Offshore Mariculture

Where and Why?

Donna Lanzetta, *CEO*

&

Dr. Konstantine Rountos

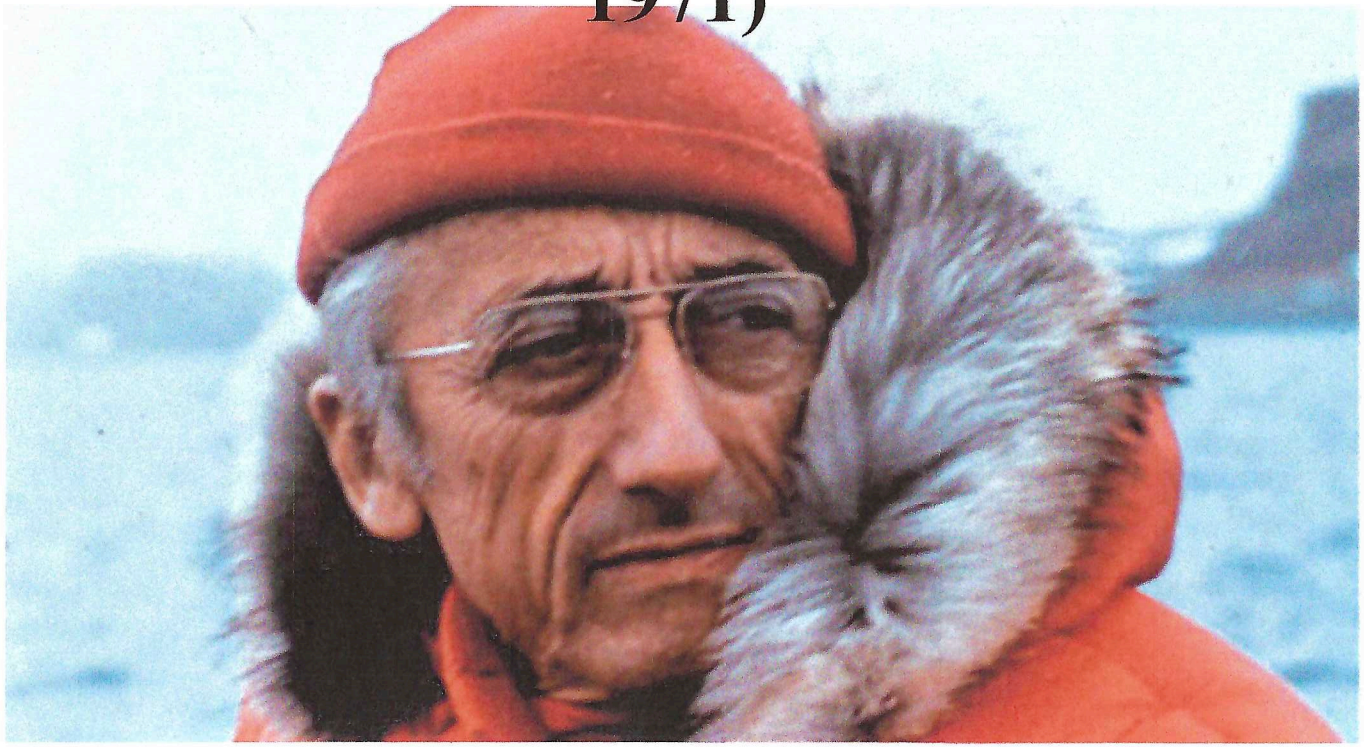
(Director of Research & Development)

MANNA FISH FARMS, INC.

OFFSHORE MARICULTURE CONFERENCE EUROPE, 6-8 APRIL, 2016
BARCELONA, SPAIN

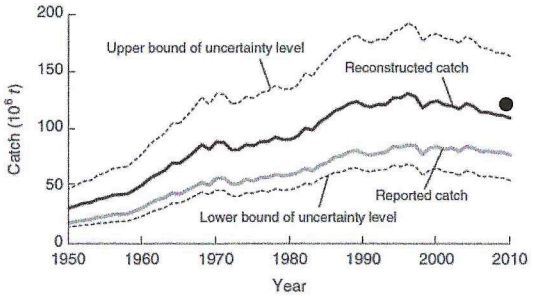
"We must plant the sea and herd its animals using the sea as farmers instead of hunters. That is what civilization is all about -- farming replacing hunting."

