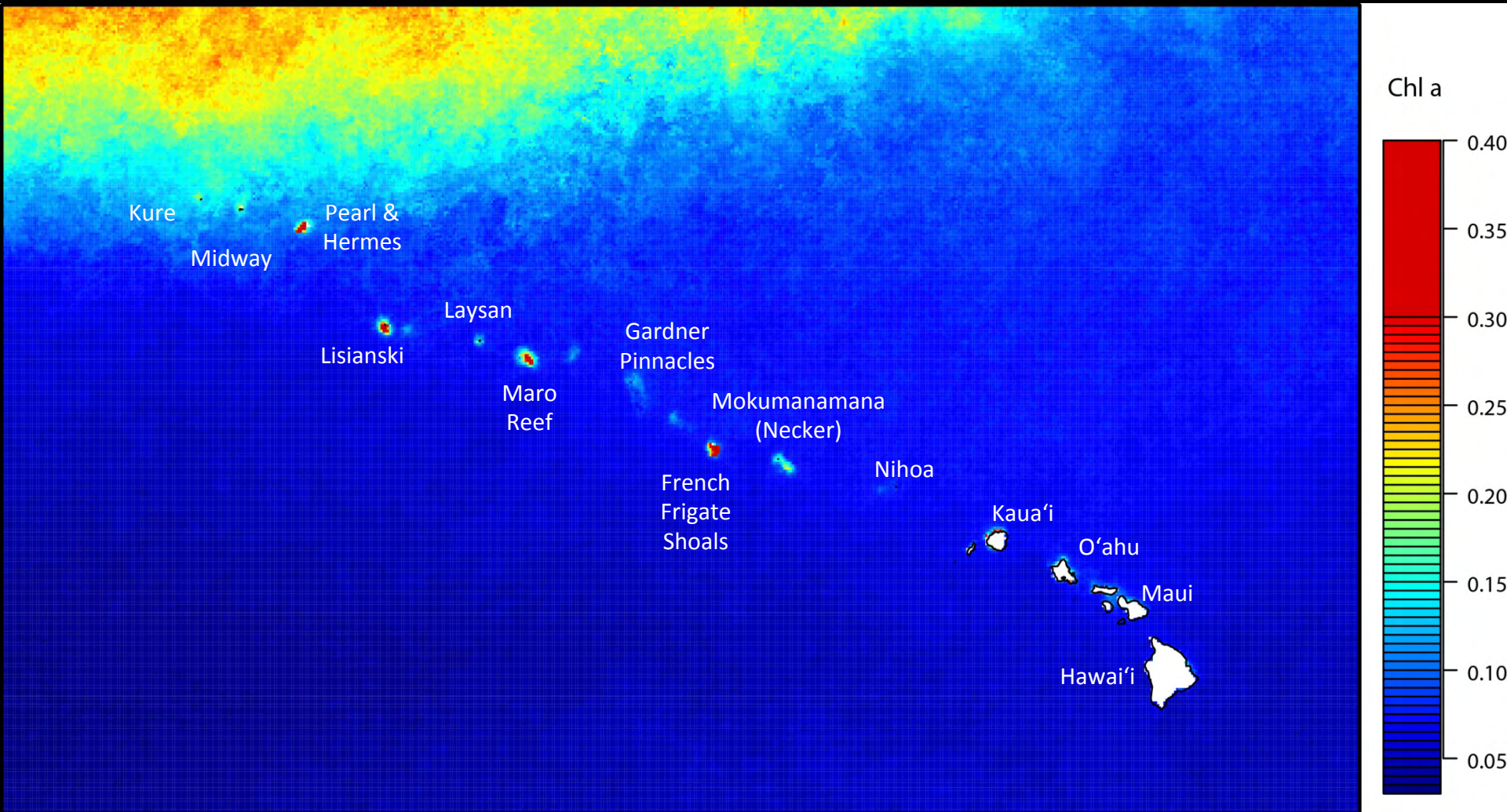
Ocean Color (chlorophyll-a) reflecting productivity



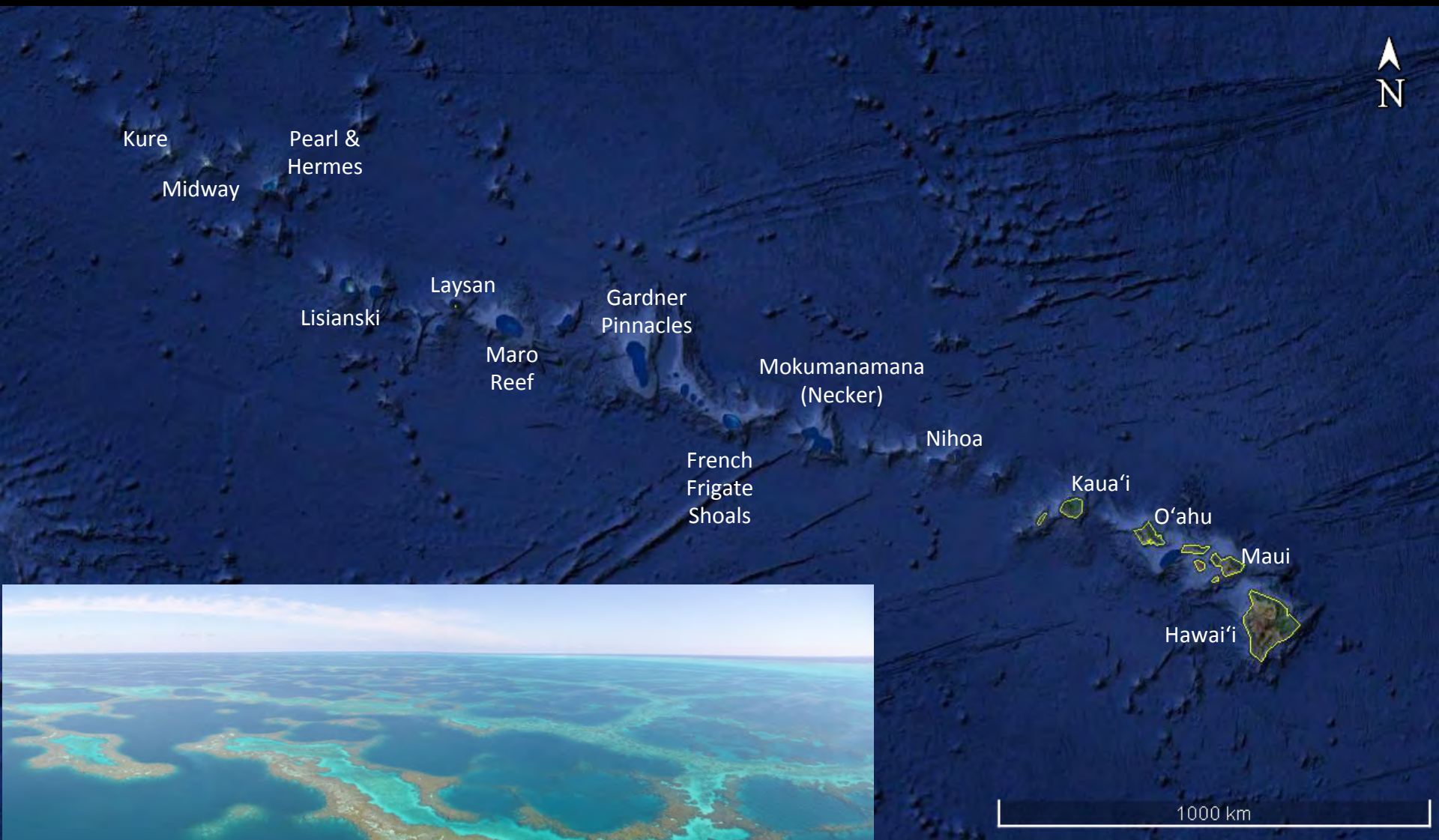
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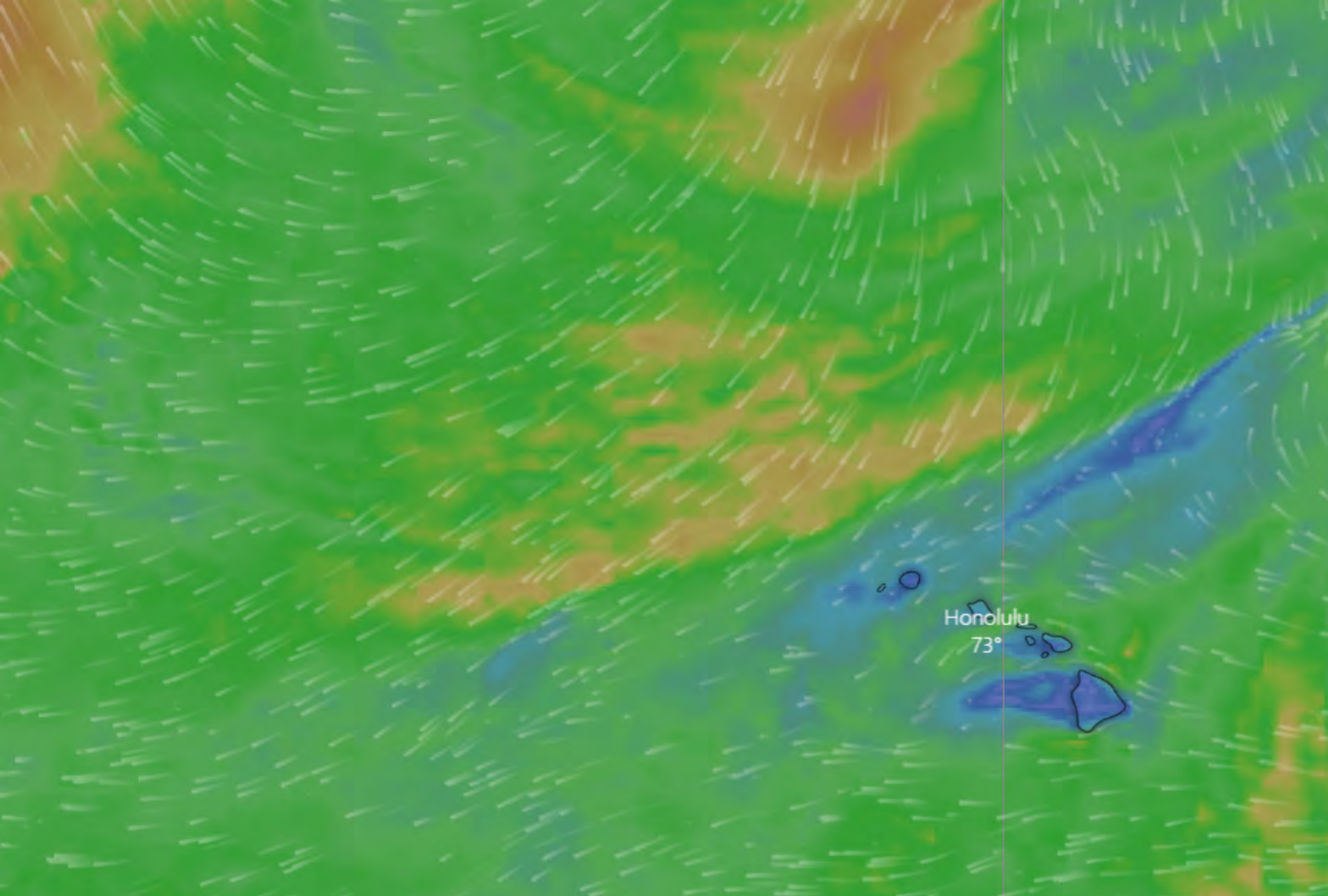


