For: *Aquaculture America, Honolulu, HI*

US Marine Fish R&D Capabilities

Tuesday, February 11th, 2020

OCEAN ERA *

* = The company formerly known as 'Kampachi Farms, LLC'

Seriola R&D

Macroalgae culture

Kyphosus culture

Offshore permitting

Neil Anthony Sims, Co-Founder, CEO. email: neil@ocean-era.com

OCEAN ERA –

COLLABORATIVE

OFFSHORE

AQUACULTURE R&D

ECONOMIC OPPORTUNITY

ECOLOGICAL IMPERATIVE

Neil Anthony Sims, Lisa Vollbrecht, Helen Meigs, Keelee Martin and Joseph (Crispin) Nakoa

File name: Sims_480_6
Session Name: Status of US Marine Fish (Session #: 68)
Session Date: Tuesday, February 11
Time Assignment: 10:30 am

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OCEAN ERA –

COLLABORATIVE OFFSHORE AQUACULTURE R&D AT THE NEXUS OF ECONOMIC OPPORTUNITY AND ECOLOGICAL IMPERATIVE

Neil Anthony Sims, Lisa Vollbrecht, Helen Meigs, Keelee Martin and Joseph (Crispin) Nakoa

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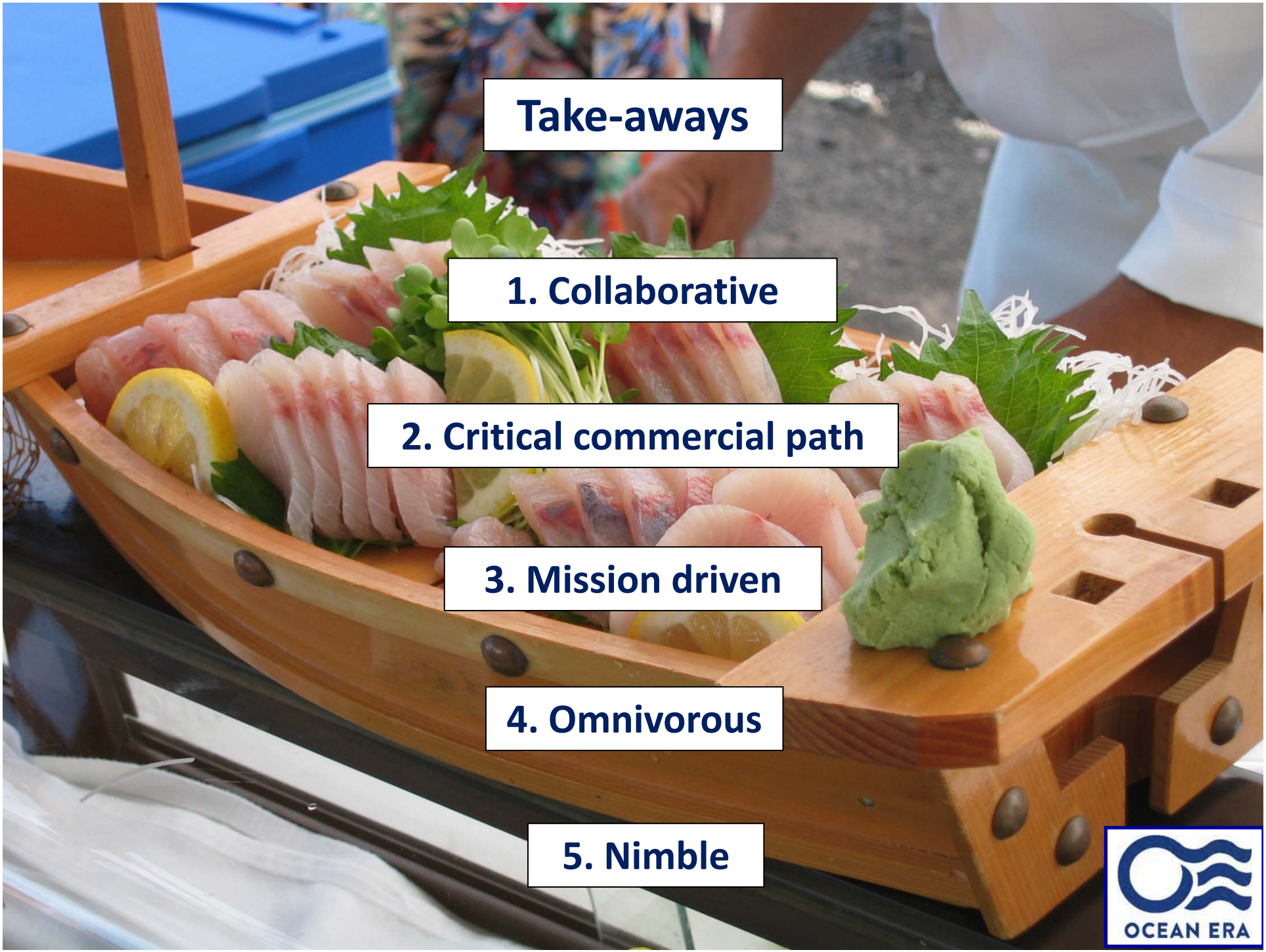
Take-aways
1. Collaborative
2. Critical commercial path
3. Mission driven
4. Omnivorous
5. Nimble
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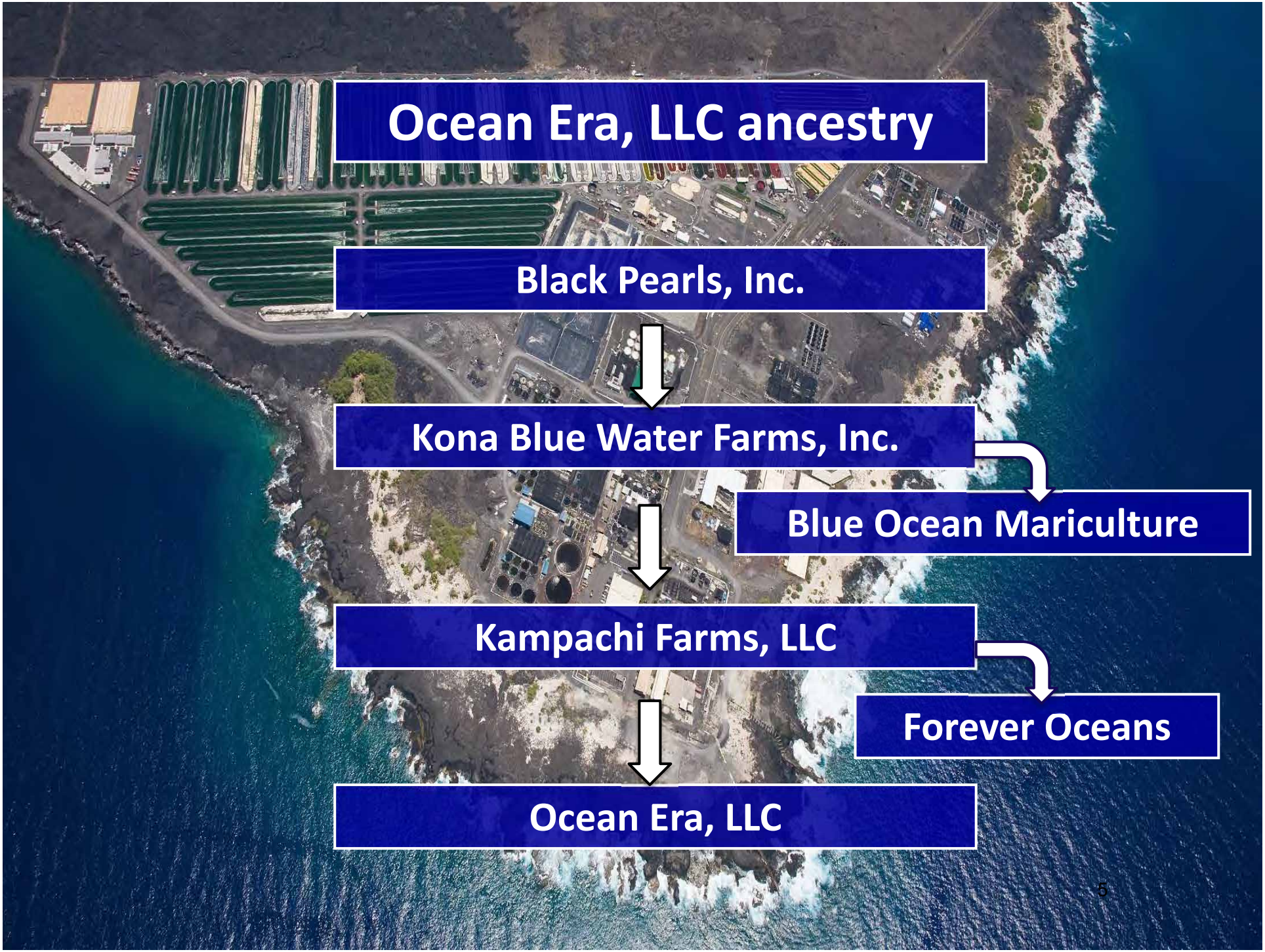

Ocean Era, LLC ancestry
Black Pearls, Inc.
Kona Blue Water Farms, Inc.
Blue Ocean Mariculture
Kampachi Farms, LLC
Forever Oceans
Ocean Era, LLC


Legend
Ocean Era office
Macroalgae yard
Fish research yard
OCEAN ERA facilities at NELHA
Google Earth
100 m