-Jacques Yves Cousteau (17 July, 1971)



Why Aquaculture?

- Aquatic food products represent one of the world's most nutritious and healthy food sources (Tacon & Metian 2013)

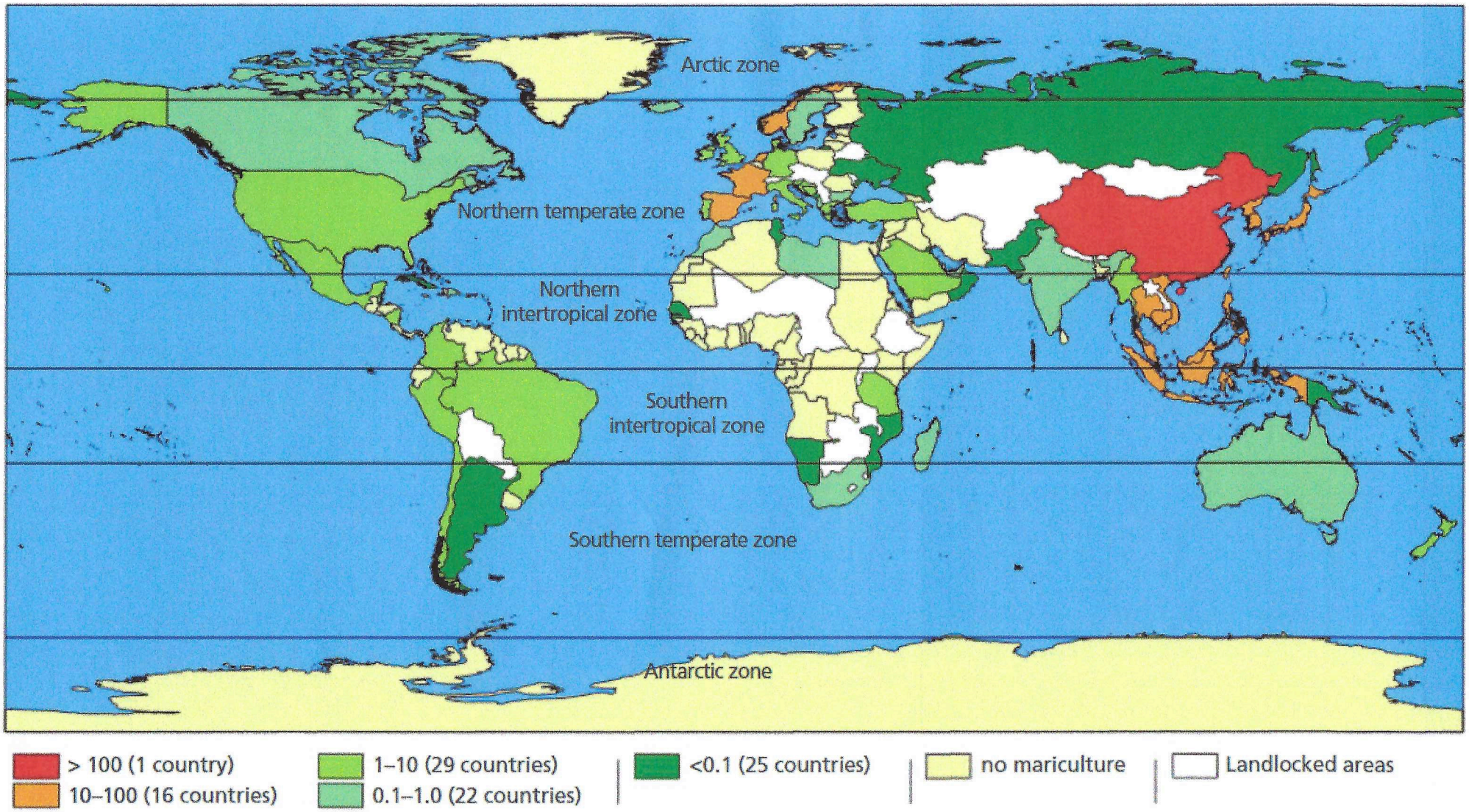


Wild fisheries have stagnated or are in decline (FAO 2014, Pauly & Zeller 2016)

- Seafood production has one of the smallest carbon footprints compared to other animal proteins (Nijdam et al. 2012)

Freshwater footprint is generally lower than terrestrial animal production even when feeds are evaluated (Gephart et al. 2014, Troell et al. 2014)

51% of countries with active mariculture produce <1 t km-1 of coastline per year



Kapetsky et al. 2013

FAO Fisheries and Aquaculture Technical Paper No. 549

Why Offshore?

