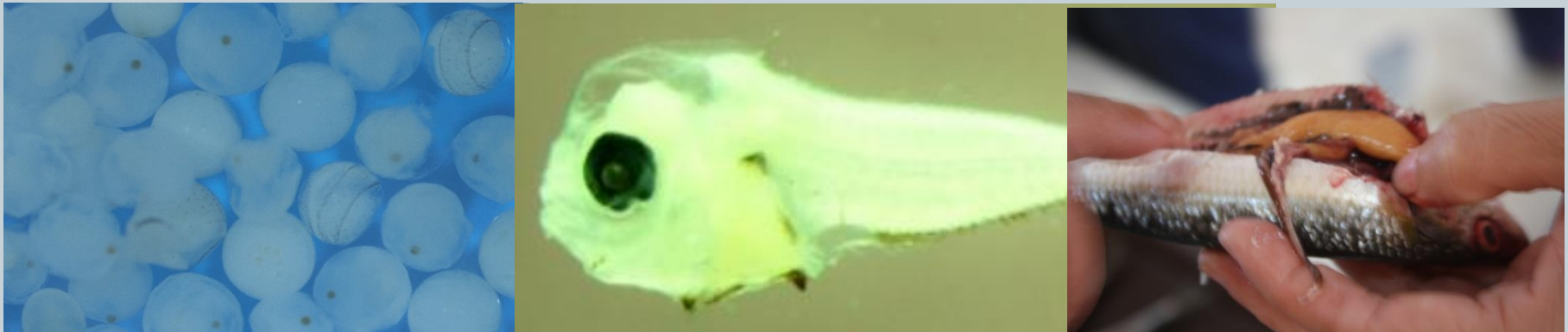


PROTECTED SPAWNING AREAS and IMPACT OF LAND RECLAMATION ON FISHERIES



Mudjekeewis D. Santos, Ph.D.

NAST-OYS 2011

Scientist II, NFRDI

Faculty, UST & ADMU

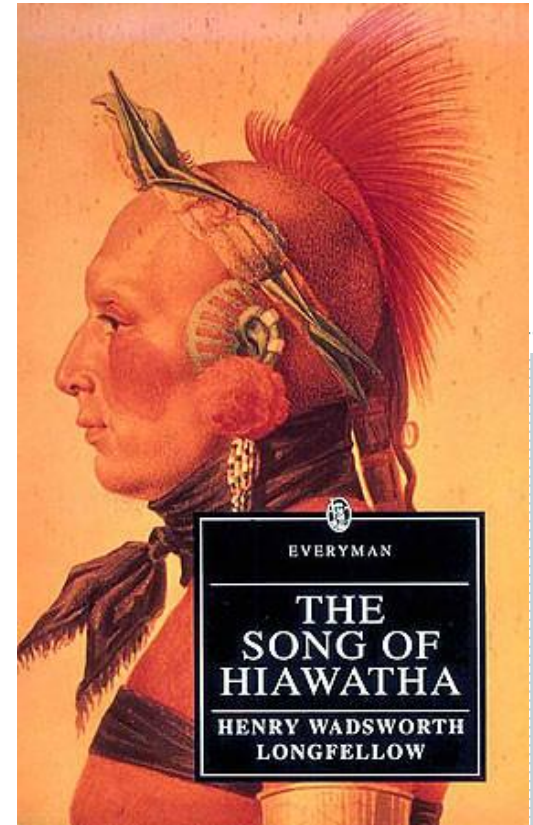
mudjiesantos@gmail.com

Mudjekeewis = god of winds

Dalisay = Pure

Santos = Saint

Ph.D. = Puro hangin Dala



Research Arm of BFAR established in 1998



Department of Agriculture

NATIONAL FISHERIES RESEARCH AND DEVELOPMENT INSTITUTE

"Ensuring Sustainable Fisheries Through Research and Development"

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Our Mission

Generate scientific information, technologies and knowledge that will respond to the needs of the fisheries industry and fisherfolk and to serve as basis for sustainable fisheries management and policy formulation.



Today is February 28, 2015

NFRDI's Continuing Commitment to be Fit

POSTED BY: Information Group | DATE: 2014-08-29



The National Fisheries Research and Development Institute (NFRDI) capped this year's observance of the "Civil Servants Health and Wellness Month" by conducting its annual sports fest held from July 30 to July 31, 2014 at Quezon City Memorial Circle Sports Complex.

The sports activity has become the Institute's commitment in promoting health and wellness and further encourages its employees to engage in physical activities purposely to shed some calorie...

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Enhancing Reproductive Health in Women



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www.nfrdi.da.gov.ph

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World capture fisheries in crisis !!!

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Science & Environment

Marine population halved since 1970 - report

© 16 September 2015 | Science & Environment



The report analysed more than 1,200 species of marine creatures in the past 45 years

Populations of marine mammals, birds, fish and reptiles have declined by 49% since 1970, a report says.

The study says some species people rely on for food are faring even worse, noting a 74% drop in the populations of tuna and mackerel.

In addition to human activity such as overfishing, the report also says climate change is having an impact.



ARTICLE

Received 27 Feb 2015 | Accepted 19 Nov 2015 | Published 19 Jan 2016

DOI: 10.1038/ncomms10244

OPEN

Catch reconstructions reveal that global marine fisheries catches are higher than reported and declining