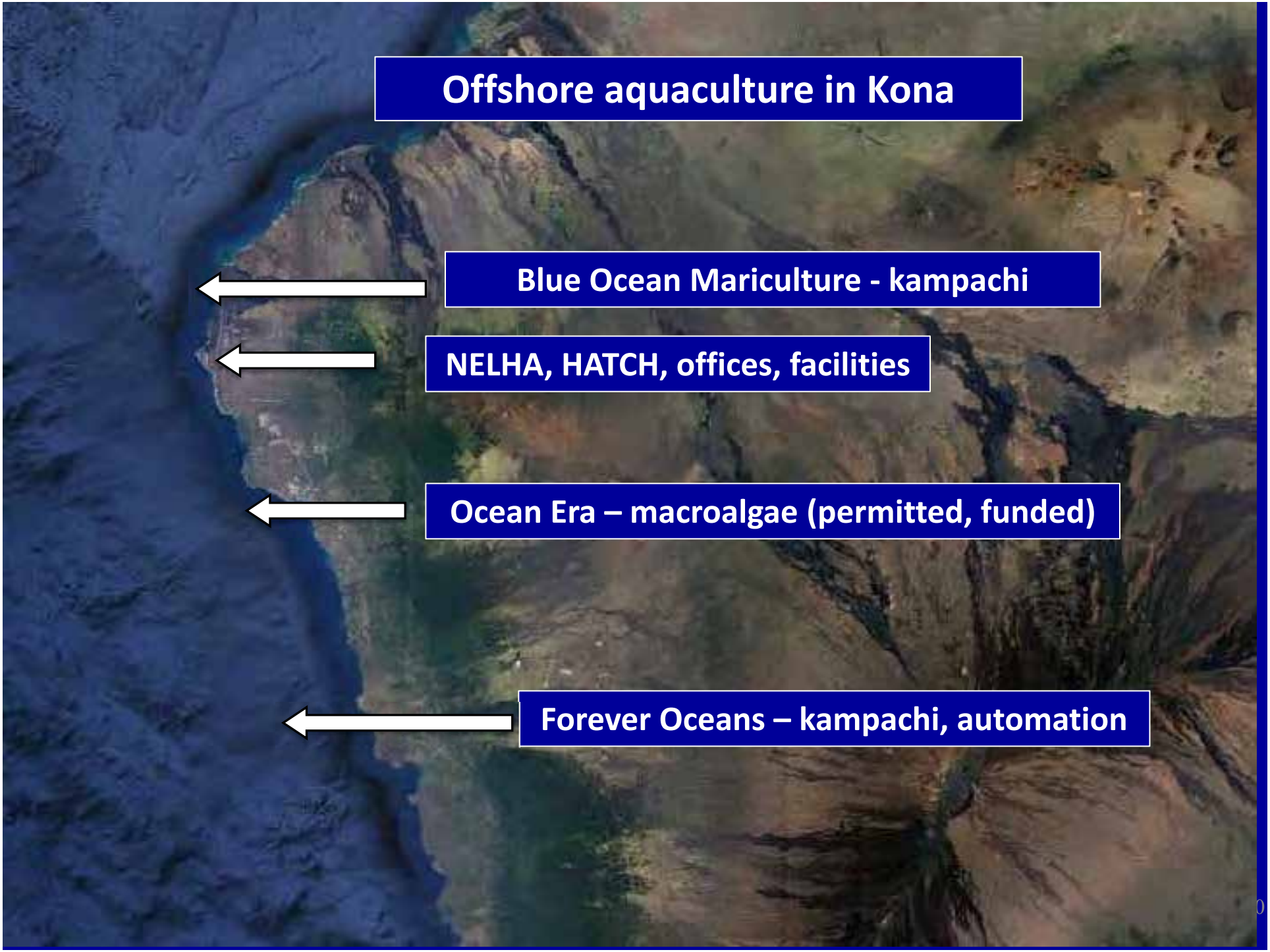
OCEAN ERA facilities at NELHA

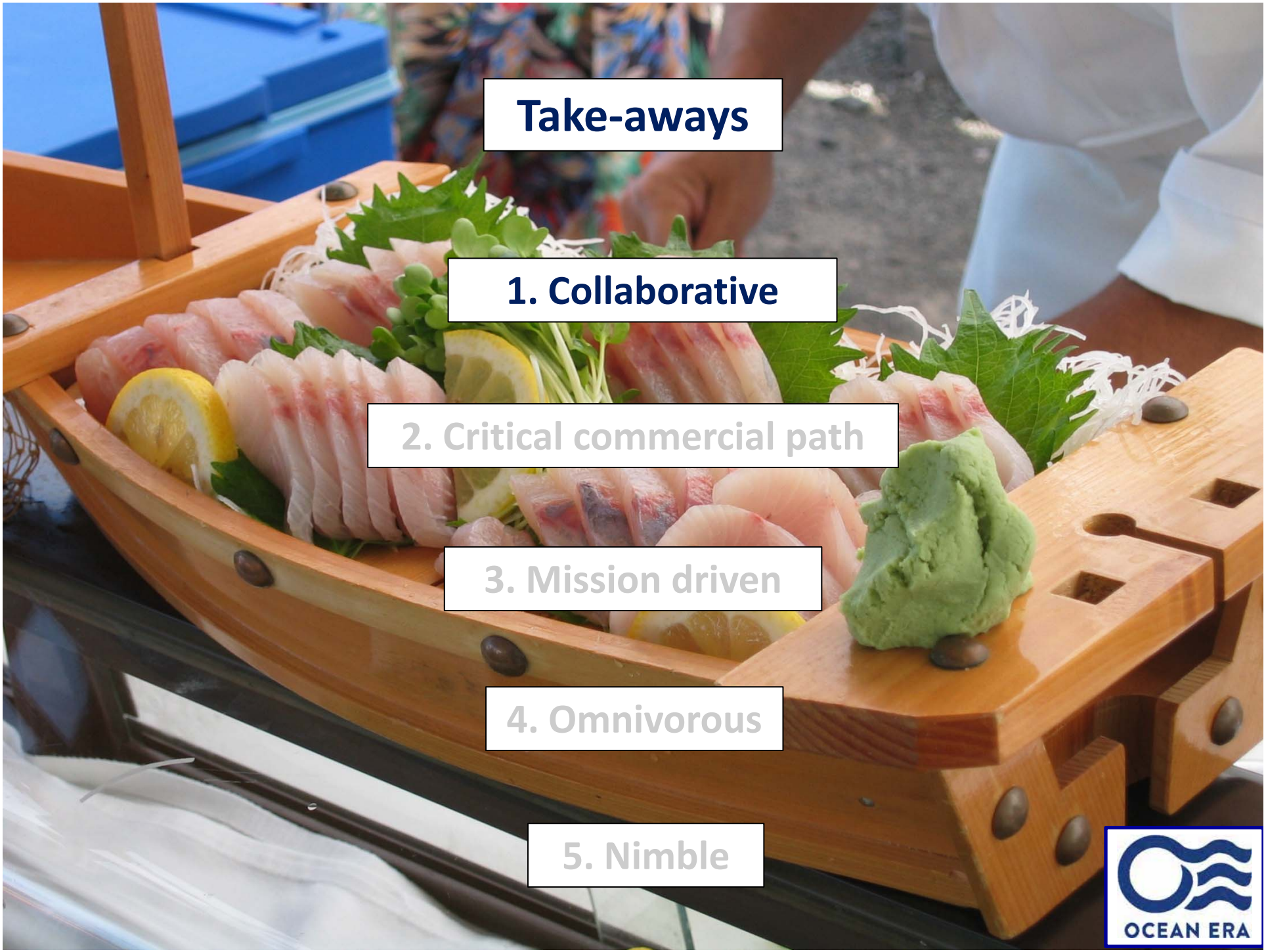
OCEAN ERA facilities at NELHA

Fish research yard

36 x 4,000 L HDPE tanks for replicated trials

Broodstock tank array (under construction):


Offshore aquaculture in Kona
Blue Ocean Mariculture - kampachi
NELHA, HATCH, offices, facilities
Ocean Era – macroalgae (permitted, funded)
Forever Oceans – kampachi, automation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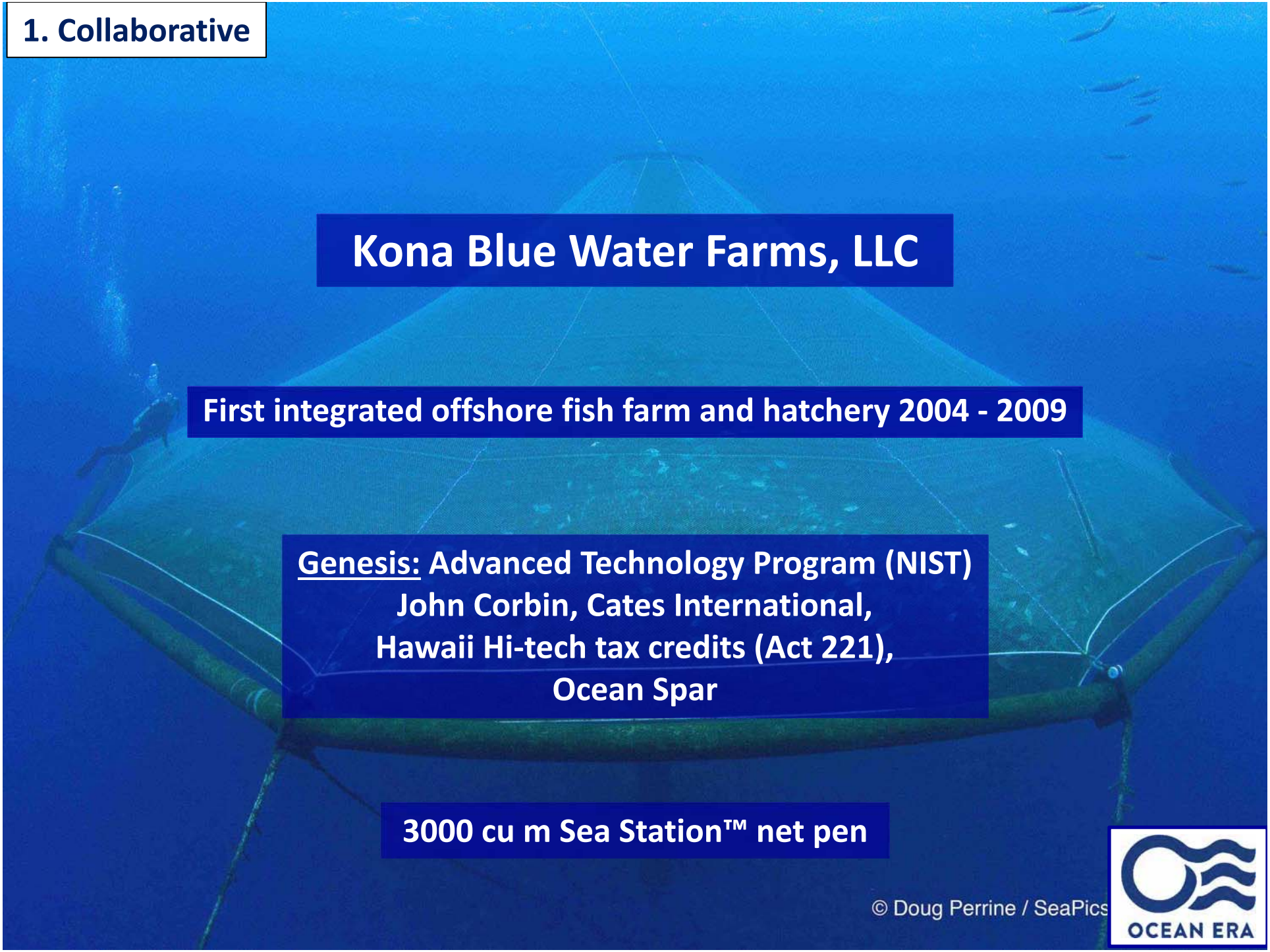
1. Collaborative

Kona Blue Water Farms, LLC

First integrated offshore fish farm and hatchery 2004 - 2009

Genesis: Advanced Technology Program (NIST)
John Corbin, Cates International,
Hawaii Hi-tech tax credits (Act 221),
Ocean Spar