Coastlines do have finite space when stakeholders are considered

Tourism

Fisheries

Energy

Trade

Sensitive ecosystems

Why Offshore?

Environmental impacts are largely negligible:

- Improved water quality
- Reduced impact to benthos, water column, and wild species

(Holmer 2010, Price & Morris 2013, Rust et al. 2014)

MANNA FISH FARMS

Offshore Integrated multi-trophic aquaculture

MANNA
FISH FARMS, INC.

http://mannafishfarms.com/

Striving to be the first open ocean farm on the East Coast of the United States

The Three P's

MANNA
FISH FARMS, INC.

Passion

Partnerships

Perseverance

Multipronged Strategy

Proud recipient of a 20% capital equipment / match grant from New York State Empire Development, through the Long Island Regional Economic Development Council.

Supporters

New York State Assembly

Fred Thiele, Assemblyman

Joseph Saladino, Assemblyman

New York State Senate

Kristen Gillibrand, Senator

New York State Legislature

Jay Schneiderman, Suffolk

County Legislator

Bridget Fleming, Suffolk County

United States Congress

Tim Bishop, former congressman

Anna Throne – Holst, congressional candidate 2016

Town of Southampton

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Advisors

SUNY Stony Brook School of Marine and Atmospheric Science
Dr. Chris Gobler
Dr. Dianna Gobler

University of New Hampshire, School of Marine Science and Ocean Engineering
Dr. Michael Chambers
Dr. David Berlinsky
Dr. W. Huntting Howell
Dr. Rob Swift

St. Joseph's College, New York
Department of Biology
Dr. Konstantine Rountos

Multi Aquaculture Systems, Amagansett, New York
Dr. Robert Valente
Dr. Maria Valente

InnovaSea
Langley Gace, President

Ocean Farm Technology
Steve Page, engineer and Aquapod designer

Kampachi Farm/The Velella Project
Neil Sims

K & B Seafood
Tom Kehoe

Issues, Laws, and Agencies

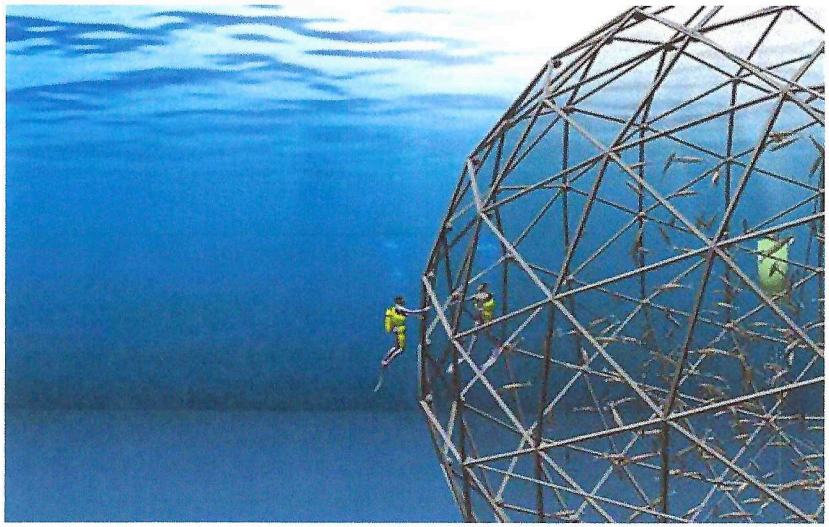
Issues	Laws	Regulatory agencies
Fisheries management, protection of habitat, marine mammals, and endangered species	Magnuson-Stevens Fishery Conservation Management Act Marine Mammal Protection Act Endangered Species Act National Environmental Policy Act Coastal Zone Management Act National Marine Sanctuaries Act	NOAA (NMFS) NOAA (NMFS) NOAA (NMFS), FWS USEPA, NOAA (NMFS), USACE NOAA (National Ocean Service) NOAA (National Ocean Service)
Nutrient discharge	Clean Water Act, NPDES discharge permits Safe Drinking Water Act Marine Protection, Research, and Sanctuaries Act	USEPA, USACE USEPA USEPA, NOAA (NMFS), USACE
Siting, hazards to navigation, permitting and construction of structures, transporting product	Rivers and Harbors Act Lacey Act 14 U.S.C. 83 (marking structures in navigable waters) Outer Continental Shelf Lands Act	USACE FWS U.S. Coast Guard Bureau of Safety and Environmental Enforcement and Bureau of Ocean Energy Management
Seafood safety, feed ingredients, animal health, use of veterinary drugs	Federal Insecticide, Fungicide, and Rodenticide Act Federal Food, Drug, and Cosmetic Act Food Safety Modernization Act Hazard Analysis and Critical Control Points Program Surveillance and Monitoring Program	USEPA USFDA USFDA USFDA USFDA
Health management, best management practices	Animal Health Protection Act Virus Serum Toxin Act 9 CFR 101-124 (regulations on the spread of disease)	USDA (APHIS) USDA (APHIS) USDA (APHIS)
Escapes, broodstock management, monitoring and reporting	Magnuson-Stevens Fishery Conservation and Management Act State and local regulations with requirements for reporting and response	NOAA (NMFS) State and local agencies

