Flying with Albatross:

What Black-footed Albatross are Teaching Us About the Ocean

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Oikonos and HPU Ecologist
NOAA BrownBag Seminar
19 July 2012

Outline

I. The Albatross Collaborative

Universities, Non-profit, Resource Managers, Educators

II. Integrating Science and Education

Discovering How Albatross Make a Living

for *Conservation* and *Public Stewardship*

Albatross Collaborative

This collaborative partnership is working to improve our understanding of albatross ecology toward **effective conservation** and **stewardship of highly migratory species** and their habitats

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HAWAI'I PACIFIC UNIVERSITY • HOLOMUA ME KA 'OIA'I'O •

NATIONAL MARINE SANCTUARIES ™
CORDELL BANK

PAPAHĀNAUMOKUĀKEA
Marine National Monument

USGS
science for a changing world

FORESTRY AND WILDLIFE
HAWAII

U.S. FISH & WILDLIFE SERVICE
DEPARTMENT OF THE INTERIOR

Accomplishments

Movement Research

- Investigated movements of 36 Black-footed Albatross that visited Cordell Bank, California
- Complemented research on albatross habitat use from boat surveys

  Michael, P. 2011. Master's Thesis
- Discovered new foraging hotspots of 19 Black-footed Albatross from Kure Atoll breeding colony, Hawaii

Accomplishments

Plastic Ingestion/Diet Research

- Compared diet of 150 albatross chicks from three Northwestern Hawaiian Island colonies

- Quantified mass and volume of plastic in regurgitated boluses

- Quantified different plastic types in boluses: sheets, line, fragments, foam

Accomplishments

Outreach and Education

- Free informal and formal classroom activities: grades 8 to college

  Marine debris pollution

  Marine animal migrations

  available at - oikonos.org/education

- Classroom resources: provided albatross boluses to 15,000 students from eight U.S. states, Guam & New Zealand

Integrating Science and Education
Case Study

Classroom Activity Package

soon to be released

WINGED AMBASSADORS

OCEAN LITERACY THROUGH THE EYES OF ALBATROSS

New & Improved Materials

Quick Facts

- 5 Lessons
- Inquiry–based science instruction
- Grades 6-8 with extensions for 9-12
- State (CA, HI) and National Standards and Ocean Literacy
- Contributions from professional artists and photographers

- Funded by NOAA's Office of National Marine Sanctuaries
  - Pacific Island Region
  - West Coast Region
- Led by:

National Marine Sanctuaries
Cordell Bank

oikonos

Papahānaumokuākea
Marine National Monument

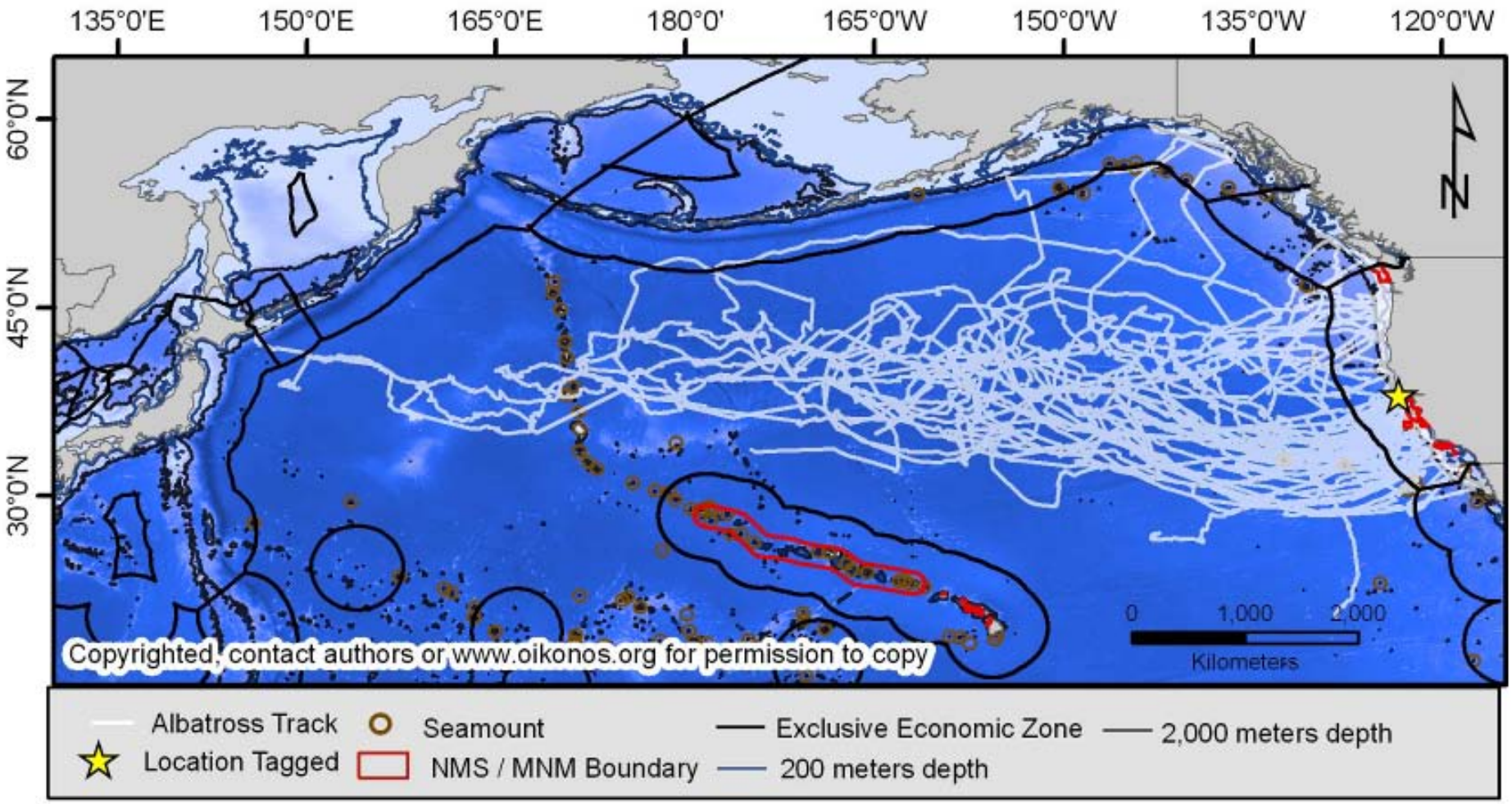
WINGED AMBASSADORS

OCEAN LITERACY THROUGH THE EYES OF ALBATROSS

- Lesson 1 **– Introduction to Seabirds**
- Lesson 2 **– Tracking Albatross Migrations**
- Lesson 3 **– Protecting Ocean Hotspots**
- Lesson 4 **– Bolus Analysis**
- Lesson 5 **– Campus Debris Survey**