3000 cu m Sea Station™ net pen




1. Collaborative
The Velella Beta-test
TIME Magazine's "25 Best Inventions 2012"
Superb FAD for Kona fishermen
© Tom Carey
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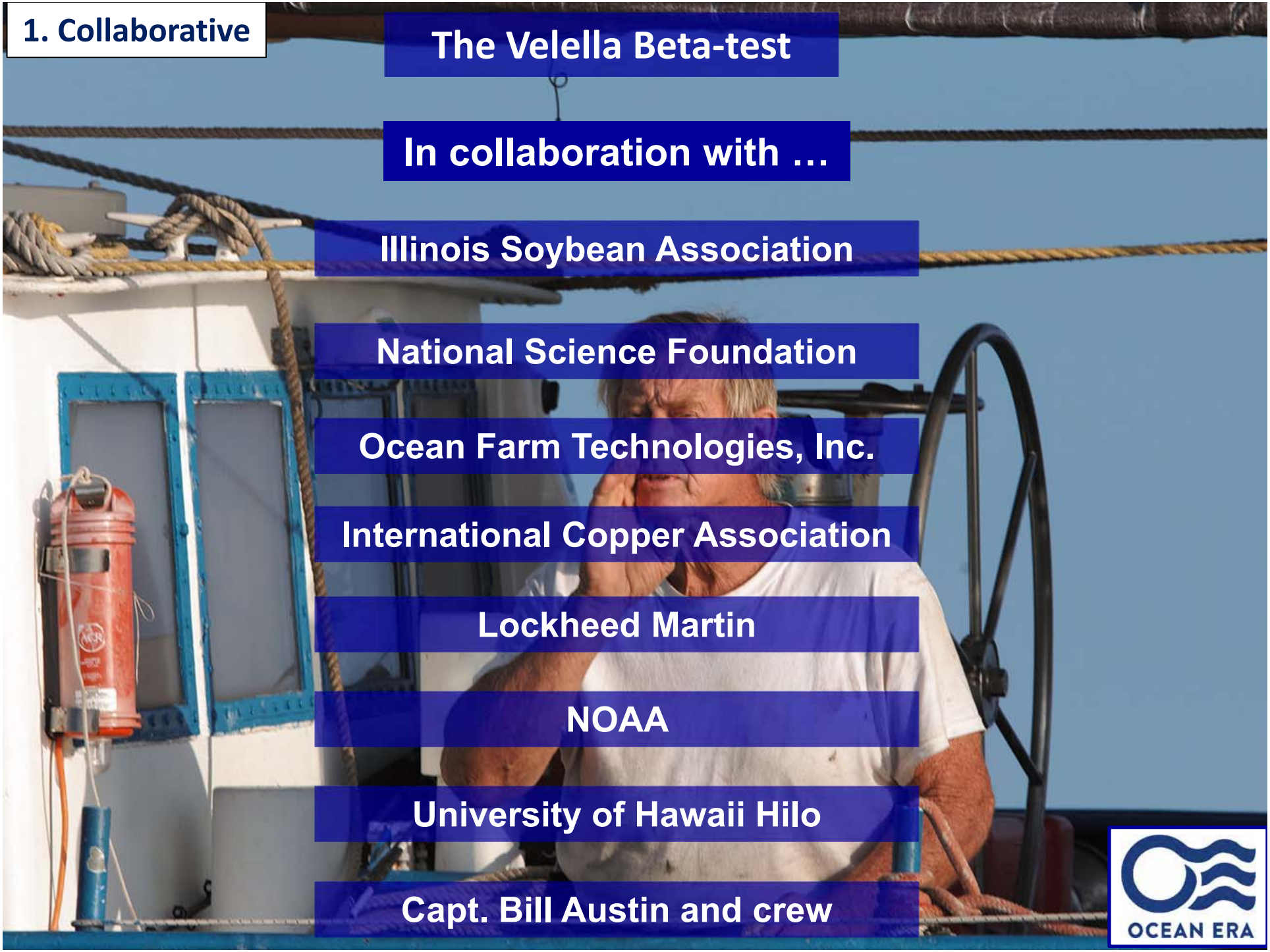
1. Collaborative
The Velella Beta-test
In collaboration with …
Illinois Soybean Association
National Science Foundation
Ocean Farm Technologies, Inc.
International Copper Association
Lockheed Martin
NOAA
University of Hawaii Hilo
Capt. Bill Austin and crew
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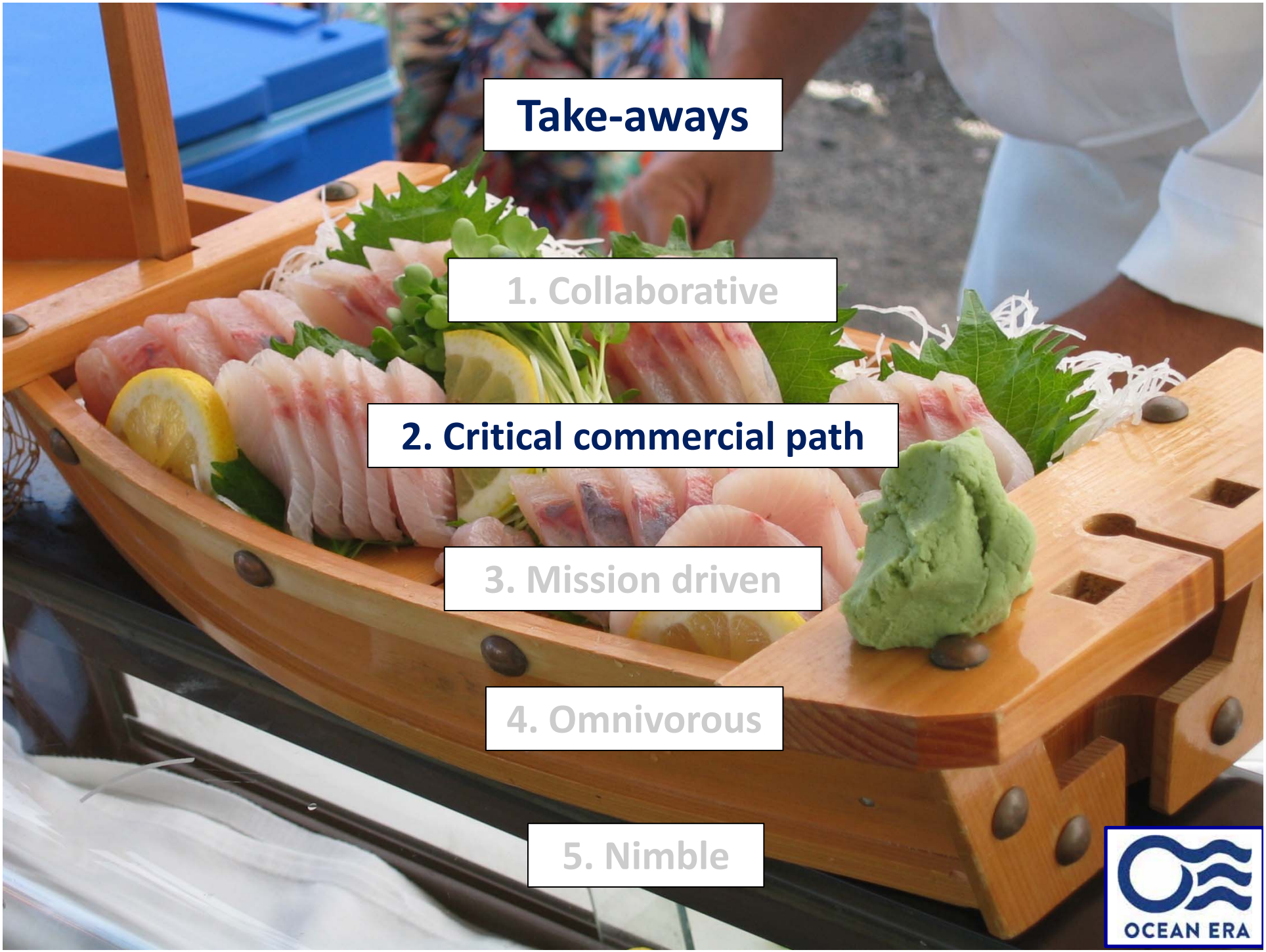
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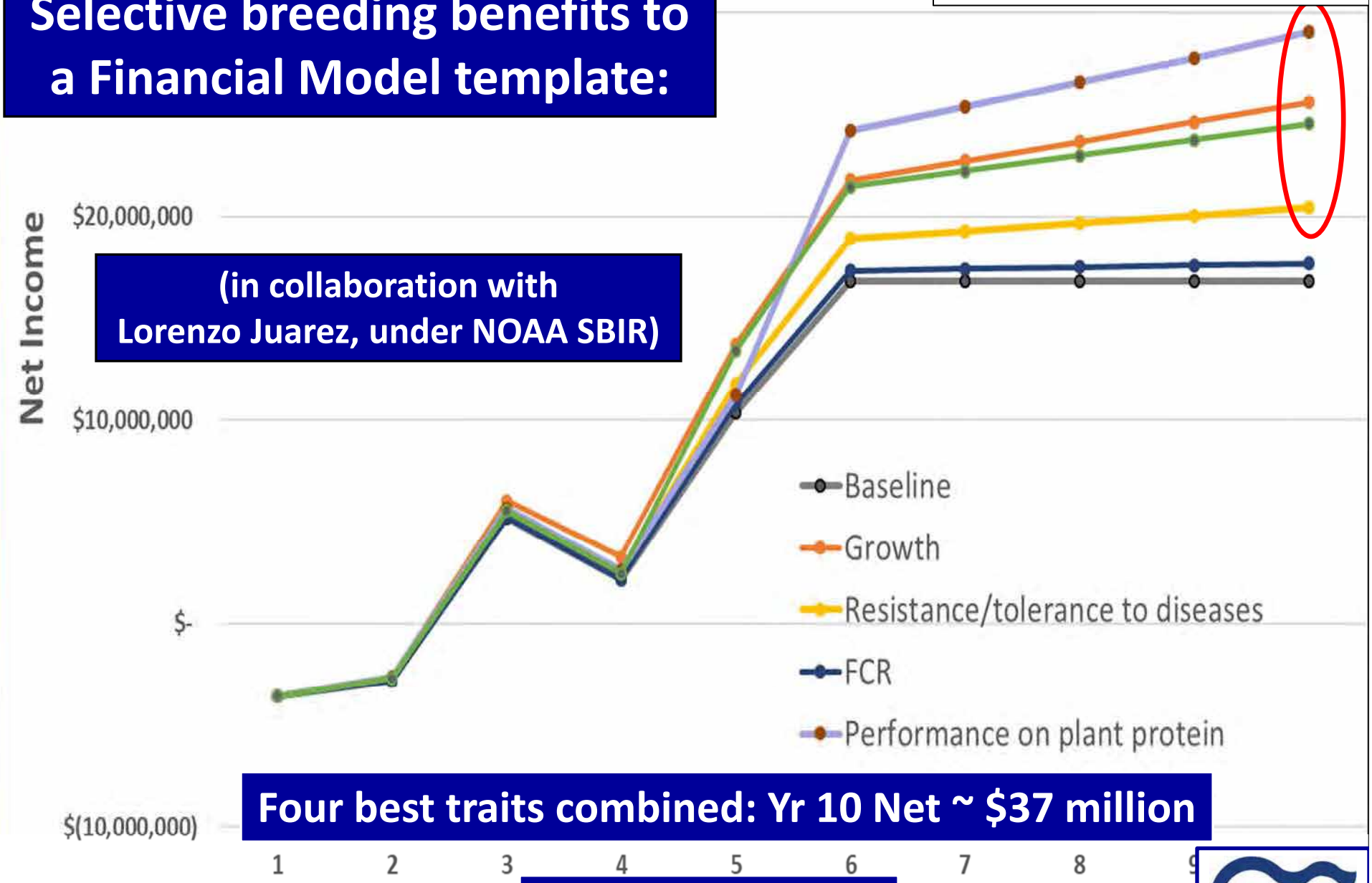
2. Critical commercial path