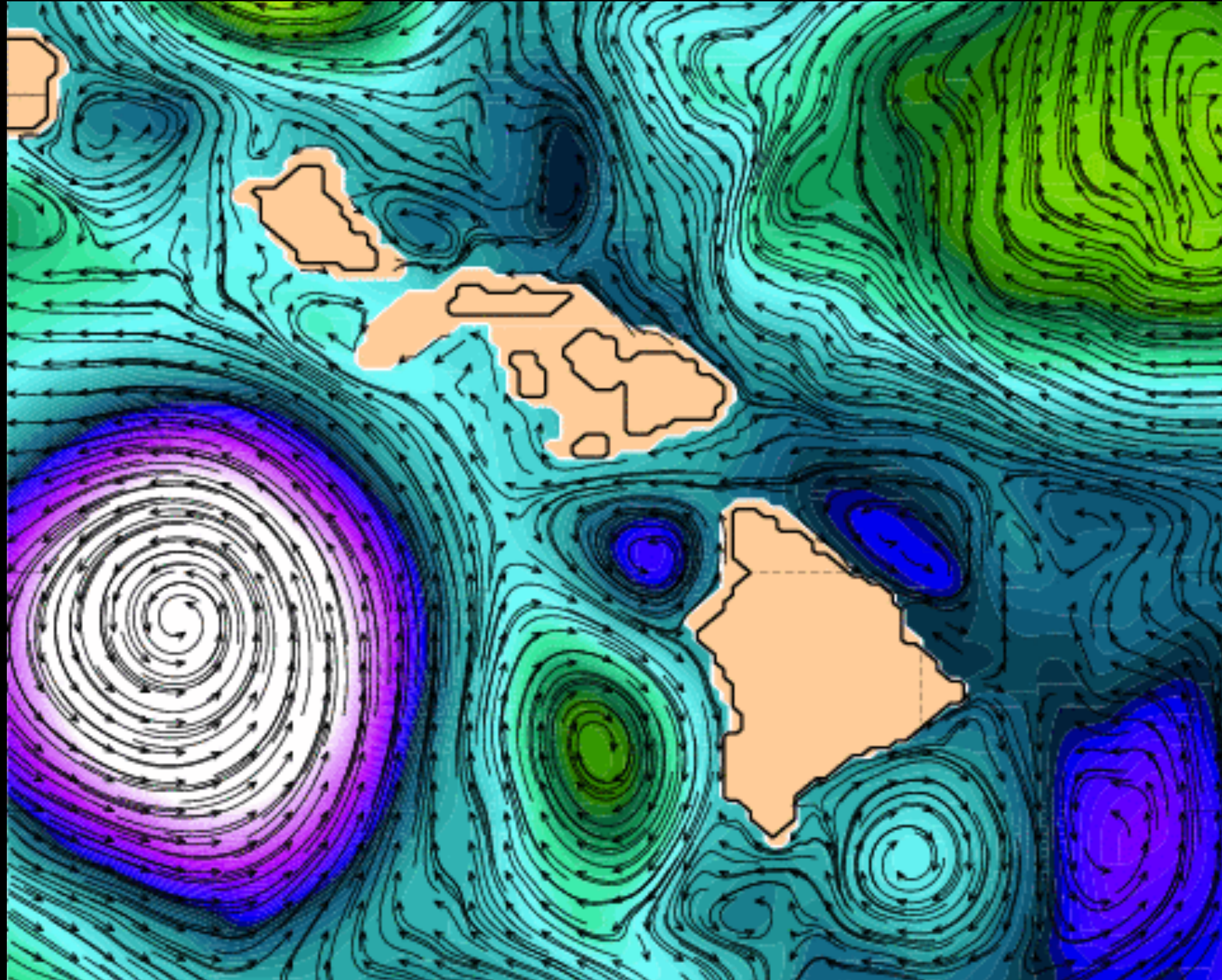
Ocean Color (chlorophyll-a) reflecting productivity



Ocean Color (chlorophyll-a) reflecting productivity

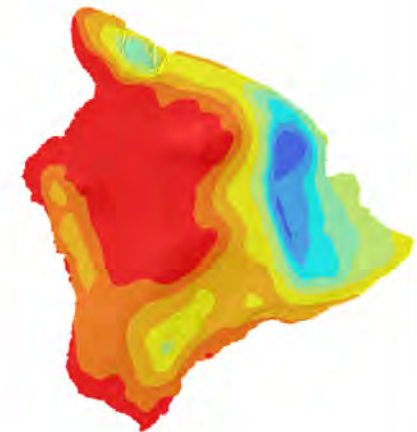
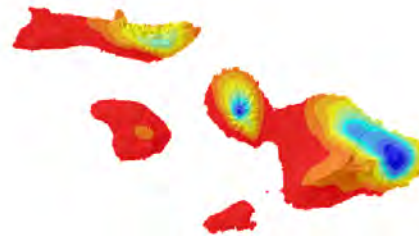
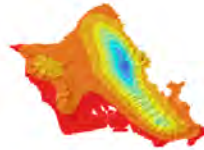
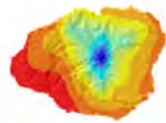