Research Results – Shared Responsibility

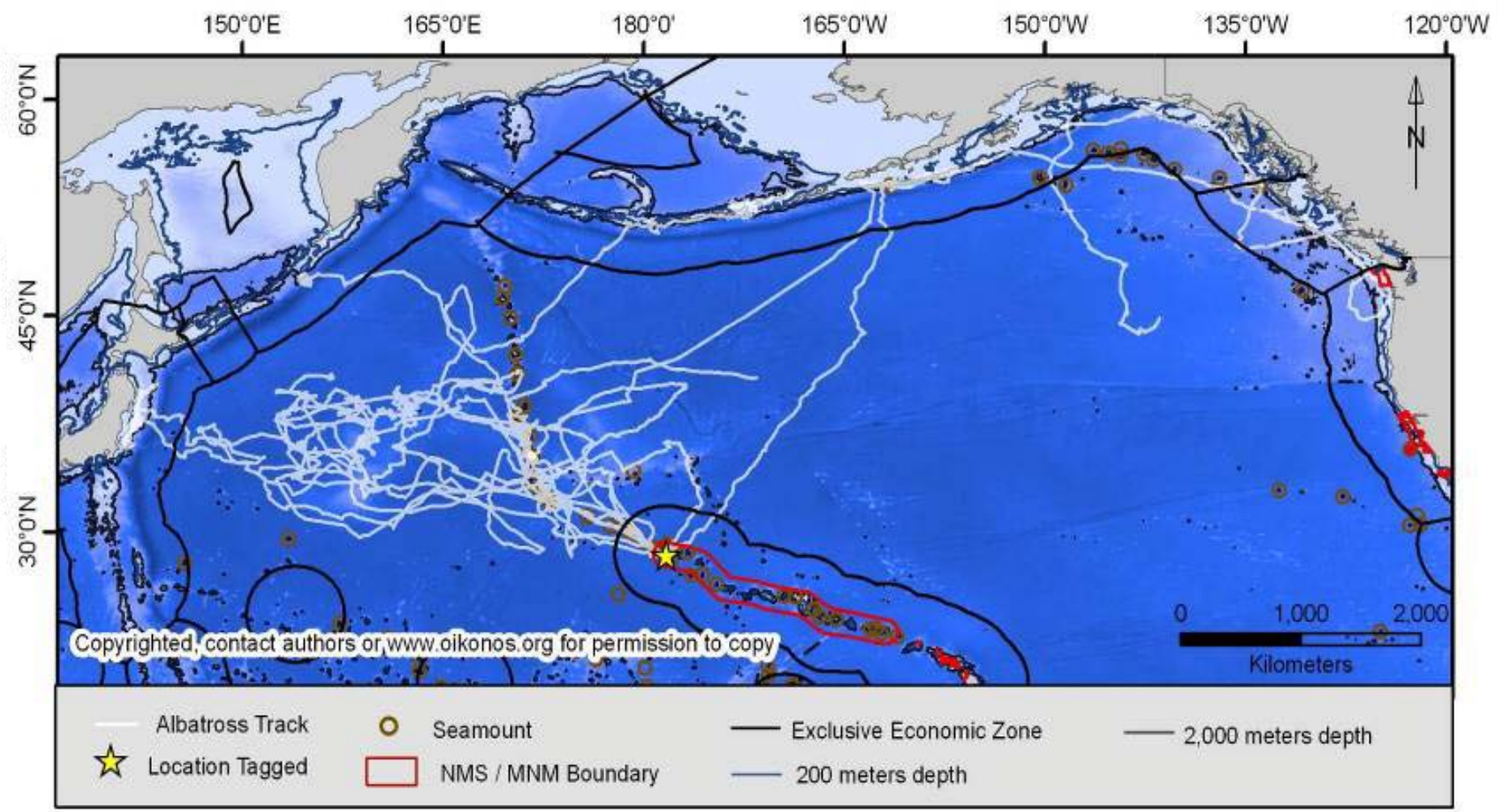
BFAL from Cordell Bank NMS



Research Results – Shared Responsibility

BFAL from Kure Atoll

Chick Migration



Research Results – Shared Responsibility

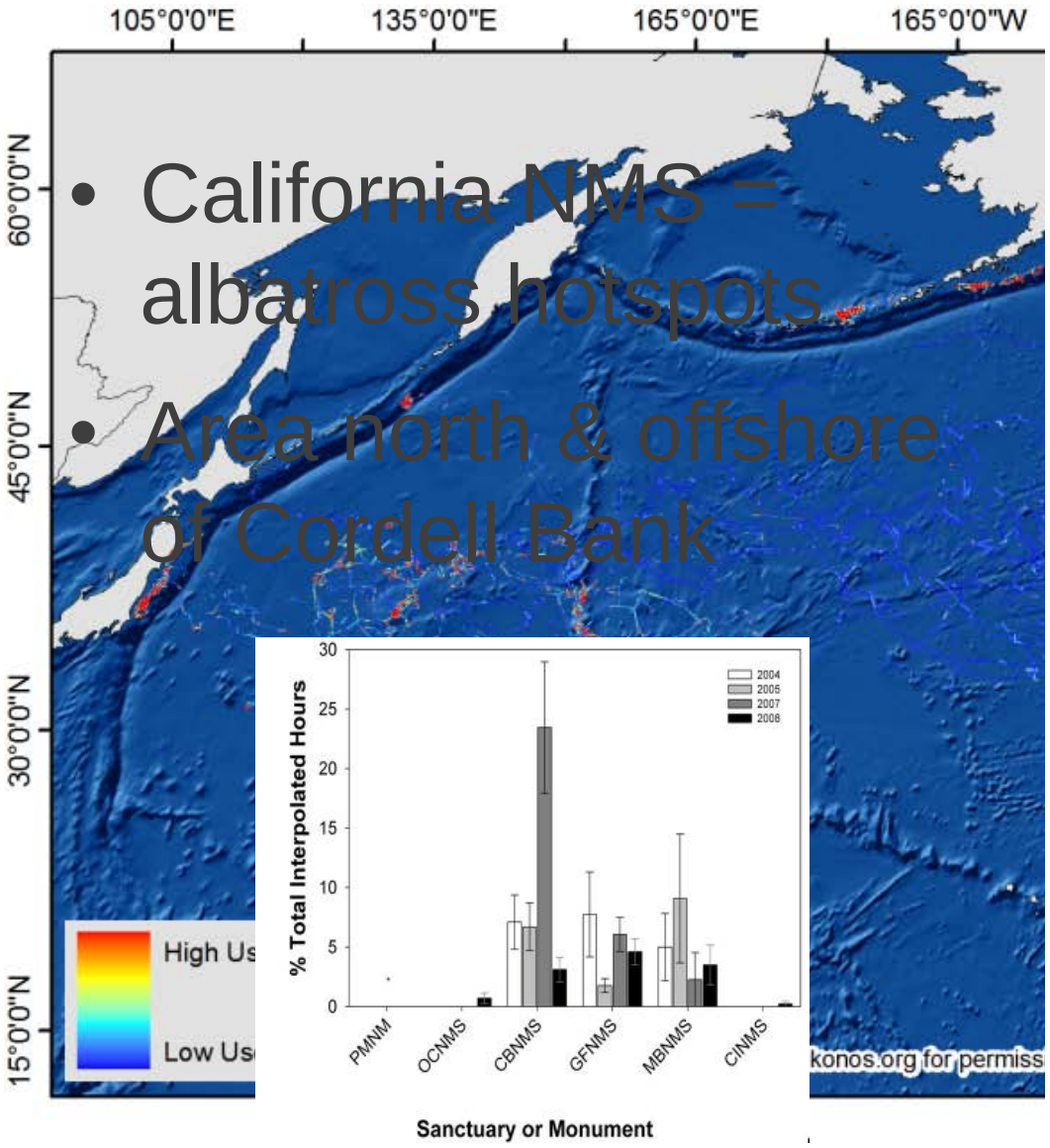
- The tracked post-breeding birds entered the waters of five nations (Japan, Russia, Canada, Mexico and U.S.)

