Kure Atoll Management

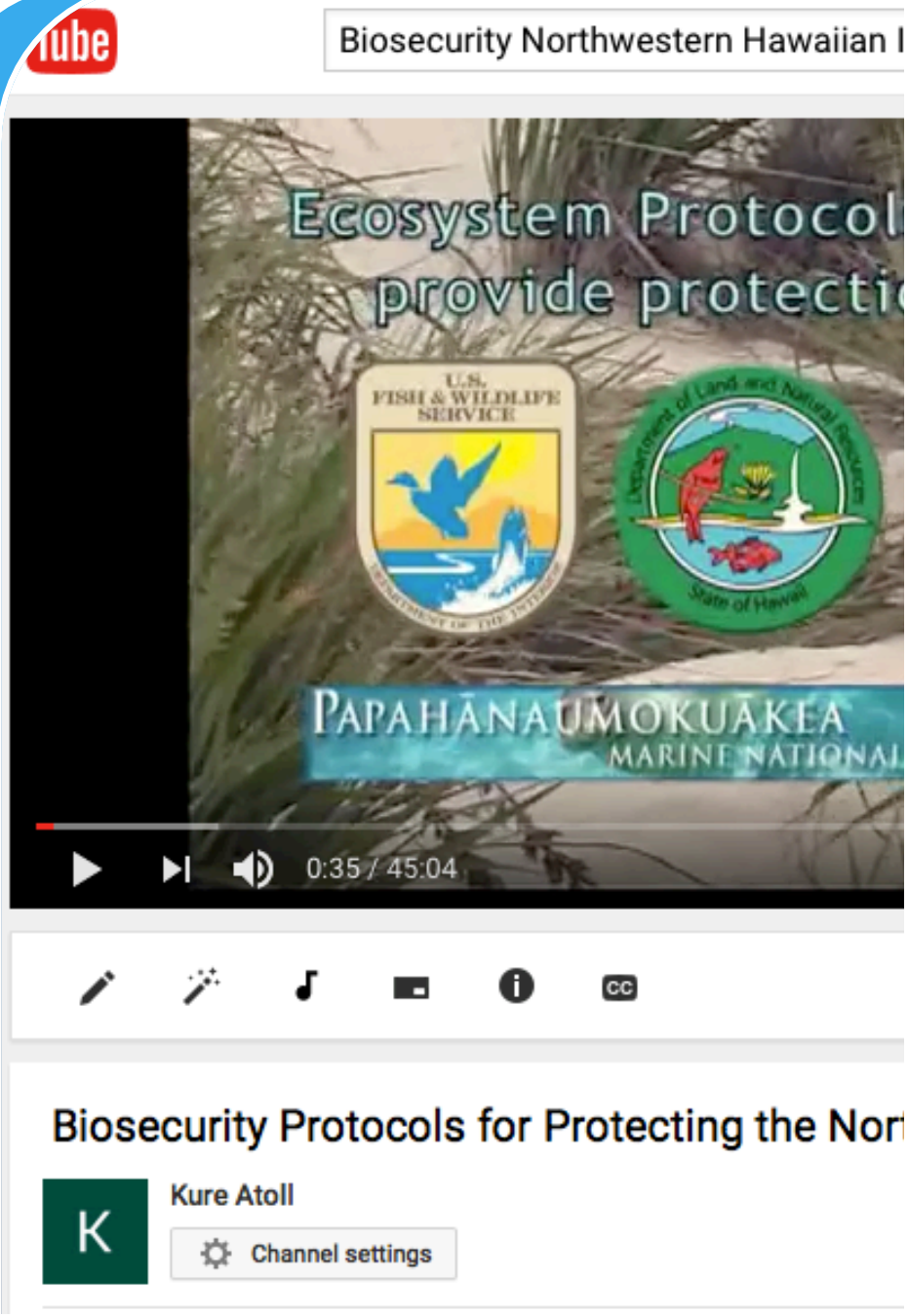
DLNR Department of Land and Natural Resources July2017

Alien Species

Strategy for Managing Invasive Species

5 levels of action

(1) Prevention
(2) Risk assessment and prioritization
(3) Chemical and physical control or eradication
(4) Restoration
(5) Monitoring to evaluate success and aid in adaptive management



Strict Biosecurity

The goal of this training video is to educate the viewer regarding the issues of invasive species by presenting both the biosecurity procedures that protect the ecosystem and the dire consequences of introducing new species to the region.

