












Seabirds at the Crossroads

Pavilion Event, Sunday, 4 Sept, 12:00-13:00

IUCN World Conservation Congress Hawai'i 2016

Seabirds at the Crossroads: Perspectives, Challenges, Solutions

Lisa T. Ballance

NOAA Fisheries & Scripps Institution of Oceanography, U.S.A.

Photo: Greg LeCoeur

Perspectives

- Global and regional priorities for seabird conservation
- Seabirds as bio-indicators
- Seabirds as part of the ocean's "benefits package"
- Climate change

Conservation Challenges and Multidisciplinary Solutions

- Restoration science
- Fisheries technology
- Economics
- Fisheries management
- Governance
- Sociology
- Communications

Seabirds at the crossroads: Where do we go from here?

Global and regional priorities for marine biodiversity protection

Clinton N. Jenkins

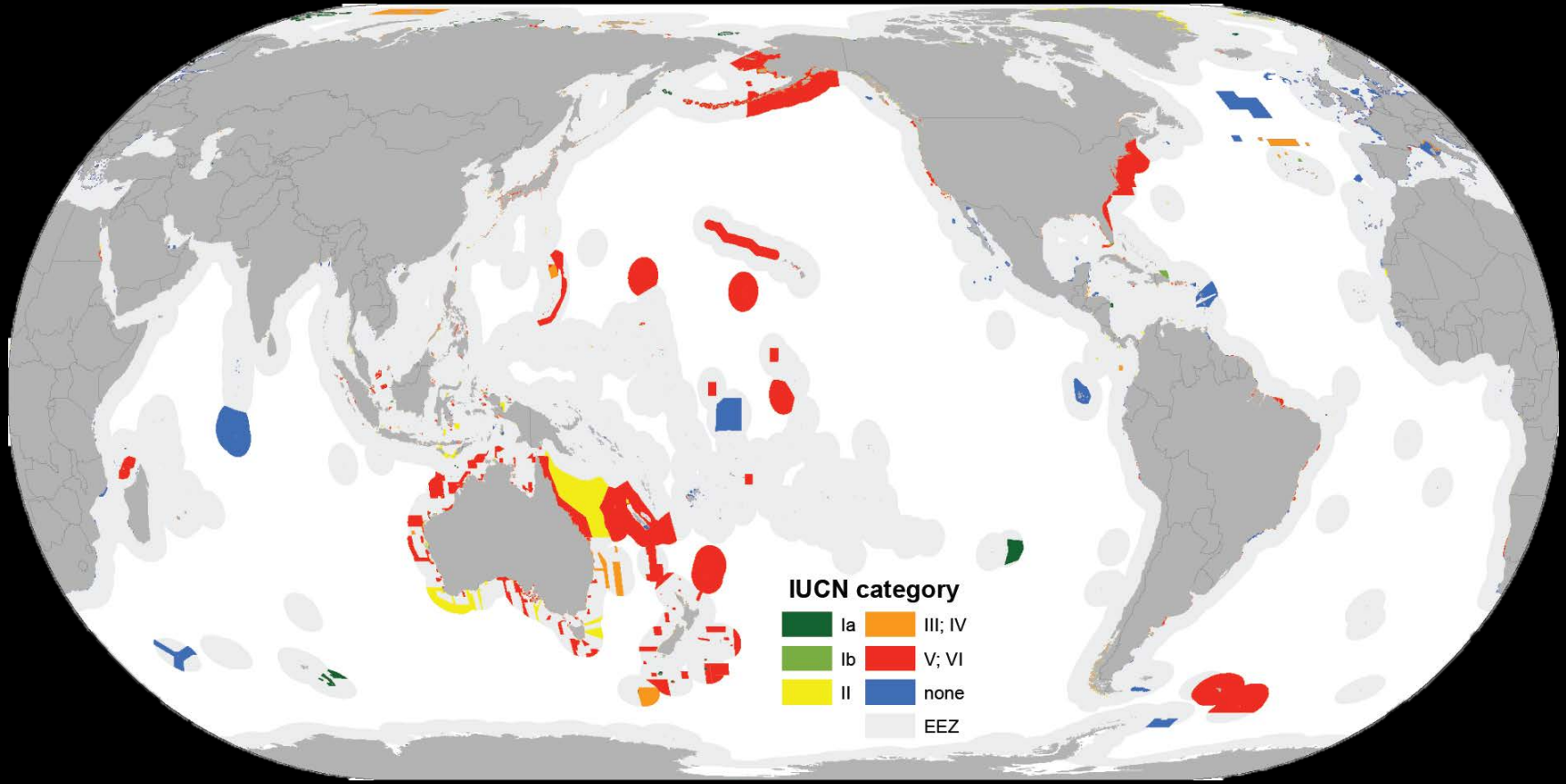
Instituto de Pesquisas Ecológicas (Brasil)