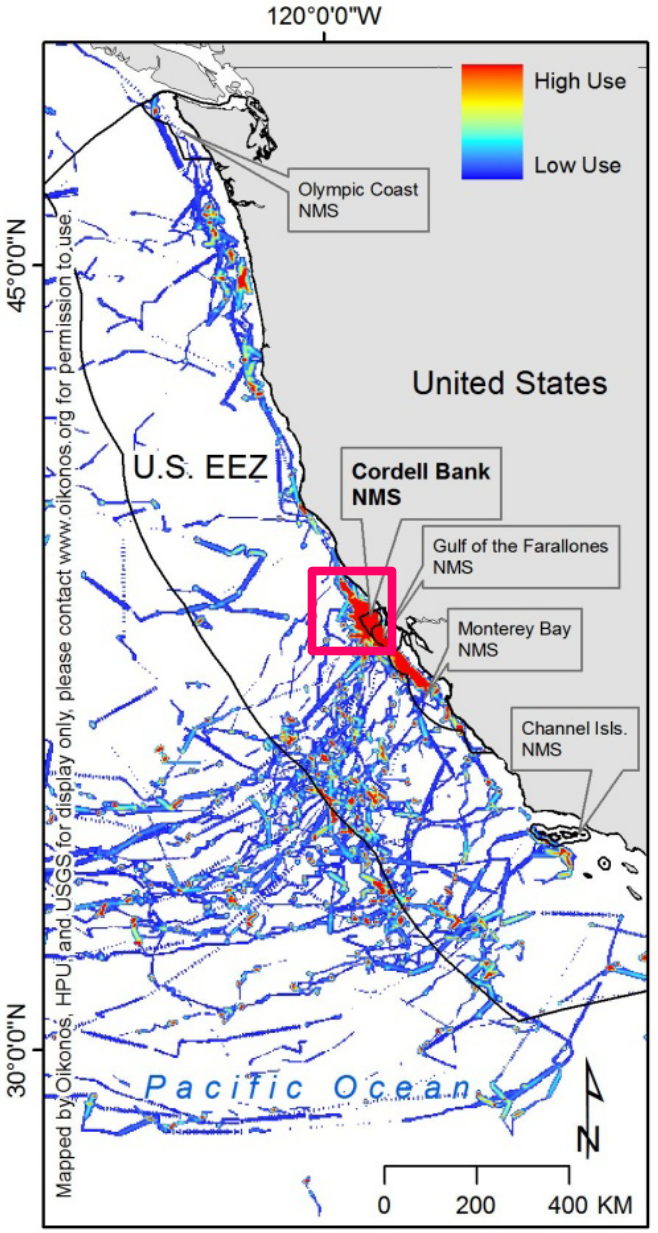
- Conversely, the chick-rearing birds from Kure ranged only into Hawai'i waters surrounding their breeding site and spent 27% of their time within the Monument

- Overall, the tracked birds spent over half their time in international waters (high seas), highlighting the need for multi-nation collaboration for effective conservation

Research Results – Hotspots

- California NMS = albatross hotspots
- Area north & offshore of Cordell Bank

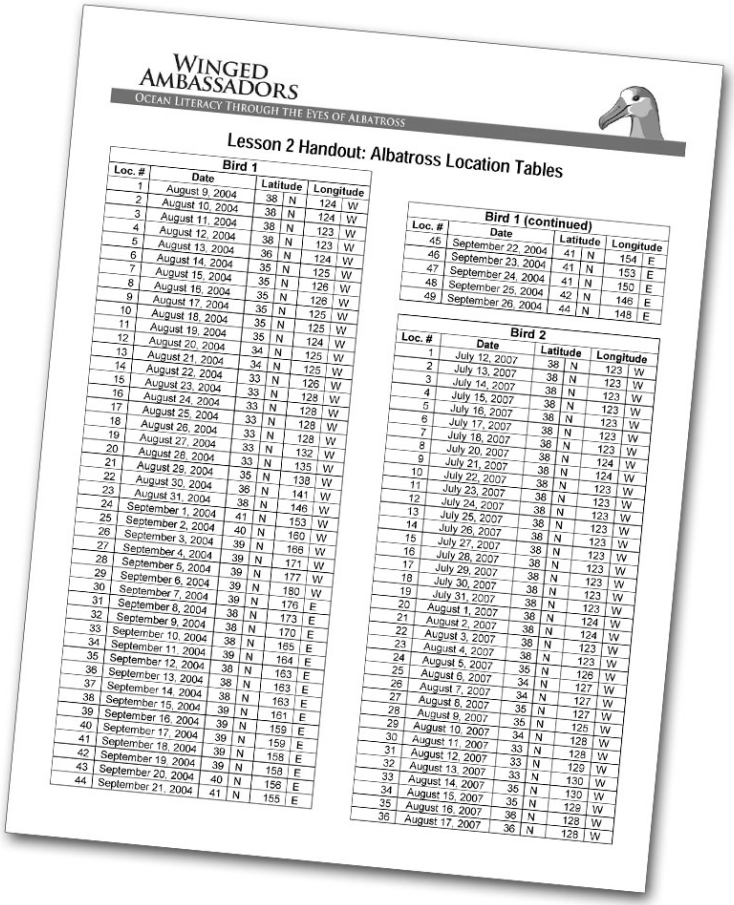




Winged Ambassador - Student Activities

Student will be able to:

- Map Latitude and Longitude
- Identify Hotspots
- Design a Marine Protected Area



WINGED AMBASSADORS

OCEAN LITERACY THROUGH THE EYES OF ALBATROSS

Lesson 2 Handout: Albatross Location Tables

Bird 1

Loc. #	Date	Latitude		Longitude	
1	August 9, 2004	38	N	124	W
2	August 10, 2004	38	N	124	W
3	August 11, 2004	38	N	123	W
4	August 12, 2004	38	N	123	W
5	August 13, 2004	36	N	124	W
6	August 14, 2004	35	N	125	W
7	August 15, 2004	35	N	126	W
8	August 16, 2004	35	N	128	W
9	August 17, 2004	35	N	125	W
10	August 18, 2004	35	N	125	W
11	August 19, 2004	35	N	124	W
12	August 20, 2004	34	N	125	W
13	August 21, 2004	34	N	125	W
14	August 22, 2004	33	N	126	W
15	August 23, 2004	33	N	128	W
16	August 24, 2004	33	N	128	W
17	August 25, 2004	33	N	128	W
18	August 26, 2004	33	N	128	W
19	August 27, 2004	33	N	132	W
20	August 28, 2004	33	N	135	W
21	August 29, 2004	35	N	138	W
22	August 30, 2004	36	N	141	W
23	August 31, 2004	38	N	146	W
24	September 1, 2004	41	N	153	W
25	September 2, 2004	40	N	169	W
26	September 3, 2004	39	N	168	W
27	September 4, 2004	39	N	171	W
28	September 5, 2004	39	N	177	W
29	September 6, 2004	39	N	180	W
30	September 7, 2004	39	N	176	E
31	September 8, 2004	38	N	173	E
32	September 9, 2004	38	N	170	E
33	September 10, 2004	38	N	165	E
34	September 11, 2004	39	N	164	E
35	September 12, 2004	38	N	163	E
36	September 13, 2004	38	N	163	E
37	September 14, 2004	38	N	163	E
38	September 15, 2004	39	N	161	E
39	September 16, 2004	39	N	159	E
40	September 17, 2004	39	N	159	E
41	September 18, 2004	39	N	158	E
42	September 19, 2004	39	N	158	E
43	September 20, 2004	40	N	156	E
44	September 21, 2004	41	N	155	E

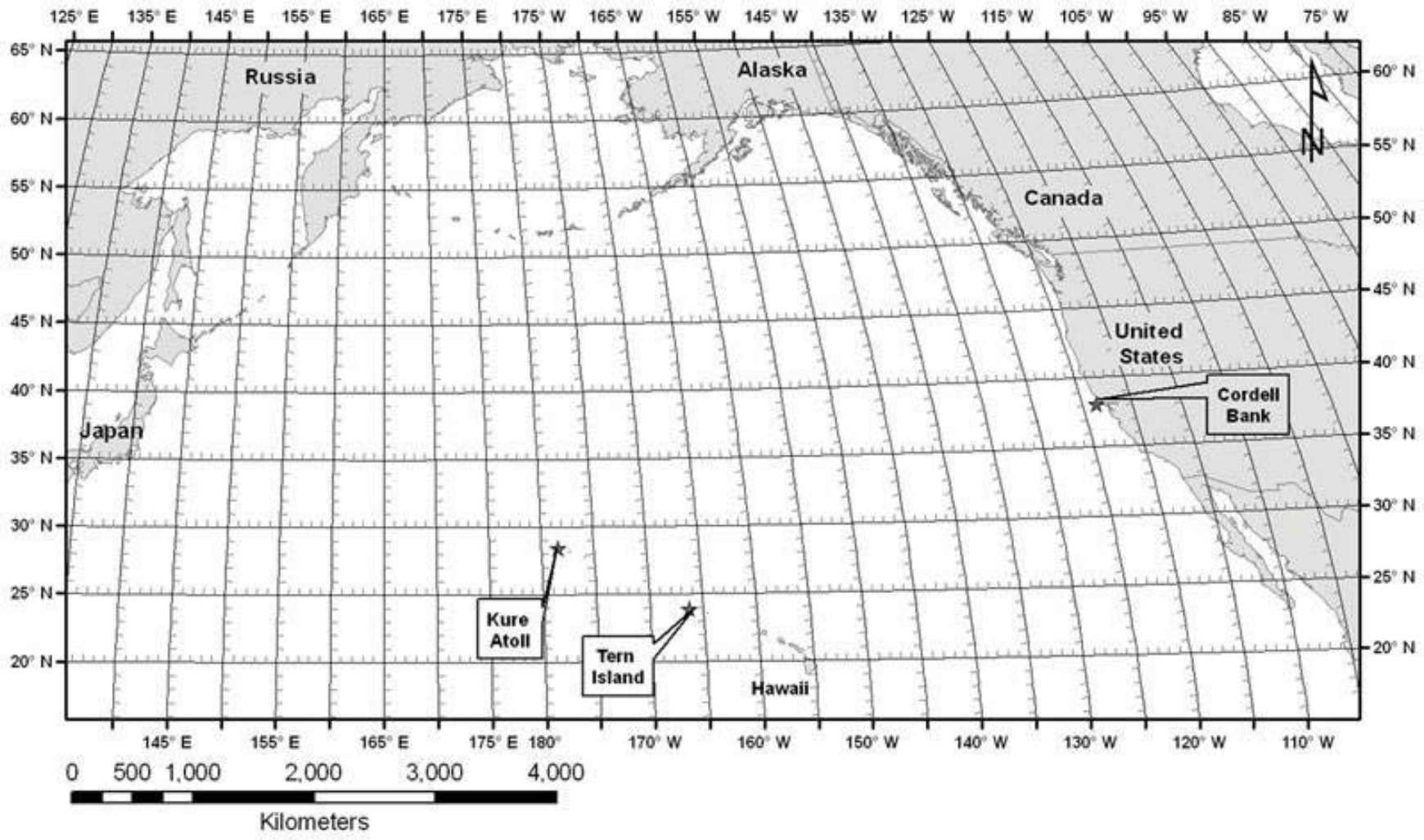
Bird 1 (continued)

Loc. #	Date	Latitude		Longitude	
45	September 22, 2004	41	N	154	E
46	September 23, 2004	41	N	153	E
47	September 24, 2004	41	N	150	E
48	September 25, 2004	42	N	146	E
49	September 26, 2004	44	N	148	E