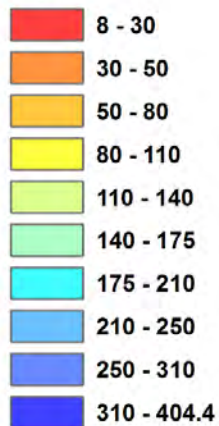


Mean Annual Rainfall State of Hawai'i

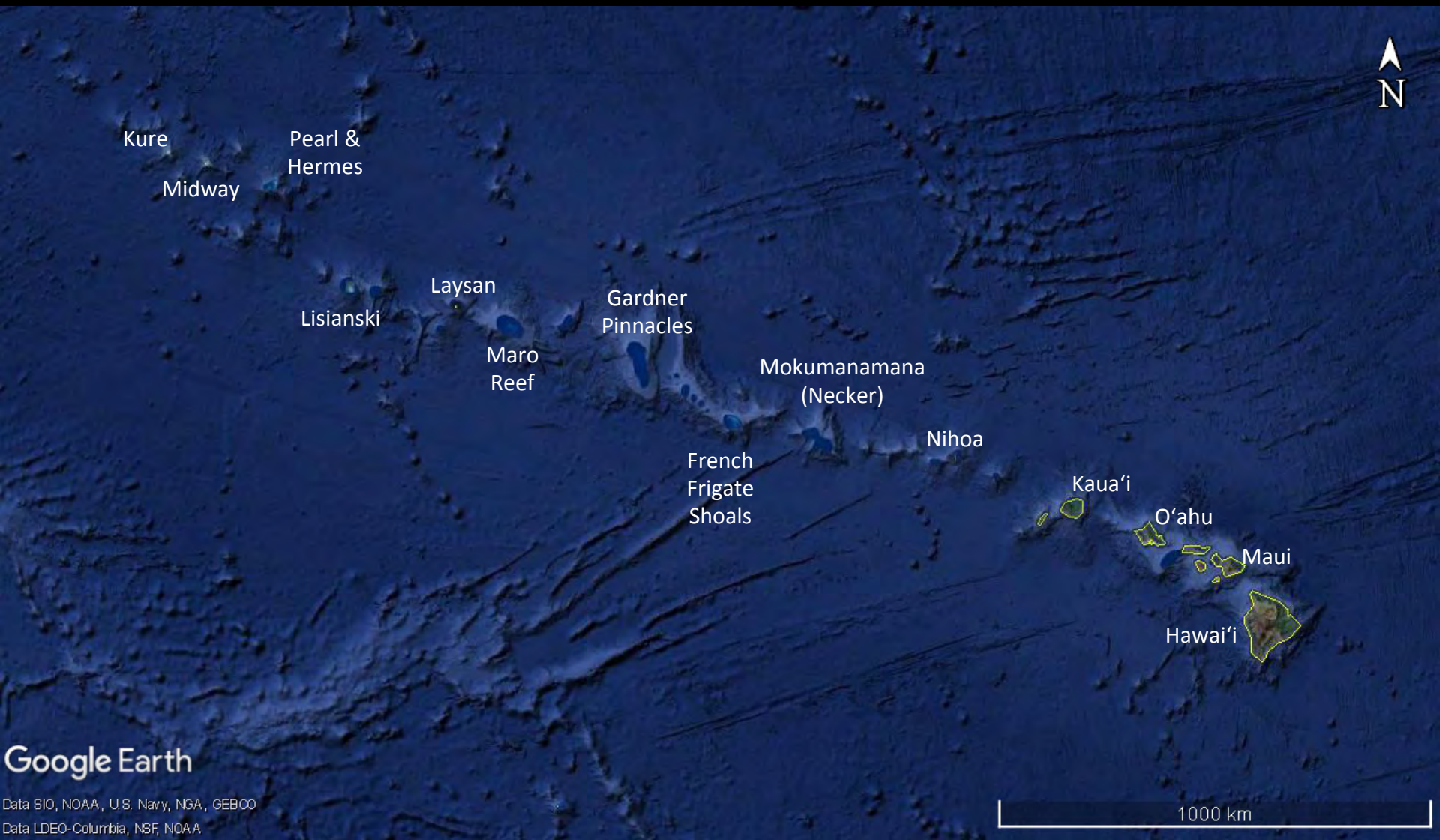
2013 Rainfall Atlas of Hawai'i
Department of Geography, University of Hawai'i at Mānoa



Annual Rainfall (inches)



Rainfall at Midway Atoll averages ~39"



More shallow water (<200 m) habitat in NWHI than MHI





Common bottlenose dolphin



© Jordan K. Lerma/Cascadia Research

False killer whale



© Robin W. Baird/Cascadia Research

Pantropical spotted dolphin



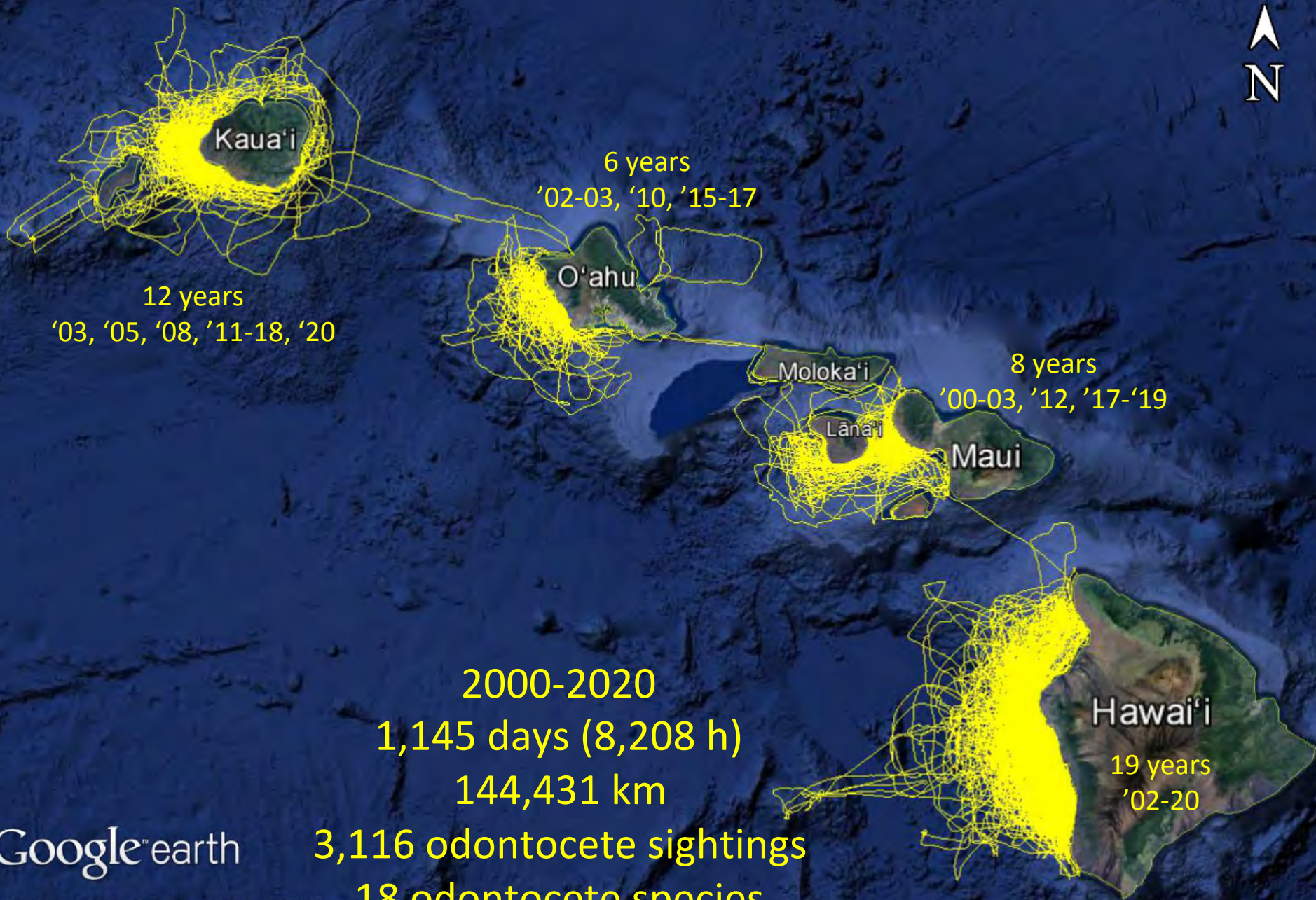
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(c) Galen Craddock







Google™ earth

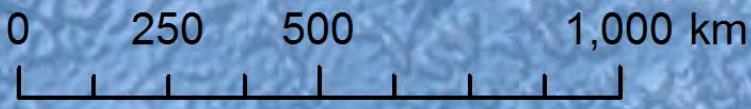
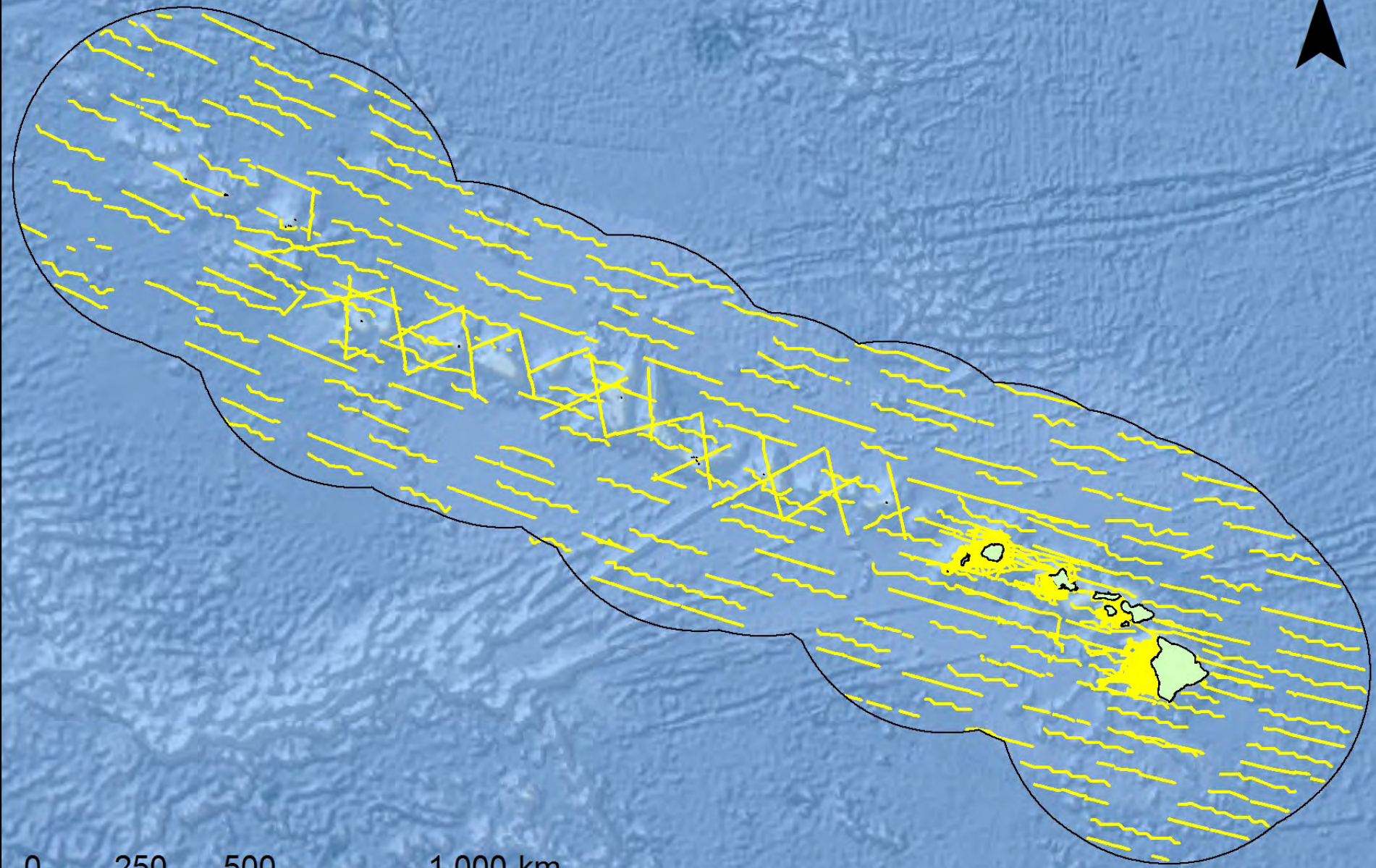
Data SIO, NOAA, U.S. Navy, NGA, GEBCO