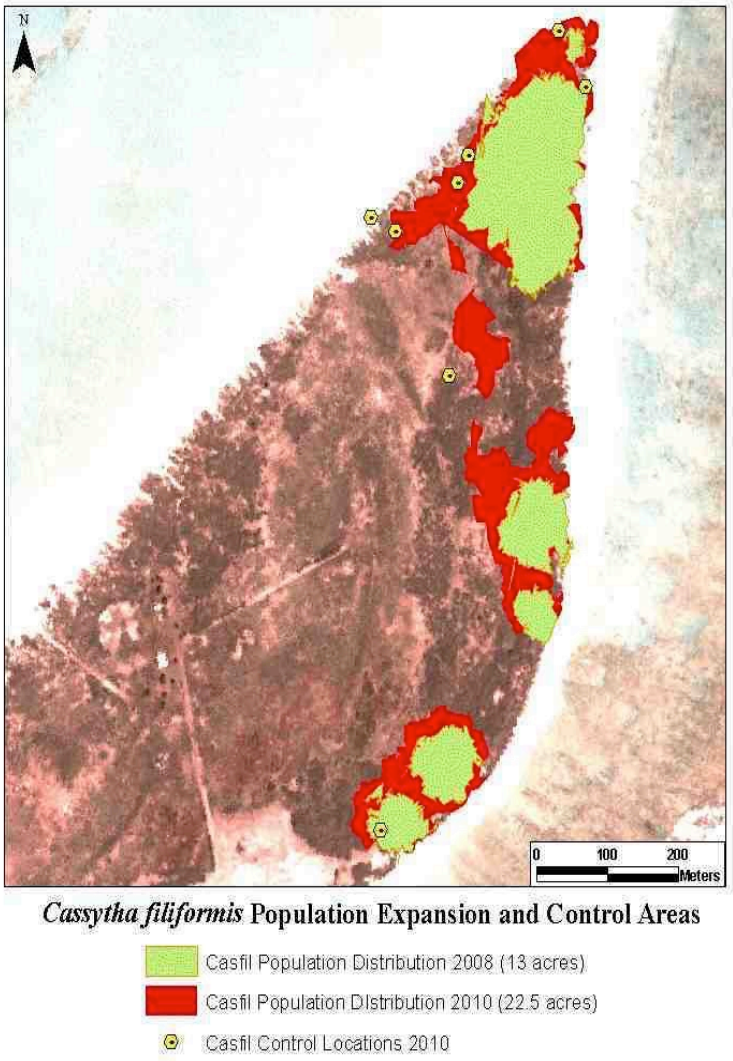
Top 3 Invasive Plants Slated for Eradication on Kure

1) *Heliotropium foertherianum*

2) *Cassytha filiformis*

3) *Verbesina encelioides*

Why? Because these plants have the potential to drastically decrease ecosystem function



Top Eradication Priority *Cassytha Filiformis*

- parasitic vine potential to kill every plant on Kure.
- In 10 years it expanded its range from 10 to 30 acres.
- Range is now contained and all new infestations are removed.
- Could spread to other NWHI by Bristle-thighed Curlews that eat seeds

Dead naupaka branches after Cassytha infestation

Cassytha infesting naupaka in beach dune causing erosion

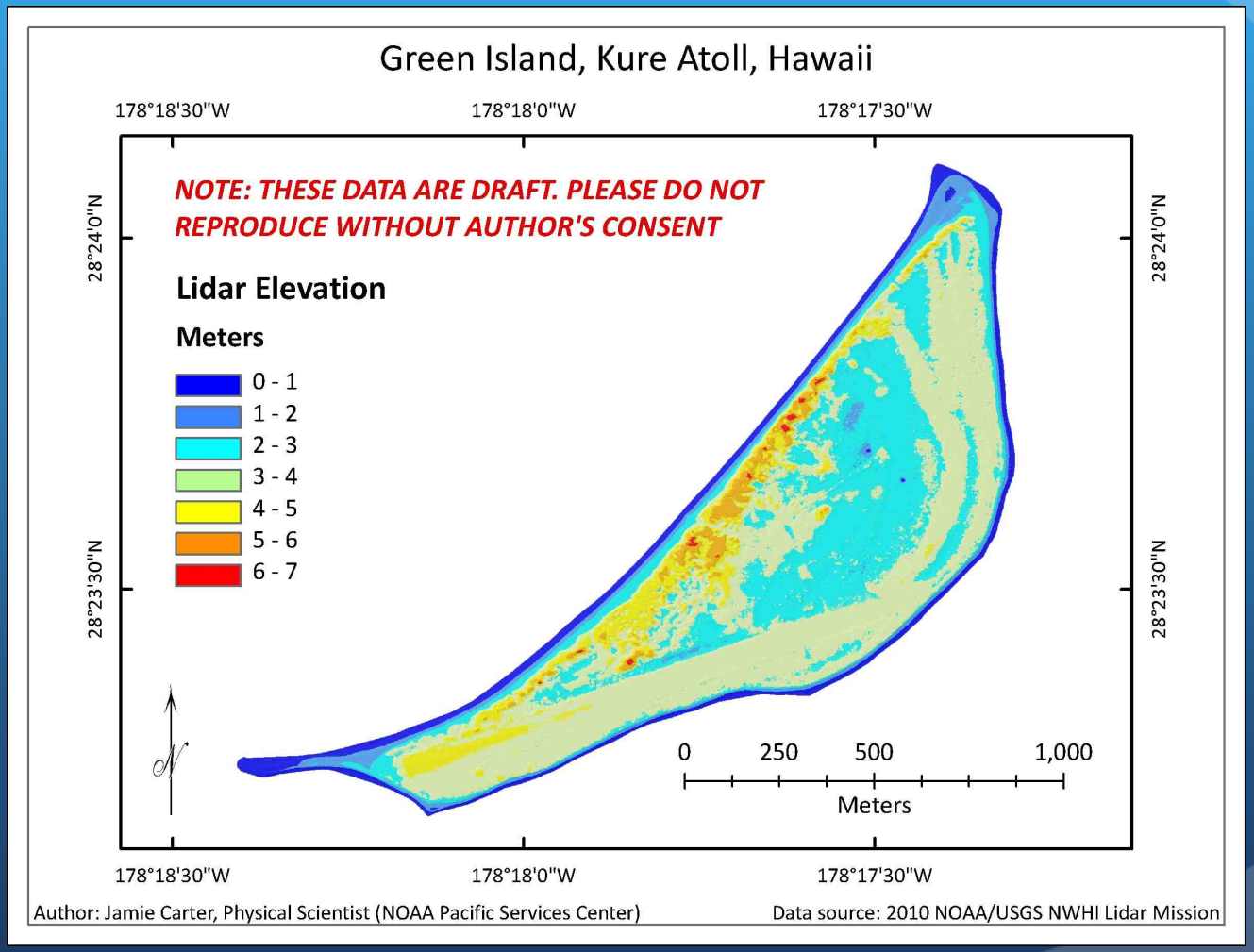
Top Eradication Priority
Heliotropium foertherianum
Why Eradicate Heliotropes?