Daniel Pauly¹ & Dirk Zeller¹

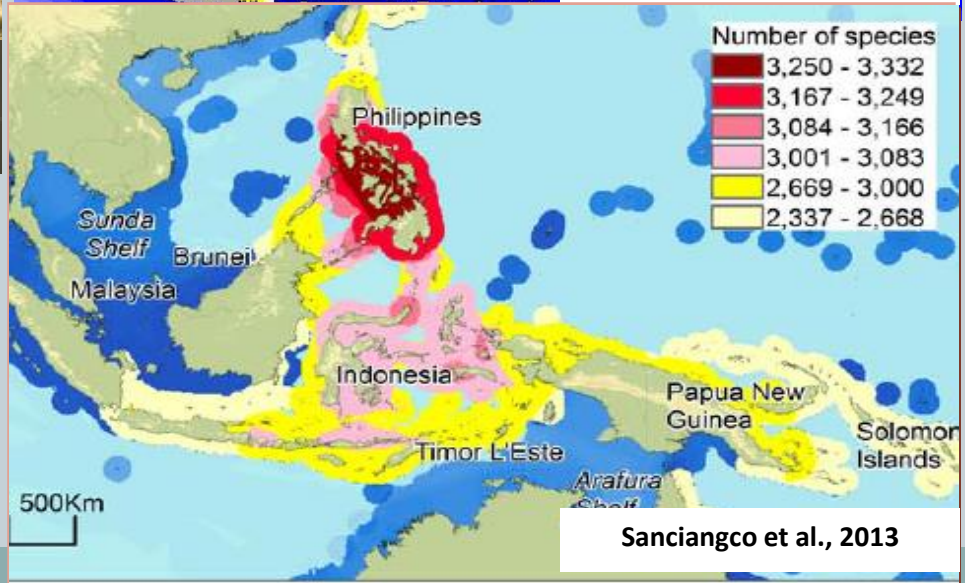
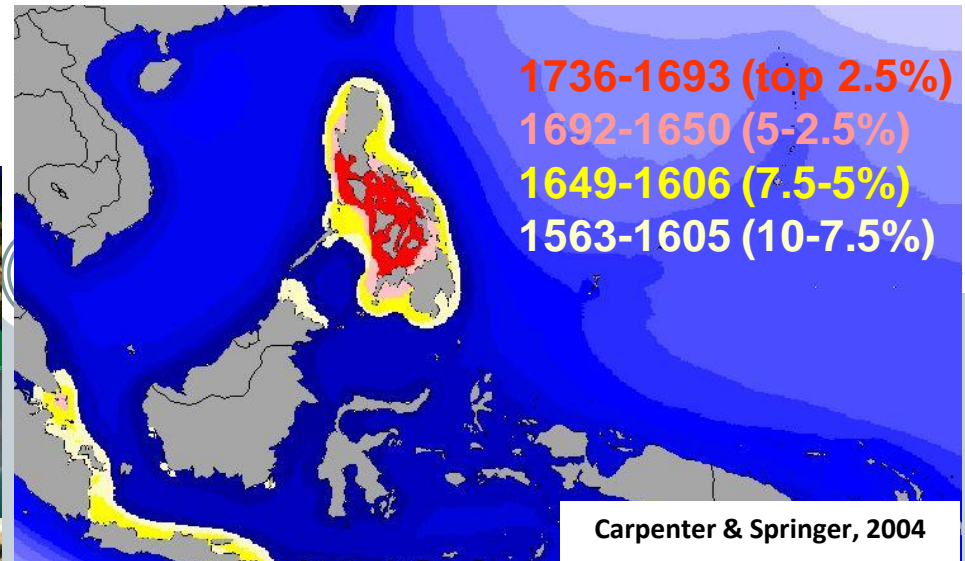
Fisheries data assembled by the Food and Agriculture Organization (FAO) suggest that global marine fisheries catches increased to 86 million tonnes in 1996, then slightly declined. Here, using a decade-long multinational 'catch reconstruction' project covering the Exclusive Economic Zones of the world's maritime countries and the High Seas from 1950 to 2010, and accounting for all fisheries, we identify catch trajectories differing considerably from the national data submitted to the FAO. We suggest that catch actually peaked at 130 million tonnes, and has been declining much more strongly since. This decline in reconstructed catches reflects declines in industrial catches and to a smaller extent declining discards, despite industrial fishing having expanded from industrialized countries to the waters of developing countries. The differing trajectories documented here suggest a need for improved monitoring of all fisheries, including often neglected small-scale fisheries, and illegal and other problematic fisheries, as well as discarded bycatch.

PH fisheries one of world's top



- ❑ among top 10 fish producing countries in the world
- ❑ 3rd in seaweeds production in the world
- ❑ 3rd longest coastline in the world
- ❑ 1 of few Distant Water Fishing Nations (DWFN)
- ❑ Contribution to total GDP: ~ 150 B
- ❑ Employment: ~ 1.5 M (direct)

PH: Center of marine biodiversity



Philippines host to the highest number of marine organisms per area !

2 new fish spp. described in the past year, endemic to the PH

Zootaxa 3911 (2): 287–293
www.mapress.com/zootaxa/
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Article

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<http://zoobank.org/urn:lsid:zoobank.org:pub:501BD04B-EB95-4533-B377-239AB03C0020>

A new fish species of the subfamily Serraninae (Perciformes, Serranidae) from the Philippines

JEFFREY T. WILLIAMS¹ & KENT E. CARPENTER²

¹Division of Fishes, Department of Vertebrate Zoology, National Museum of Natural History, Smithsonian Institution, 4210 Silver Hill Road, Suitland, MD 20746, USA. E-mail: williamsjt@si.edu

²Department of Biological Sciences, Old Dominion University, Norfolk, Virginia 23529, USA. E-mail: kcarpent@odu.edu

Abstract

A new species of serranine fish is described from the Philippine Islands. A single specimen of a new species, *Chelidoperca santosi*, captured by fishermen working in Palawan waters was discovered in the public fish market in Iloilo City, Panay, Philippines. Two additional specimens of the new species, also from the Philippines, were subsequently discovered in the collections of the Museum Victoria, Australia. The new species is currently known only from the Philippines and is characterized by its distinctive coloration with a row of four small dark spots on the snout (two in front of the eye) and two dark spots on the chin (one on each side of the symphysis of the mentaries), a white anal fin with two large yellow spots separated by broad white interspaces and a narrow yellow distal border, caudal fin with two yellow bars and a yellowish distal margin and no dark spots, and a combination of meristic and morphological characters.

Key words: *Chelidoperca santosi*, perchlet, Serranidae, Philippines, endemic

Journal of the
Ocean Science Foundation

2017, Volume 25



Acanthurus albimento, a new species of surgeonfish (Acanthuriformes: Acanthuridae) from northeastern Luzon, Philippines, with comments on zoogeography

KENT E. CARPENTER

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Corresponding author; Email: kcarpent@odu.edu

JEFFREY T. WILLIAMS

Division of Fishes, Department of Vertebrate Zoology,
National Museum of Natural History, 4210 Silver Hill Road, Suitland, MD 20746, USA
E-mail: williamsjt@si.edu

MUDJEKEEWIS D. SANTOS

Genetic Fingerprinting Laboratory, Research and Ecological Assessment Division,
National Fisheries Research & Development Institute,
Quezon City, Metro Manila, Philippines

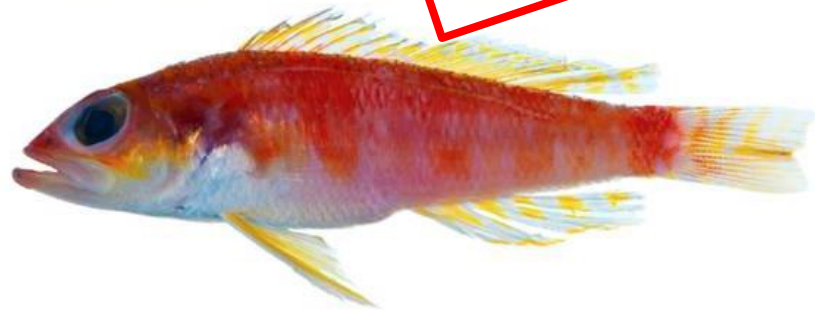


FIGURE 1. *Chelidoperca santosi*, holotype, PNM 15190, 84 mm SL, freshly collected at a fish market at Iloilo, Panay, Philippines, photographed by J.T. Williams.