Data LDEO-Columbia, NSF, NOAA

Image Landsat / Copernicus



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Baird 2016





Paula Olson, NOAA PIFSC

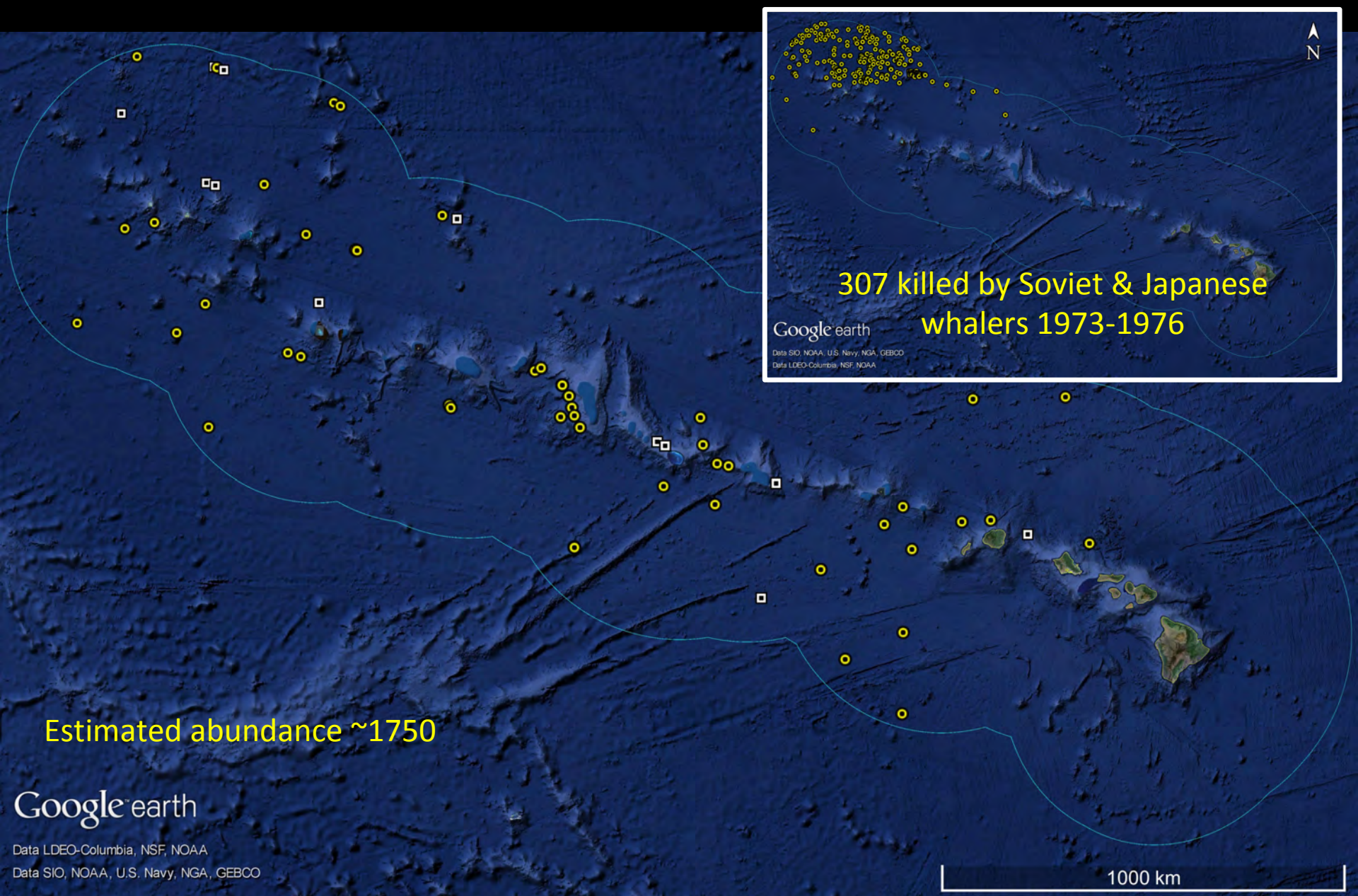


NOAA PIFSC



© Doug Perrine





Sightings of Bryde's whales (yellow) and Bryde's/sei whales (white)

Abundance from Bradford et al. 2017. Fishery Bulletin 115:129-142

Baird 2016



© Tom Jefferson

NE of O'ahu November 2007



~2/3 of warm (>21.1°C) shallow (<200 m) habitat in the NWHI



Kure
Midway

Pearl &
Hermes

Laysan
Lisianski

Maro
Reef
Gardner
Pinnacles

Necker

French
Frigate
Shoals

Nihoa

Kaua'i

O'ahu

Maui

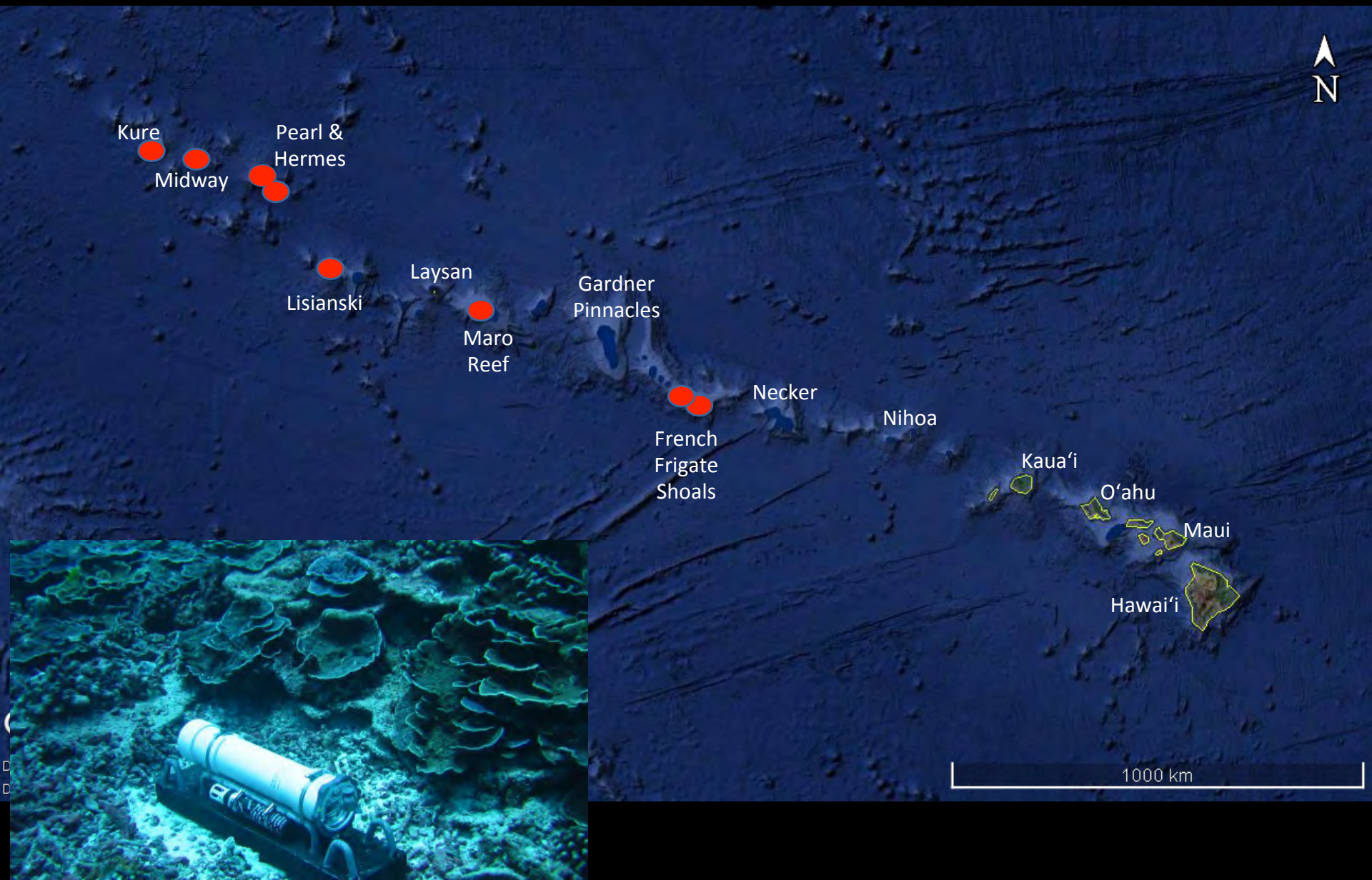
Hawai'i

Google Earth

Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Data LDEO-Columbia, NSF, NOAA

1000 km

Johnston et al. 2007. Identification of humpback whale wintering habitat in the Northwestern Hawaiian Islands using spatial habitat modeling. *Endangered Species Research* 3:249-257.