- First documented on Kure in 1960. Highly invasive in sandy soils out competing dune building naupaka and native grasses.
- Grows in tall monotypic stands along coast lines creating hot windless interiors.
- Shallow roots pull up during large storms and tsunamis and roll inland entangling birds
- Native to tropical Asia, Madagascar, tropical Australia, and Polynesia
- Naturalized in Hawaii and common in coastal areas of Kure, Midway, and Pearl and Hermes atolls, Lisianski, Laysan, French Frigate Shoals, and all of the main islands except Kahoolawe (Wagner et al. 1999).

Heliotropes form dense forests preventing wildlife from using beaches

- Prevents turtles from accessing beaches for nesting. Roots trap hatchlings emerging from nests.
- Prevents monk seals from accessing inland haul out for pupping and resting.
- Prevents albatross from walking to take off areas on the beach

Addressing Climate Change: Use Naupaka and grasses to create higher elevation along coastlines



Heliotrope *introduced to Midway in 1930's.*
First observed on Kure 1960.

Outcompetes
all native plants

Thick shallow Roots
cause erosion

Beach erosion caused by Heliotropes with poor root structure

Top Eradication Priority *Verbesina encelioides*

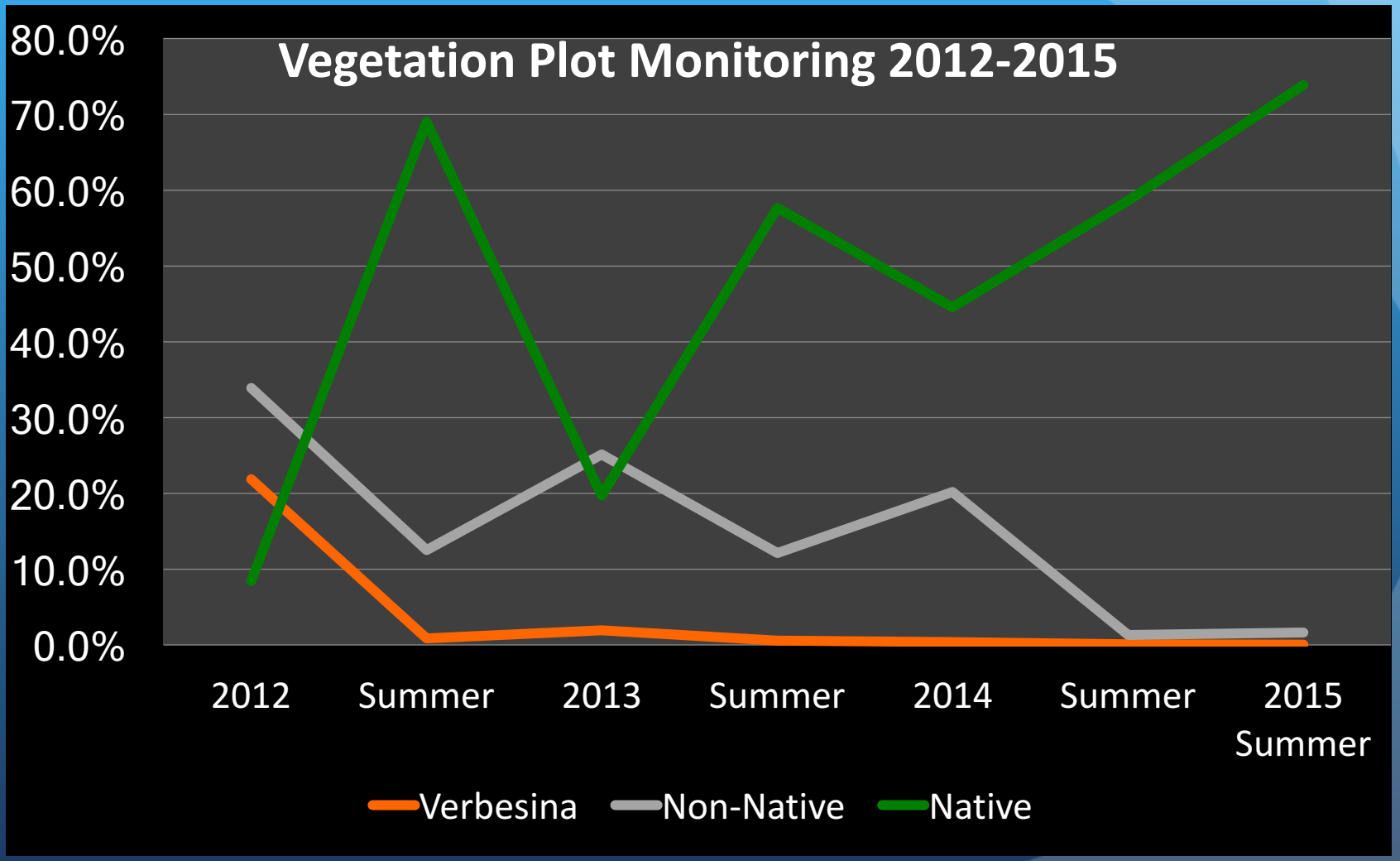
- Eradication programs on Midway and Kure
- Creates tall thick stands
- Outcompetes native plants
- Increases temp on the ground where birds are subject to heat stress
- Causes erosion

Habitat Restoration

Creating and Maintaining Unique Habitat Zones

- Lowlands - grassy
- Central Plain - assemblages of vines and low growing plants
- Shublands – naupaka
- Dunes - naupaka and grasses
- Wetlands – sedges and grasses
- Recovered runway - intermittent islands of plants on hard substrate

Monitoring Vegetation
Native plants 74% weeds < 10%



Naupaka *(Scaevola taccada)*
Primary Dune Builder/Stabilizer
Using Resilient Vegetation in the face of Climate Change

Kure dunes reach heights of 20 feet

How Does Naupaka Create Dunes?