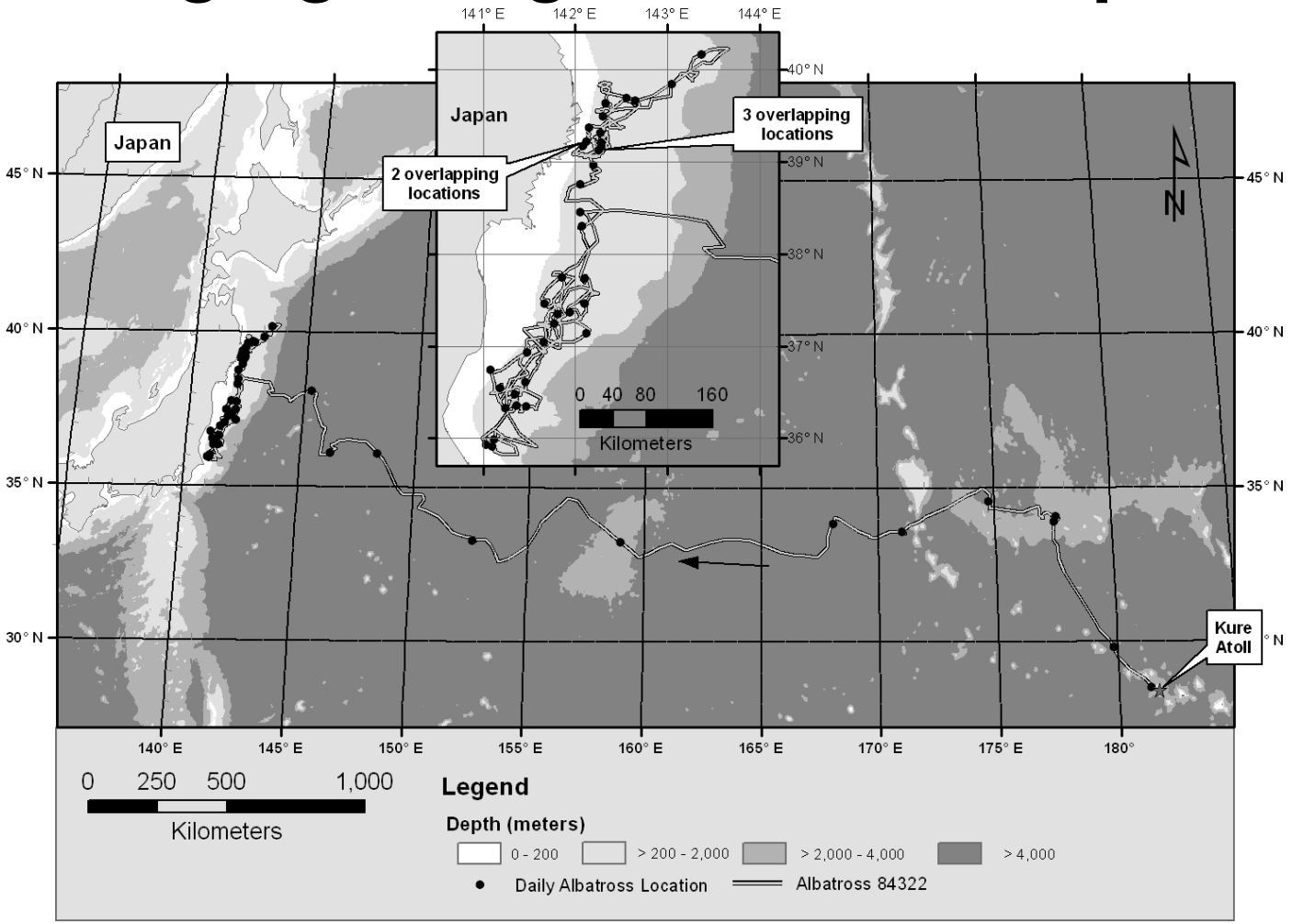
Bird 2

Loc. #	Date	Latitude		Longitude	
1	July 12, 2007	38	N	123	W
2	July 13, 2007	38	N	123	W
3	July 14, 2007	38	N	123	W
4	July 15, 2007	38	N	123	W
5	July 16, 2007	38	N	123	W
6	July 17, 2007	38	N	123	W
7	July 18, 2007	38	N	123	W
8	July 20, 2007	38	N	123	W
9	July 21, 2007	38	N	124	W
10	July 22, 2007	38	N	124	W
11	July 23, 2007	38	N	123	W
12	July 24, 2007	38	N	123	W
13	July 25, 2007	38	N	123	W
14	July 26, 2007	38	N	123	W
15	July 27, 2007	38	N	123	W
16	July 28, 2007	38	N	123	W
17	July 29, 2007	38	N	123	W
18	July 30, 2007	38	N	123	W
19	July 31, 2007	38	N	123	W
20	August 1, 2007	38	N	123	W
21	August 2, 2007	38	N	124	W
22	August 3, 2007	38	N	124	W
23	August 4, 2007	38	N	123	W
24	August 5, 2007	38	N	123	W
25	August 6, 2007	35	N	126	W
26	August 7, 2007	34	N	127	W
27	August 8, 2007	34	N	127	W
28	August 9, 2007	35	N	127	W
29	August 10, 2007	35	N	125	W
30	August 11, 2007	34	N	128	W
31	August 12, 2007	33	N	128	W
32	August 13, 2007	33	N	129	W
33	August 14, 2007	33	N	130	W
34	August 15, 2007	35	N	130	W
35	August 16, 2007	35	N	129	W
36	August 17, 2007	36	N	128	W