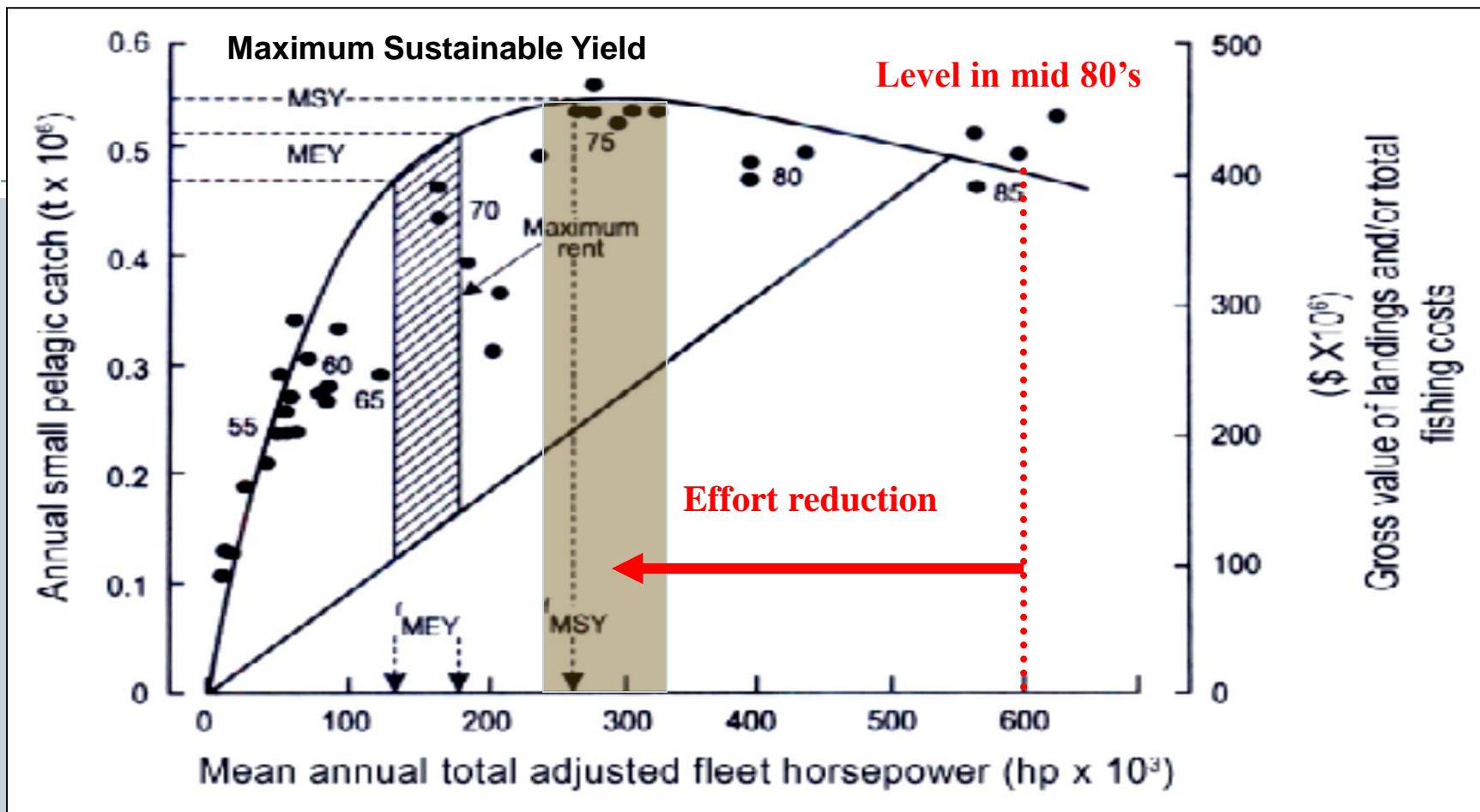


Figure 3. *Acanthurus albimento*, fresh holotype, PNM 15199, 252.4 mm SL, northeast Luzon, Philippines (J.T. Williams).

Pogi perchlet
(*Chelidoperca santosi*)

Whitechin surgeonfish
(*Acanthurus albimento*)

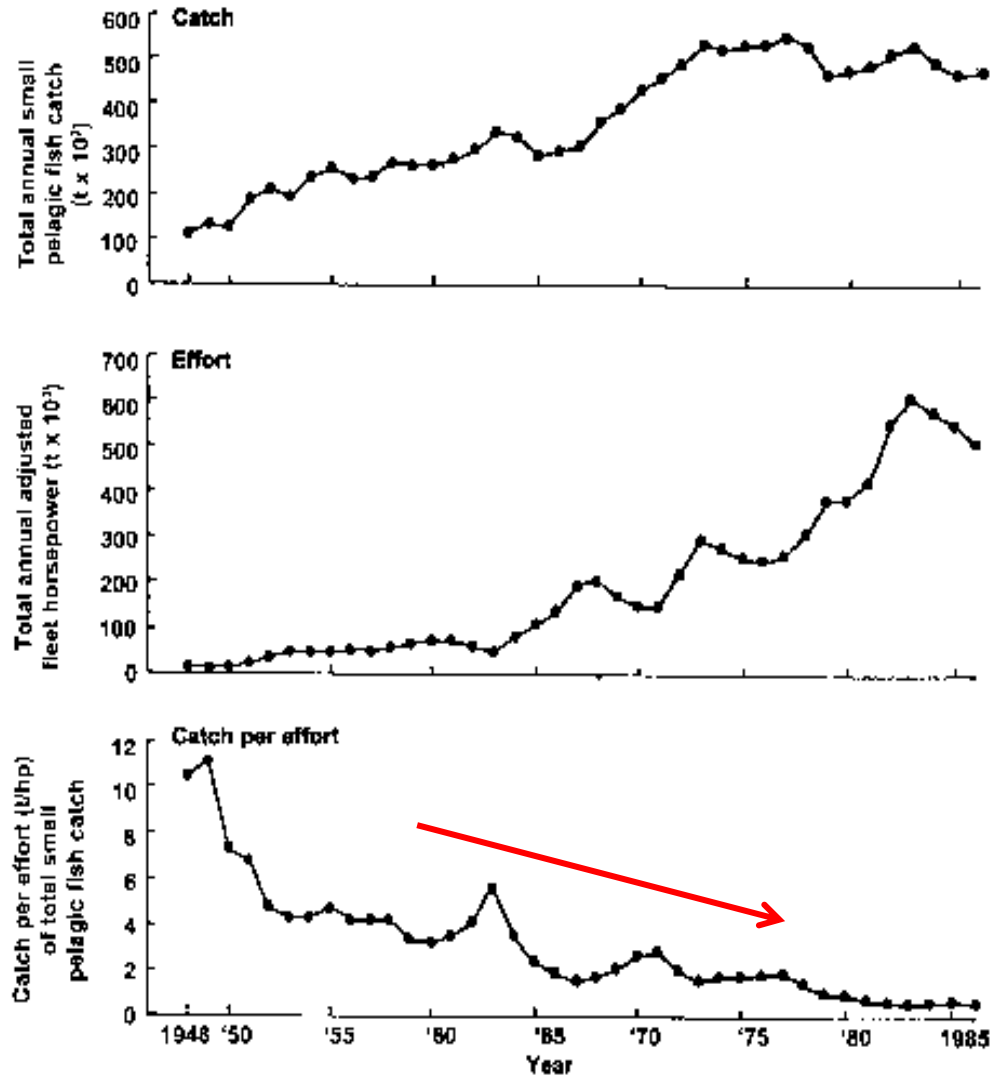
PH Capture Fisheries: Over the MSY in 80's