Sand blows into naupaka covering branches

Branches send out fine roots that capture sand

Naupaka grows higher and more sand blows into the bush

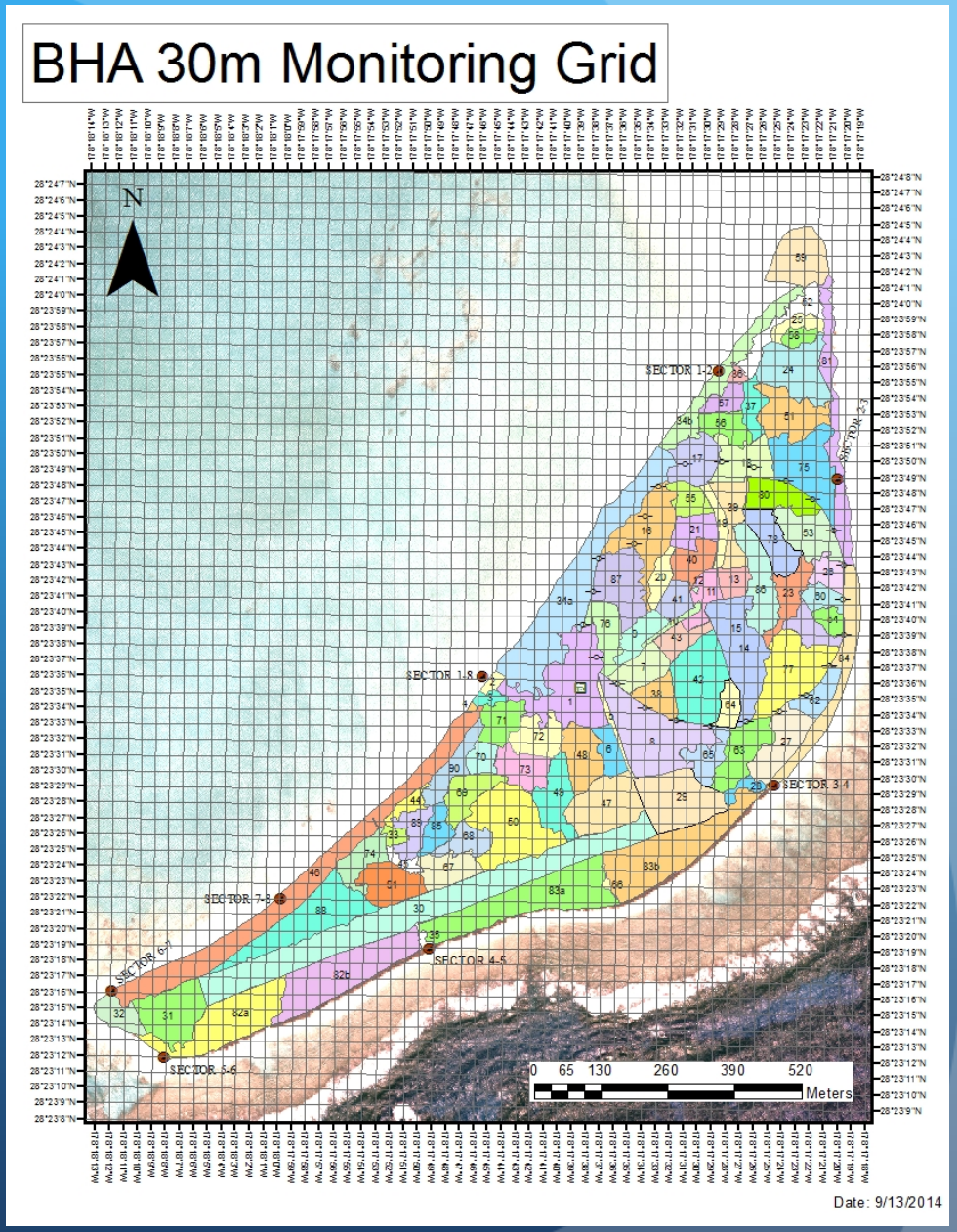
The process continues and dune grows higher and higher

Mosquito Eradication

- The Southern house mosquito *(Culex quinquefasciatus)* was confirmed at Kure on August 22, 2016.
- Suspected that a few were blown to Kure from Midway Atoll
- all open water sources are monitored weekly and treated with VectoLex larvicide.
- The last detection of Mosquitoes was May 10, 2017

Big Headed Ant Eradication

- Started in summer 2014
- monitoring twice a year
- 2017 - Island wide Infestation has been reduced to ½ acre



Rat Eradication Program

- 1St rat eradication (Rattus exulans, Polynesian rat) completed in 1994
- An individual black rat (Rattus rattus) was visually documented on August 20, 2016. The presence of the rat was visually confirmed on August 29 and captured on August 31.
- Likely introduced on heavy equipment used to clean up PCBs at the landfill.
- No other rats have been detected or captured after extensive monitoring and trapping for 11months.