Lammers et al. 2011. Humpback whale song reveals wintering activity in the Northwestern Hawaiian Islands. *Marine Ecology Progress Series* 423:261-268.

Spring survey reveals large numbers of humpback whales in the Northwestern Hawaiian Islands

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¹Joint Institute for Marine and Atmospheric Research, University of Hawai'i, Honolulu HI, USA

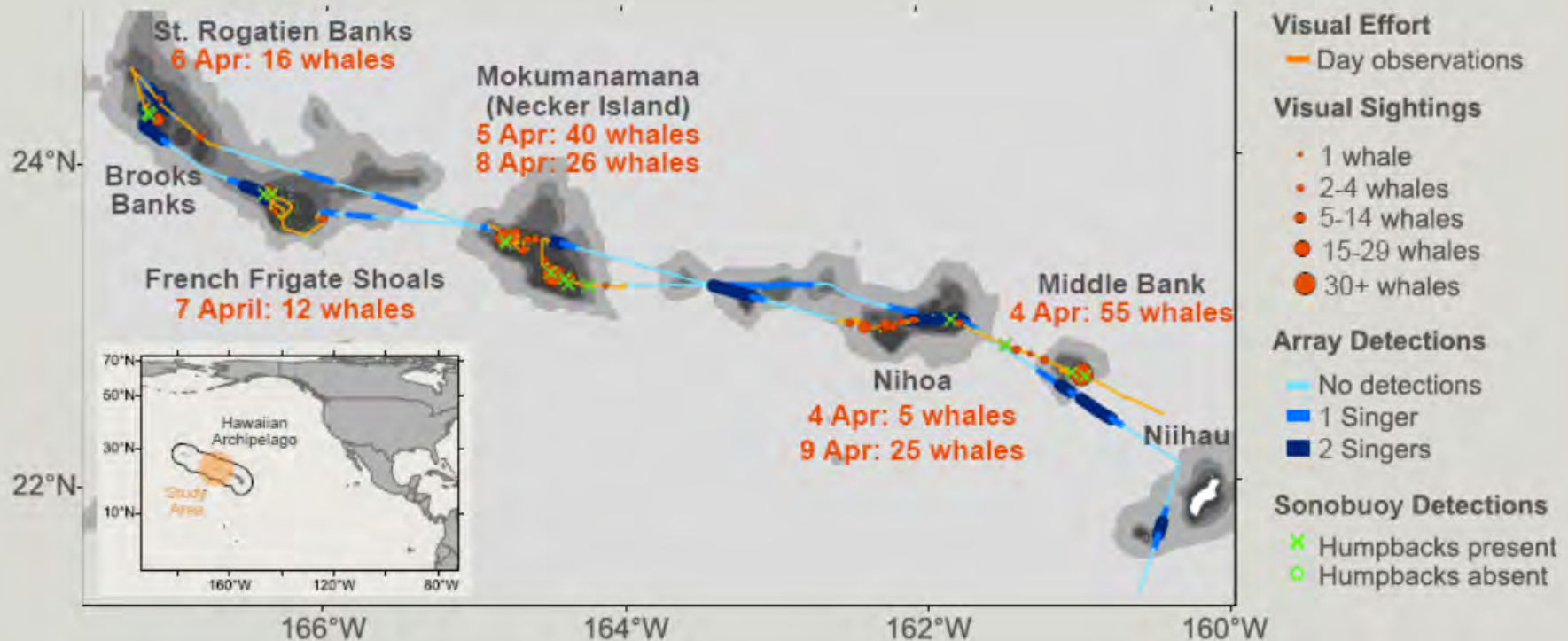
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During 4-9 April 2019, we sighted ~180 humpback whales in the Northwestern Hawaiian Islands.



Spring survey reveals large numbers of humpback whales in the Northwestern Hawaiian Islands



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FLUKE MATCHES *so far*



2019: Middle Bank
2018: Salish Sea - between Victoria BC, Canada and Washington, USA
(Katie Elyn Smith via HappyWhale.com)



2019: St. Rogatien Banks
2011: Commander Islands, Bering Island, Russia
(Russian Cetacean Habitat Project via HappyWhale.com)



2019: Nihoa
2002 and 2007: Shumagin Islands, Alaska, USA
(UASF Marine Advisory Program via HappyWhale.com)

Eight (8) unassociated individuals seen during our 2019 survey were previously sighted near Maui HI between 2005 and 2017.



4 Apr: Middle Bank
9 Apr: Nihoa
(NMFS NOAA)



Mokumanamana (Necker Island)



Nihoa

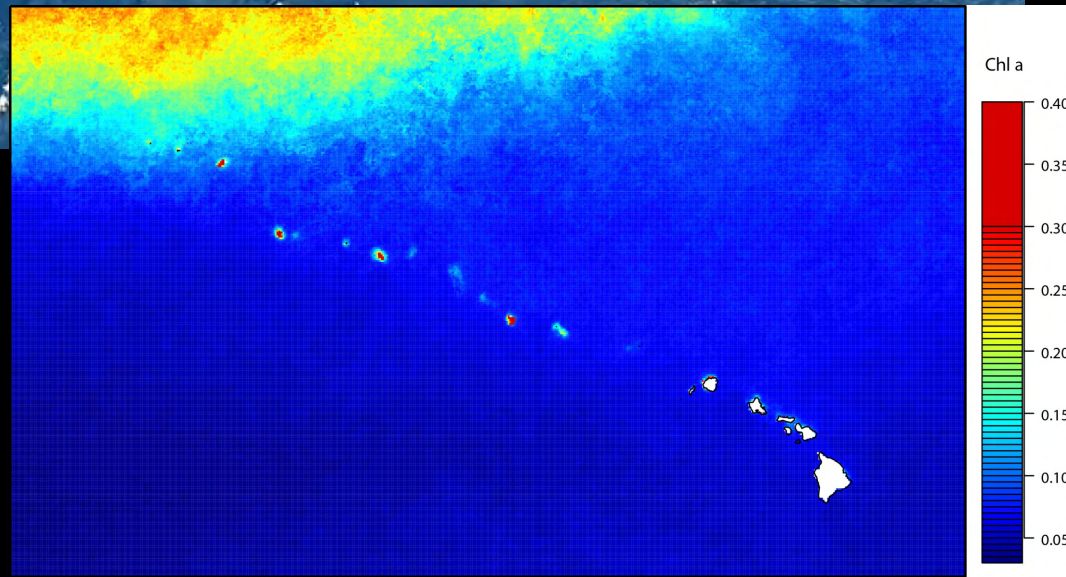
French Frigate Shoals

(University of Hawai'i at Hilo Marine Mammal Lab and HappyWhale.com contributors: Katie Elyn Smith, Keiki Kohola Project, Pacific Whale Foundation, Maui Adventure Cruises, Safari Boat Excursions Maui, and Whale Trust Maui)