Selective breeding benefits to a Financial Model template:

(in collaboration with Lorenzo Juarez, under NOAA SBIR)



Four best traits combined: Yr 10 Net ~ $37 million

= 118% increase

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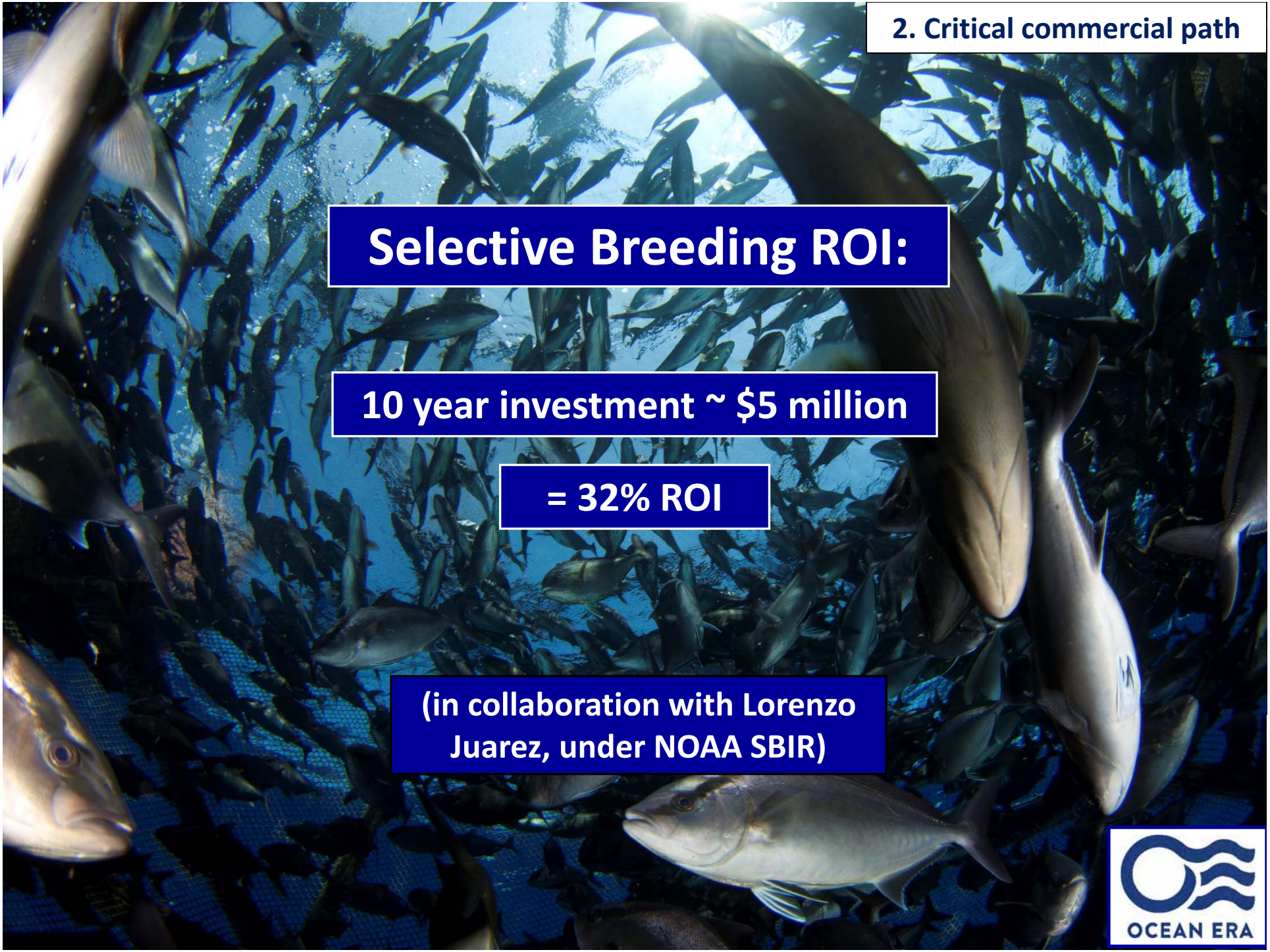

Selective Breeding ROI:

10 year investment ~ $5 million

= 32% ROI

(in collaboration with Lorenzo Juarez, under NOAA SBIR)

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Commercial spin-offs
5 miles
Scale
"Concession" - 4 miles offshore
BAHIA DE LA PAZ
Genesis: Michael Bullock, Matias Arjona, Rex Ito, Government of Mexico …
LA PAZ
OCEAN ERA

Kampachi Mexico

Submersible Polar-Cirkel-style surface pens

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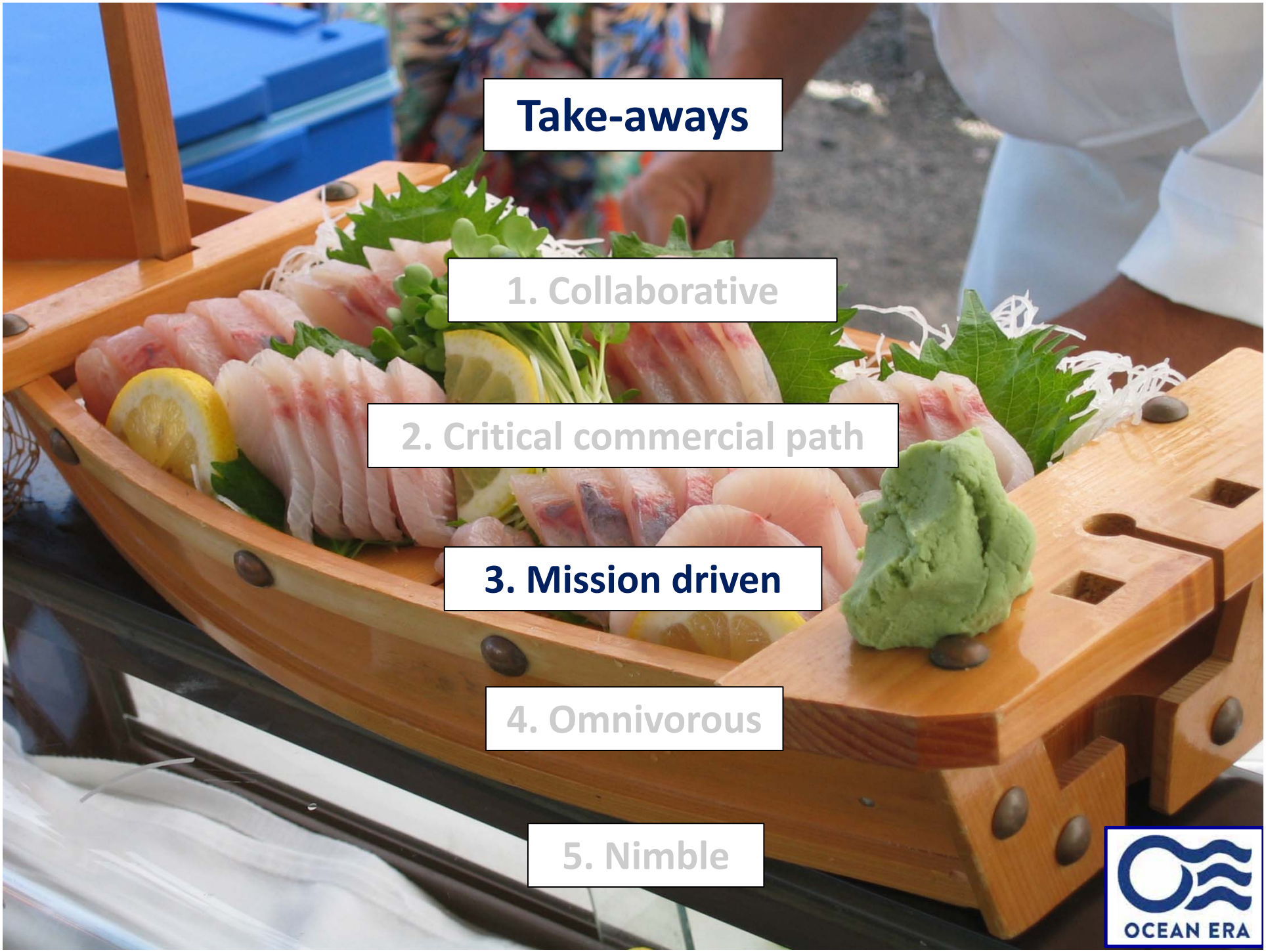
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3. Mission driven

Nebraska Soybean Board-supported research (2006 - 2017)