Habitat Management and Conservation Action Plan

- ***STRATEGY HMC-2**: Within 10 years investigate, inventory and map sources of known contamination from historic human uses of the NWHI, and where appropriate, coordinate with responsible parties to develop plans and complete cleanup actions.*

USCG Landfill Contaminated with PCB and Lead

Recent Management Actions

- 2016 USCG removed 400 cubic yards of contaminated sand
- Treated contaminated sand with microbes and reburied it inland in a pit lined with geotextile material impregnated with carbon.
- Planted naupaka and grasses at the old landfill beach site
- Outplanted native plants on the cap of the reburial pit

Expected Outcomes

- Dunes formation over old landfill protecting interior
- Microbes break down PCBs
- Carbon capture PCBs mobilized during flooding

USCG monitoring ever 5 years. Next testing yr 2021

Recovering the 18 acre runway for nesting seabirds and duck foraging

digging holes for naupaka

Need to Increase drainage

Marine Debris Action Plan

STRATEGY MD-1: *remove and prevent marine debris throughout the life of the plan*

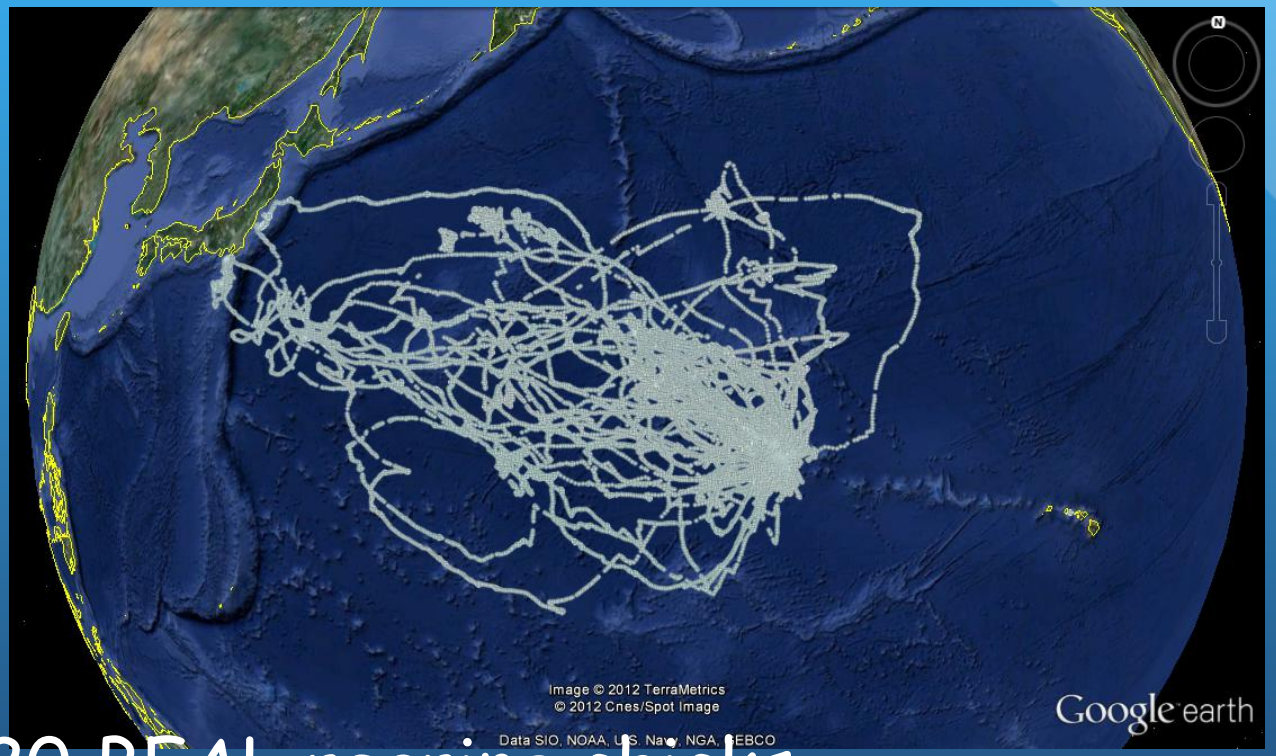
Plastic ingestion by Albatross

- Completed analysis of Kure BFAL plastic ingestion and movements during 2007-08 hatch year.
- Study revealed 100% plastic incidence in boluses (n=25) and chick stomachs (n=5).
- GPS tracking revealed adults collected material from Western North Pacific, in the vicinity of the Emperor Seamount Chain. One manuscript submitted.

Plastic Ingestion by Albatross

- Multi-colony (MIDWAY – KURE – FFS) analysis of albatross (BFAL / LAAL) bolus composition during 2008-09 hatch year.
- Study revealed 100% plastic incidence in boluses (n= 75 BFAL / 75 LAAL), with species-specific and colony-specific differences in the amounts and types of ingested plastics.
- Kure Atoll was characterized by highest loads and most distinct species-specific bolus composition, this site is particularly interesting for ongoing pollution monitoring.