Plot Albatross Routes from 3 Tagging Sites

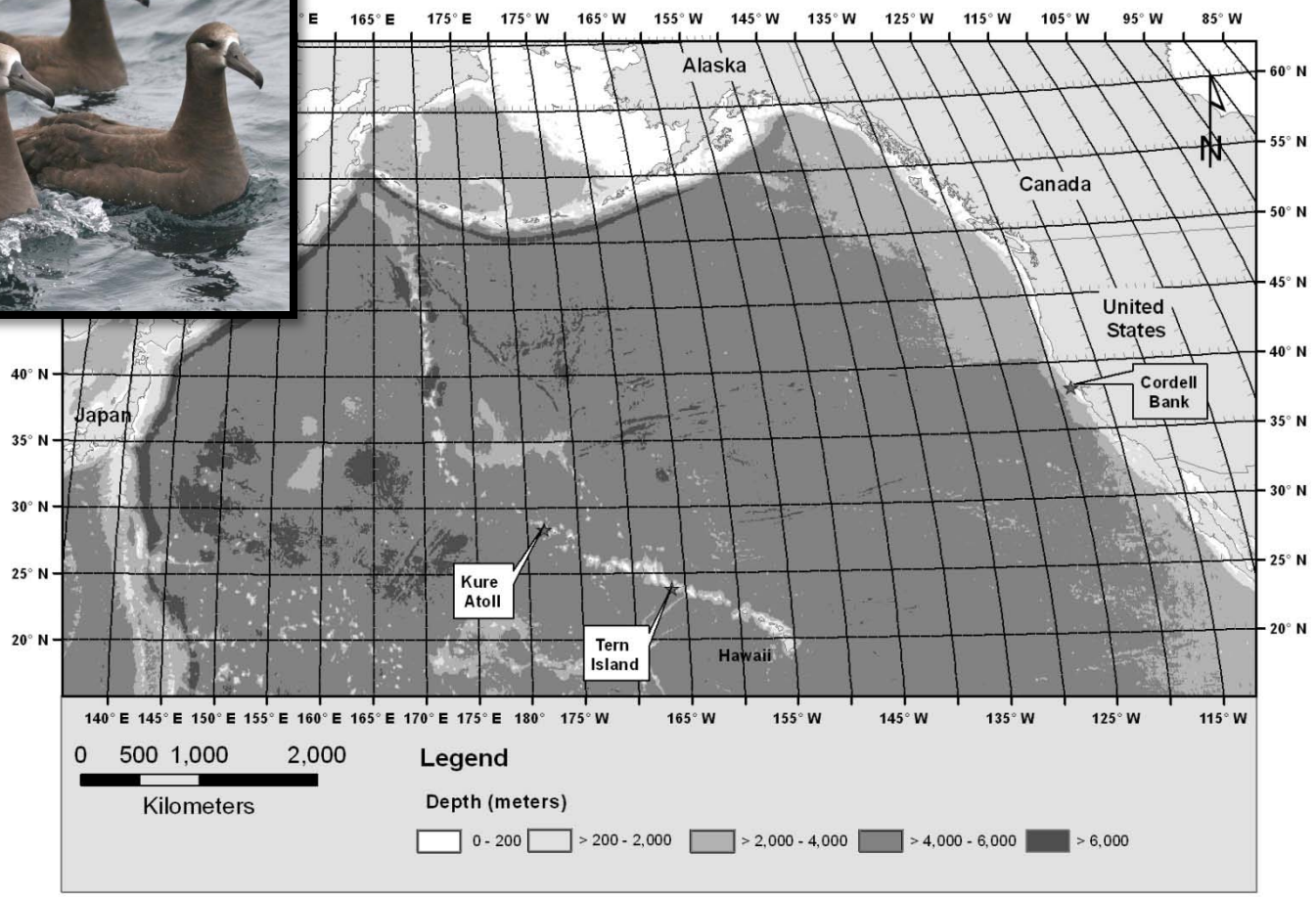


Foraging along the shelf / slope of Japan



Data courtesy of Oikonos, HPU, USGS, and partners

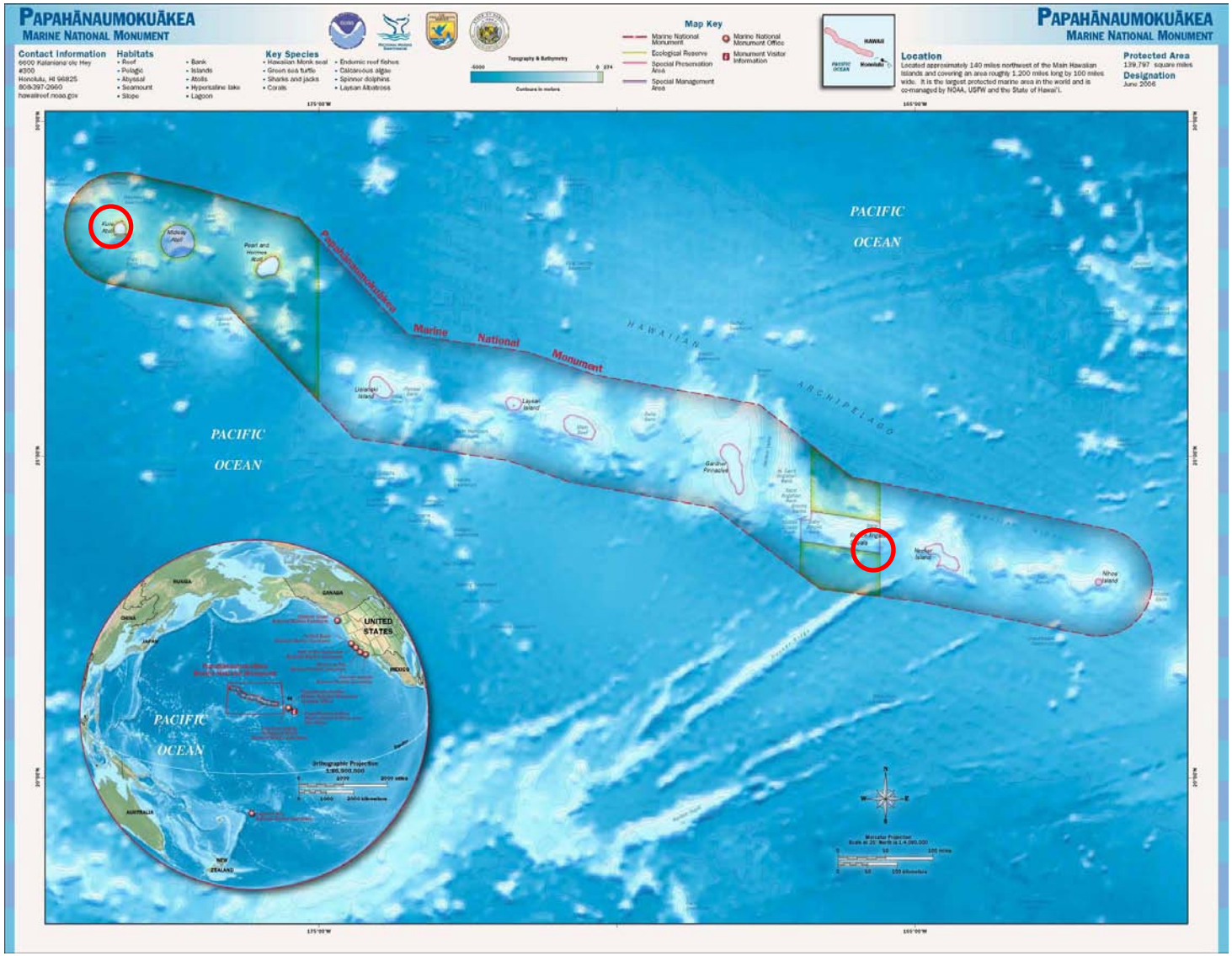
Where would you create an Albatross Sanctuary?