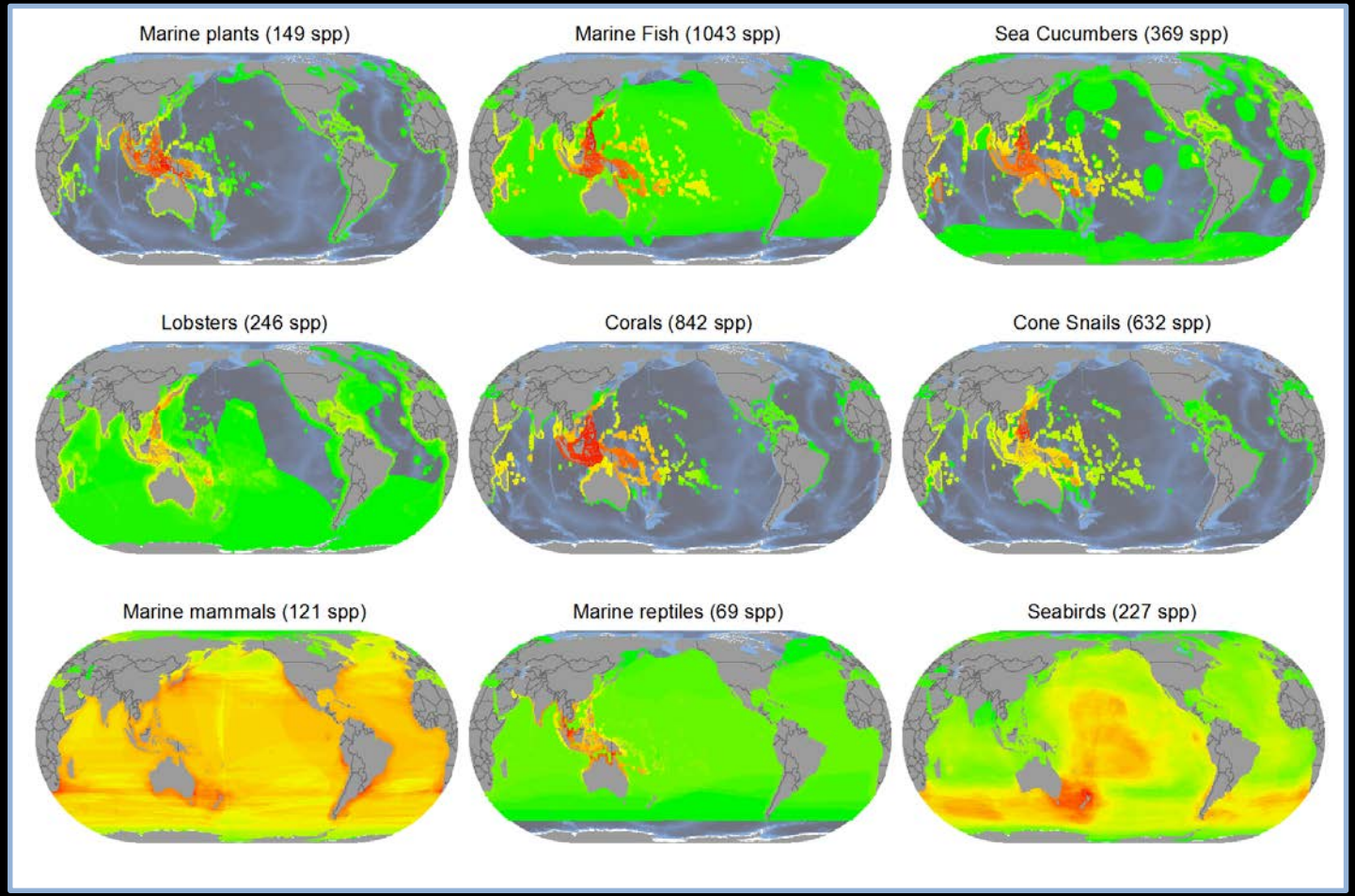
Kyle S. Van Houtan

NOAA Fisheries // Duke University

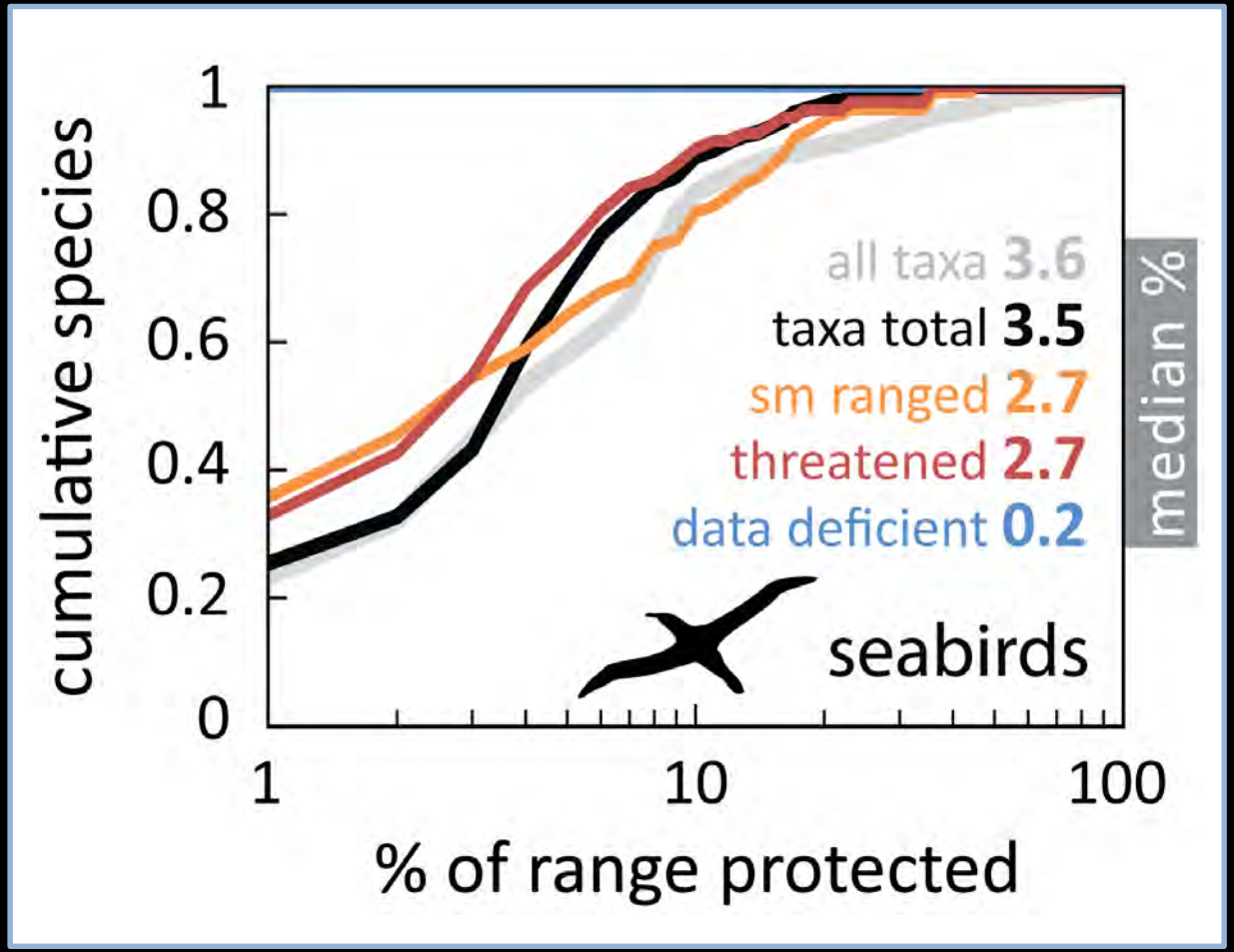
Monterey Bay Aquarium®

global MPA network *



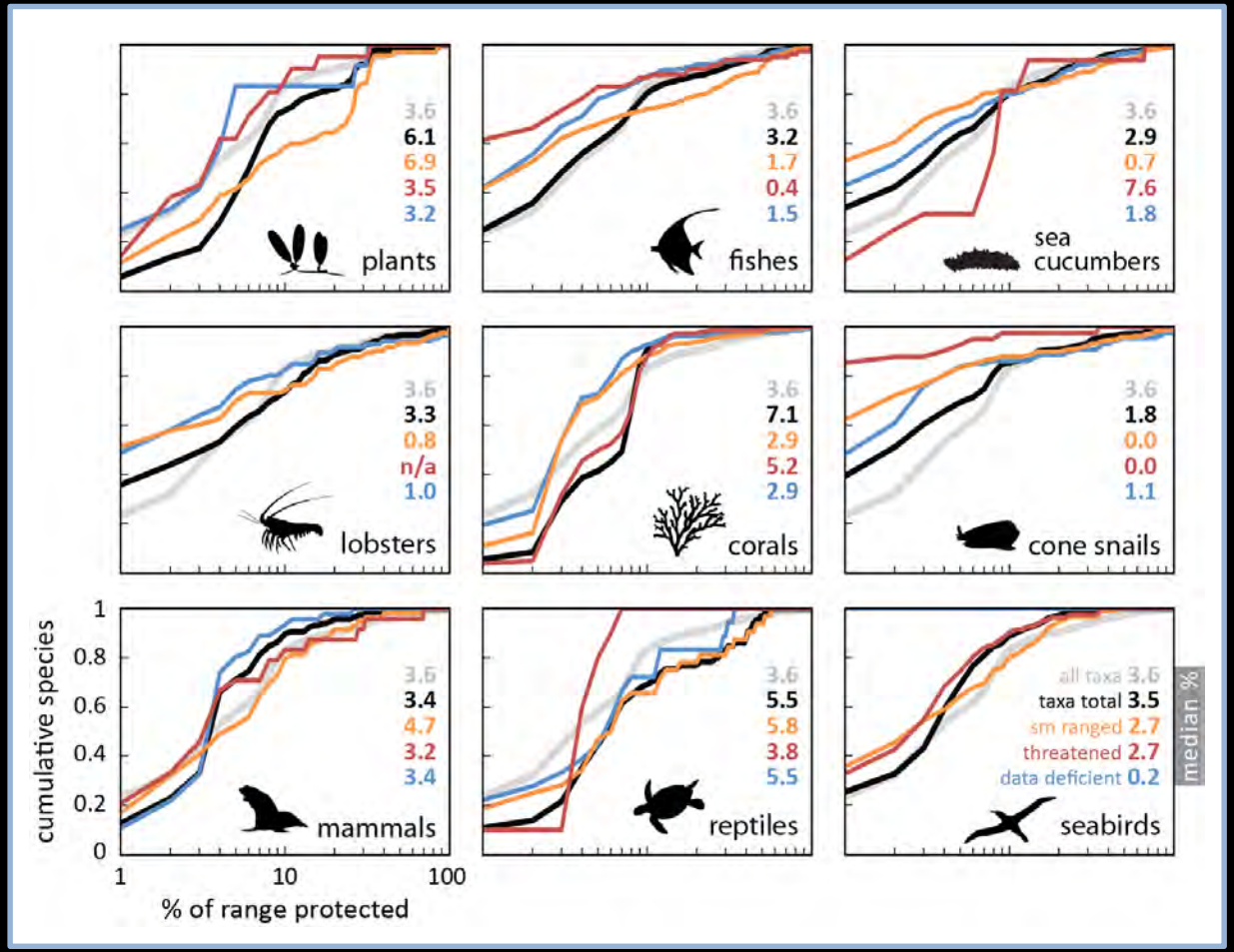


Monterey Bay Aquarium®



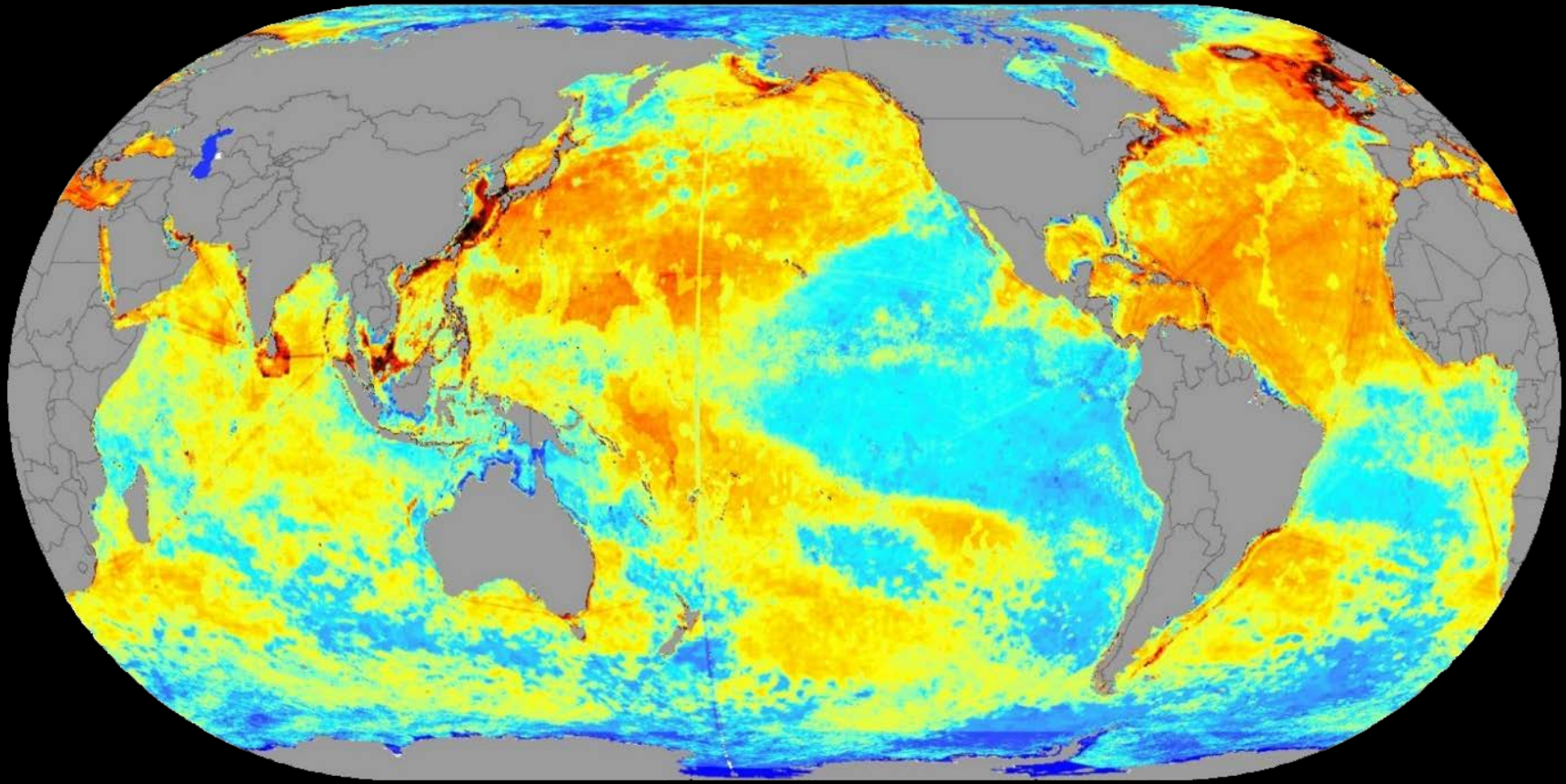
Monterey Bay Aquarium

1 cones
2 fish
3 lobsters
4 seabirds
5 cukes
6 mammals
7 corals
8 plants
9 reptiles

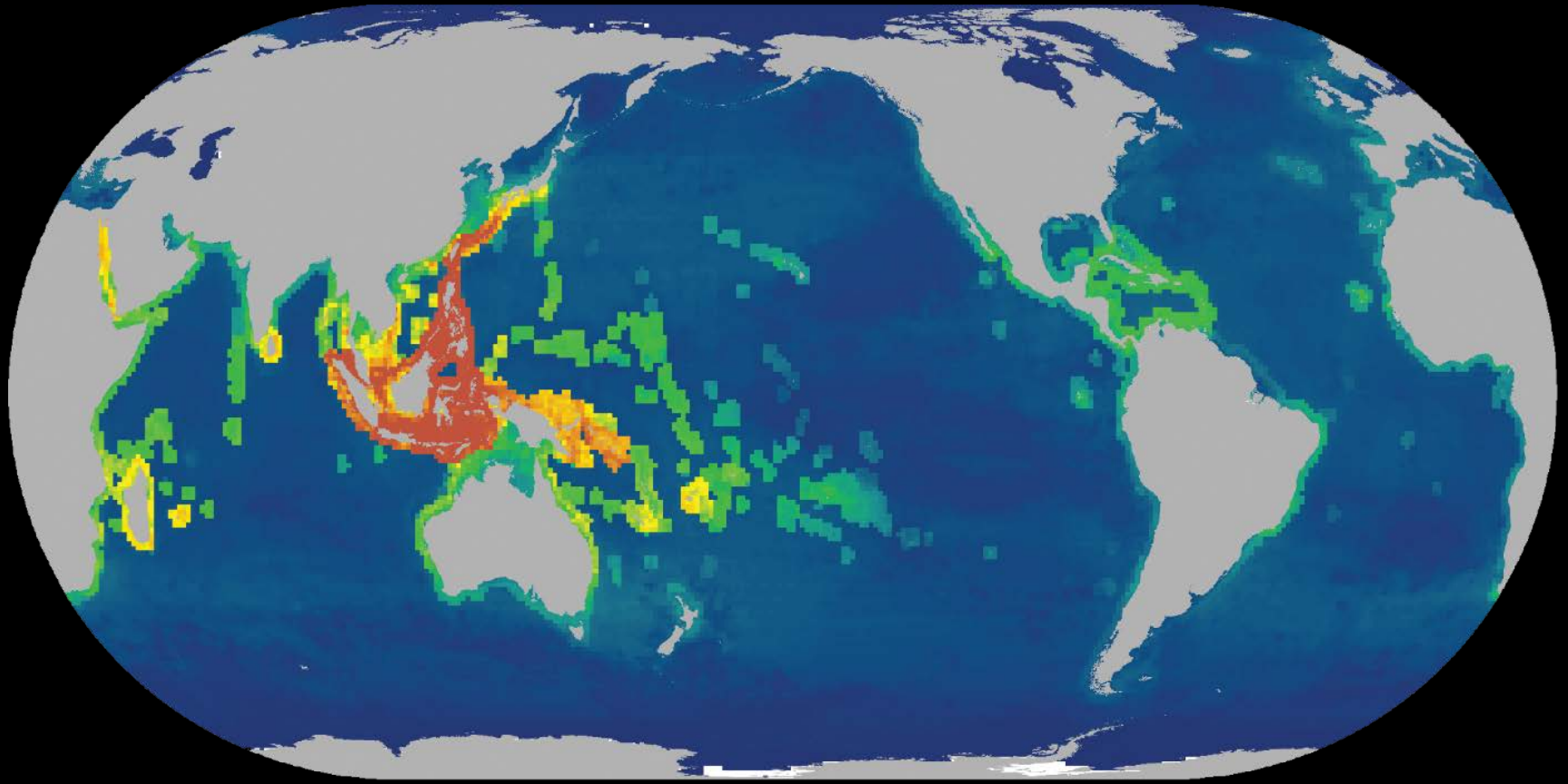


Monterey Bay Aquarium

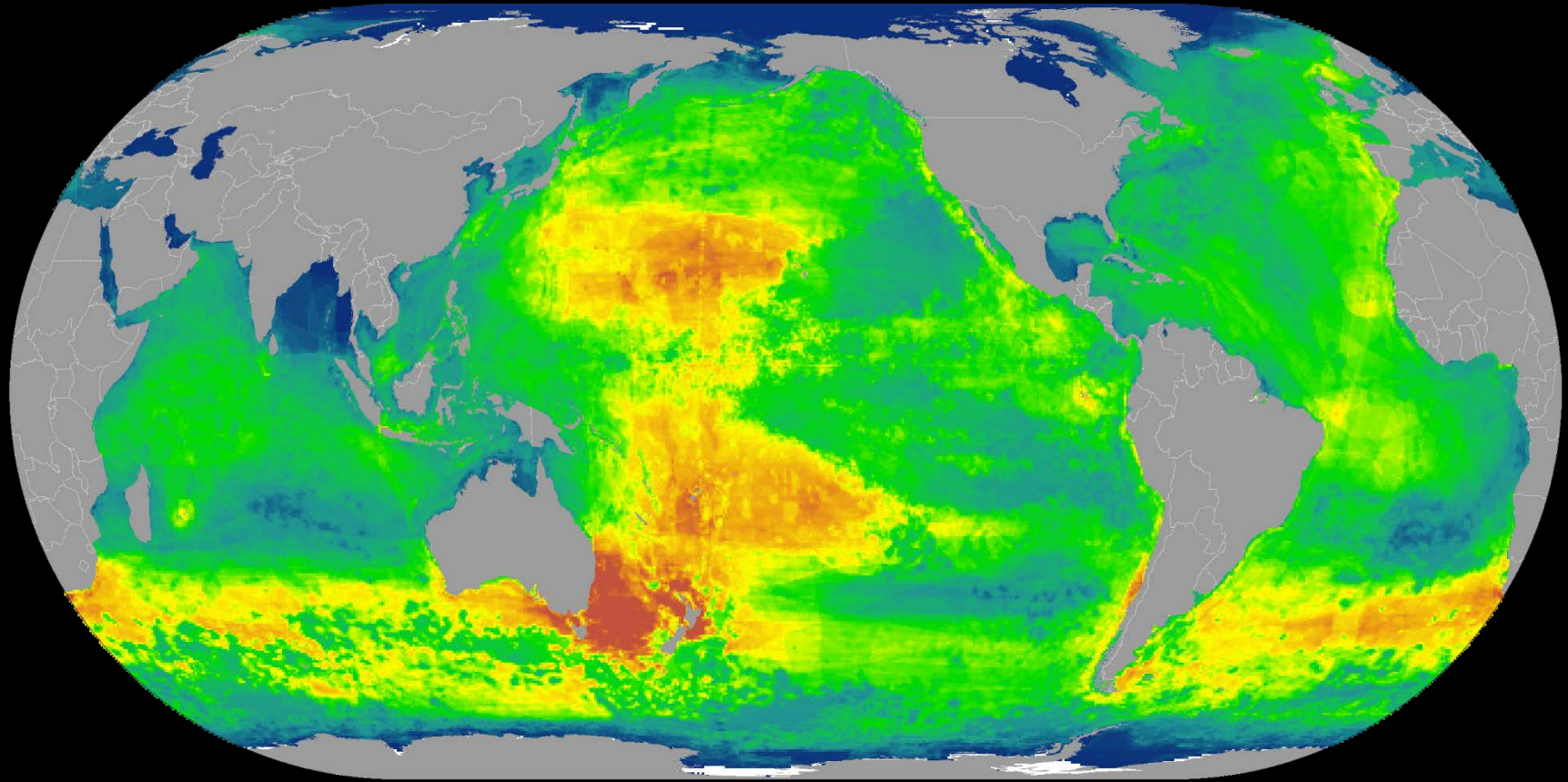
cumulative human impacts



global marine priorities



global seabird priorities



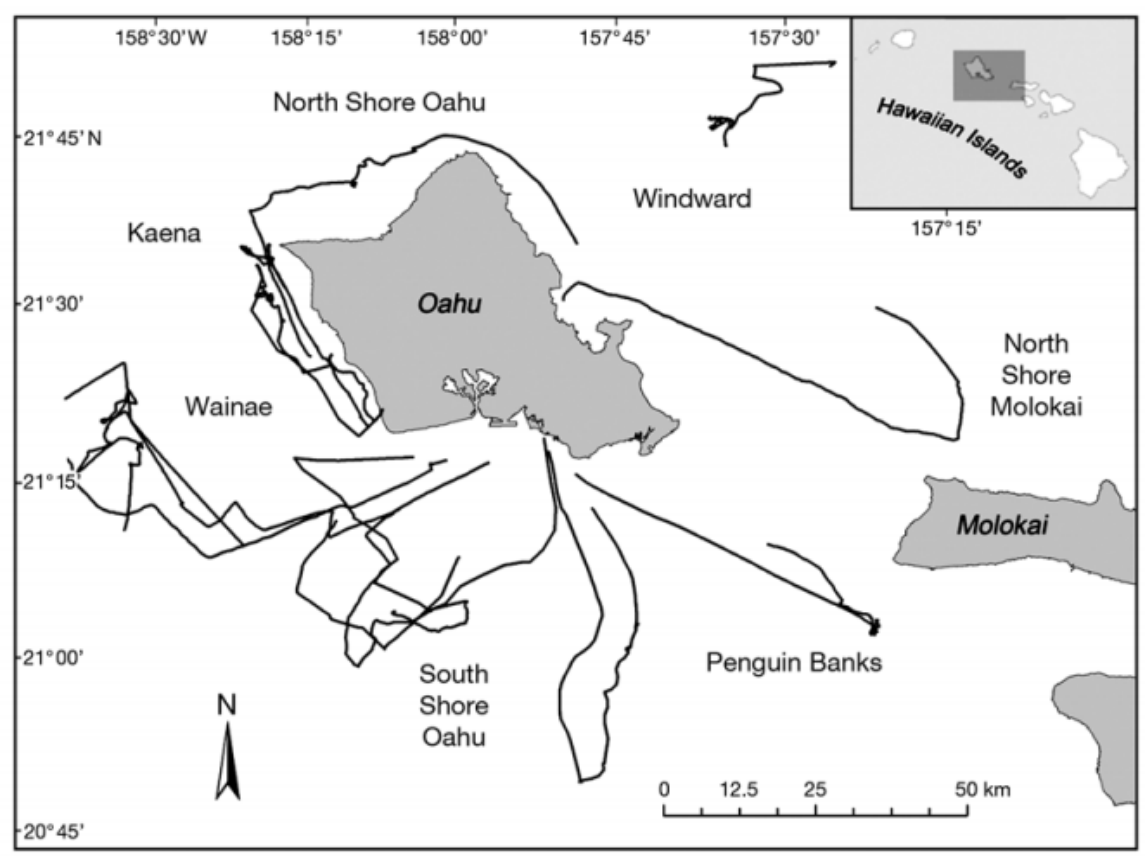
Feathered Oceanographers: Seabirds and Bio-Indicators