Surplus production model for pelagic fishes (Dalzell *et al*, 1986)

Small pelagic stocks declining

Time-series data of total small pelagic catch, fishing effort and catch per effort, 1948 to 1986 (Dalzell and Corpuz 1990)

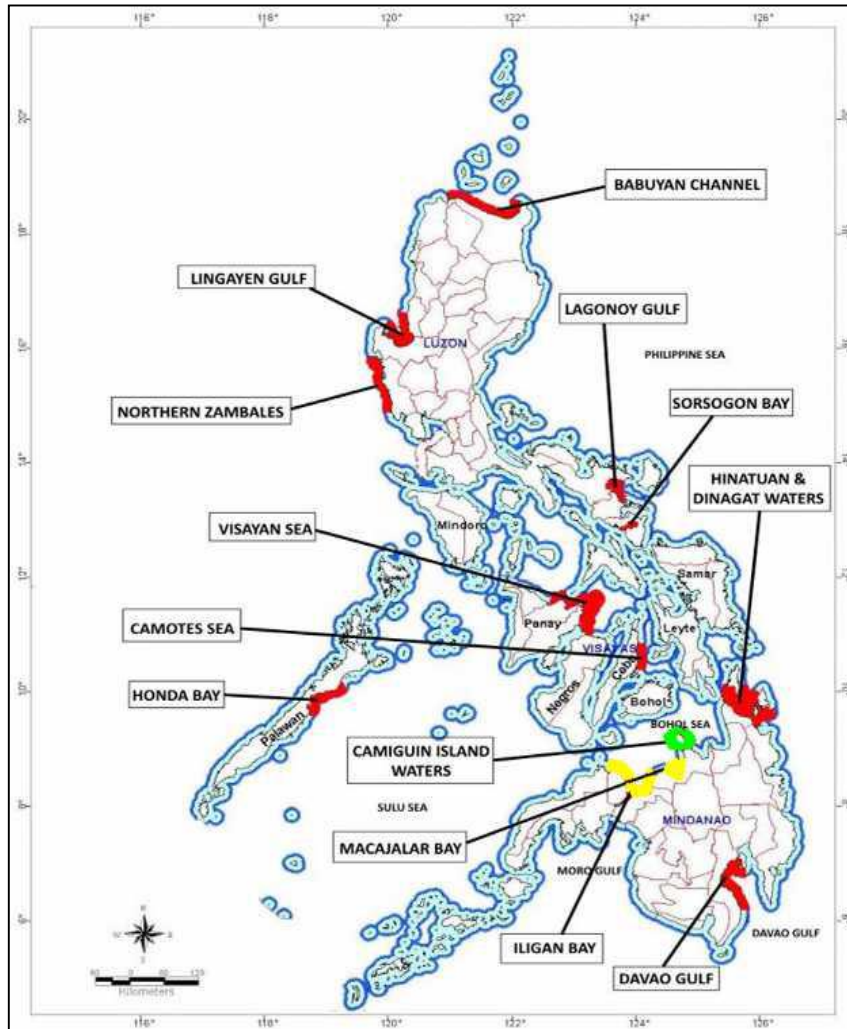


Demersal stocks declining

Area	Year	Stockdensity (t/km ²)	Relative density (% of baseline)		Source
Manila Bay	1949-50	4.61	100.0		<i>Warfel & Manacop 1950</i>
	1968-72	1.71	37.1	↓	<i>Silvestre et al., 1987</i>
	1992-93	0.47	10.2		<i>Armada, 1994</i>
San Miguel Bay	1947	10.6	100.0		<i>Warfel & Manacop 1950</i>
	1980-81	2.13	20.1	↓	<i>Vakily, 1982</i>
	1992-93	1.96	18.5	↓	<i>Cinco et al., 1995</i>
	1995-96	1.31	12.4		<i>Soliman & Dioneda, 1997</i>
Lingayen Gulf	1978-79	1.33	100.0	↓	<i>Villoso & Aprieto, 1983</i>
	1987-88	0.57	42.9	↓	<i>Ochavillo et al., 1989</i>
Carigara Bay	1979-80	2.00	100.0	↓	<i>Armada & Silvestre, 1981</i>
	1995-96	1.04	52.0	↓	<i>Pura et al., 1997</i>
Sorsogon Bay	1972	1.87	100.0	↓	<i>Ordoñez et al., 1972</i>
	1994-95	1.20	64.2	↓	<i>Cinco & Perez, 1996</i>

Estimates of demersal stock densities in selected fishing grounds of the Philippines

Fishing grounds heavily exploited



WWF-Philippines
@WWF_Philippines

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10 out of 13 fishing grounds in the Philippines are overfished or heavily exploited. Let's work hard to turn the tide. #PaNaGaT #SFS2015

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ASSESSING PROGRESS TOWARDS THE 2010 BIODIVERSITY TARGET:

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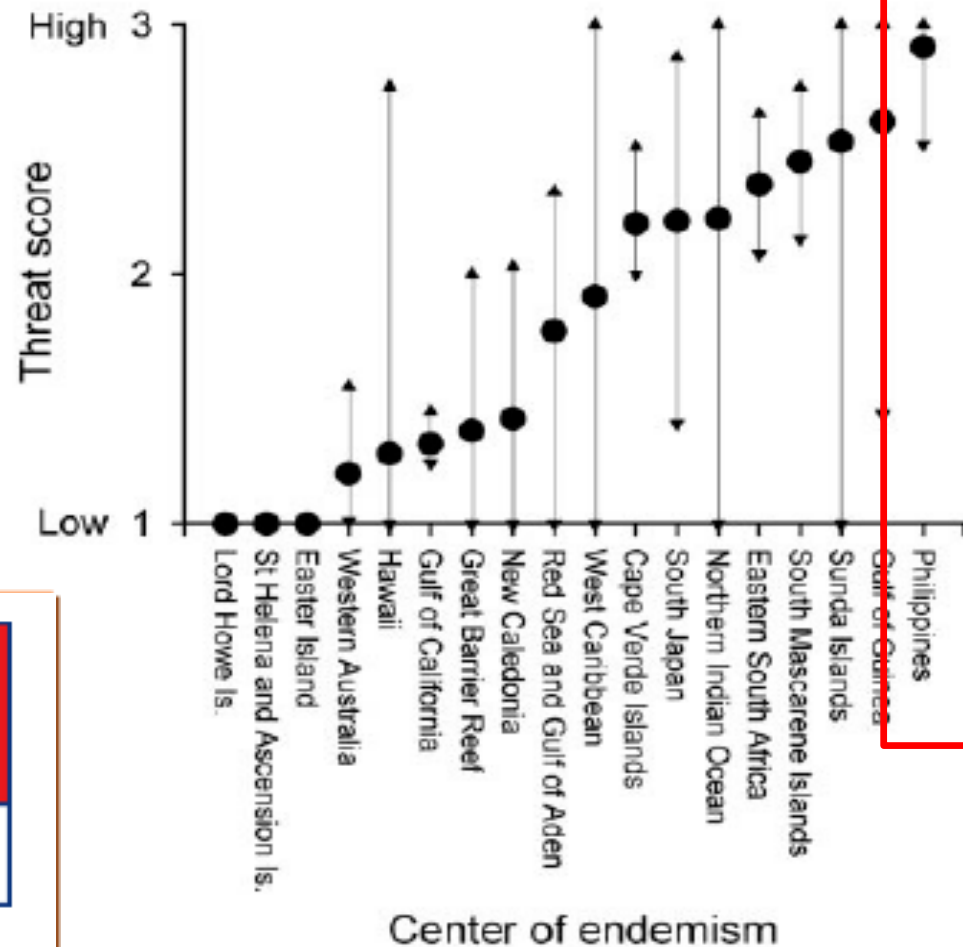
Republic of the Philippines

2009



PH: “hottest of hotspots”

Fig. 3. Threats to reefs in centers of endemism. The figure shows mean (circles), maximum, and minimum threat scores for grid cells included within each center of endemism, calculated with data from Bryant *et al.* (3, 13).



Roberts et al 2002.



PH fisherfolk: Poorest of the poor



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ENVIRONMENT

PH oceans in crisis: The sad state of small fisherfolk

On Friday, May 30, a day before National Fisherfolk's Day, fisheries reform advocates will march to Malacañang to submit to President Aquino a proposal on how to save Philippine marine resources

**Pia Ranada**
@piananada
Published 9:00 AM, May 30, 2014
Updated 2:35 PM, May 30, 2014



PH Fishery Laws are responsive

SEC. 101. Fishing shall be unlawful in sanctuaries as declared

Upon a summary finding of administrative liability, the offender shall be punished with confiscation of catch and gear and an administrative fine of:

- (1) Twenty thousand pesos if the offender fails to pay the fine;
- (2) Two hundred thousand pesos if the offender fails to pay the fine;
- (3) Six hundred thousand pesos if the offender fails to pay the fine;
- (4) One million pesos if the offender fails to pay the fine.

Upon conviction by a court of law, the offender shall be punished with imprisonment of six (6) months and one (1) day to six (6) years, confiscation of catch and gear, and fine twice the amount of the administrative fine and cancellation of license or permit. (aa)

amended, as follows:

"SEC. 2. Declaration of the policy of the State

- (a) x x x
x x x

SEC. 100. Fishing During Closed Season. – It shall be unlawful to fish during closed season.

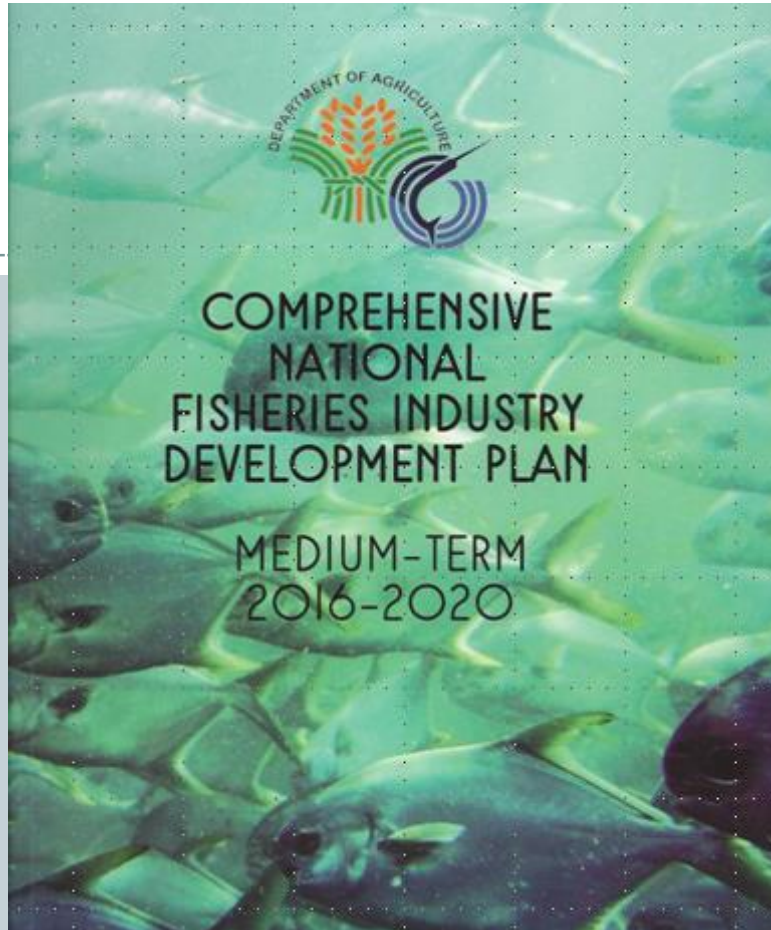
Upon a summary finding of administrative liability, the offender shall be punished with confiscation of catch and gear and an administrative fine of:

- (1) Three times the value of the catch or Twenty thousand pesos (P20,000.00) for municipal fishing, whichever is higher: Provided, That if the offender fails to pay the fine, community service shall be rendered;
- (2) Five times the value of the catch or One hundred thousand pesos (P100,000.00), whichever is higher for small-scale commercial fishing;
- (3) Five times the value of catch or Three hundred thousand pesos (P300,000.00), whichever is higher for medium-scale commercial fishing; and
- (4) Five times the value of catch or Five hundred thousand pesos (P500,000.00), whichever is higher for large-scale commercial fishing.