Rust et al. 2014 Fisheries 39: 508-524

Location

The Offshore Marine Aquaculture Facility is proposed for 26.1 km off the coast of Eastern Long island

Aquapod



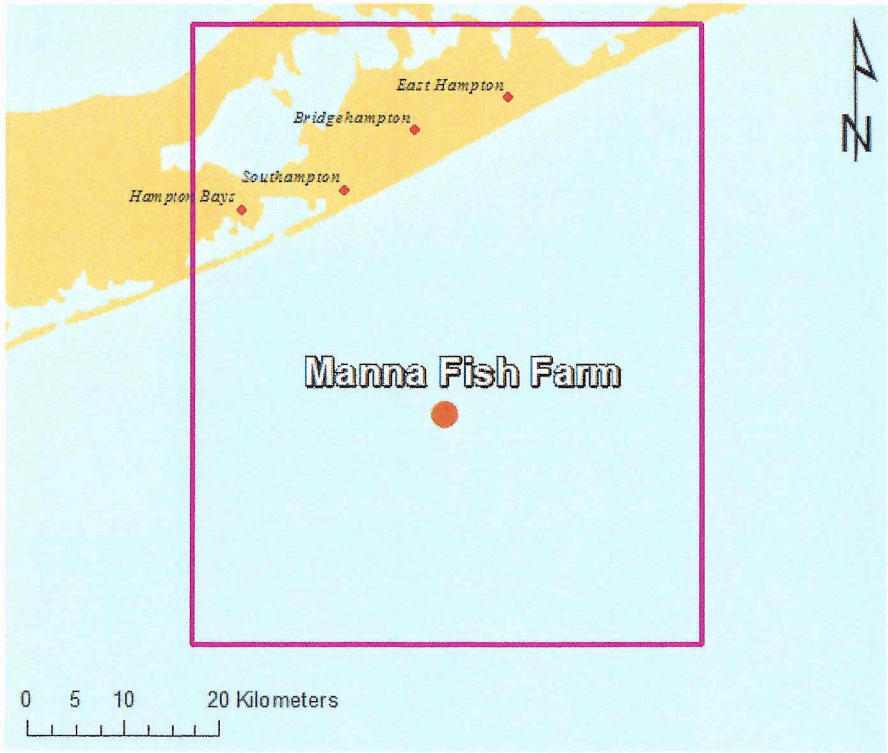
Aquapod Model A4700

- Outer diameter of approximately 21.2 m
- Volume approximately 4,701 m3
- Sufficient for up to 95 tons of fish at harvest.

•The Aquapods can be raised and lowered through activation and deactivation of flotation devices, which allow for easy maintenance, feeding and harvest.

Vessel Traffic

Vessel Automatic Information System (AIS) data monitors the location and characteristics of vessels in real time.