David Hyrenbach

Hawai'i Pacific University, Marine Science, Kaneohe, HI

Pelagicos
www.pelagicos.net

Seabird – Tuna Associations Around O'ahu



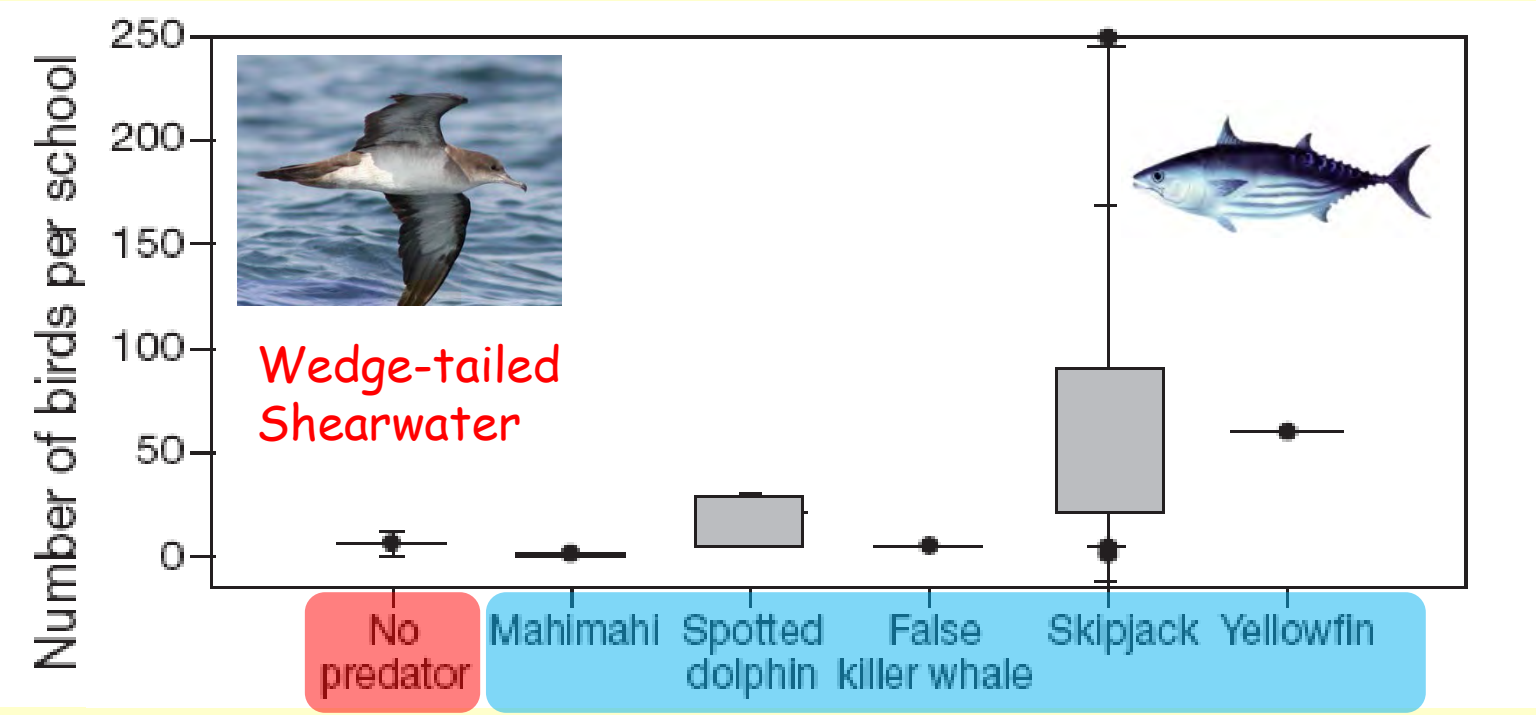
Survey Platform:
Fishing vessels
(comm. & rec.)

62 seabird feeding observations

97 % with
Tunas & Dolphins

(Hebshi et al., 2008)

Species-Specific Associations



Wedge-tailed Shearwater Significantly Associated with Skipjack

(Hebshi et al., 2008)

Take-Home #1: Ecological Associations

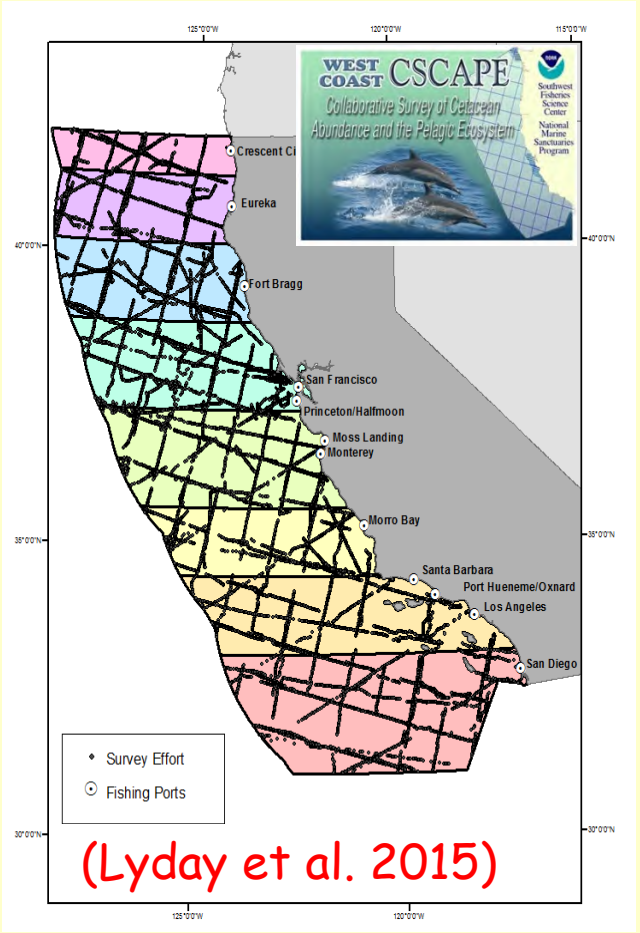
Shearwaters and Small Tunas Forage Together

Shearwaters Predict California Fishery Catches

- Commercial Catch:
  - 4 summers (96, 01, 05, 08)
  - 13 fish / squid species

- Fishery Catch = function of:
  - (latitude) +
  - (MEI) + (PDO) + (NPGO) +
  - (Shearwater Metrics)

- Shearwater Metrics: 6 species
  - Density (# birds / km^2)
  - Behavior (% feeding)



Best Fishery Models Including Shearwater Metrics

- Abundance:

Catch	Shearwater Variable	# Predictors	r^2
MARKET SQUID	Sooty Shearwater Density	5	0.33

- Behavior:

Fishery	Shearwater Variable	# Predictors	r^2
MAHI MAHI	Black-vented Shearwater Feeding	1	0.75

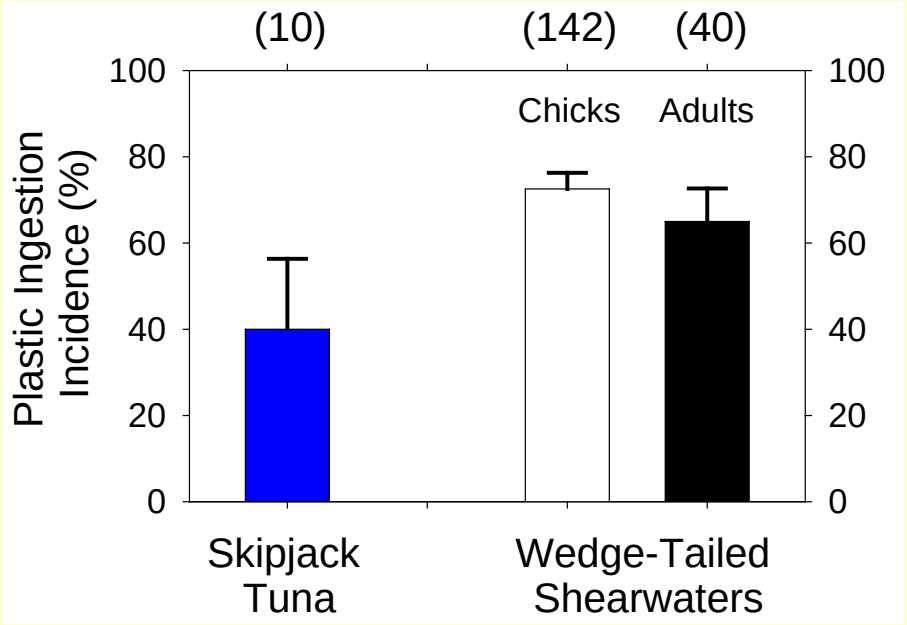
(Lyday et al. 2015)

Take-Home #2: Shearwaters & Fisheries Covariation

Fishery Independent Metrics: Abundance and Behavior

So What ?

Shearwaters & Tunas Share Same Food Web



Way Forward:
Integrated Seabird / Fishery Management

What are seabirds worth?