Upon conviction by a court of law, the offender shall be punished with imprisonment of six (6) months and one (1) day to six (6) years, confiscation of catch and gear, and fine twice the amount of the administrative fine and cancellation of license or permit. (aa)

Rule 100.1. Scientific Basis. – The DA-NFRDI and DA-BFAR, in coordination with the concerned stakeholders, LGUs and other government agencies, whenever appropriate, shall conduct resource assessments to determine whether there is a need to establish or continue declaring a closed season for fishing or for the use of some fishing gears and/or methods for some fishery species.

Science-based fishery industry plan



Strategy 3:

Implement science-based conservation and management measures

Implement science-based measures to rehabilitate domestic stocks

Prevent introduction/containment of invasive/alien species (IAS)

Restore fishery habitats
(mangroves, sea grasses, coral reefs, wetland, and inland bodies
of water) through protection and rehabilitation including pollution control

Set reference points/harvest control rules

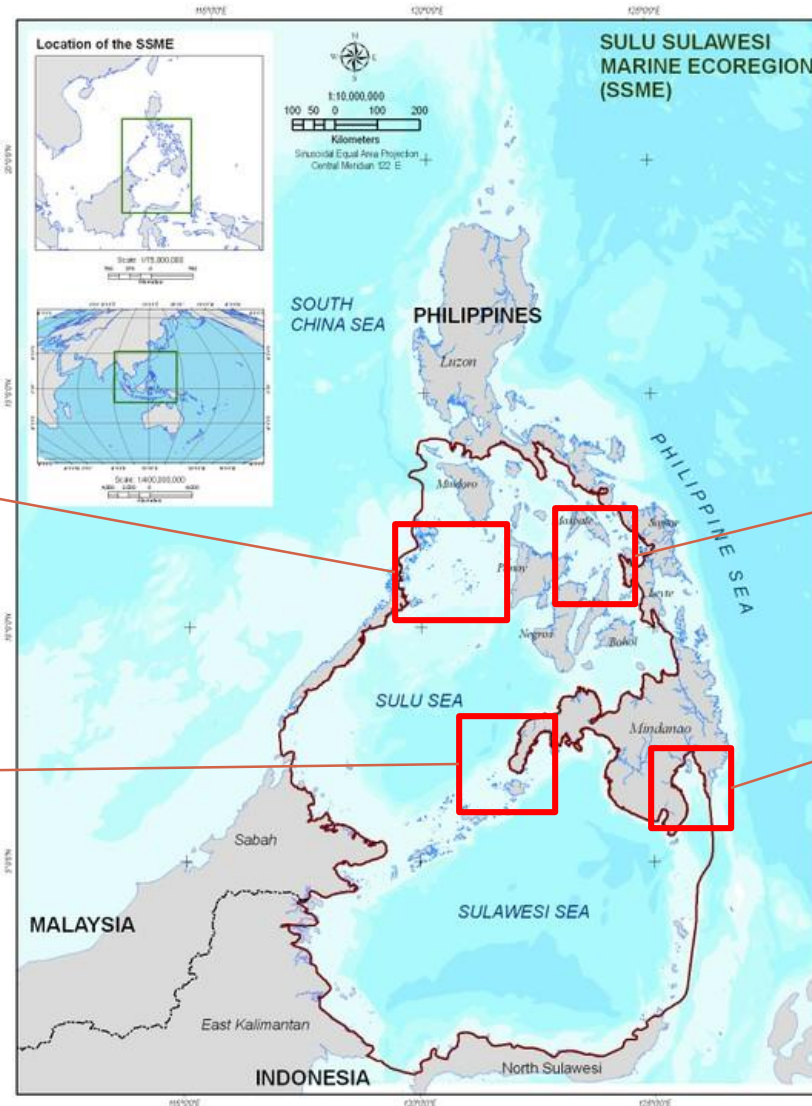
Work for the passage of ordinances for the implementation of 10.1 - 15km
by small and medium scale commercial access subject to existing laws

Revisit and review the 15km distance
to include the study of bathymetry and topography

Protect spawning grounds and spawning cycles
based on research and using a participatory process

Develop inter-LGU Integrated Coastal Resource Management (ICRM) plan
based on PCRA