Take a picture to download



Matching through happywhale.com and by Adam Pack



HAWAIIAN ODONTOCETES



Killer Whale
Orcinus orca



Sperm Whale
Physeter macrocephalus



False Killer Whale
Pseudorca crassidens



Dwarf sperm whale
Kogia sima



Pygmy sperm whale
Kogia breviceps



Cuvier's beaked whale
Ziphius cavirostris



Short-finned pilot whale
Globicephala macrorhynchus



Risso's dolphin
Grampus griseus



Longman's beaked whale
Indopacetus pacificus



Melon-headed whale
Peponocephala electra



Pygmy killer whale
Feresa attenuata



Fraser's dolphin
Lagenodelphis hosei



Striped dolphin
Stenella coeruleoalba



Rough-toothed dolphin
Steno bredanensis



Bottlenose dolphins
Tursiops truncatus



Blainville's beaked whale
Mesoplodon densirostris

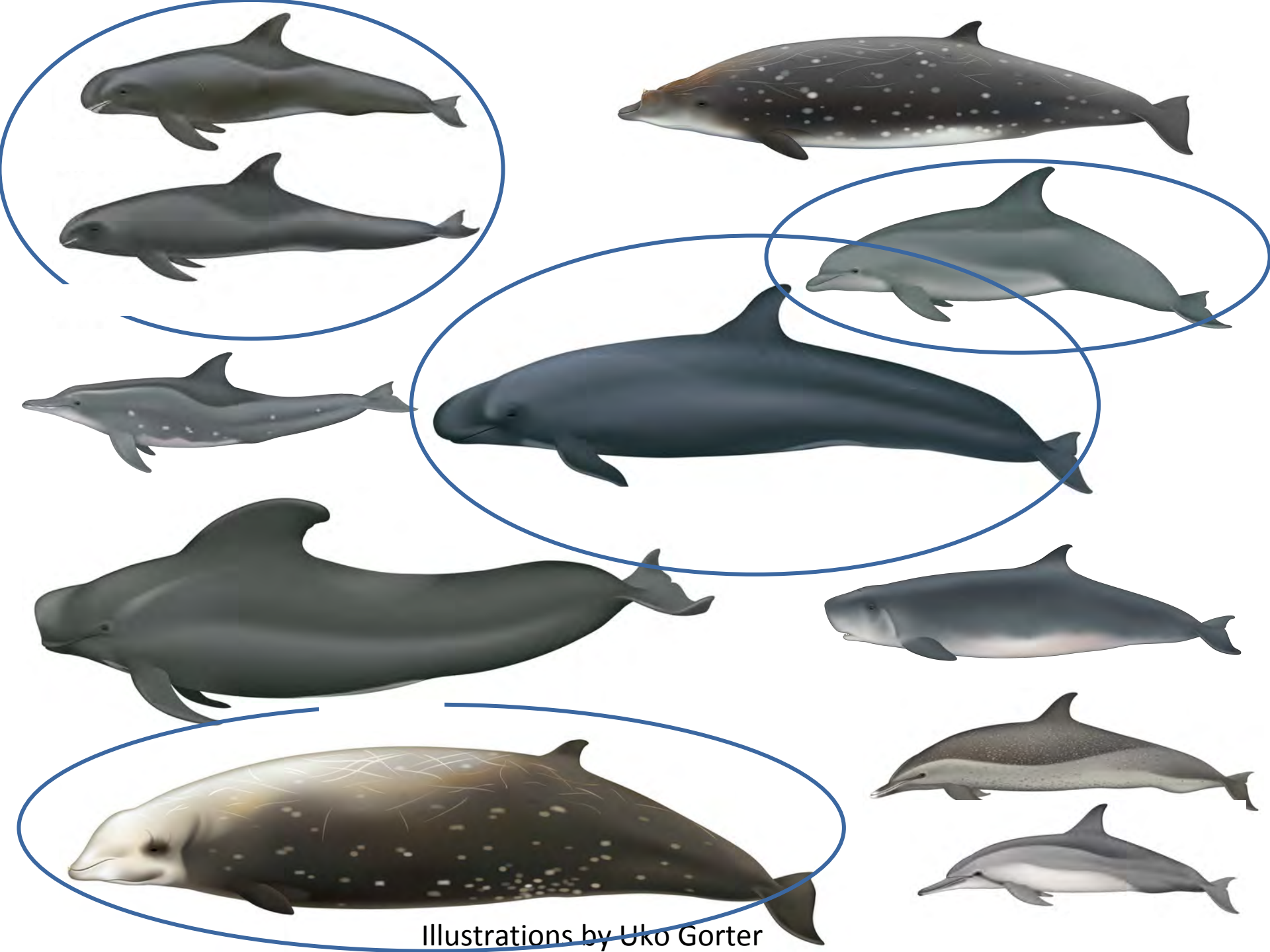


Spinner dolphin
Stenella longirostris



Pantropical spotted dolphin
Stenella attenuata

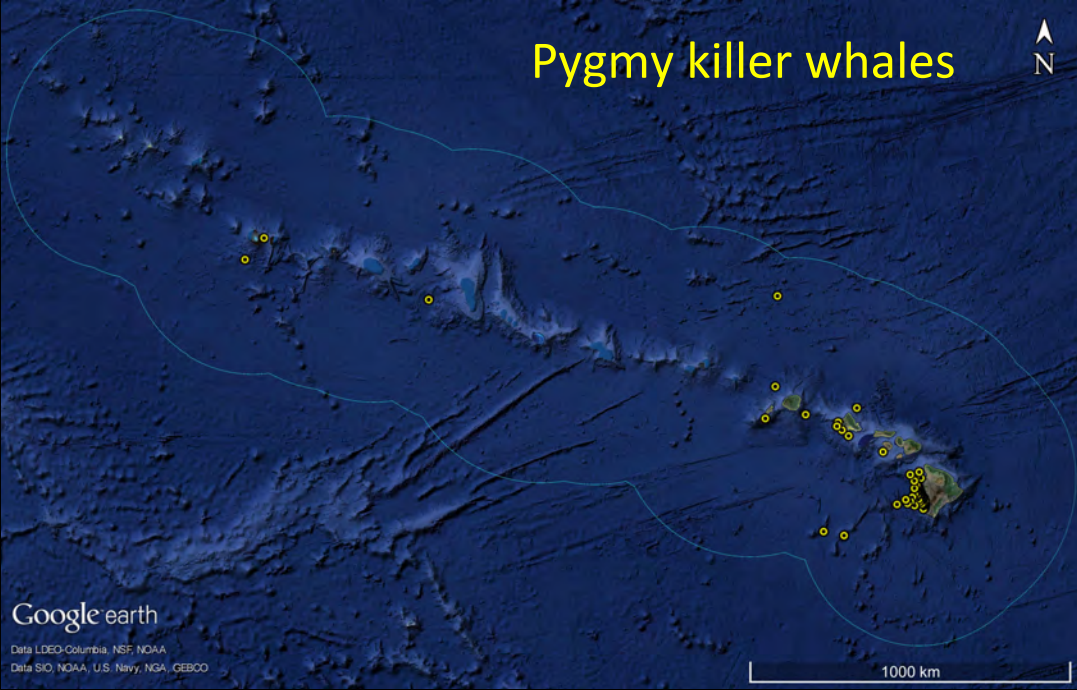




Illustrations by Uko Gorter



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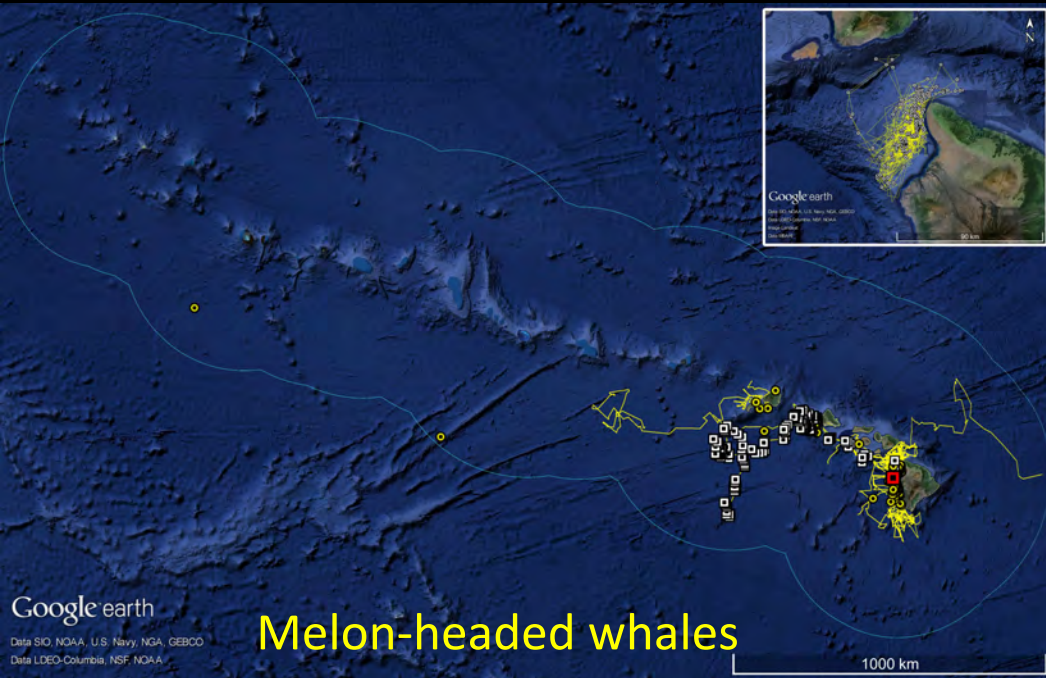


Pygmy killer whales

Google earth

Data LDEO-Columbia, NSF, NOAA
Data SIO, NOAA, U.S. Navy, NGA, GEBCO

1000 km



Melon-headed whales

Google earth

Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Data LDEO-Columbia, NSF, NOAA