Summer Martin, Ph.D.
NOAA Pacific Islands
Fisheries Science Center

Photo: Mark Sullivan

Nutrient cycling

100s of km

Carbon
Nitrogen
Phosphorous
Potassium

Top predators

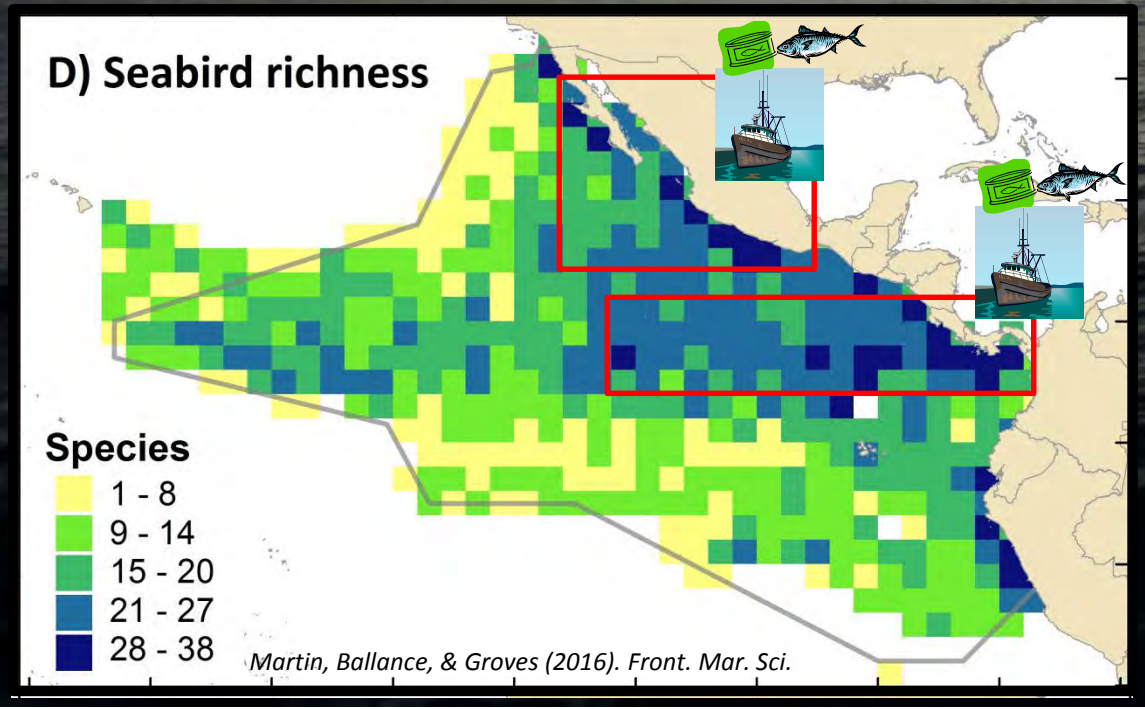
Top-down control

Fish, squid, zooplankton

Food web structure

Maintain ecosystems

Ecosystem indicators



Ocean conditions

Human threats

Fisheries targets

Photo © Nick Hall; blog.nature.org

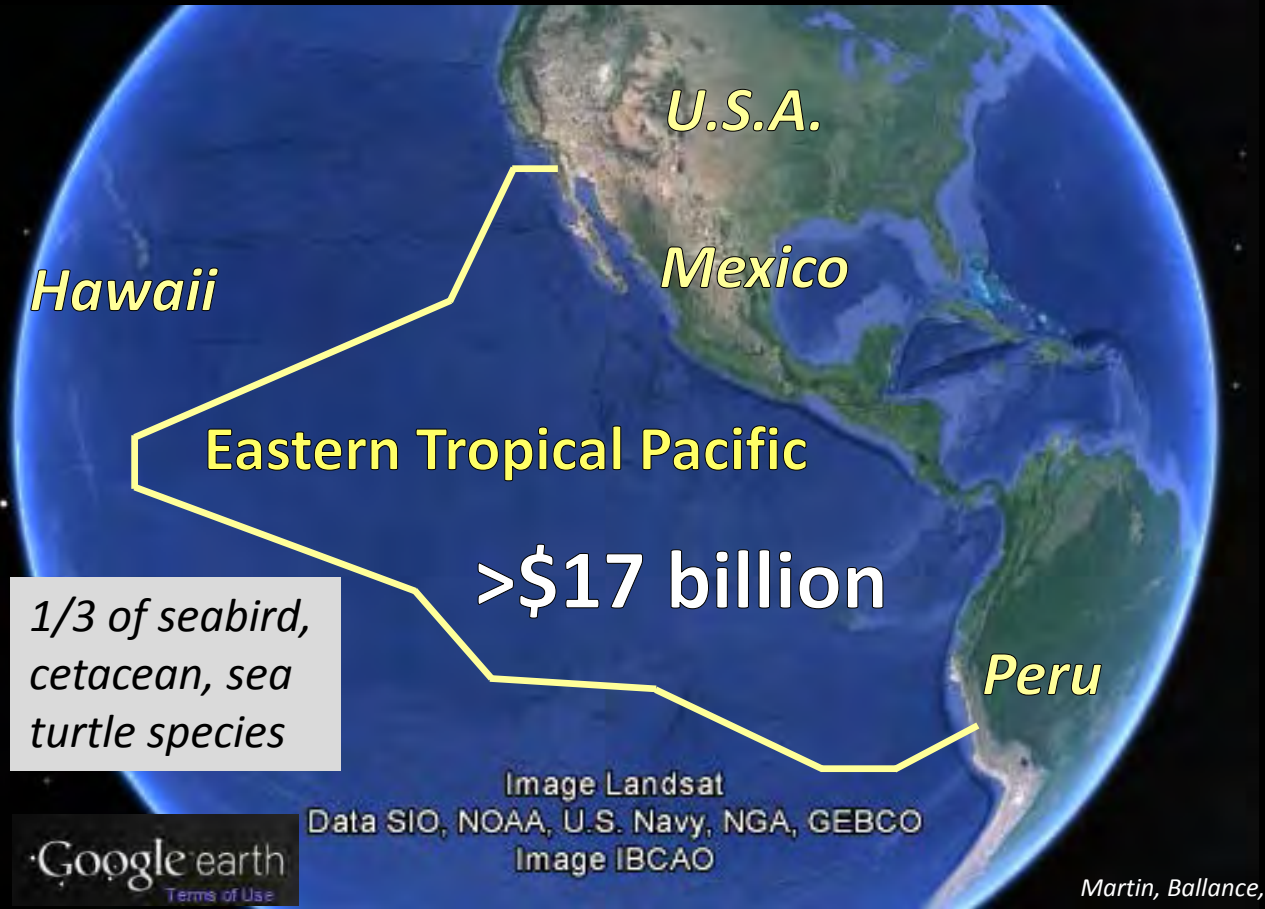
Ecotourism

Global whale-watching
$2 billion/yr

Galapagos
$400 million/yr
145,000 visitors

All photos: Mark Sullivan

Quantify benefits



Commercial fisheries:
$3 B/yr

Carbon storage
$13 B/yr

Recreational fishing
$1 B/yr

Biodiversity
conservation
research
tourism
$100 M - $1 B

Martin, Ballance, & Groves (2016). Front. Mar. Sci.

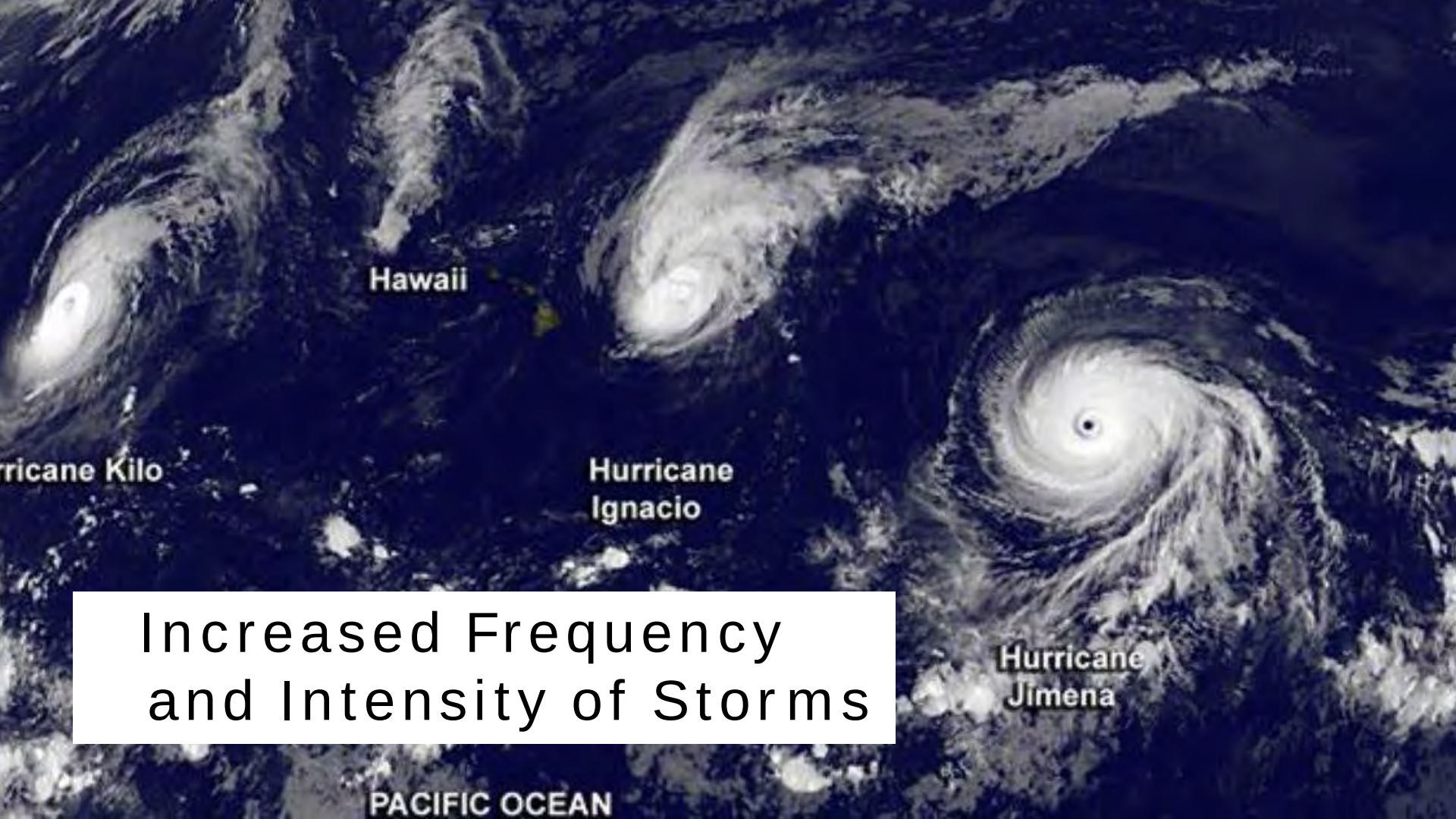
Seabirds: part of the ocean's "benefits package"

Racing Climate Change to the Crossroads

Elizabeth Flint & David Duffy

Changes to food web due to shifts in ocean chemistry circulation, and temperature affecting productivity and species distributions

Changing incidence and distribution of pathogens, parasites, and organisms producing marine toxins



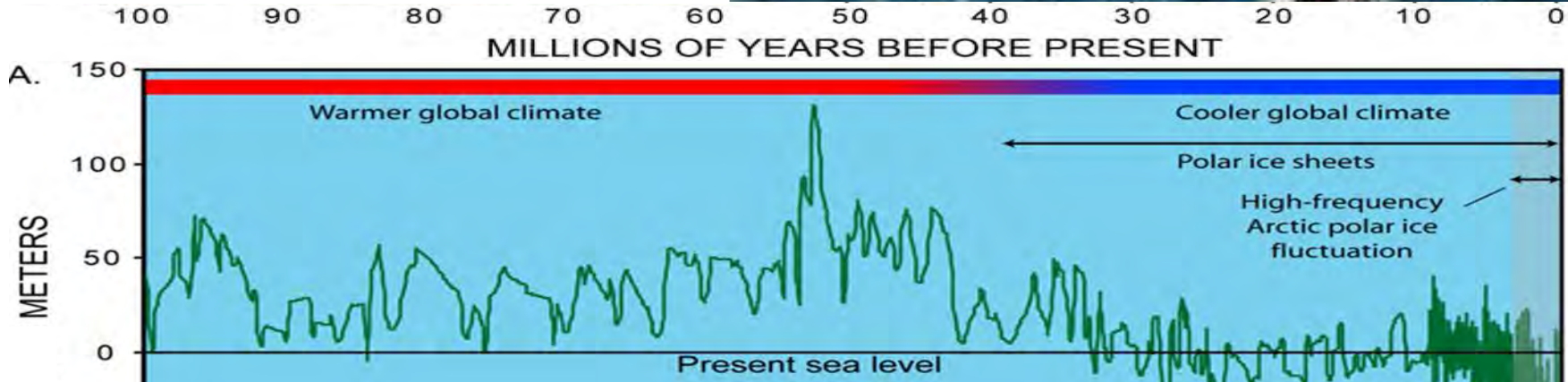
Increased Frequency and Intensity of Storms

Sea level rise resulting in more frequent wave-driven inundation events and eventual loss of all low-elevation nesting islands

Most high elevation islands infested with non-native mammals

18-day old Newell's Shearwater chick
Brenda Zaun, USFWS

All the modern orders of seabirds survived sea levels greater than 140 meters above what they are now – Will they survive the Anthropocene?



Bonin Petrel *Pterodroma hypoleuca*

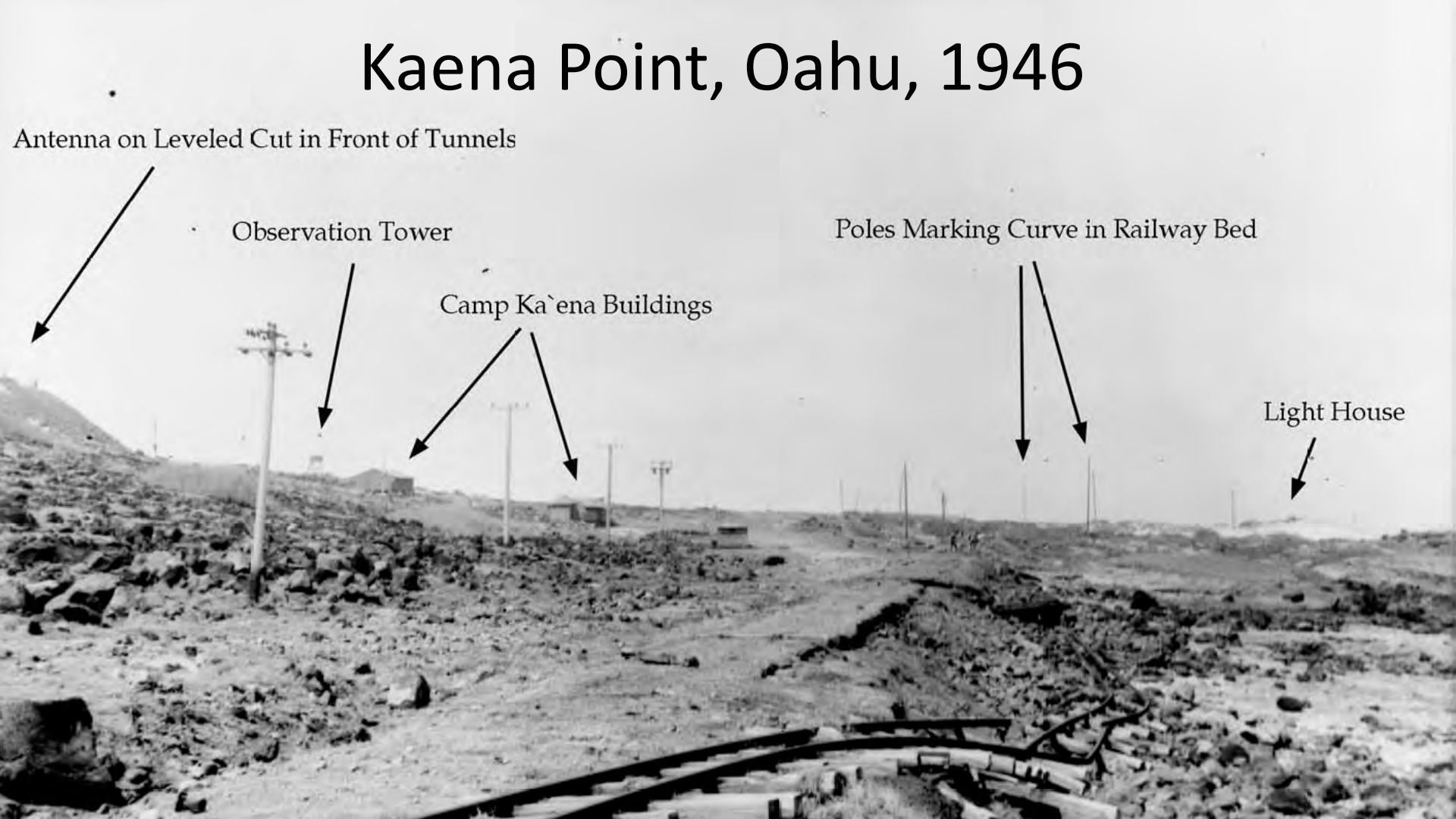
Restoration science: combining passive and active seabird restoration techniques