Seasonal Fishing Closures during Peak Spawning Period of Fish



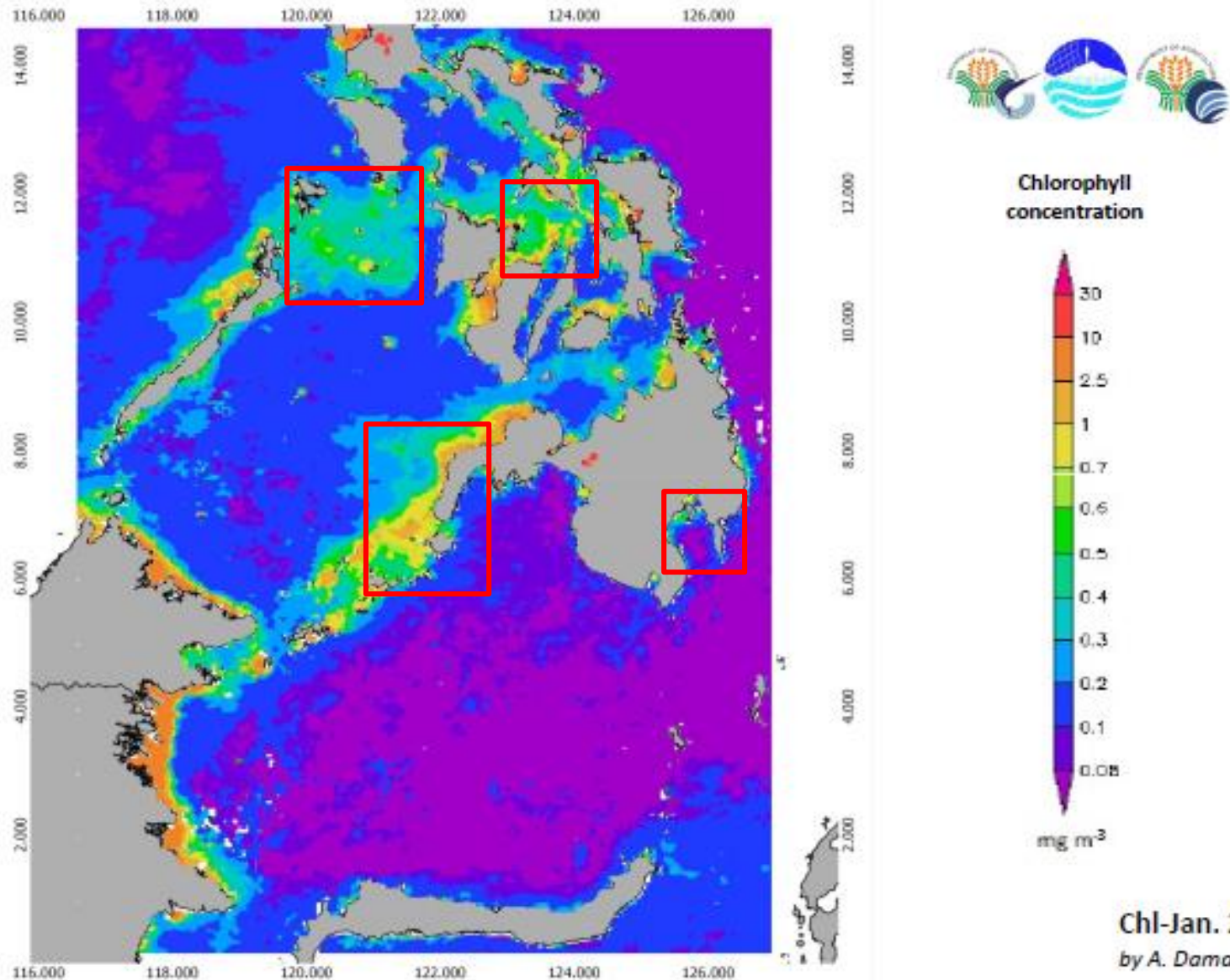
4. Northern Palawan (2015)

2. Zamboanga Peninsula (2011)

1. Visayan Sea (1989)

3. Davao Gulf (2014)

Chlorophyll-a = small pelagic fishes



1. VISAYAN SEA (November 15 to February 15)

Republic of the Philippines
Department of Agriculture
BUREAU OF FISHERIES AND AQUATIC RESOURCES
860 Quezon Ave., Quezon City, Metro Manila 3008

July 12, 1989

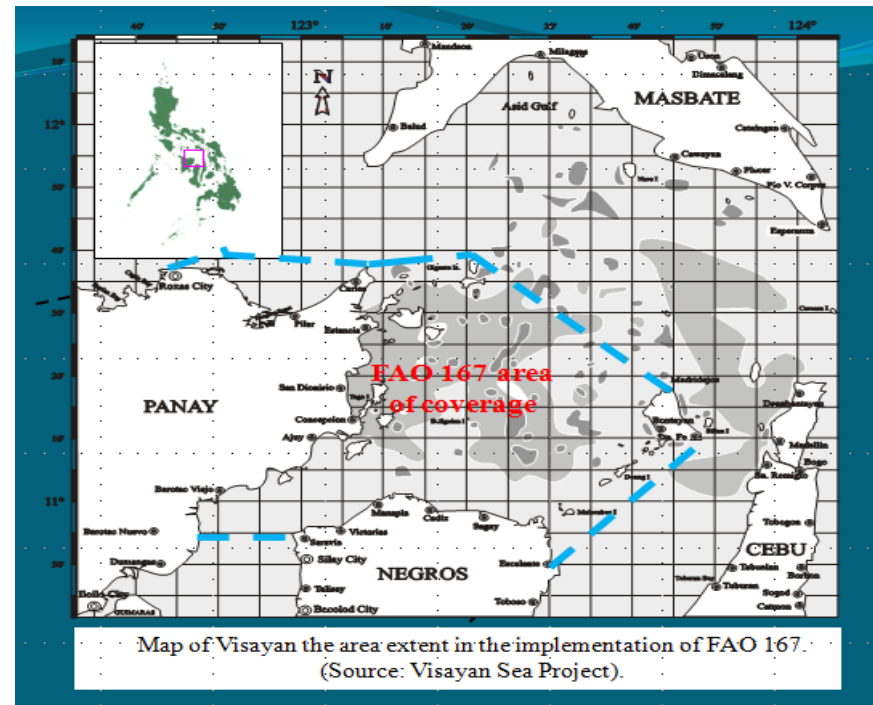
FISHERIES ADMINISTRATIVE)
ORDER No. 167:
Series of 1989)

SUBJECT: Establishing a closed season for the conservation of sardines and herrings and mackerels in the Visayan Sea.

Pursuant to the provisions of sections 3 (b), 4 and 7 of Presidential Decree No. 704, as amended, otherwise known as the Fisheries Decree of 1975, and Section 1 of Presidential Decree No. 1015, the following rules and regulations are hereby promulgated for the protection and conservation of certain species of fish known as sardines and herrings (Clupeidae) and mackerels (Scombridae) in the Visayan Sea.

Section 1. Definition. - For the purpose of this order, the following terms are used herein shall be construed as follows:

- a) Sardines and herrings shall include the following species of fish belonging to the family *Clupeidae* and known under the following scientific and local names: *Sardinella fimbriata*, fimbriated sardines, tunsoy, lao-lao, tabagak, tamban, liryao; *Sardine/la perforata*, deep-bodied herrings, lalobaybay, tamban, lapad, tamban lison, lapa; *sardinella longiceps*, Indian sardines, tamban tunsoy, haul-haul; *Dusunieria acuta*, round dwarf herring, tulis, balantiyong, and hilos-hilos.
- b) Mackerels shall mean species of fish belonging to the family *Scombridae* and known under the following scientific and local name *Rastrelliger brachyosoma*, short-bodied mackerels, hasa-hasa, and *Rastrelliger chrysozonus*, striped mackerels, alumahan and bulao.
- c) Fry on young sardines and mackerels shall refer to the fry or young of the species mentioned in Section 1 a) and 1 (b) above, and known under the local names of "lupoy," "silinyasi," "linalsay" or "manansi".