GPS Tracking - 2012 & 2013



20 BFAL rearing chicks
Feb-April 2012 & 2013
(Hester et al. in prep)

7-10,000 of entanglement hazards removed from Kure every year

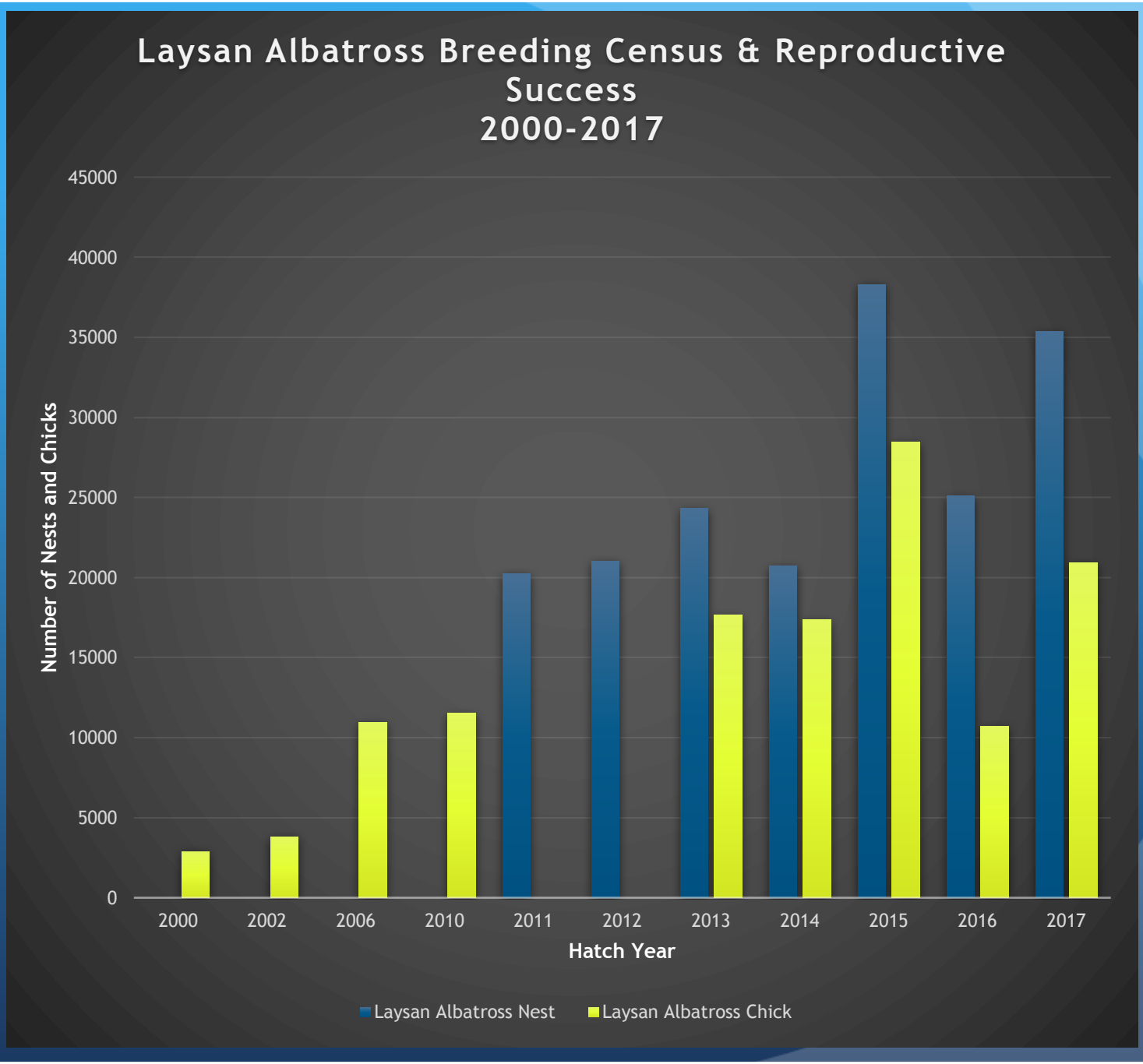
Laysan Teal (*Anas laysanensis*)

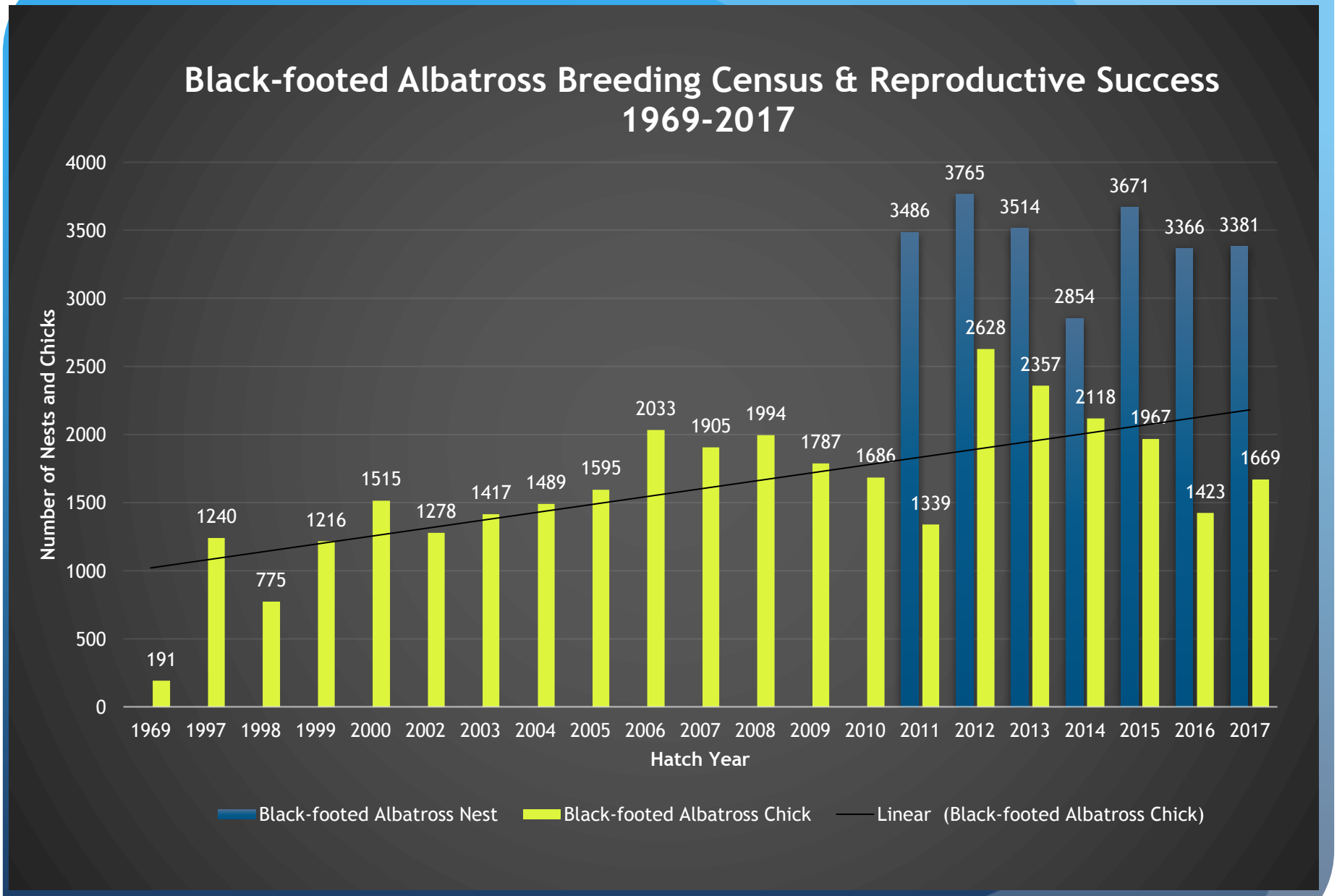
- Fall 2014 - 28 Founders translocated from Midway (est. 3rd pop.)
- Summer 2015 - 22 broods (1-12 DLs), 35 estimated to survive to HY
- Spring 2016 – Unusual mortality Botulism event and loss of 28 LADU
- Summer 2016 – 10 broods (1-8 DLs), 0 survivorship
- Winter 2016 - Supplemental feeding to improve hen condition
- Wetland and seep management
- Current population estimate is 35