Dr. Lindsay Young
Executive Director
Pacific Rim Conservation

Types of seabird restoration

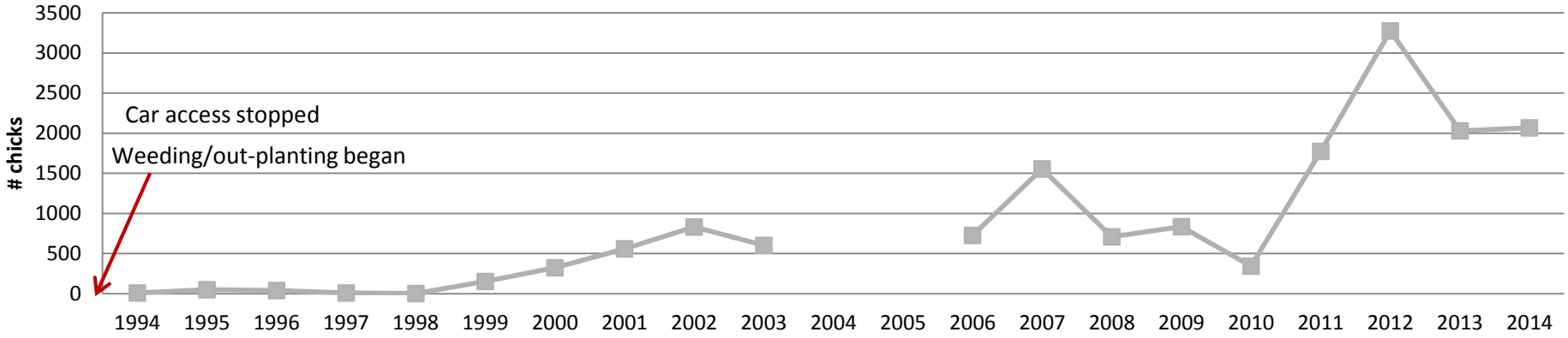
- Restoring the nesting habitat:
  - Modifying vegetation & substrate
  - Removing non-native predators
- Restoring the birds
  - Passive restoration (attract them)
  - Active restoration (translocate/move them)

Kaena Point, Oahu, 1946



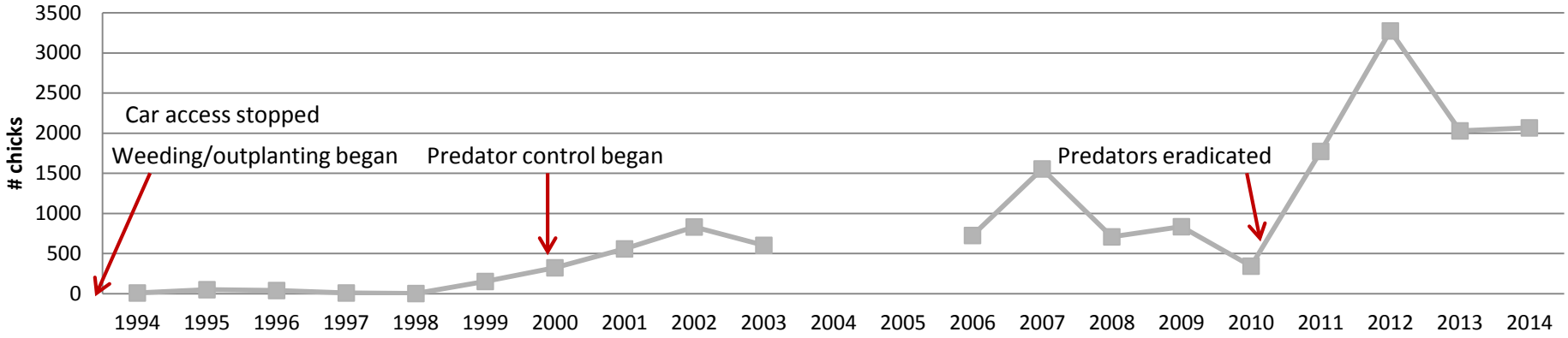
Today

Shearwater chicks at Kaena Point



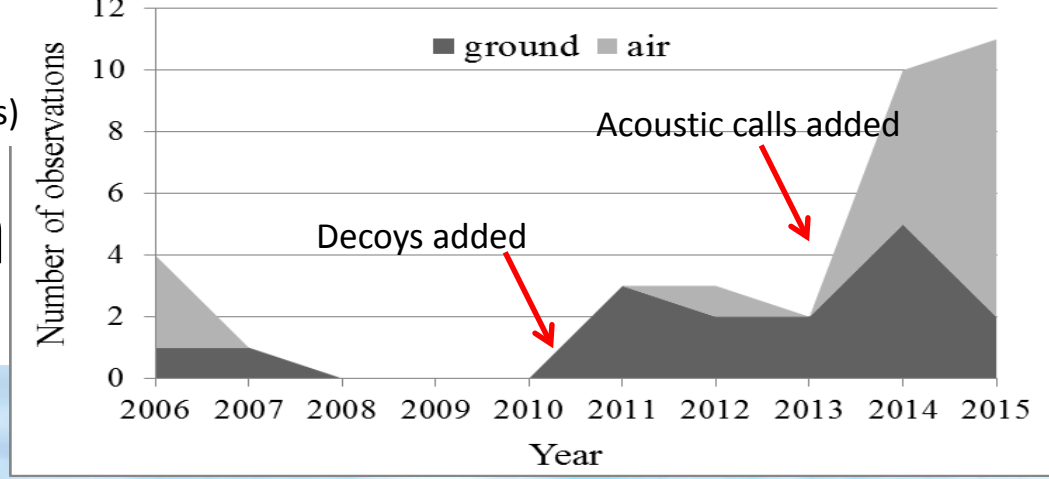
Predator control & eradication

Shearwater chicks at Kaena Point



Passive restoration:

social and acoustic attraction (decoys & broadcasting calls)



Young, L.C. and E.A. VanderWerf. 2016. *The beginning of Black-footed Albatross colonization on Oahu, Hawaii.* Elepaio. 76:1-4

Active restoration: translocation

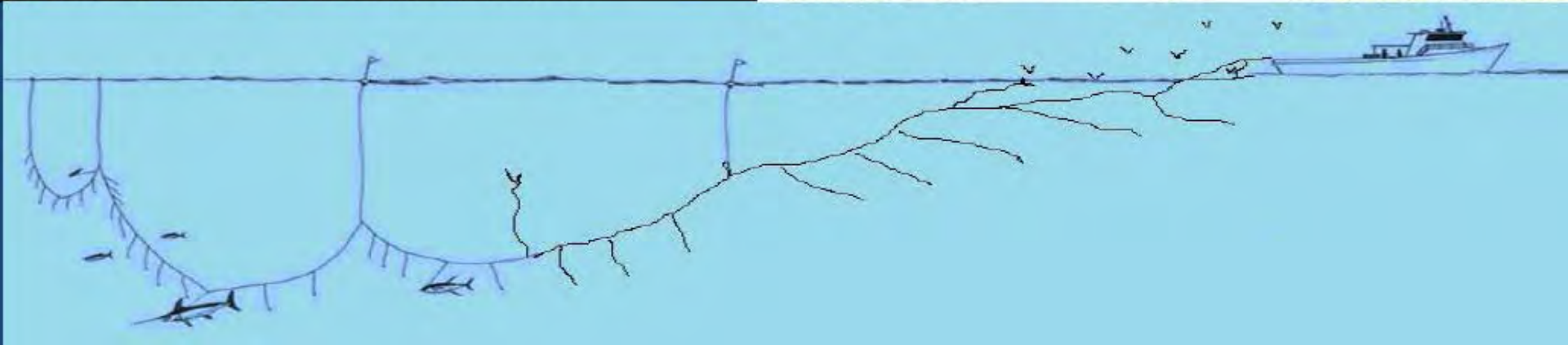
Partners

Mitigating Seabird Bycatch in Longline Fisheries & Fishery-dependent Seabird Data Underpinning Ecosystem-based Management

IUCN WCC – 4 Sept. 2016

Eric Gilman, FisheriesResearchGroup@gmail.com

G Robertson's overused but highly emotive photo



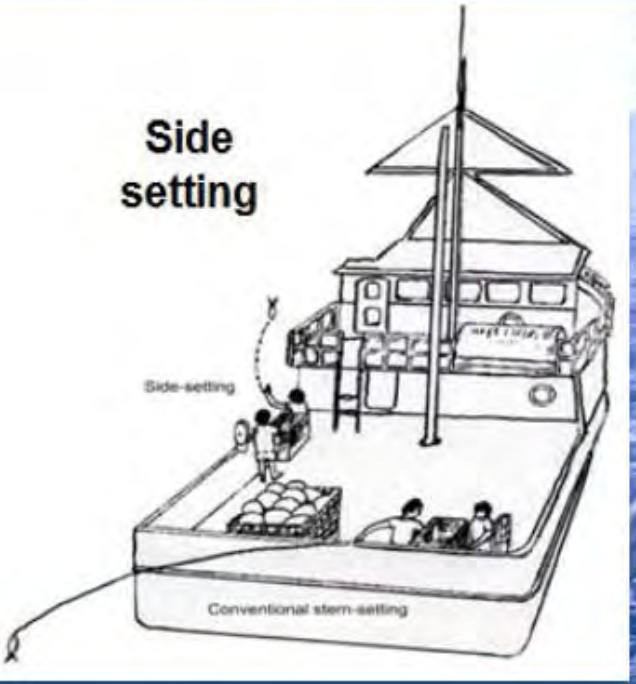
Sources of Unobserved Fishing Mortality

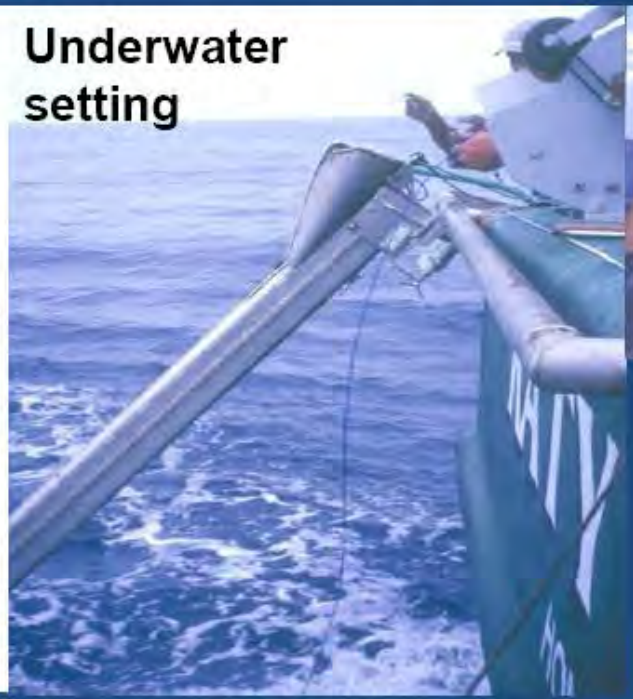
- Half of birds caught during setting not on the gear by the haul
- Death of breeding albatross → chick starves, delay for remaining bird to mate again
- Ghost fishing mortality

Weighted branchlines

Tori Line

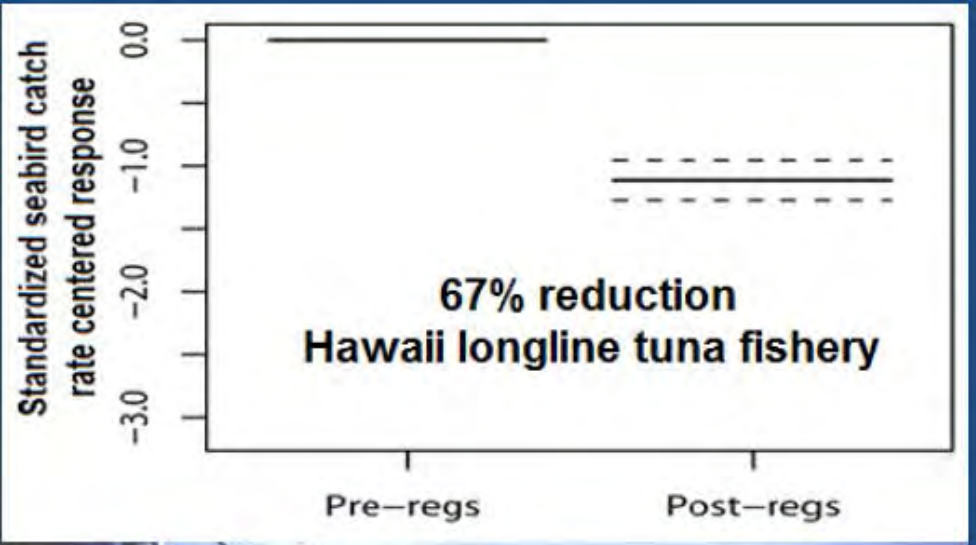
Tori Line





Underwater setting

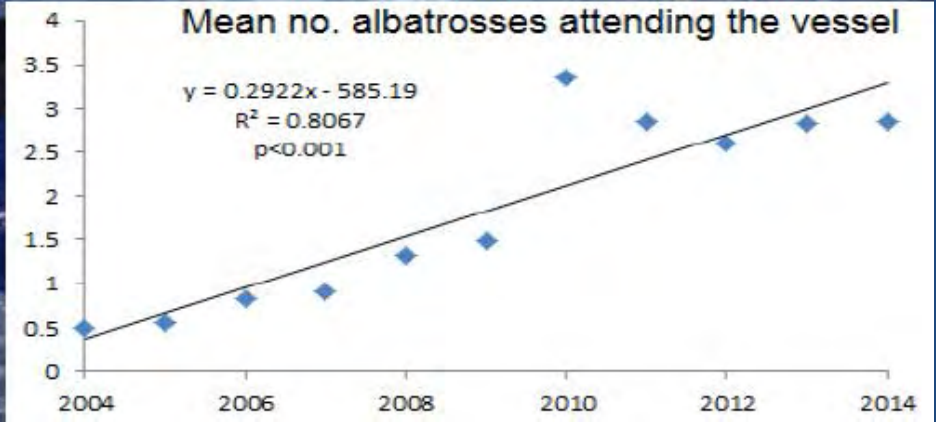
Blue-dyed bait



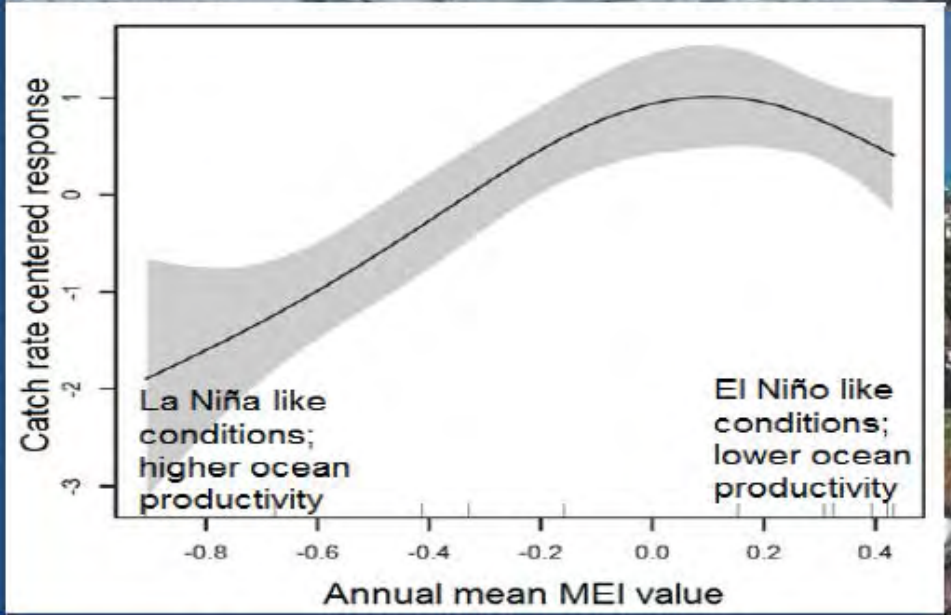
- Fishery-specific efficacy
- Commercial viability
- Cross-taxa conflicts