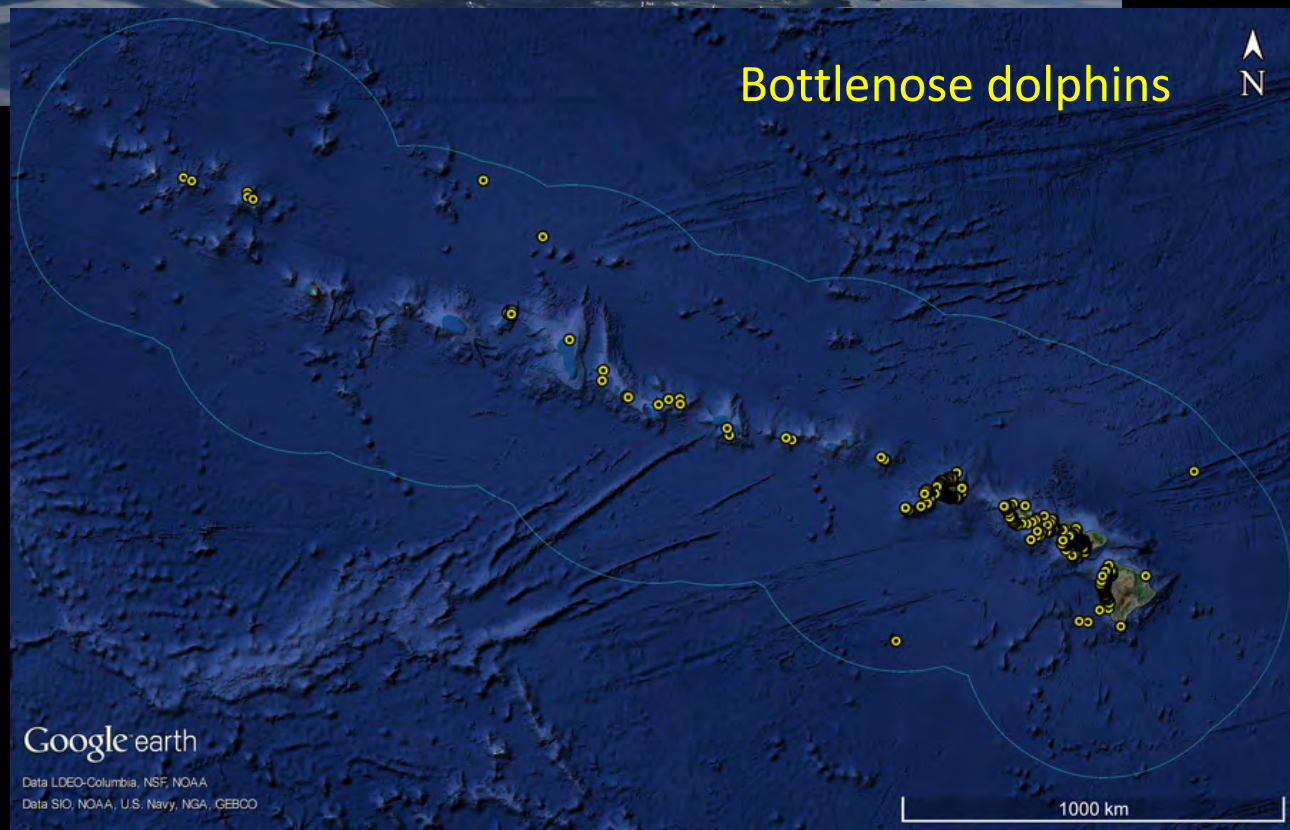
1000 km



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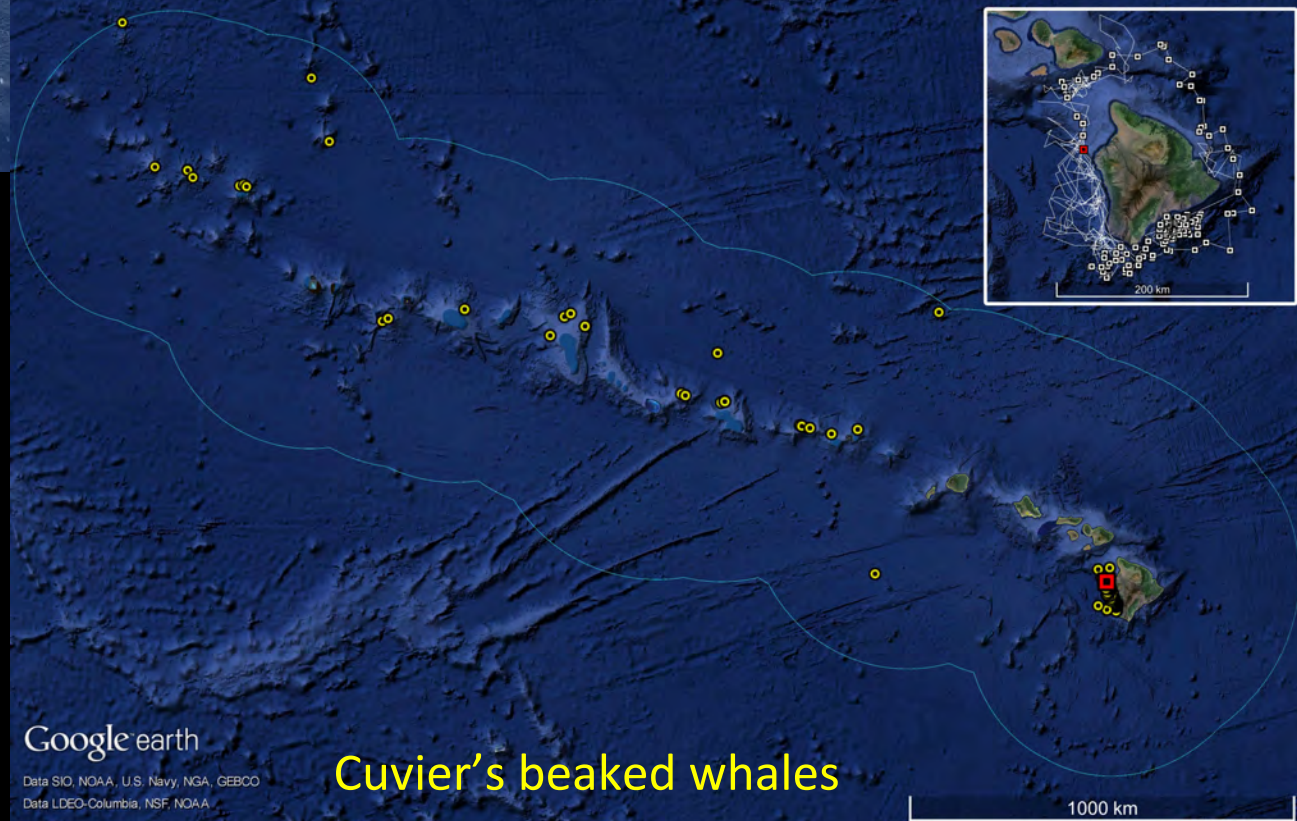
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Baird 2016



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Google earth

Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Data LDEO-Columbia, NSF, NOAA

Cuvier's beaked whales

Baird 2016

1000 km



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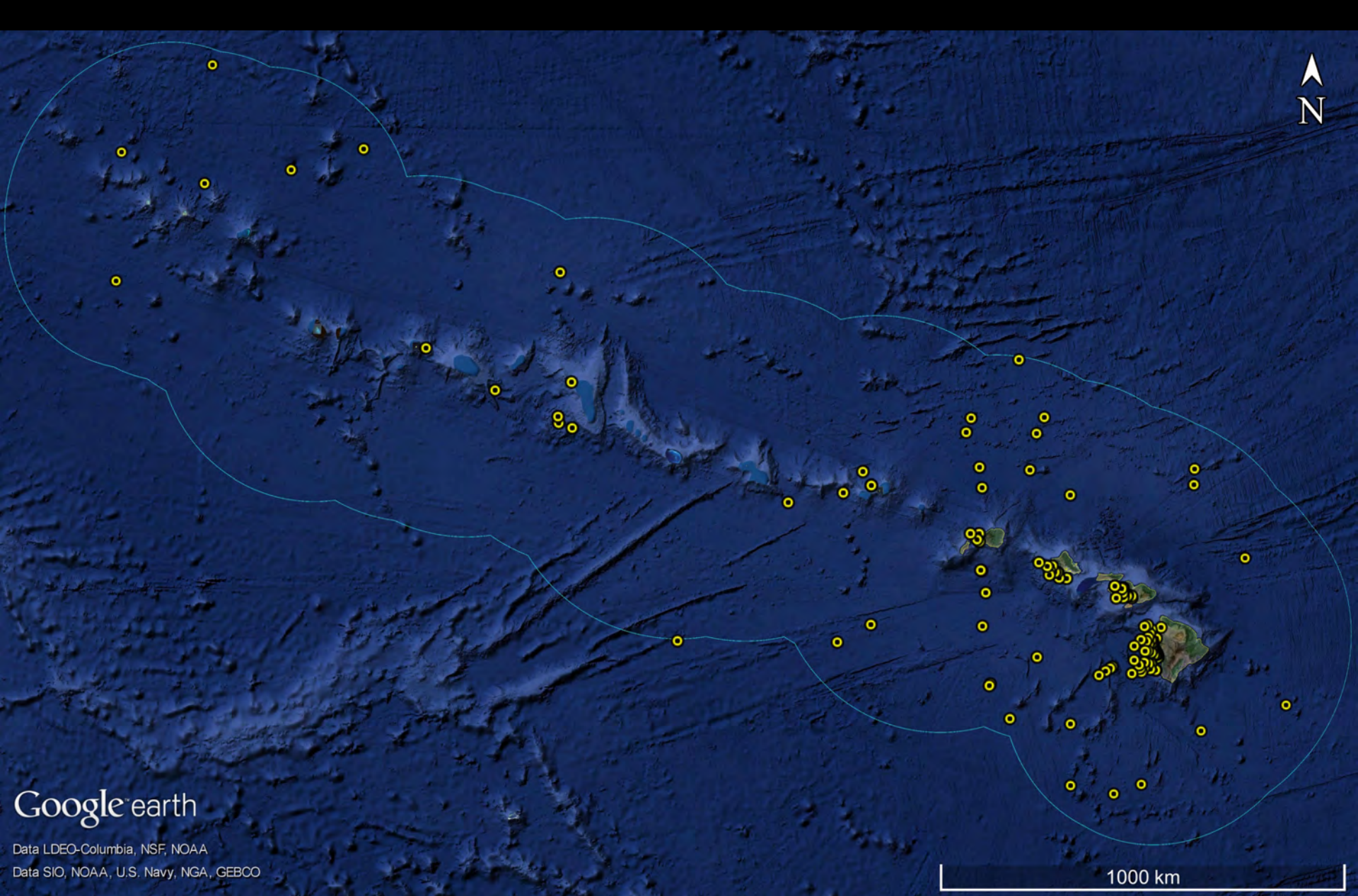
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© Chuck Babbitt