In collaboration with U Nebraska Lincoln, Dr Tom Clemente

Fish-In : Fish-Out < 1:1

Control Diet

SPC-based Diet

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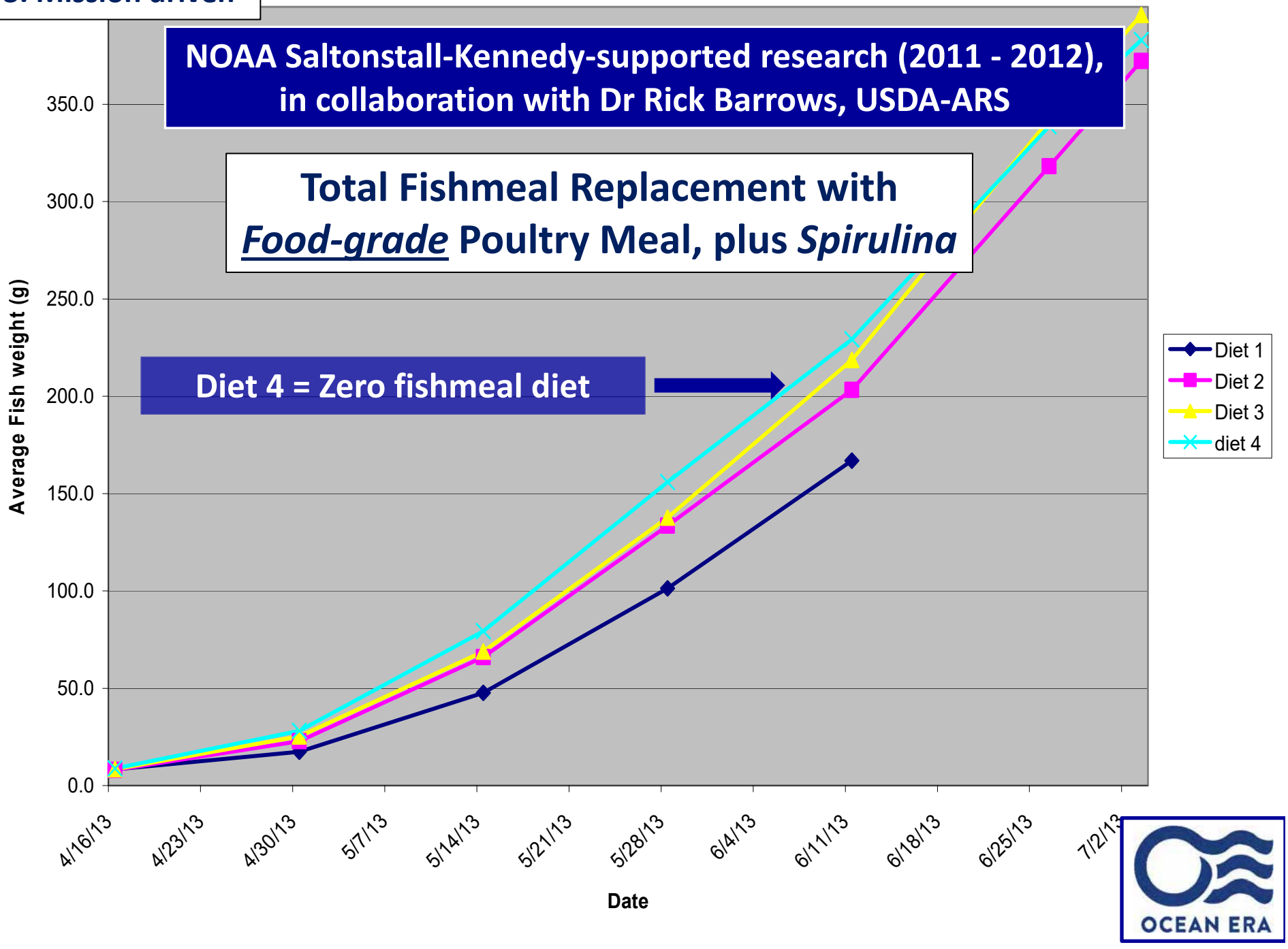
3. Mission driven



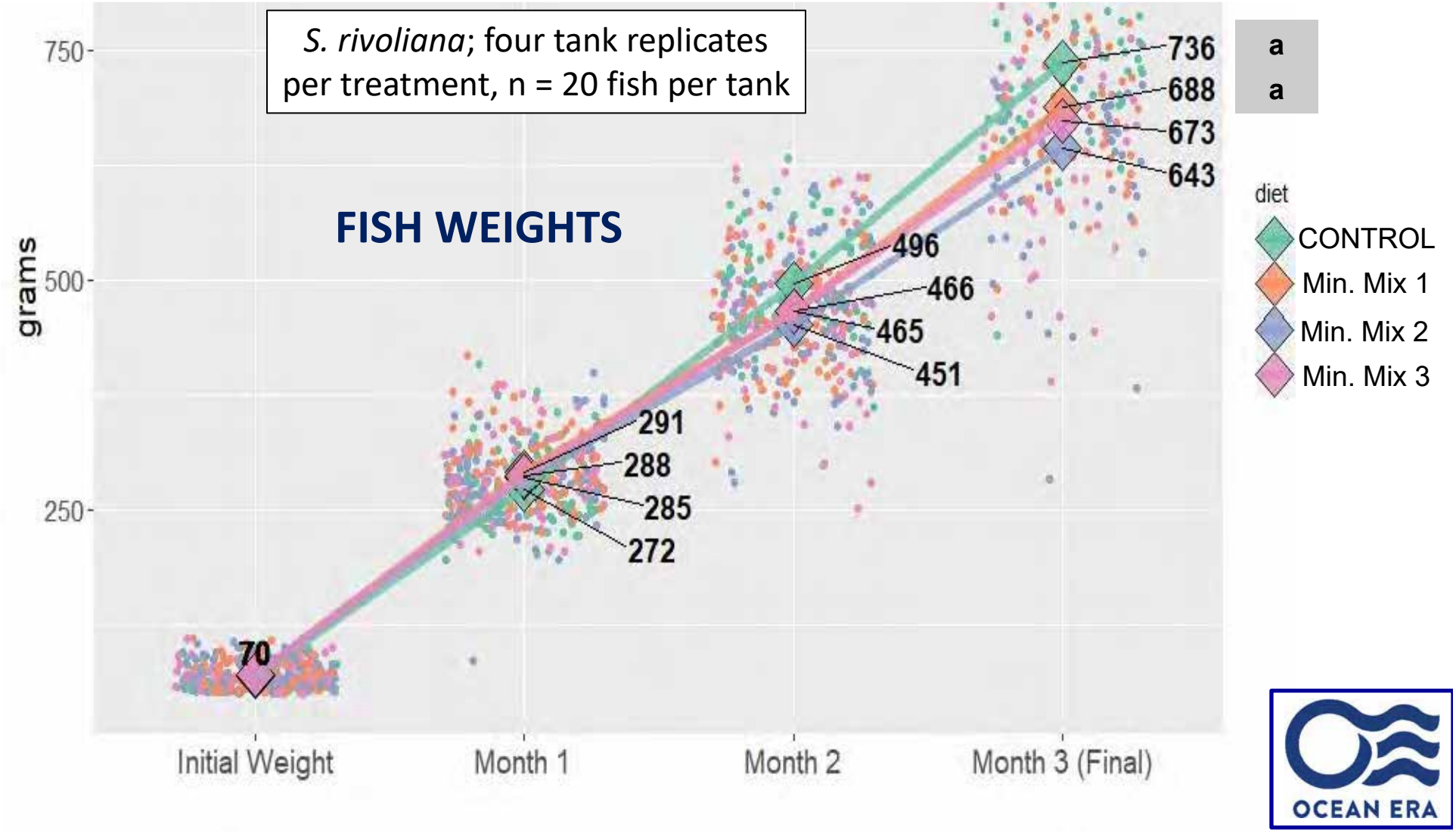
3. Mission driven

Total Fishmeal Replacement with *Feed-grade* Poultry Meal, plus trace mineral mix

Mineral Mix Diets 1 – 3 v Commercial control

NOAA – SK, in collaboration with F3 – Future of Fish Feed, and Dr Rick Barrows (ret.)

S. rivoliana; four tank replicates per treatment, n = 20 fish per tank



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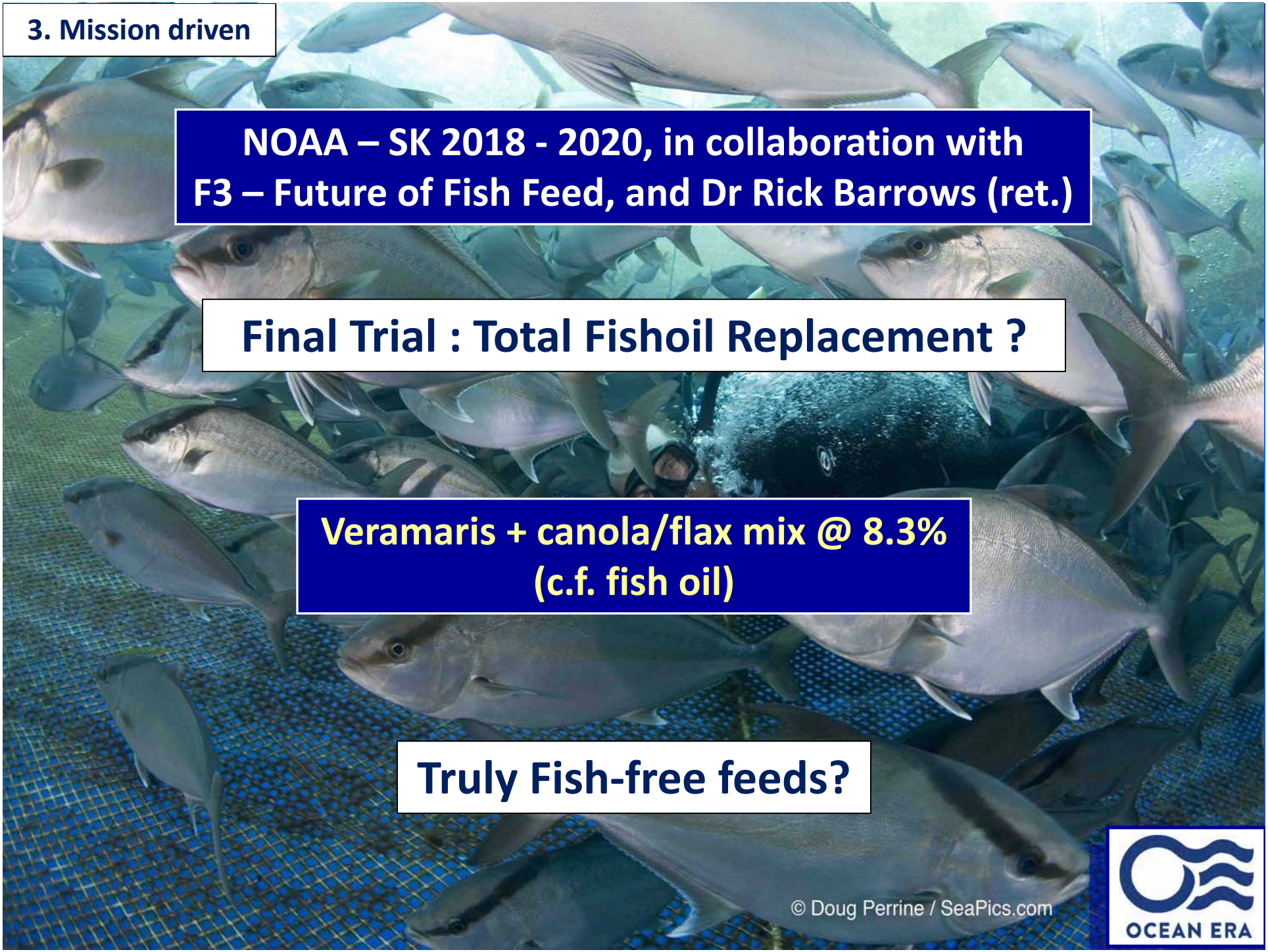
3. Mission driven
NOAA – SK 2018 - 2020, in collaboration with
F3 – Future of Fish Feed, and Dr Rick Barrows (ret.)
Final Trial : Total Fishoil Replacement ?
Veramaris + canola/flax mix @ 8.3%
(c.f. fish oil)
Truly Fish-free feeds?
© Doug Perrine / SeaPics.com
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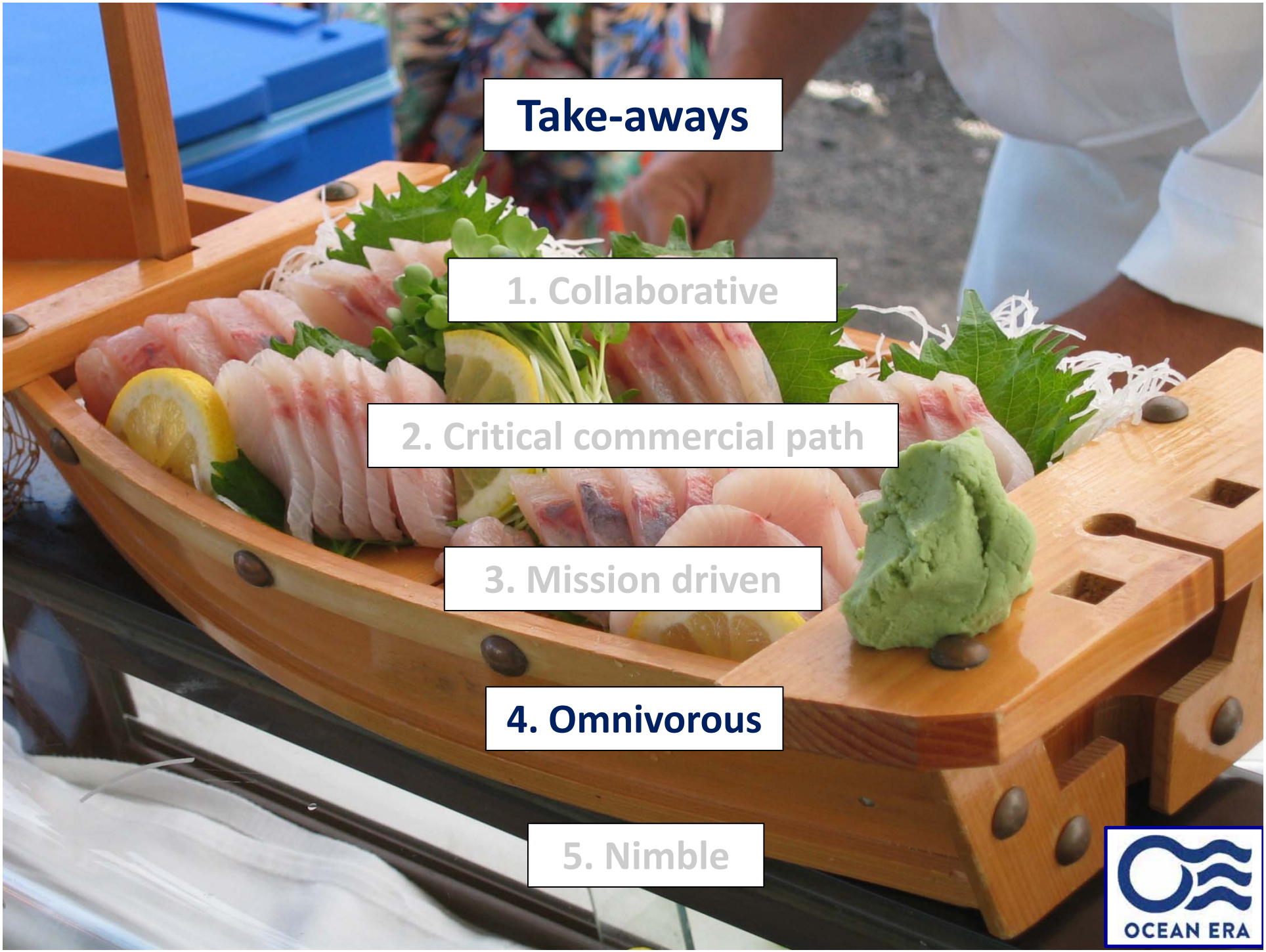
3. Mission driven