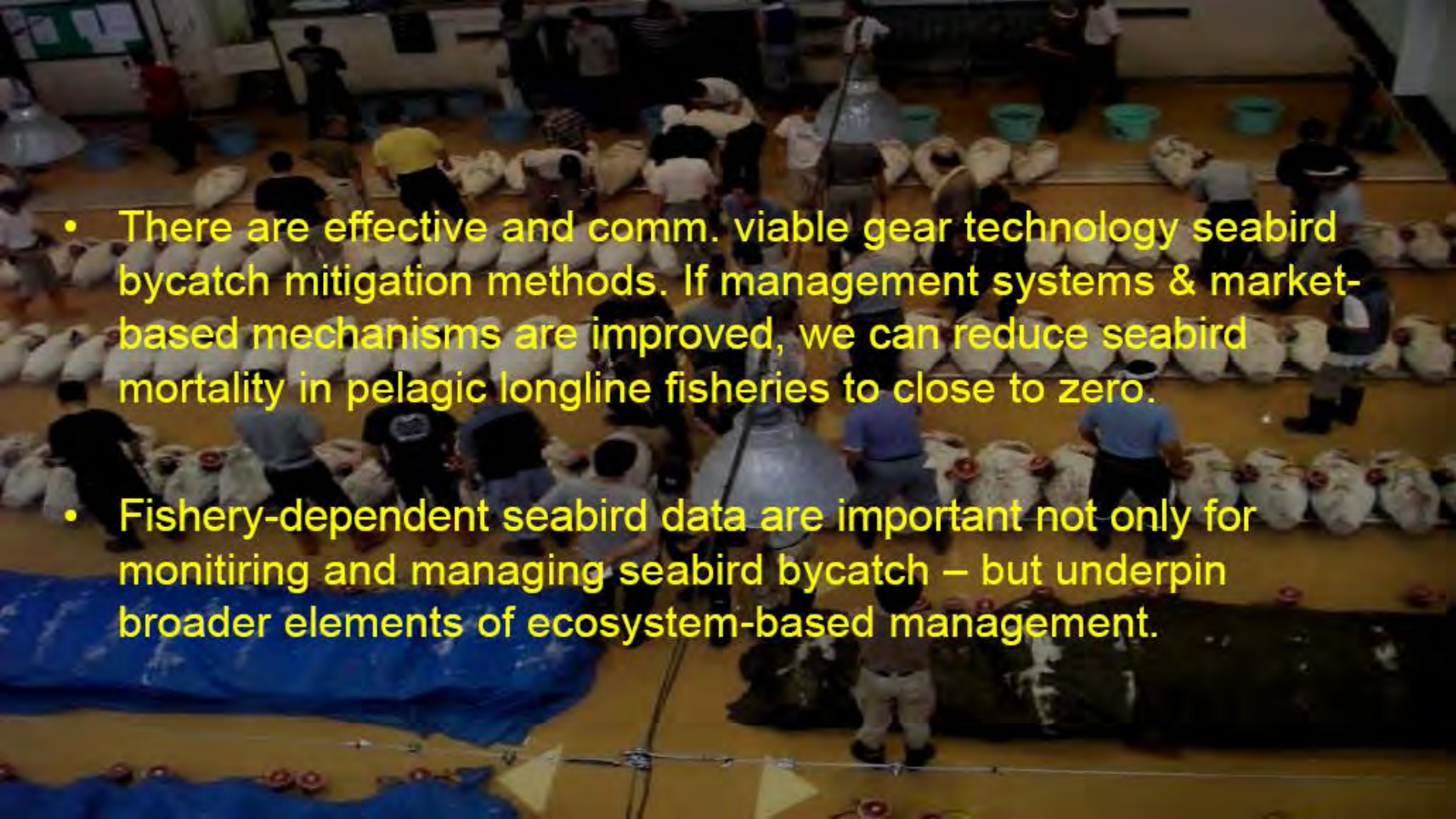
NMFS, 2016

NMFS, 2016




ISSF & Birdlife


Catch rate centered response
1
0
-1
-2
-3
La Niña like conditions; higher ocean productivity
El Niño like conditions; lower ocean productivity
-0.8
-0.6
-0.4
-0.2
0.0
0.2
0.4
Annual mean MEI value



- There are effective and comm. viable gear technology seabird bycatch mitigation methods. If management systems & market-based mechanisms are improved, we can reduce seabird mortality in pelagic longline fisheries to close to zero.

- Fishery-dependent seabird data are important not only for monitiring and managing seabird bycatch – but underpin broader elements of ecosystem-based management.

Economics: Incentives-Based Approaches to Mitigate Bycatch

Dale Squires

Why Should You Care About Economic Incentives?

- Compared to direct regulation:
  - more effective,
  - higher compliance,
  - lower costs,
  - more innovation.
- Least-cost bycatch reduction gives more conservation with limited budgets.

Economic Incentives Change Behavior

- Incentive-based policy instruments create prices and markets for bycatch
- No prices and costs mean overexploitation
- Put cost upon otherwise unpriced or underpriced bycatch (“stick”)
- Create price premiums (“carrot”)
- These change behavior of fishers and consumers

Mitigation Hierarchy At-Sea

- Economic incentives give least-cost bycatch reduction ($/seabird)
  - Within *and* across steps
- Rather than mitigate to maximum extent practicable

Step 1: Avoidance

- Avoidance through fisheries closures
  - Create costly foregone fishing opportunities
  - Transfer effects
- Instead, least-cost, incentivized avoidance through real-time spatial management
  - Example: Transferable bycatch credits for salmon with Alaskan pollock fishery
  - Example: TurtleWatch

Step 2: Minimization

- Short-Run:
  - Technology standards
  - Example: Tori lines
- Long-Run:
  - Economic policy instruments and consumer markets incentivize bycatch-reducing technological change

Step 3: Remediation of Population

- Not applicable on fishing grounds with seabirds.
- Instead, elsewhere in life cycle:
  - Rookeries: reduce mortality of eggs and juveniles
  - Other fisheries: reduce adult mortality
  - Achieve through incentive-based policy instruments
- Prices and costs bycatch
- Least-cost alternative to fisheries closures

Step 4: Residual - Offsets

- Elsewhere in life cycle rather than at-sea
- Prices and costs bycatch
- Can be least-cost

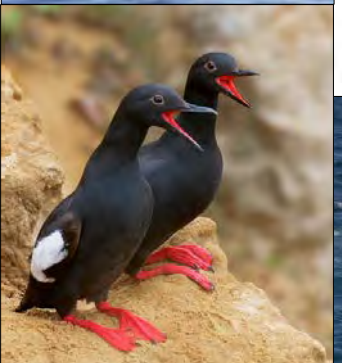
Market Information

- Insufficient bycatch information in markets.
- Information created by:
  - Eco-labeling -- creates price premium
  - Standards & certification -- price and cost bycatch
- Incentivize changes in consumer, supply chain firms, & fisher behavior

Seabird competition with fisheries?

Charlotte Boyd PhD
University of Washington





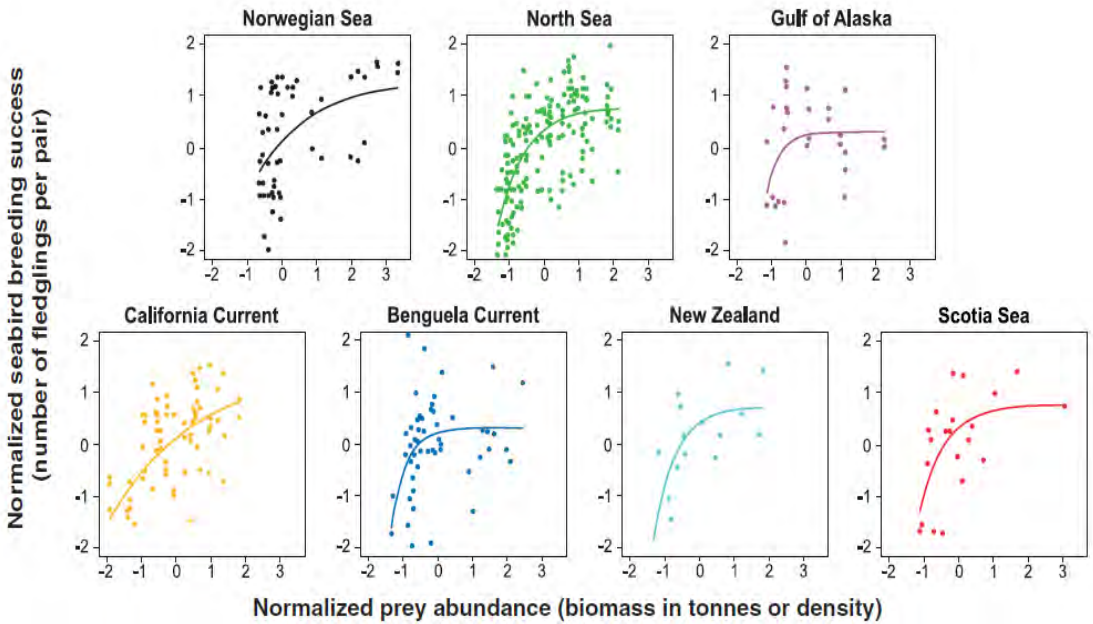
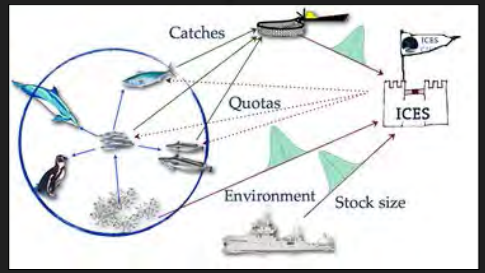
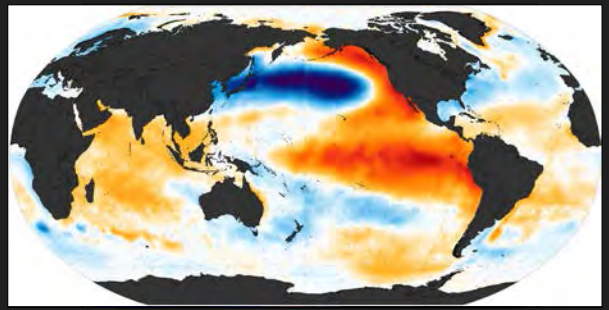



Fig. 3. Relationship between normalized annual breeding success of pooled seabird species and normalized prey abundance for the seven different ecosystems using the most parsimonious asymptotic model (table S2).