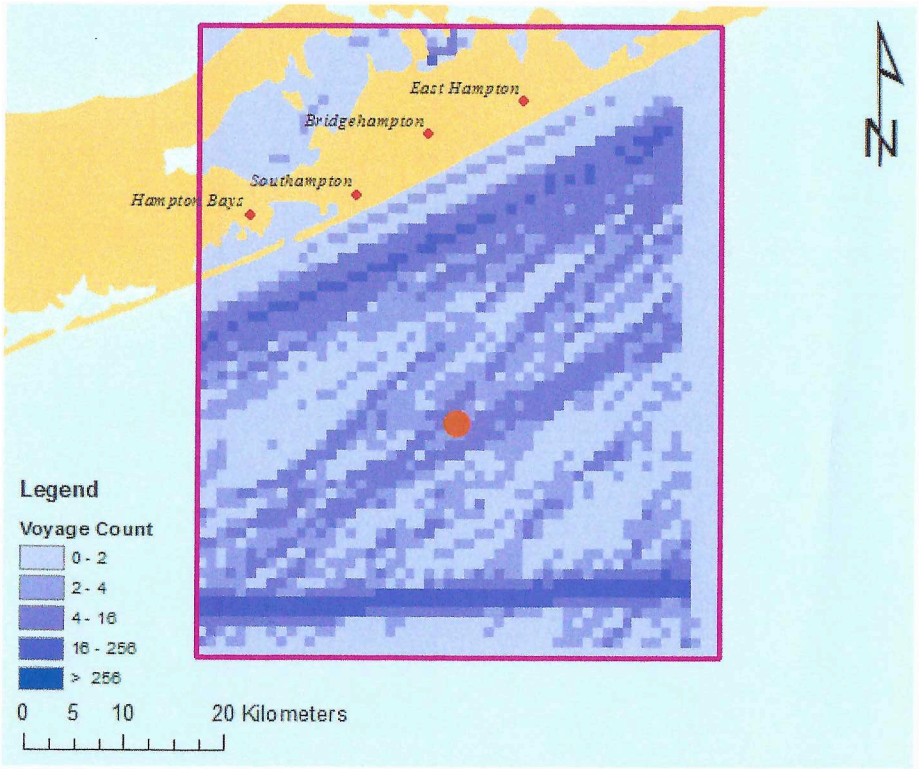


Provides information for course corrections and collision avoidance.

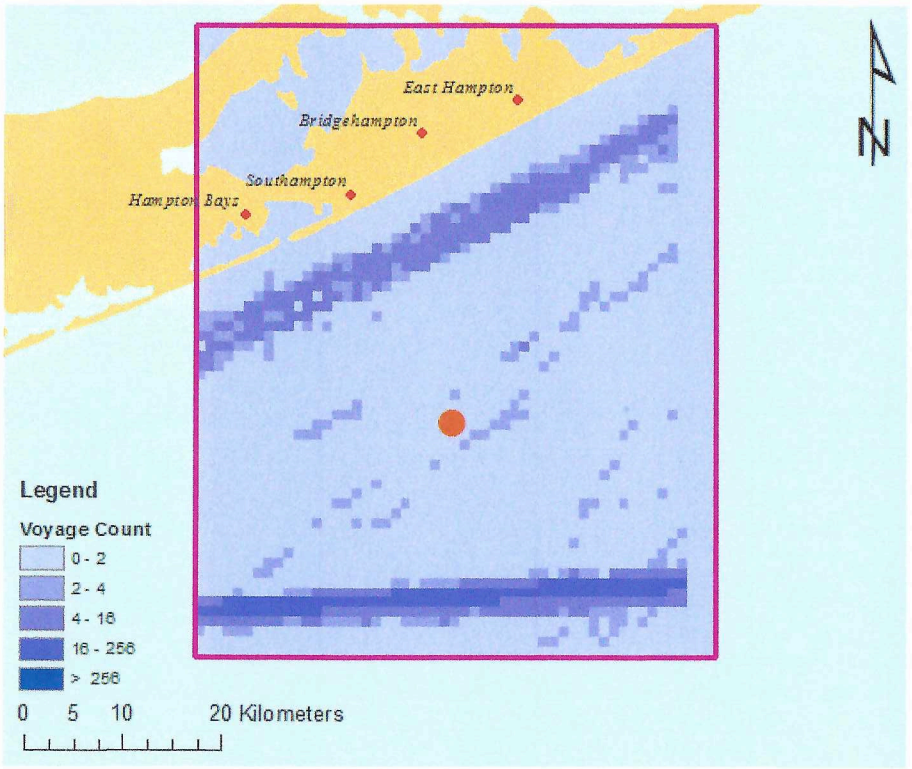
- Clipped AIS data for UTM 18 within red box (BOEM 2010)
- Divided region into 1 km grid cells (52 columns, 64 rows)
- Counted individual voyages within each cell