Data courtesy of Oikonos

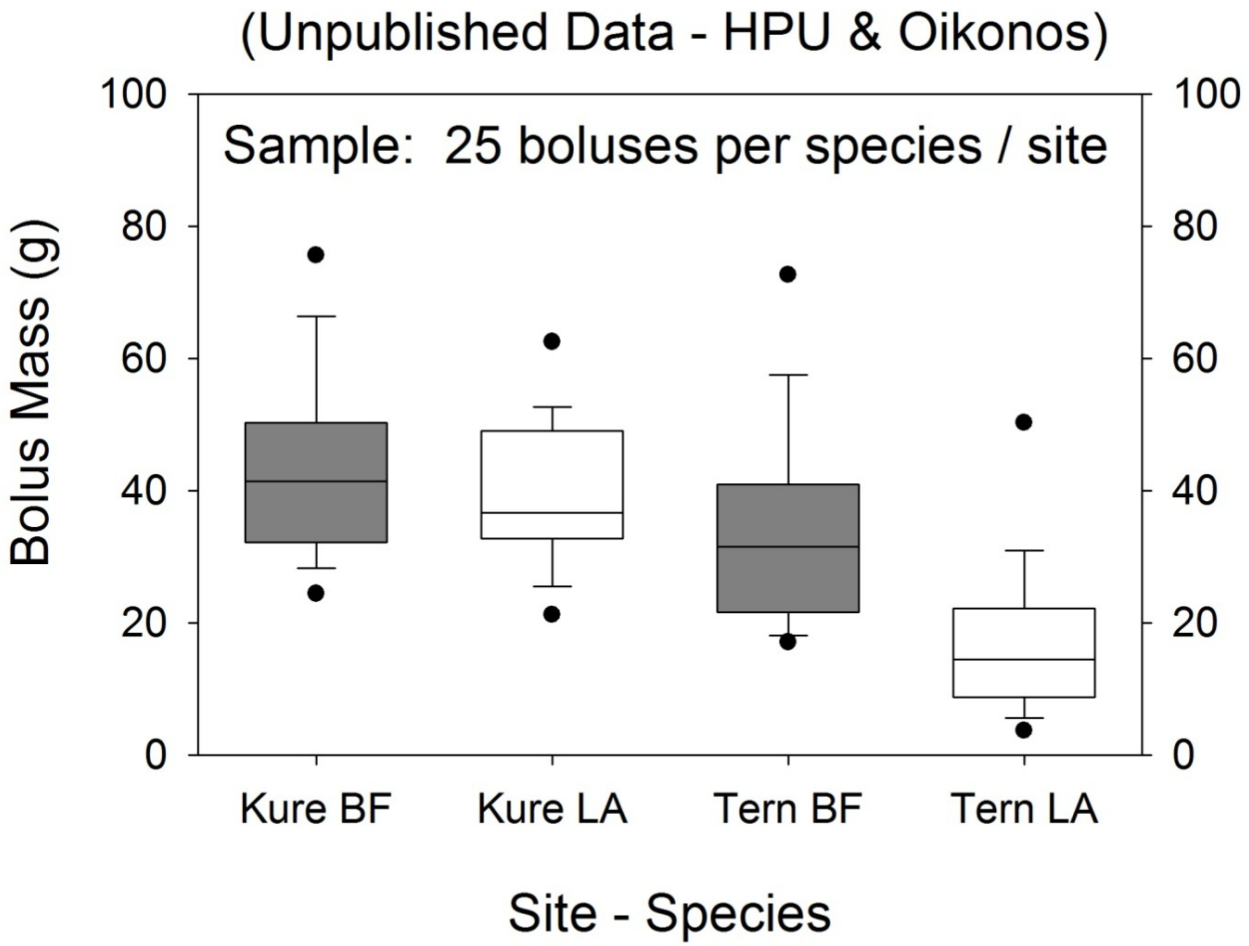
Research Results – Plastic Ingestion

Colony Comparison: Kure-Tern



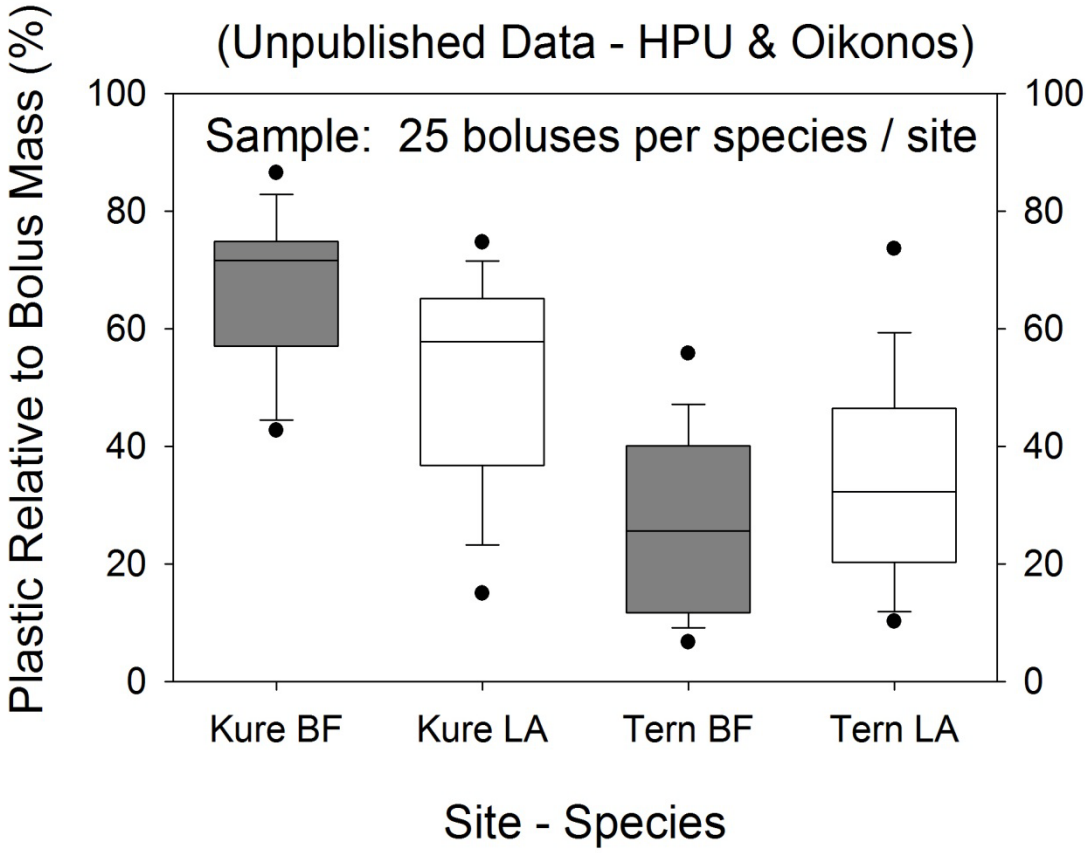
Research Results – Plastic Ingestion

Result: Kure Boluses are heavier



Research Results – Plastic Ingestion

Result: On average, Black-footed boluses are 75% plastic on Kure, only 25% on Tern.