Offshore macroalgae: economic incentive / ecological imperative

- Food, feed, fertilizer, fuels, and footprint (C)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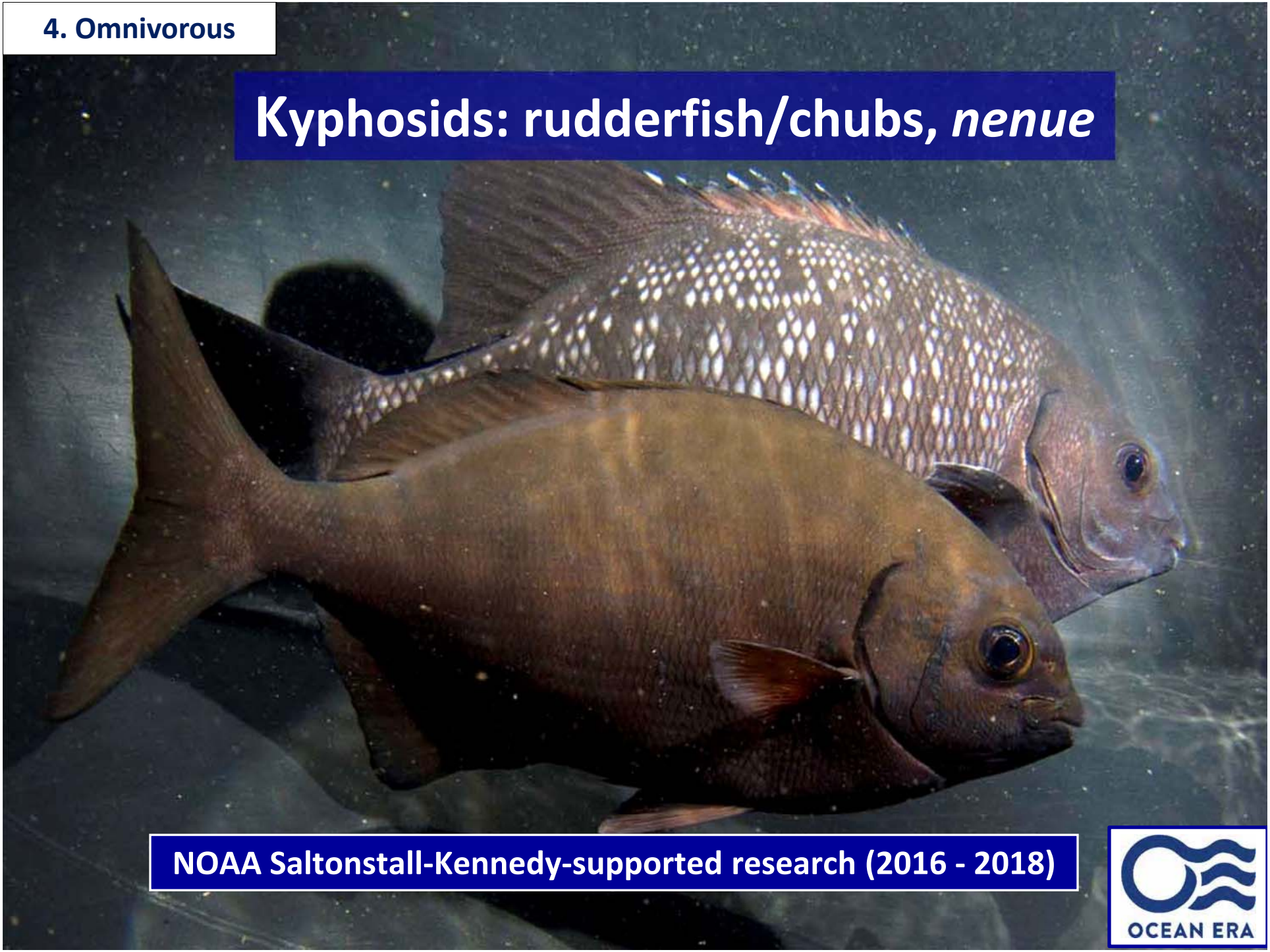
4. Omnivorous

Kyphosids: rudderfish/chubs, *nenue*



NOAA Saltonstall-Kennedy-supported research (2016 - 2018)

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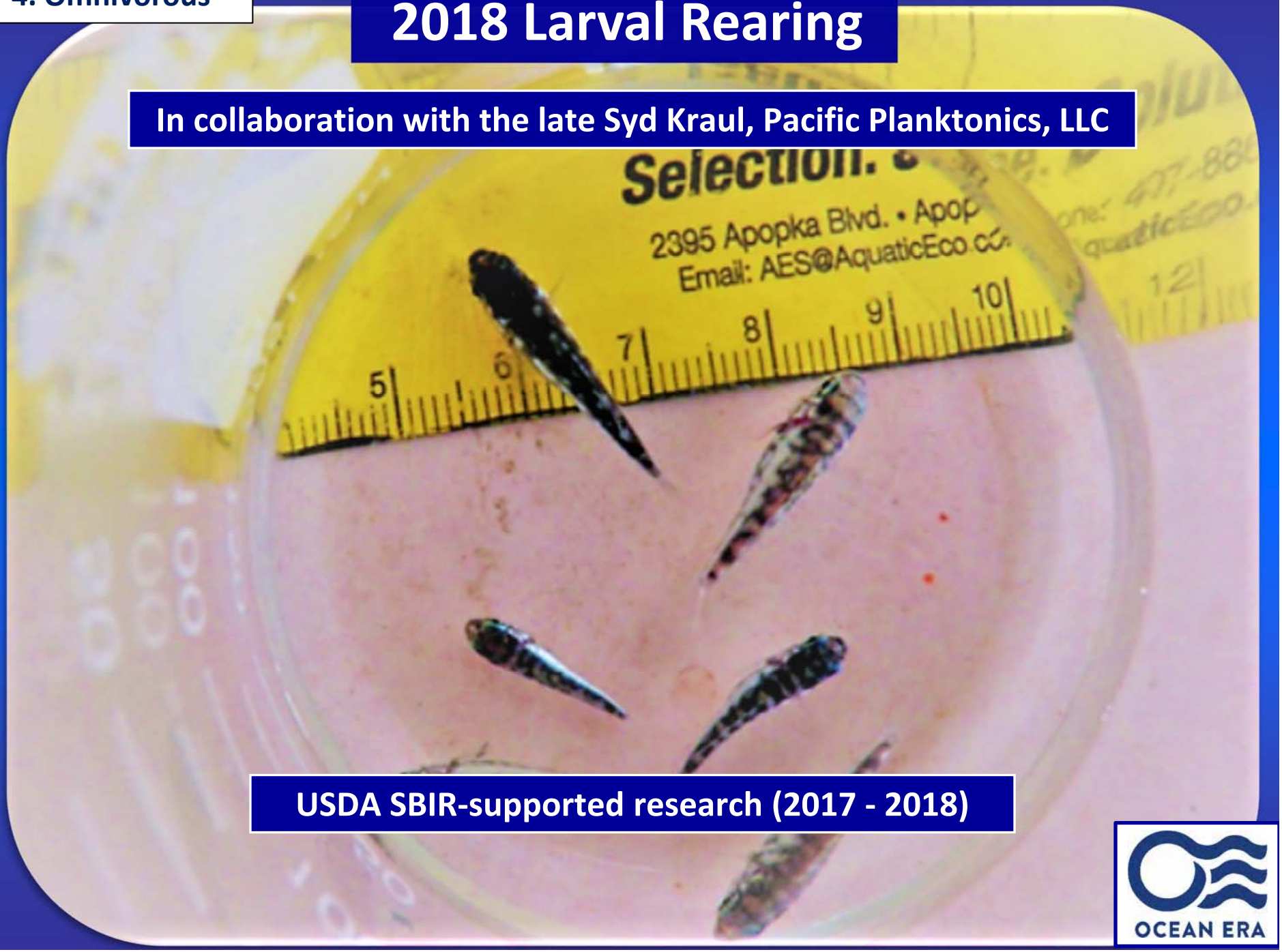
4. Omnivorous