© Colin J. Cornforth



Google earth

Data LDEO-Columbia, NSF, NOAA
Data SIO, NOAA, U.S. Navy, NGA, GEBCO

1000 km

Baird 2016

main Hawaiian Islands insular population

- Estimated to number >400 individuals in 1980s
- Estimate in 2015 of ~167 individuals (Bradford et al. 2019)
- Petition by NRDC to list as endangered in 2010
- Listed as endangered in 2012



HIPc216 tagged off Kaua'i – 8 Oct 2014 to 25 Jan 2015



Google Earth

Data SIO, NOAA, U.S. Navy, NGA, GEBCO

Data LDEO-Columbia, NSF, NOAA

200 km

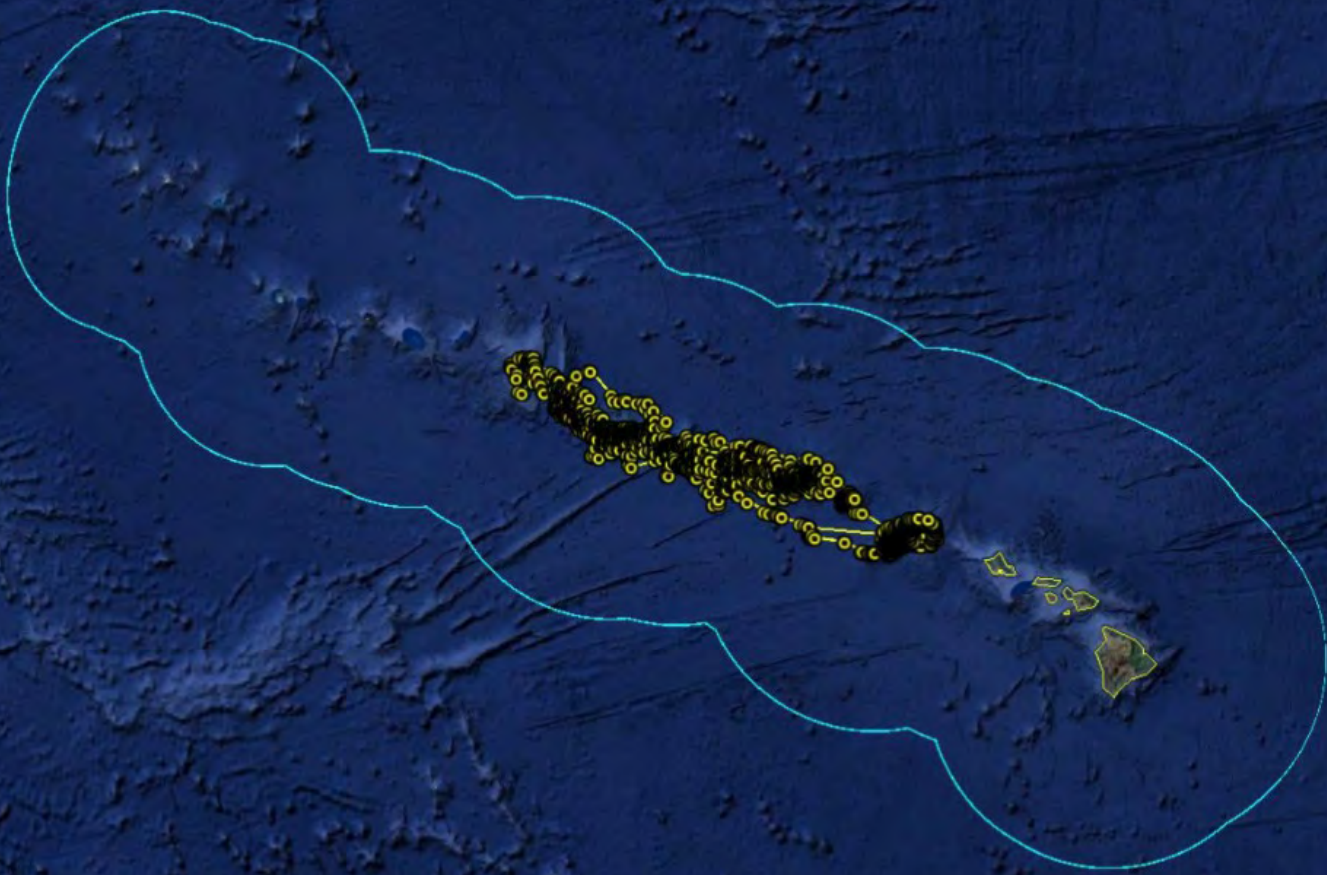


Google earth

Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Data LDEO-Columbia, NSF, NOAA



MHI population
n = 38 groups



Google earth

Data SID, NOAA, U.S. Navy, NGA, GEBCO
Data LDEO-Columbia, NSF, NOAA



NWHI population
n = 4 groups (data from CRC and PIFSC)

HIPc519 tagged off Kaua'i – 13 June to 25 July 2012



Gardner
Pinnacles

Mokumanamana
(Necker)

French
Frigate
Shoals

Nihoa

Kaua'i

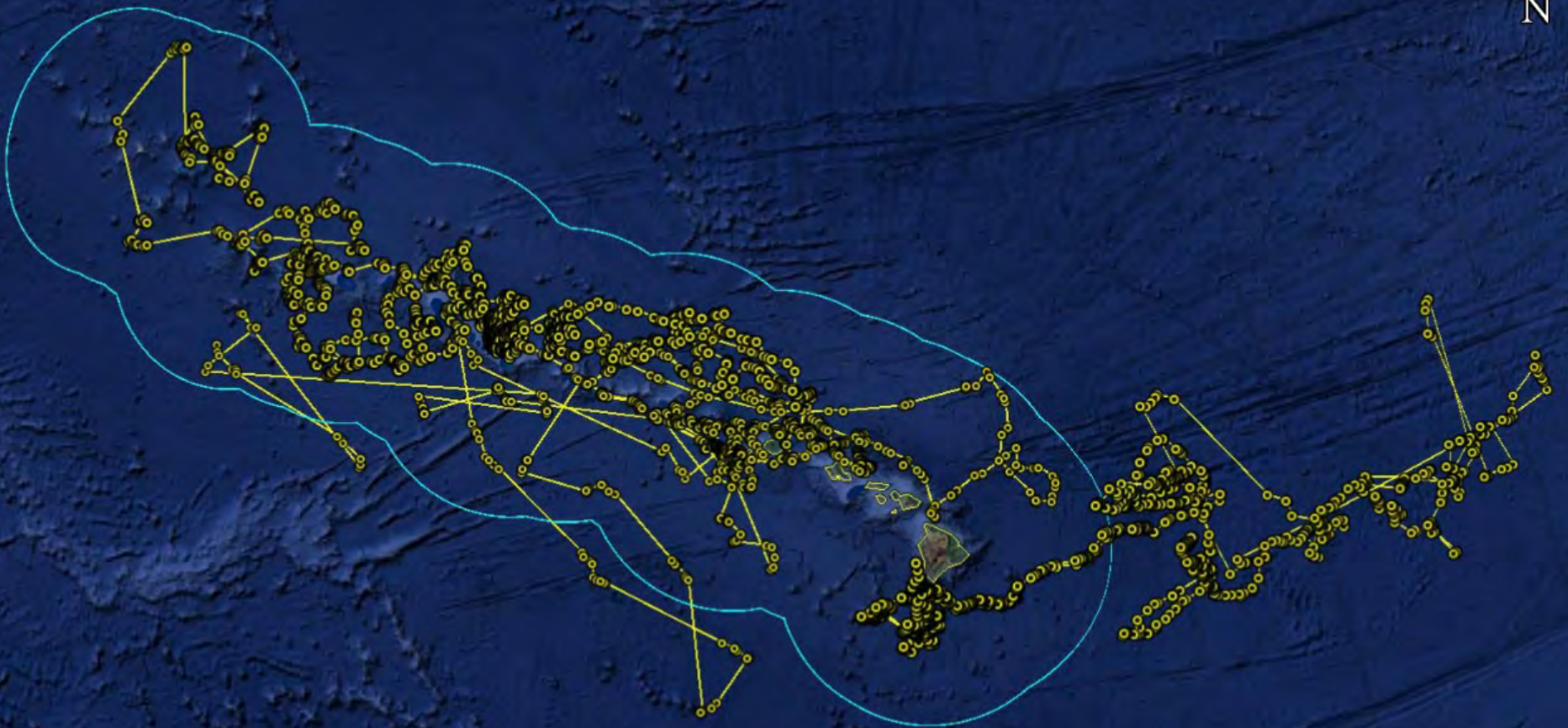
Google Earth

Data SIO, NOAA, U.S. Navy, NGA, GEBCO

Data LDEO-Columbia, NSF, NOAA

400 km





Google earth

Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Data LDEO-Columbia, NSF, NOAA

1500 km

Pelagic population
n = 4 groups (data from PIFSC and CRC)

- Some species (e.g., Bryde's whales) more likely to be found in the NWHI
- Some odontocetes that are resident to the MHI likely not resident in the NWHI (e.g., pygmy killer whales, melon-headed whales)
- Some species likely have resident populations in both areas, but need confirmation (Cuvier's beaked whales, bottlenose dolphins)
- False killer whales have island-associated resident populations in both MHI and NWHI



Got photos? Contact us at Hawaii@cascadiaresearch.org



Publications



Field projects