Research Results – Plastic Ingestion

100% of boluses contained plastic marine debris

Plastic loads vary across species and colonies

Suggests both species-specific foraging and site-specific differences in plastic distribution

Winged Ambassador - Student Activities

Student will be able to:

Note that nearly all albatross chicks are fed plastic trash.

Calculate the percentage of prey and non-prey items found in boluses.

Collect and analyze debris on their school grounds.

Educate other students about how our own behaviors impact the ocean.

Winged Ambassador - Student Activities

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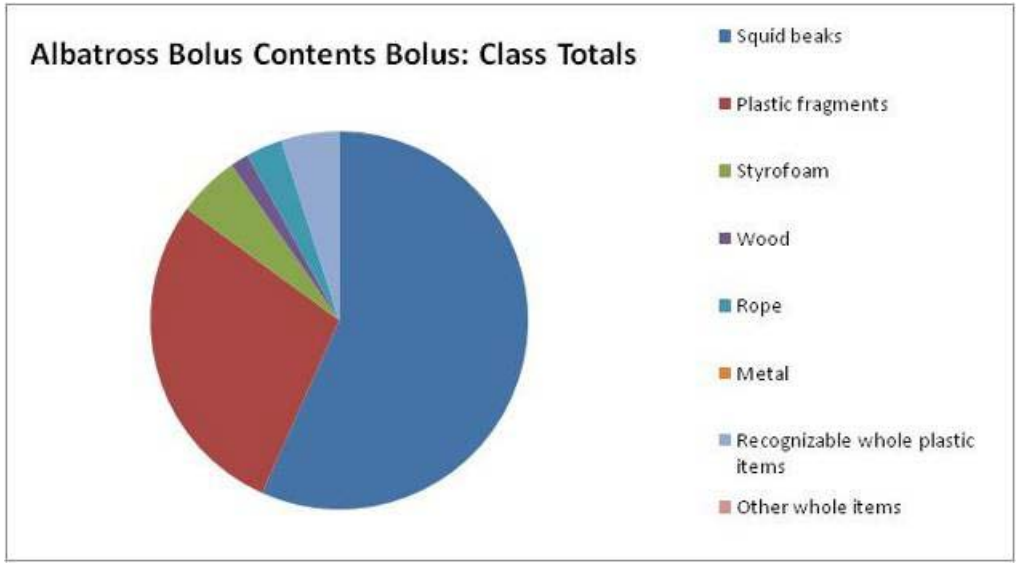
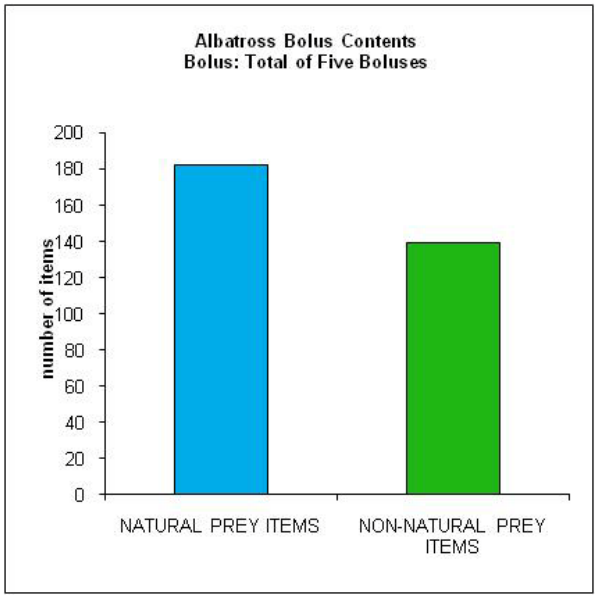
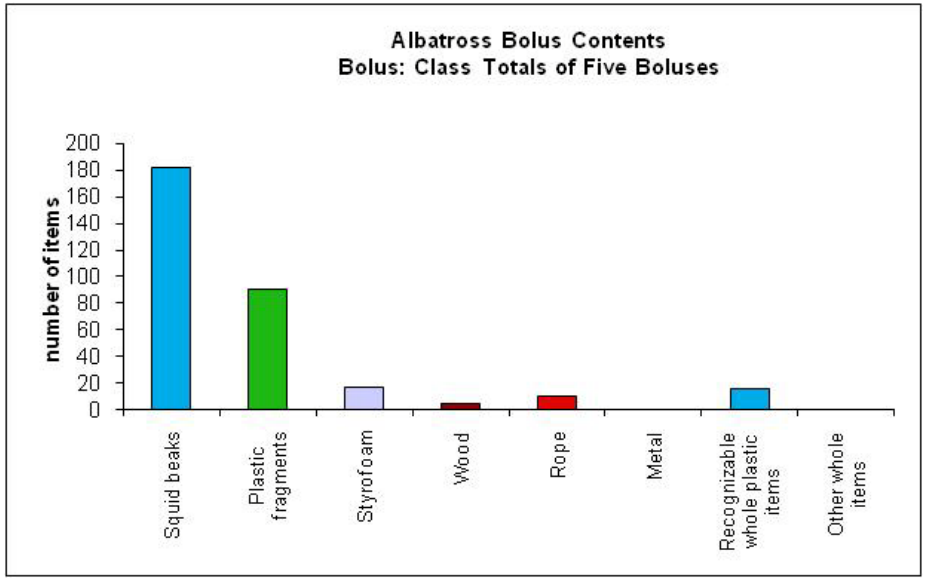




Albatross composition: natural food, plastic, other

Types of plastic pollution



Winged Ambassador - Student Activities

WHERE DOES YOUR GARBAGE GO?

WINGED AMBASSADORS
OCEAN LITERACY THROUGH THE EYES OF ALBATROSS

Available soon!

Free lessons and resources available at Partner sites:

http://cordellbank.noaa.gov/education/teachers.html

http://oikonos.org/education

http://papahanaumokuakea.gov/education/wa.html

Look for the Article in *Current* – NMEA journal in press

Marrero, M., Hester, M., Hyrenbach, K.D., Michael, P., Adams, J., Keiper, C., Stock, J., Collins, A., Alvarez, T. Winged Ambassadors: ocean literacy through the eyes of albatross. Current, In Press.

Thank You, Project Contributors

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