Laysan Duck Recommendations

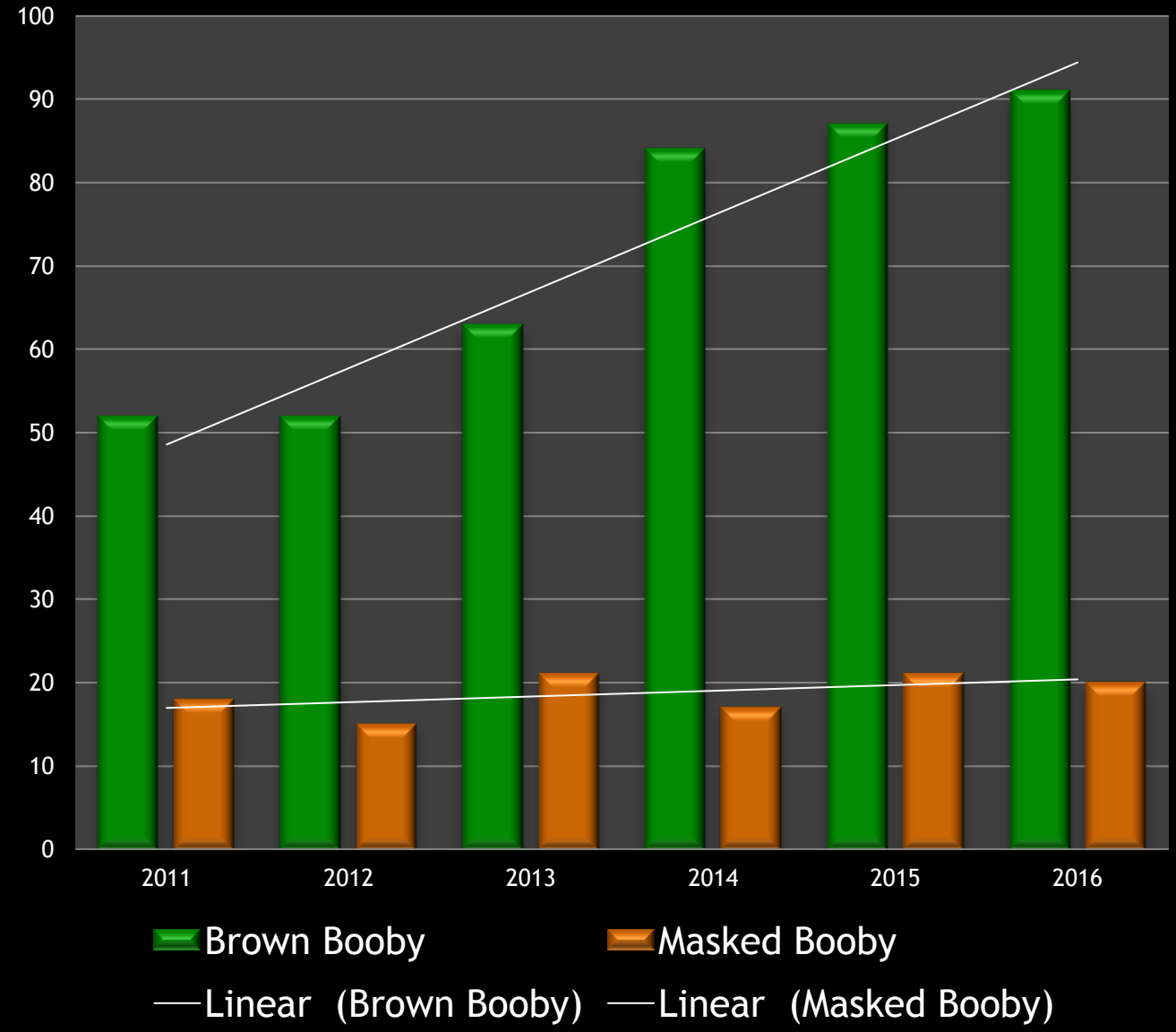
- Test botulism Vaccine at Kure
- Increase genetic diversity at Kure using Laysan and Midway Stock
- Continue to create foraging habitat
- Increase and test new types of water sources
- Research and test working dogs to find dead duck during botulism events

Three Species of Albatross !!!