2018 Larval Rearing

In collaboration with the late Syd Kraul, Pacific Planktonics, LLC



USDA SBIR-supported research (2017 - 2018)

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4. Omnivorous

Tilapia Diet FCR = 2.6

Marine Grower FCR = 2.5

400 g in 10 mos

1.3 g daily

24% fat

2.88g

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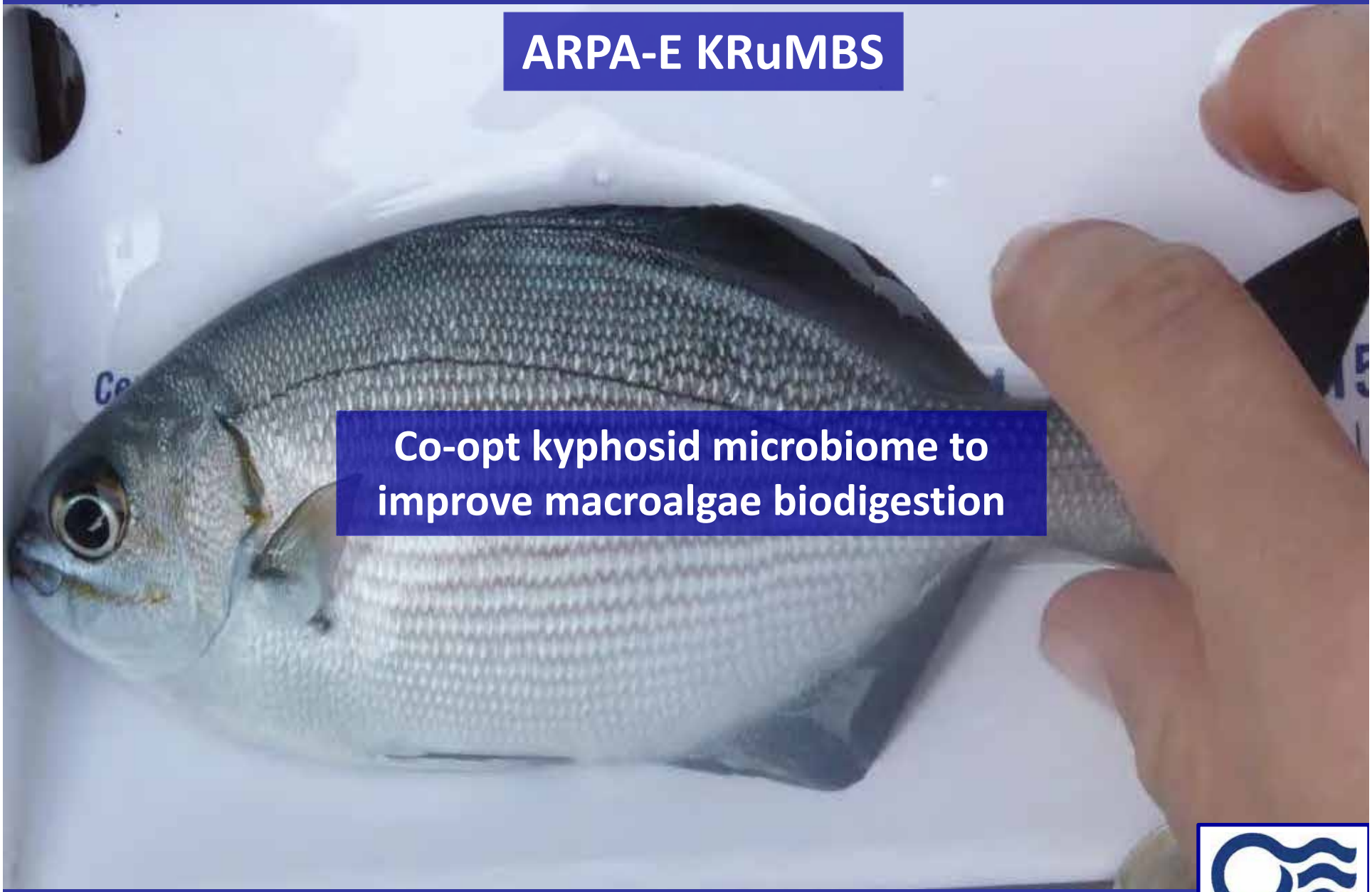
ARPA-E KRuMBS



Co-opt kyphosid microbiome to improve macroalgae biodigestion

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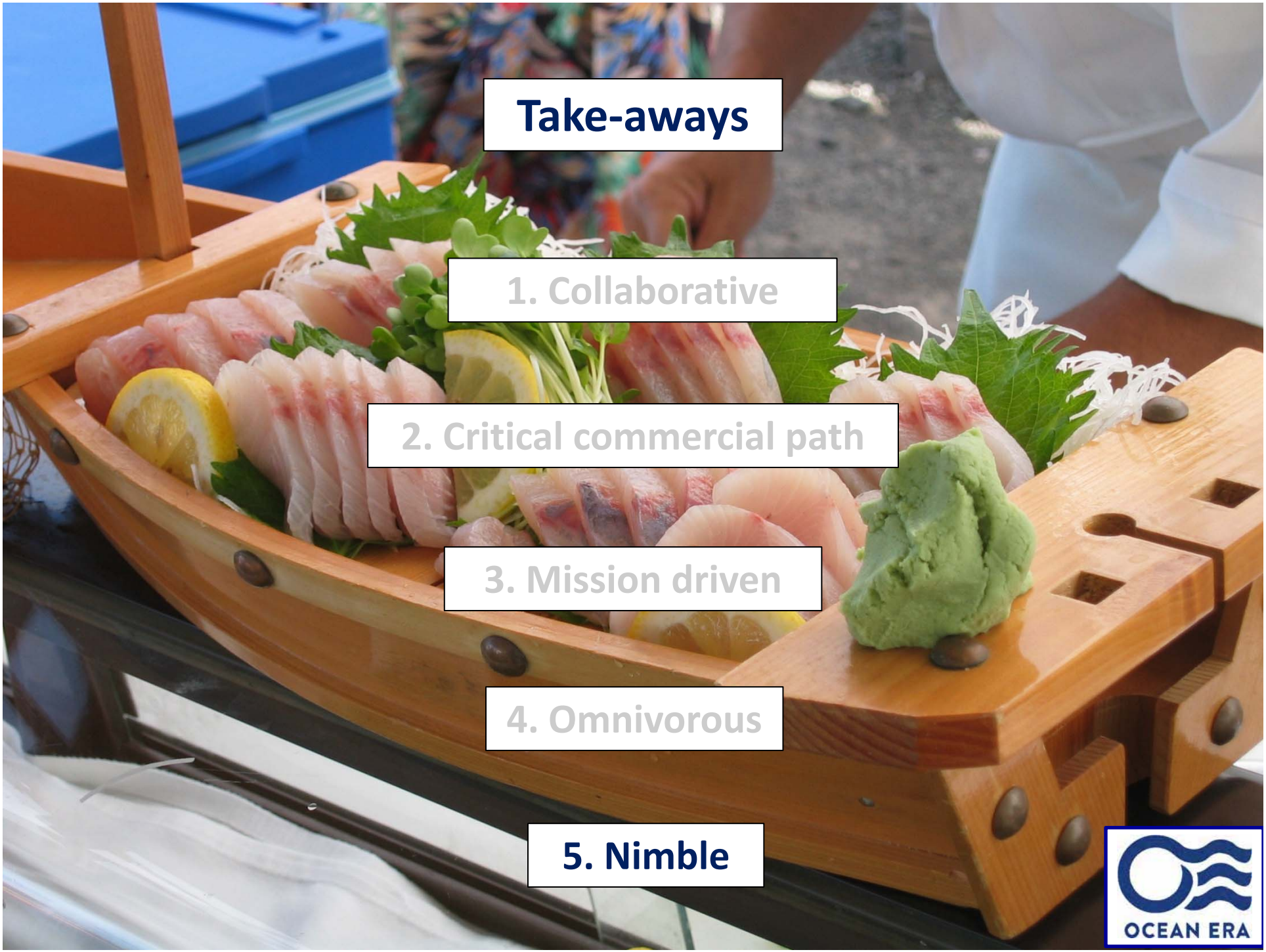
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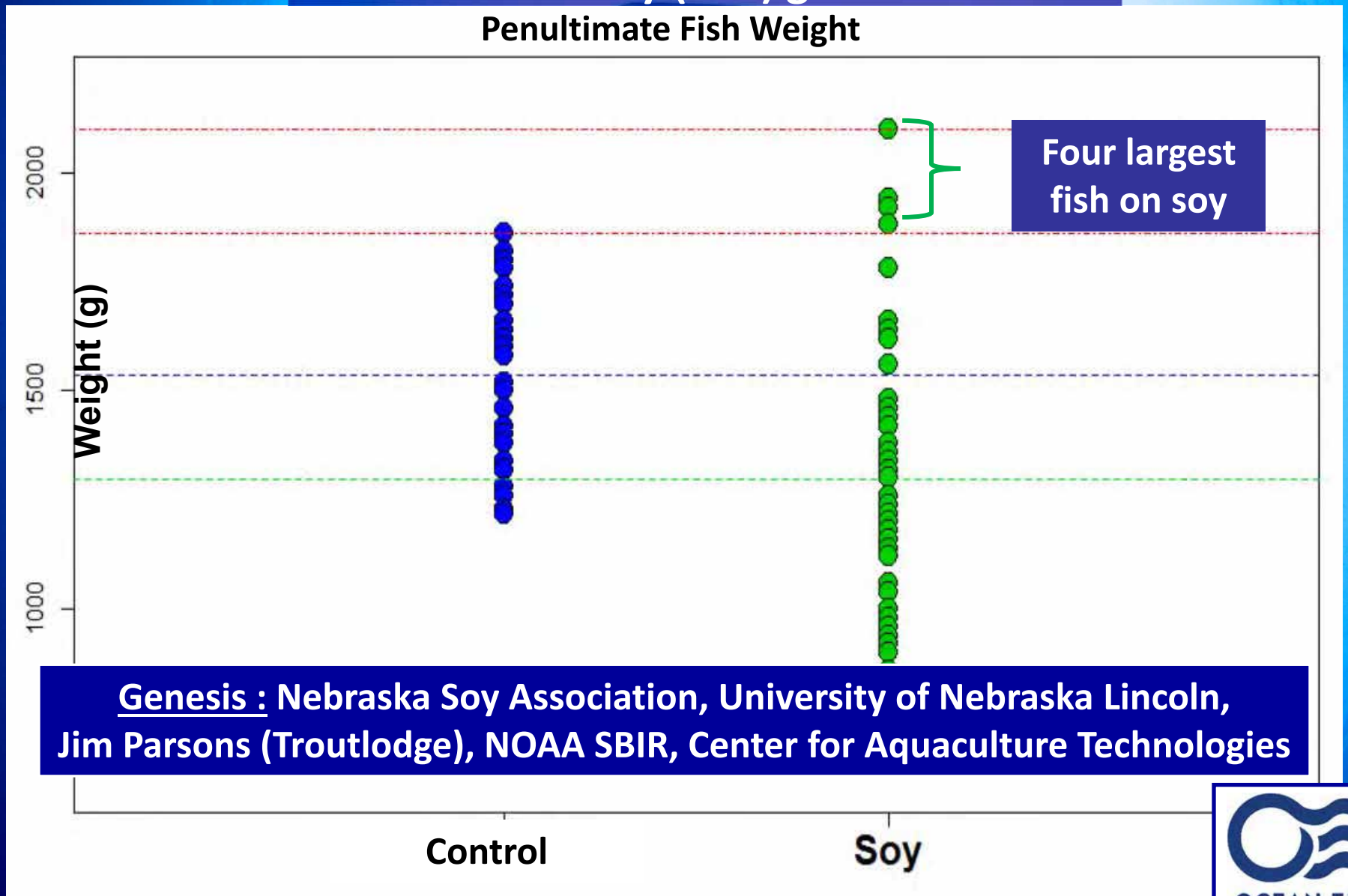
Selective Breeding for feed assimilation