AIS Voyage Counts

May

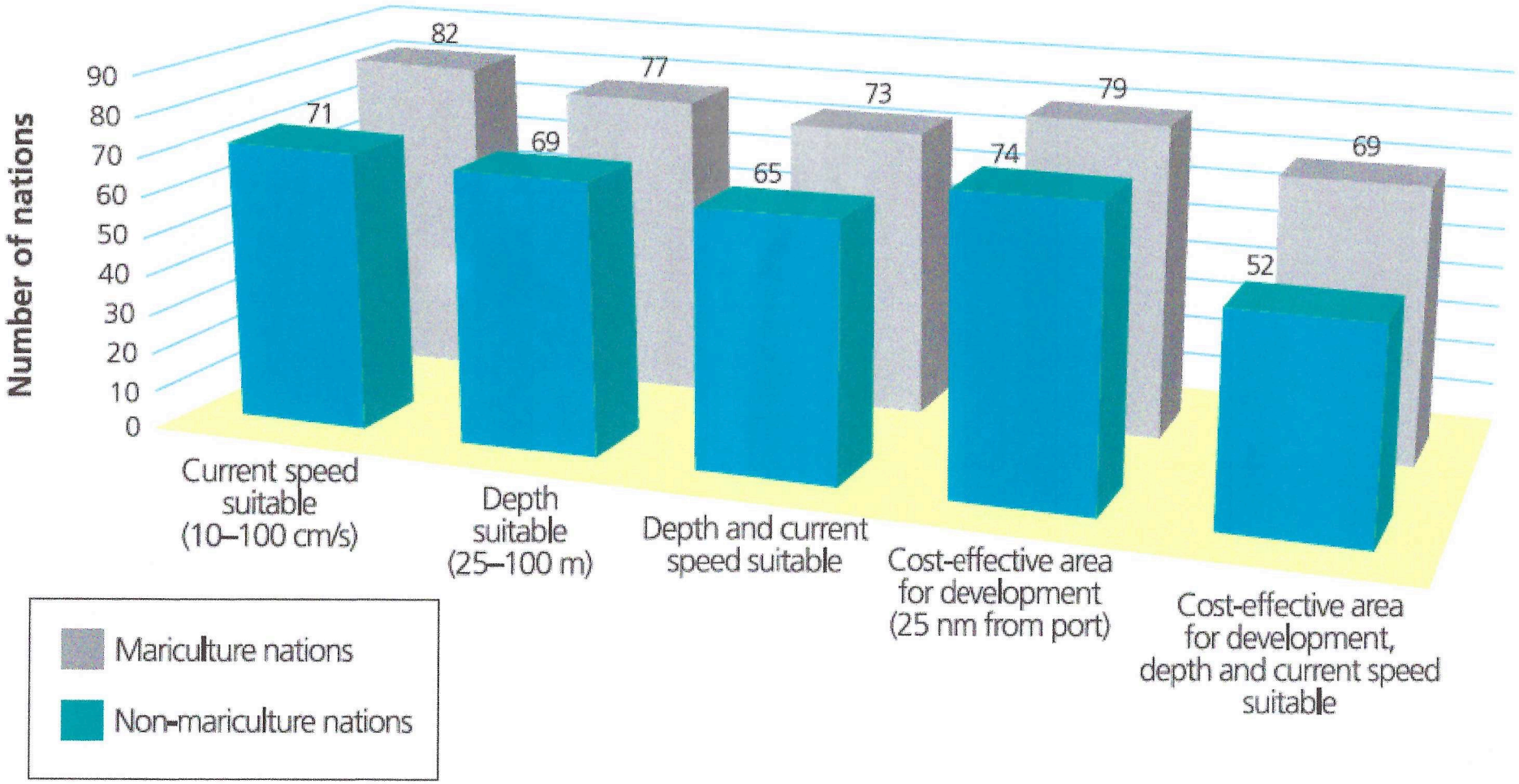


February



Offshore potential

Offshore mariculture potential for sea cages and longlines by numbers of nations meeting depth, current speed and cost-effective area for development criteria



Kapetsky et al. 2013

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Vol. 436|14 July 2005 nature

COMMENTARY

When will we tame the oceans?

In fisheries across the world, fish stocks are declining fast. Future preservation and management of the ocean's resources will require a transformation of our relationship with the seas, argues **John Marra**.

Thank you!

UNH 20 ton feed buoy