Cury et al. 2011 *Science*



Catches
Quotas
ICES
Environment
Stock size

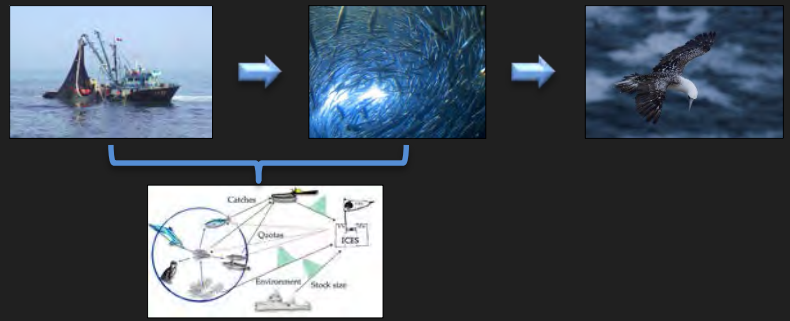
abundance

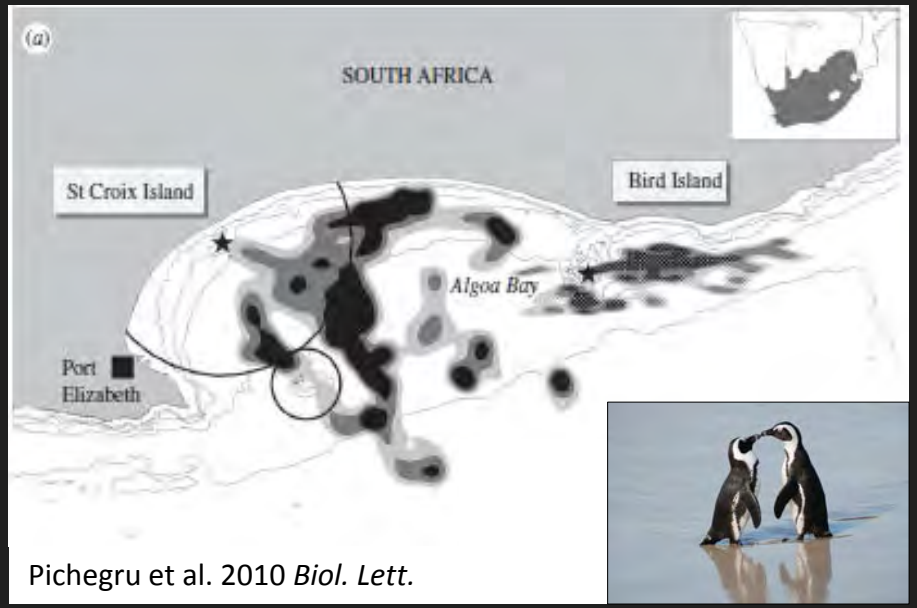


distance

depth

concentration





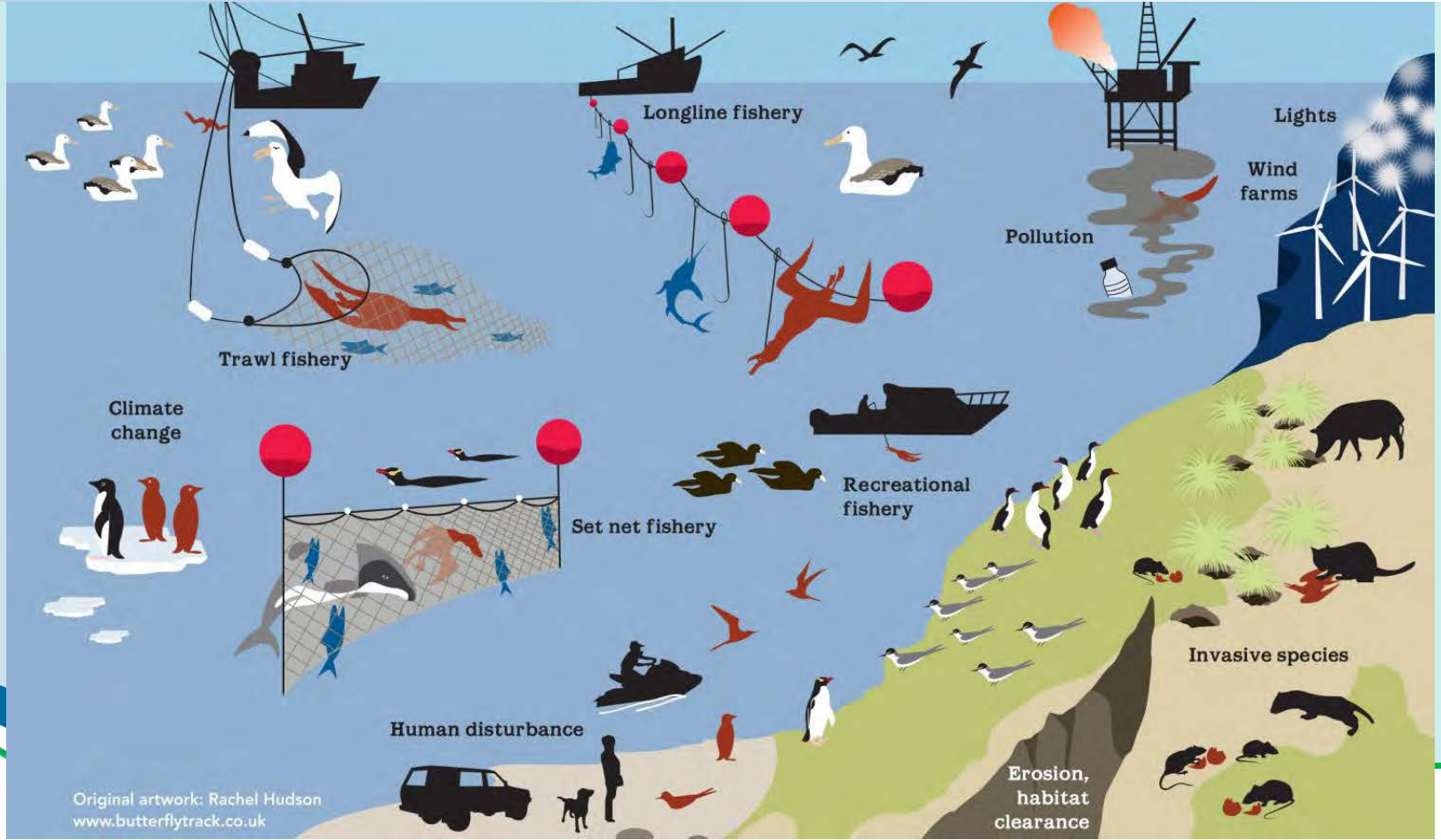
Pichegru et al. 2010 *Biol. Lett.*

Protection of Seabirds through RFMOs

Progress, Challenges and opportunities

Karen Baird

Seabird threats/actions:IAS, bycatch, MPA



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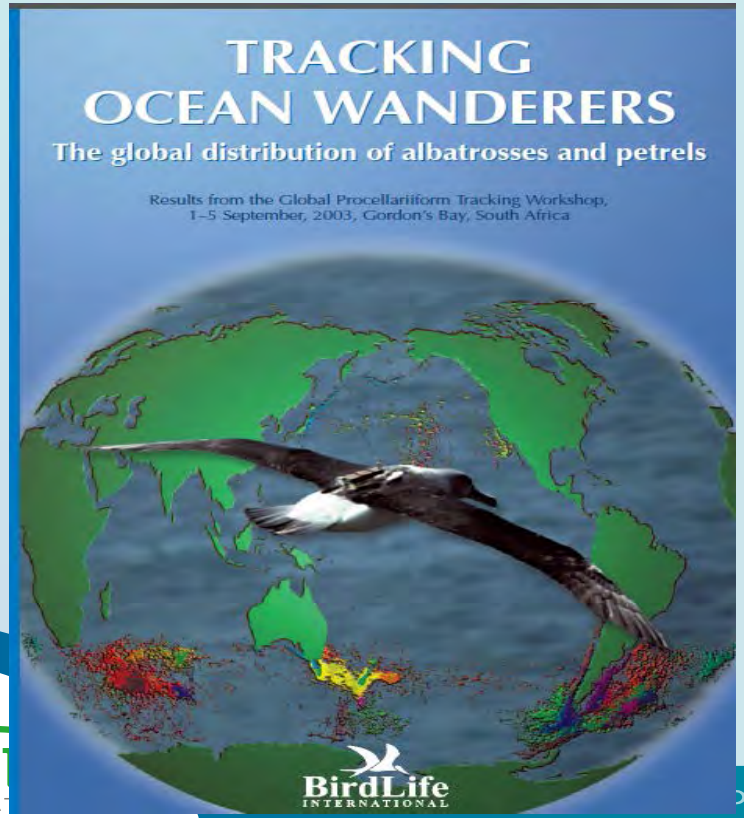
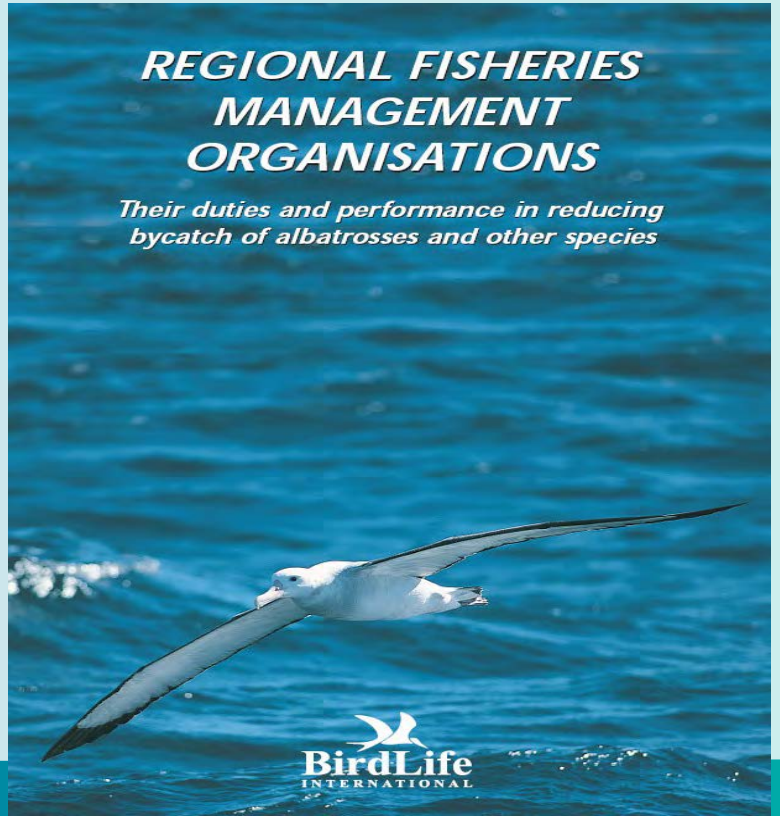
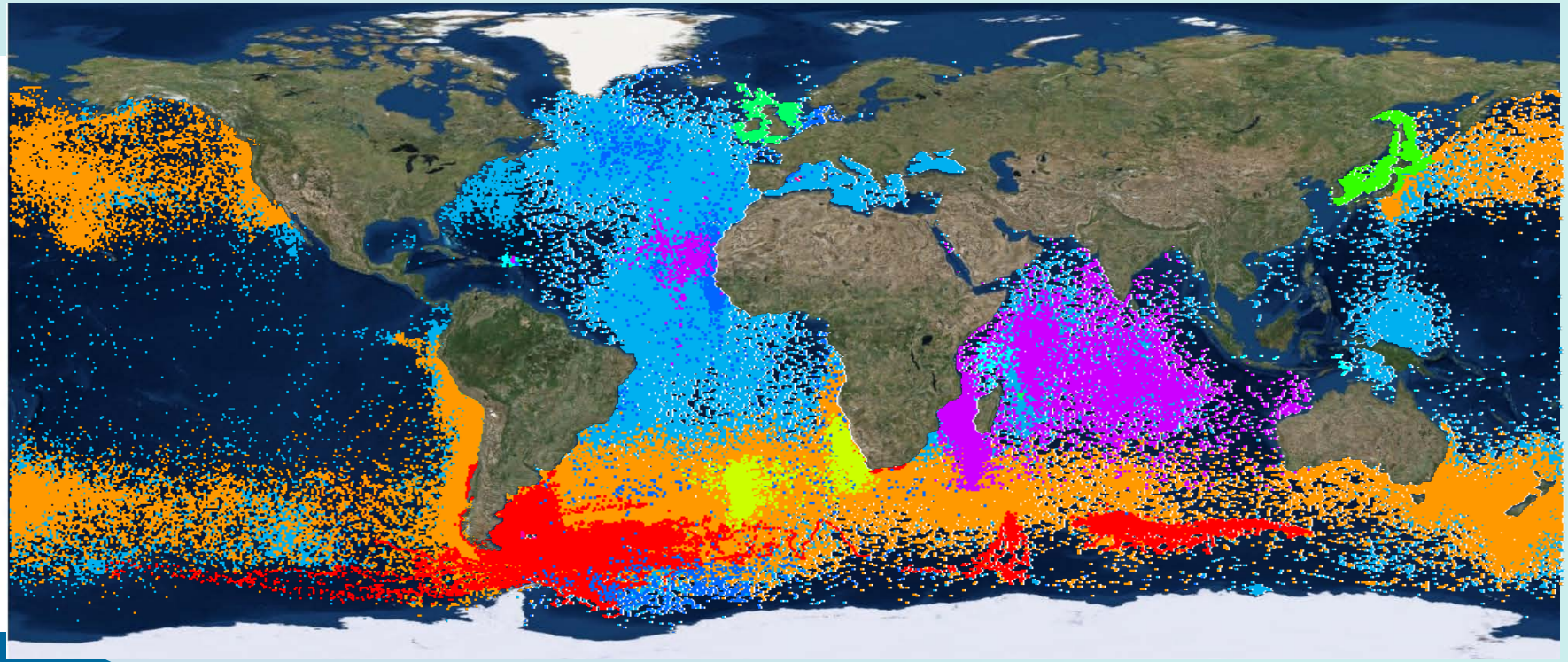
2004: Regional Fisheries Management Organisations





Seabird Tracking Database Oct 2015



>150 contributors | >100 species | > 5 million locations

12 families | 250 colonies | 14,000 tracks

BirdLife INTERNATIONAL

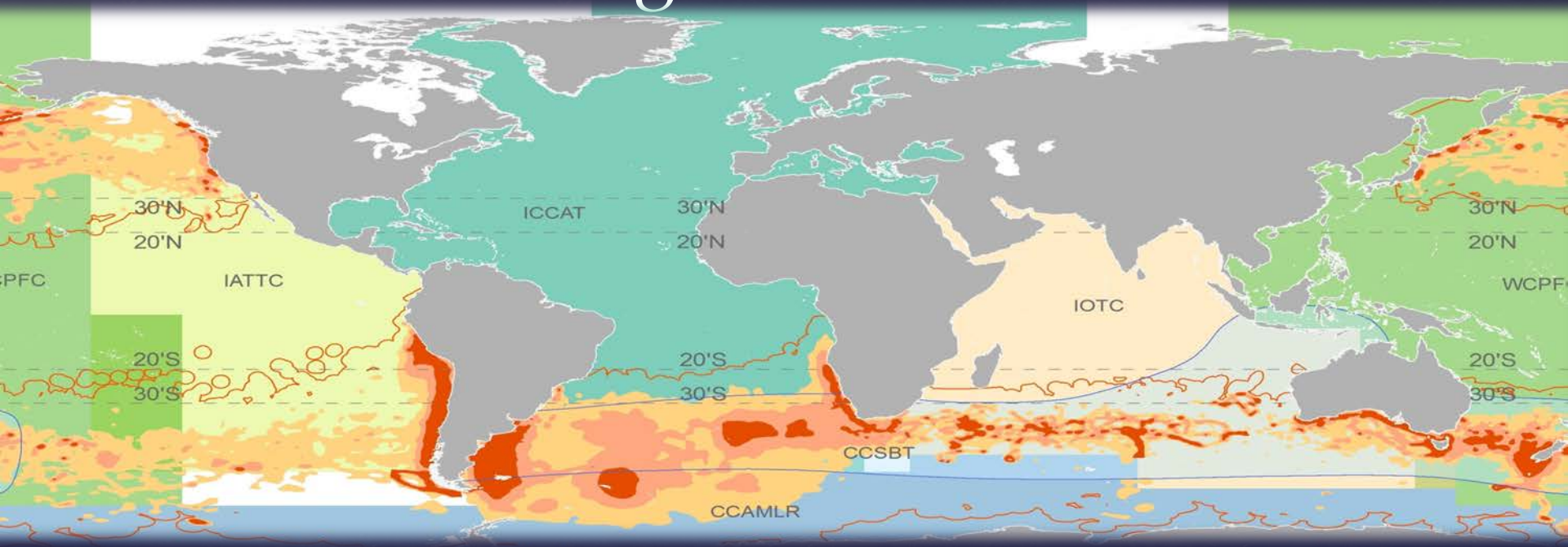
Partnership for nature and people

RFMOs: Legal Framework & Ecologically Related Species

- UN Fish Stocks Agreement 1995
- Code of Conduct for Responsible Fisheries 1995

Code 7.2.2.g: pollution, waste, discards, catch by lost or abandoned gear, catch of non-target species, both fish and non- fish species, and ***impacts on associated or dependent species are minimized***