2016 – 17 Soy (SPC) growth trial



Genesis : Nebraska Soy Association, University of Nebraska Lincoln, Jim Parsons (Troutlodge), NOAA SBIR, Center for Aquaculture Technologies

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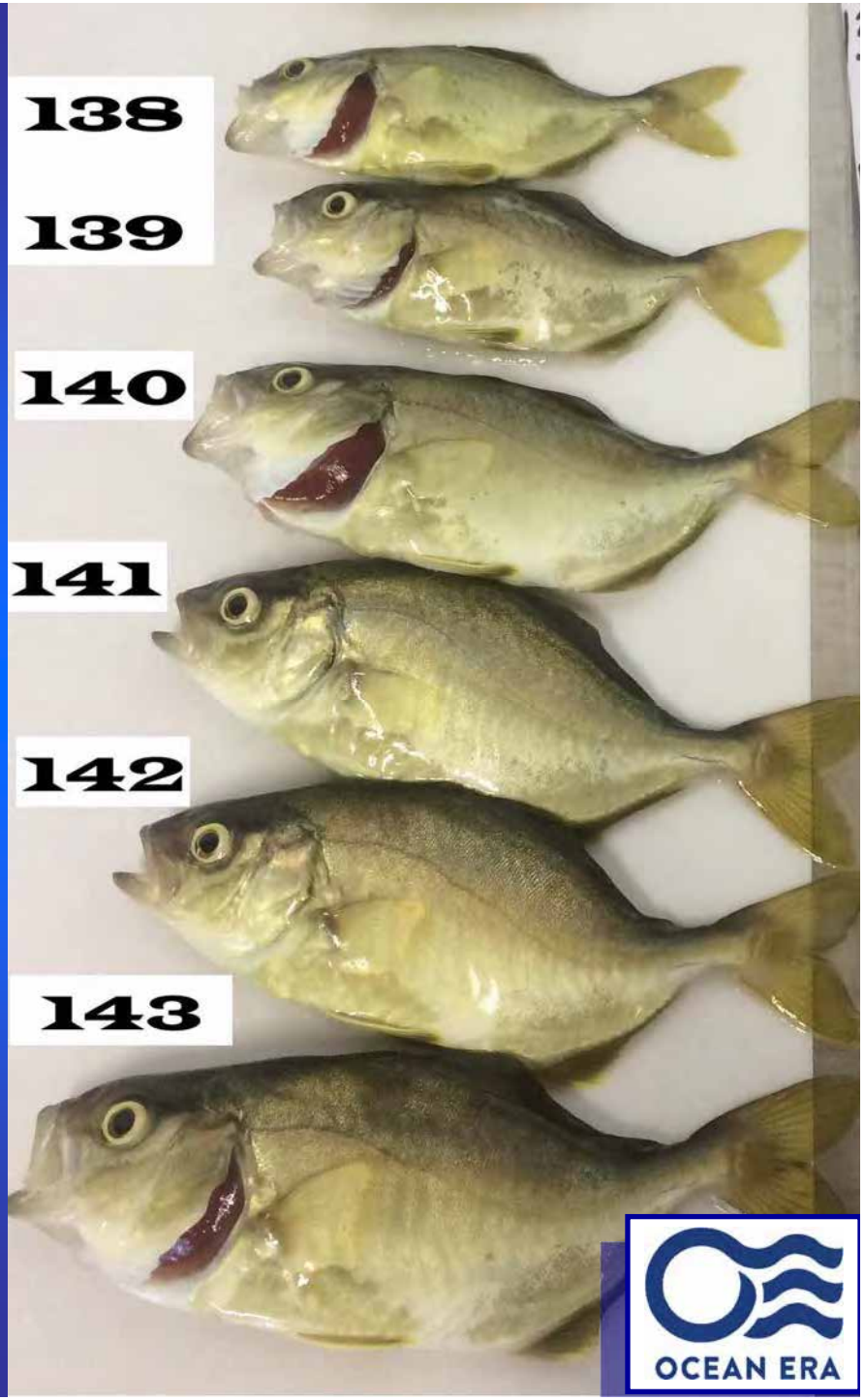
5. Nimble

Selective breeding for growth, spinal deformities, etc:

6 SNPs linked to lordosis; one strongly significant.

In collaboration with Center for Aquaculture Technologies, under NOAA SBIR



5. Nimble


Velella Gamma (Kona)
“Best fishing in my life!” - local Kona fisherman
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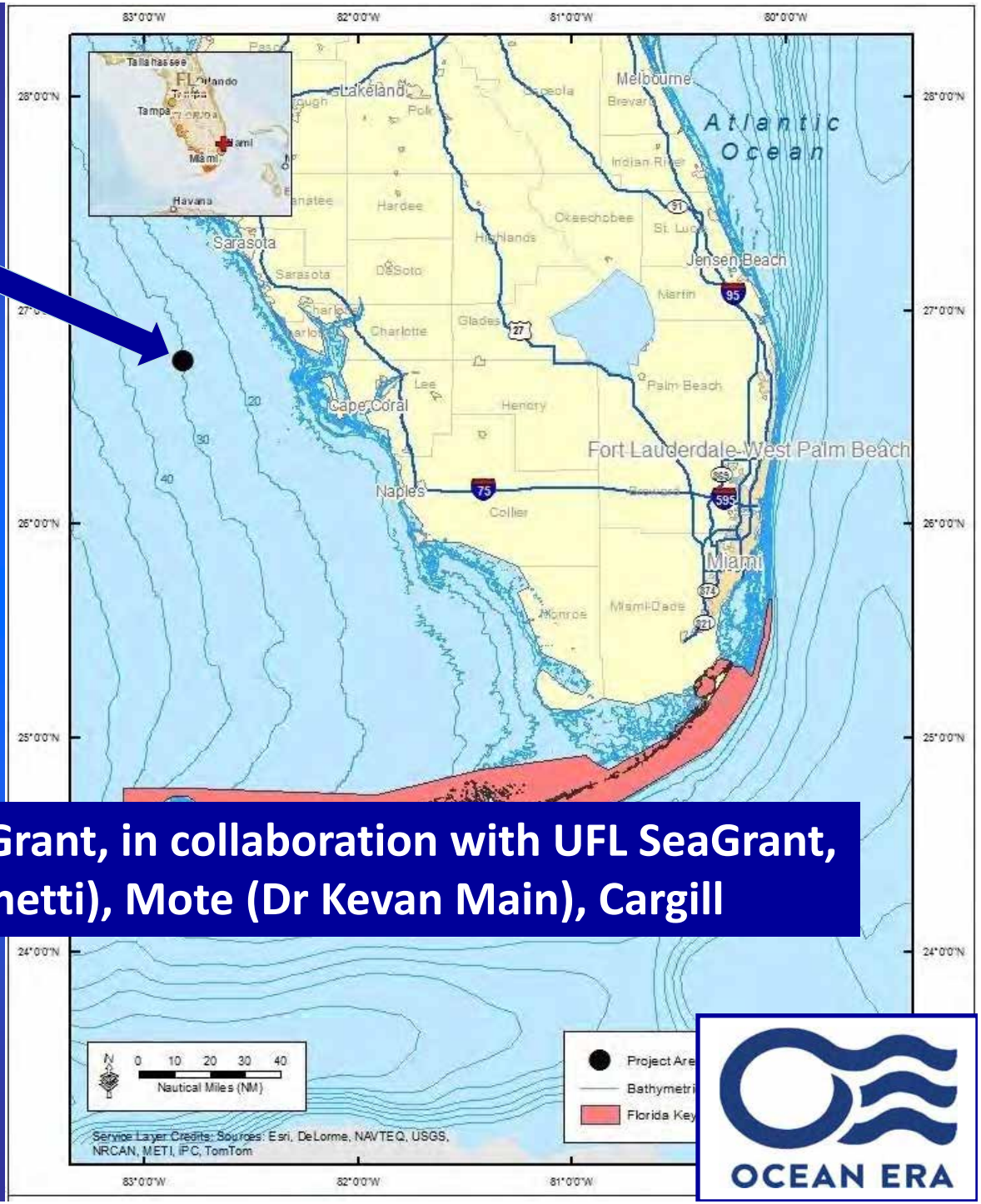
5. Nimble

Velella Epsilon
SPM net pen

Gulf of Mexico - demonstration permit application in process



Support from NOAA SeaGrant, in collaboration with UFL SeaGrant, RSMAS (Dr. Dan Benetti), Mote (Dr Kevan Main), Cargill

Seeking strategic partners

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What's next?
1. Collaborative
2. Critical commercial path
3. Mission driven
4. Omnivorous
5. Nimble
Thank you
Cell: (808) 989 2438
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