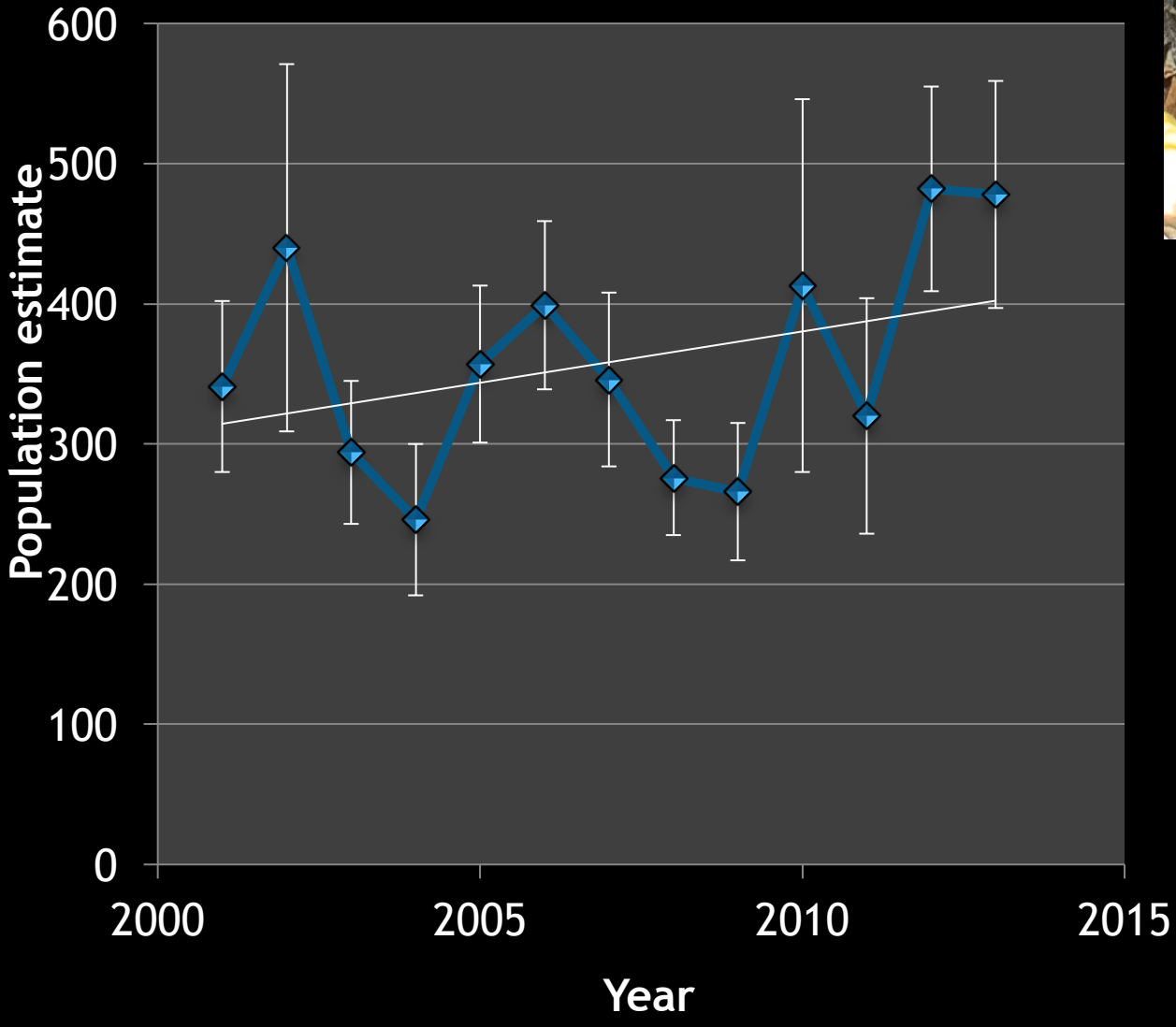

Laysan Albatross Breeding Census & Reproductive Success
2000-2017
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
Number of Nests and Chicks
2000
2002
2006
2010
2011
2012
2013
2014
2015
2016
2017
Hatch Year
Laysan Albatross Nest
Laysan Albatross Chick


Black-footed Albatross Breeding Census & Reproductive Success
1969-2017
Number of Nests and Chicks
4000
3500
3000
2500
2000
1500
1000
500
0
191
1240
775
1216
1515
1278
1417
1489
1595
2033
1905
1994
1787
1686
3486
1339
3765
2628
3514
2357
2854
2118
3671
1967
3366
1423
3381
1669
1969
1997
1998
1999
2000
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
Hatch Year
Black-footed Albatross Nest
Black-footed Albatross Chick
Linear (Black-footed Albatross Chick)

Brown & Masked Booby Fledgling Success 2011-2016



Christmas Shearwater (*Puffinus nativitatis*)



Estimated 40-60 before rat eradication in 1995

Current Population estimate is 400+ individuals

Status and Demographic Rates of the Christmas shearwater (*puffinus*

KURE CREW Dec 24, 2016

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