2004: Regional Fisheries Management Organisations



CCMLR 95% reduction; but 80% albatross distribution OUTSIDE CCMLR

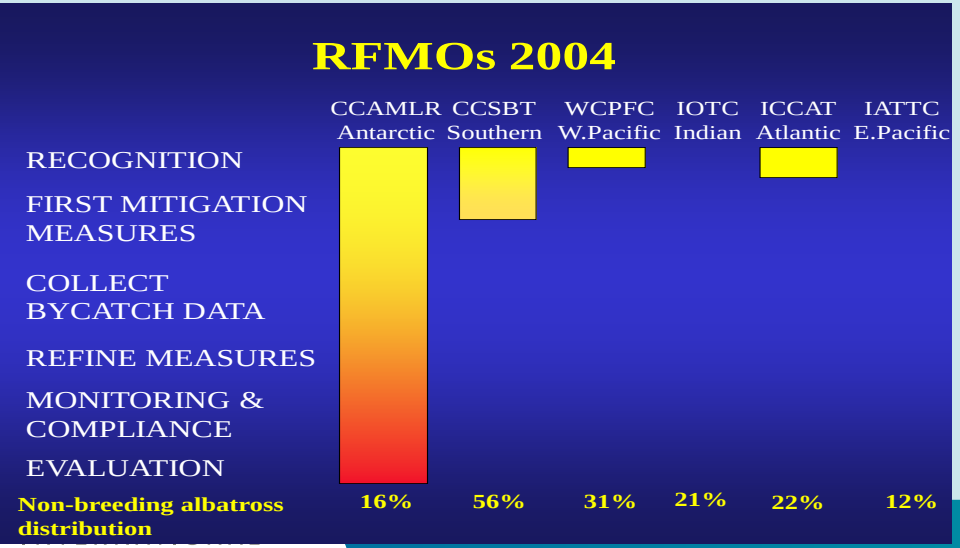
ATF working directly with fishermen

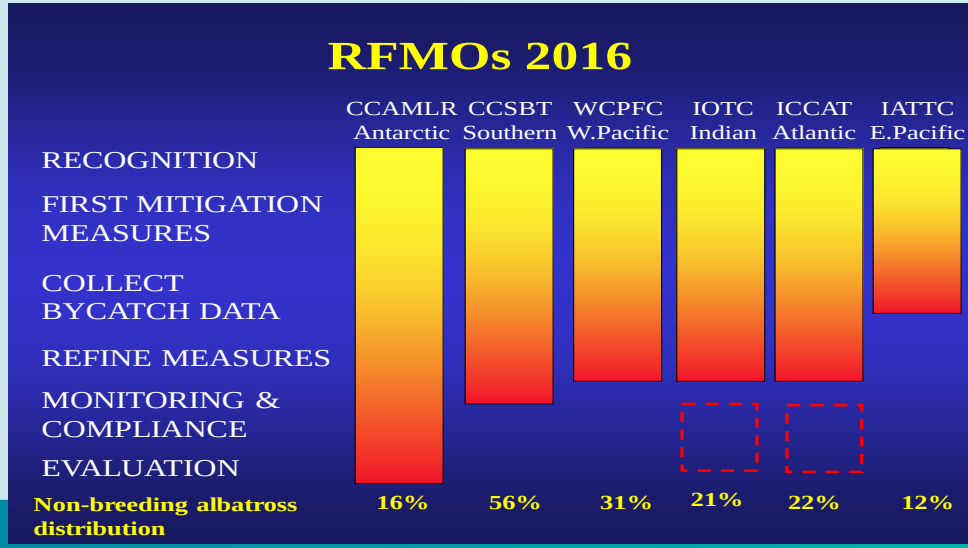
WCPFC Bali 2015 top down approach

Tuna RFMO Seabird Success

All tuna longline vessels in areas overlapping with albatrosses are now required to use seabird bycatch mitigation measures *

(* with a few exceptions)





Lessons from RFMO seabirds

- Success from collaboration (need combination of science input, practical engagement with fisheries, & policy/advocacy)
- If compelling conservation case, then regulations can be achieved in 3-4 years; but still need:
  - Support to fleets for implementation
  - Better compliance monitoring (EM?) and bycatch data reporting
  - Evaluation (joint RFMO?) data sharing protocols

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The Future :Electronic Monitoring

A. Middleton

Community-based solutions for lasting seabird protection:

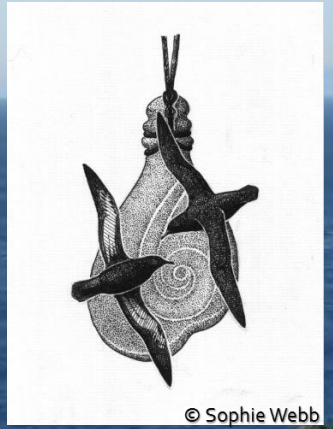
Lessons from a decade of island conservation

Michelle Hester, Executive Director
Oikonos Ecosystem Knowledge

When Seabirds Live with Humans
Conflict & Opportunity

Communities can be stewards, in perpetuity

Rakiura South Cape Islands, NZ



Chilean island communities

- Juan Fernández Archipelago
- Isla Mocha


Pink-footed
Shearwater
habitat

Bienvenidos a Isla Mocha

Advanced Outcomes

- Ability to address larger scale problems
- Increased confidence that solutions will be long-lasting

Community-led Conservation

- Trust
- Time
- Clarity
- Relevance
- Co-learning
- Commitments

Learning through…

Futbol
Theatre
Science

Growing…

Empathy
Solutions
Pride

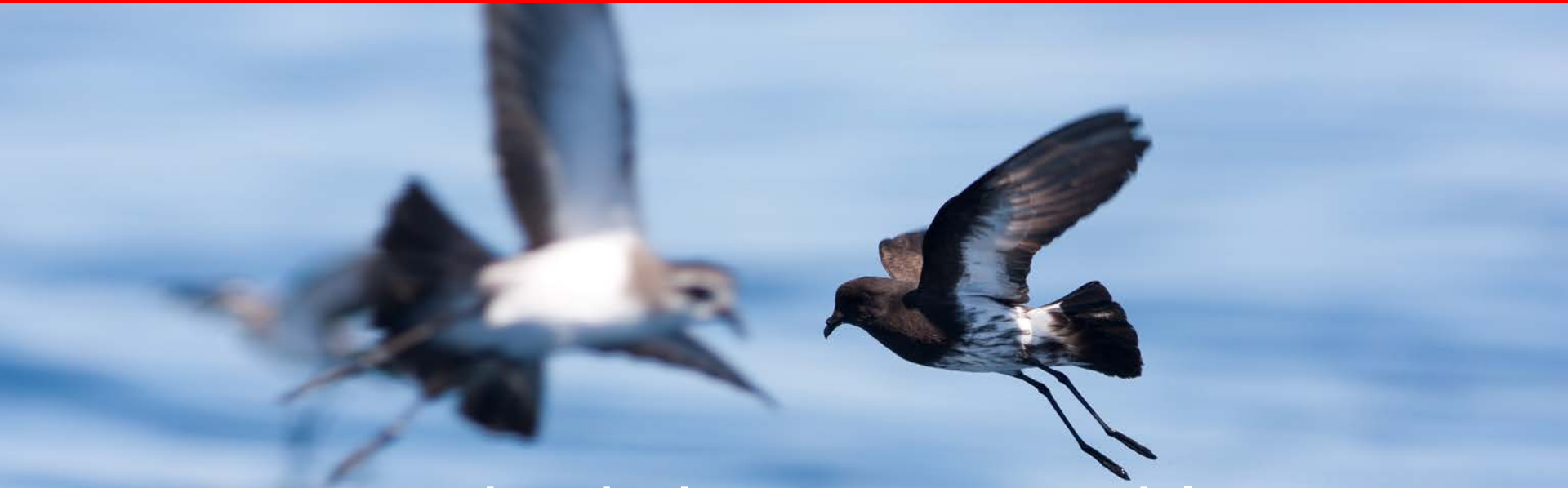
Preventing…

Predation
New Introductions
Habitat Loss
Harvesting

Advanced Outcomes

- Ability to address larger scale problems
- Increased confidence that solutions will be long-lasting

Seabirds at the Crossroads



Do seabirds have a PR problem?

Chris Gaskin

NORTHERN NZ SEABIRD TRUST

IUCN World Conservation Congress Hawai'i 2016

Campbell Albatrosses. Photo: Hadoram Shirihai

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how special?

Northern Royal Albatross. Photo: Hadoram Shirihai

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birds ...

... c.10,400 species worldwide

seabirds ....

... c.370 species worldwide

special adaptions for life at sea

Flesh-footed Shearwater. Photo: Hadoram Shirihai

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the miracle of the first year

NZ Storm-petrel. Photo: Martin Berg

New Zealand Storm-petrel *Fregetta maoriana* – believed extinct, rediscovered 2003

the miracle of the first year

Te Hauturu-o-Toi. Photo: Chris Gaskin

Researchers: Matt Rayner, Graeme Taylor, Alan Tennyson, Stefanie Ismar, Karen Baird, Megan Friesen, Chris Gaskin

The miracle of the first year

NZ Storm-petrel 3-day old chick. Photo: Jo Sim

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The miracle of the first year

the miracle of the first year

the miracle of the first year

NZ Storm-petrel. Photo: Neil Fitzgerald.

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surviving all conditions

Black-bellied Storm-petrel. Photo: aren Baird

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finding food at sea

Little Shearwater. PhotoSteve Wood

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multiple senses at play

and extraordinary physiologies

Mackerel and Euphausiids. Photo: Kim Westerskov

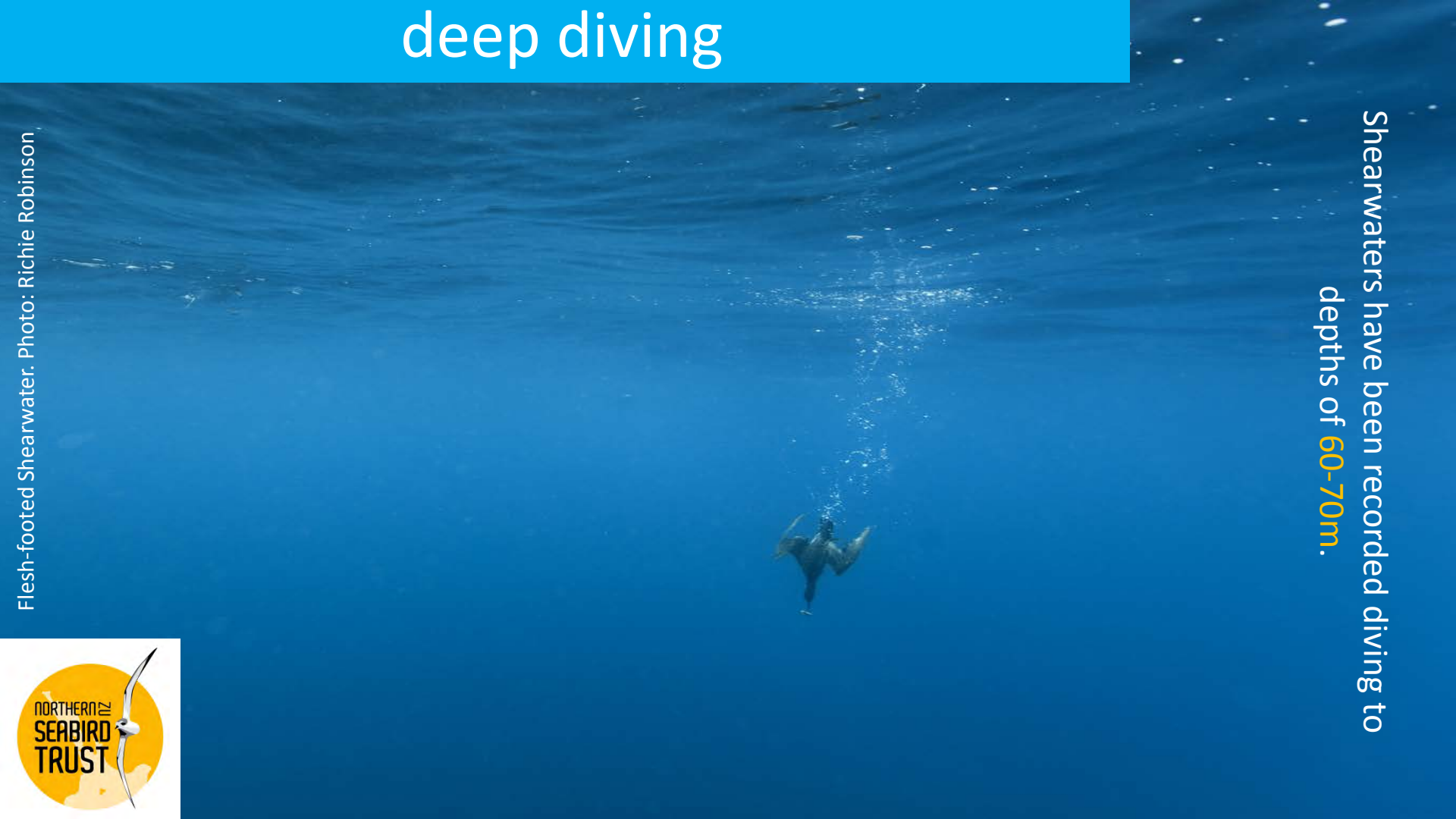
Researchers: Megan Friesen, Brendon Dunphy, Rachael Sagar (UoA), Matt Rayner (Auckland Museum), Chris Gaskin

seeing above …. and below

Fluttering Shearwater. Photo: Richie Robinson

Researchers: Chris Gaskin, Megan Friesen, James Ross, Richard Robinson

deep diving



Flesh-footed Shearwater. Photo: Richie Robinson

Shearwaters have been recorded diving to depths of 60-70m.

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underwater ‘flight’

Fluttering Shearwater. Photo: Richie Robinson

remarkable journeys!

White-capped Albatross. Photo: Abe Borker

Researchers: Matt Rayner (Auckland Museum), Graeme Taylor (DOC), Brendon Dunphy (UoA), Chris Gaskin

remarkable journeys!

One bird was logged travelling 3000kms in 3 days!

S35°
S45°
S55°
S65°
Antarctic Circle
Antimeridian
W170°
W150°
W130°
W110°
E170°
E110°
Image U.S. Geological Survey
US Dept of State Geographer
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Data SIO, NOAA, U.S. Navy, NGA, GEBCO

seabirds in extraordinary places!

FOUND!

Band-rumped Storm-petrel

Researcher: Nicole Galase, Center for Environmental Management of Military Lands, Pohakuloa Training Area

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seabirds in extraordinary places!

UNKNOWN! Ringed (Hornby's) Storm-petrel

UNKNOWN! Elliot's Storm-petrel

UNKNOWN! Pincoya Storm-petrel

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Researchers: Yovana Murillo, Hannah Nevins, Fabrice Schmitt, Rodrigo Barros, Heraldo Norambuena, Alvaro Jaramillo, Peter Harrison, Chris Gaskin, Karen Baird, Stefanie Ismar, Sebastian Cruz, Michel Sallaberry

engender respect and a sense of caring

Grey-headed Albatross. Photo: Kyle Morrison

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in the face of considerable threats

Chatham Rise, New Zealand EEZ. Photo: Karen Baird

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perfectly adapted across realms of sea, land and air

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thank you – tena koutou

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IUCN World Conservation Congress Hawai'i 2016

Seabirds at the Crossroads: Where do we go from here?

Eileen Sobeck

Assistant Administrator for Fisheries, NOAA Fisheries, U.S.A.

Photo: Greg LeCoeur