Sardinella gibbosa



Rastrelliger kanagurta



Herklotischthys quadrimaculatus

2. ZAMBOANGA PENINSULA (December 1 to March 1)



Republic of the Philippines
OFFICE OF THE SECRETARY
Elliptical Road, Diliman
Quezon City 1100
Philippines

BFAR ADMINISTRATIVE)
CIRCULAR NO. **255** :
SERIES OF 2014.....)

SUBJECT: Establishing Closed Season for the Conservation of Sardines in East Sulu Sea, Basilan Strait and Sibuguey Bay.

Pursuant to Sections 2 (c) and (f), 3 (a), 9, 16, 35 and 107 of Republic Act 8550 or the Philippine Fisheries Code of 1998, this Administrative Circular is hereby promulgated for the conservation of sardines in that portion of the East Sulu Sea, Basilan Strait and Sibuguey Bay hereafter known as the **conservation area** of approximately 6,481.80 square nautical miles or 22,260.36 square kilometers encompassing the western municipal/national waters of Zamboanga Del Norte, the waters bordering south and eastern waters of Zamboanga City and southern portion of Zamboanga Sibugay, enclosed by lines drawn between the points and coastlines shown in the attached chart and coordinates.

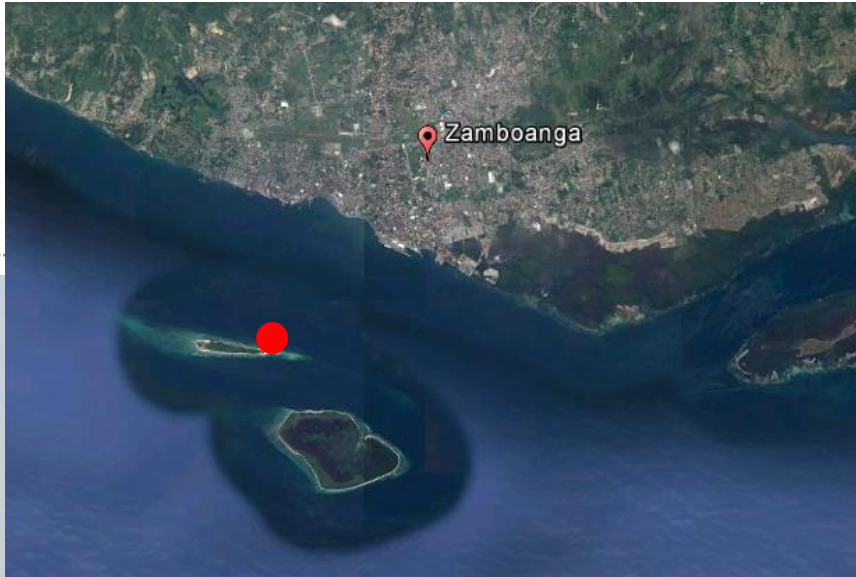


Sardinella lemuru



Sardinella gibbosa


Little Santa Cruz Island, Zamboanga City, nursery ground for main PH sardine by volume



Sardinella lemuru

3. DAVAO GULF

(June 1 to August 31)

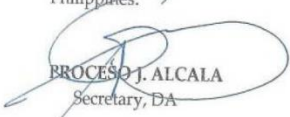
 Republic of the Philippines
DEPARTMENT OF AGRICULTURE
Elliptical Road, Diliman, Quezon City

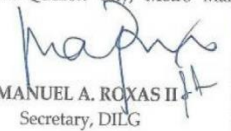
JOINT DA-DILG ADMINISTRATIVE)
ORDER NO. _____ :
SERIES OF 2014 ----->

SUBJECT: **Establishing a Closed Season for the Conservation of Small Pelagic Fishes in Davao Gulf.**

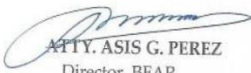
WHEREAS, studies conducted by the Bureau of Fisheries and Aquatic Resources, Regional Office No. XI, National Stock Assessment Project (BFAR-NSAP) have shown that the catch per unit effort of small pelagic fishes in Davao Gulf is declining;

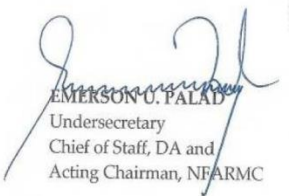
Issued this _____ day of _____ 2014 in Quezon City, Metro Manila, Philippines.



BROCESO J. ALCALA
Secretary, DA

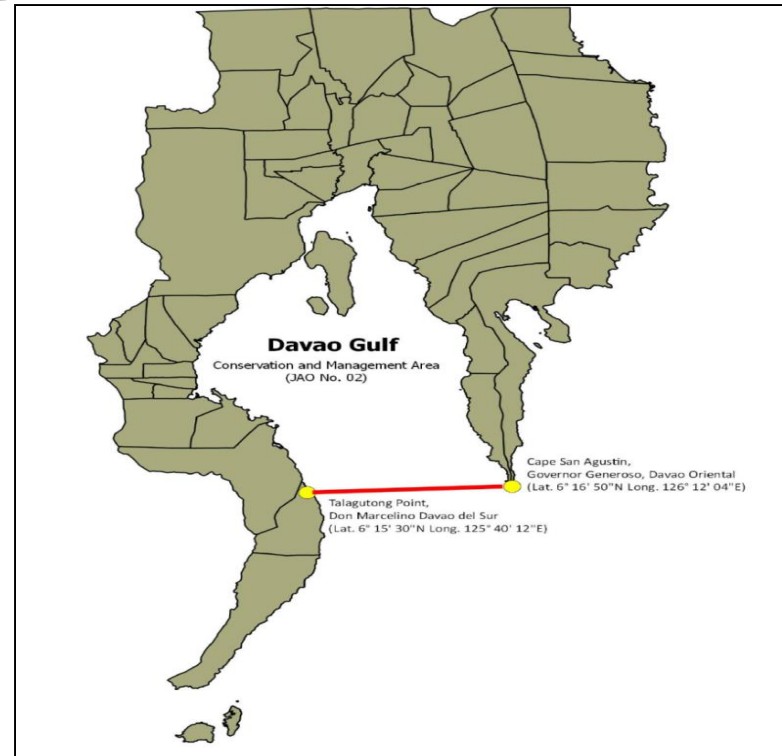

MANUEL A. ROXAS II
Secretary, DILG

RECOMMENDING APPROVAL:


ATTY. ASIS G. PEREZ
Director, BFAR


EMERSON U. PALAD
Undersecretary
Chief of Staff, DA and
Acting Chairman, NFARMC





Decapterus macarellus



Selar crumenolphthalmus



Rastrelliger kanagurta

4. NORTHERN PALAWAN (November 1 – January 31)






Republic of the Philippines
 DEPARTMENT OF AGRICULTURE
 DEPARTMENT OF THE INTERIOR AND LOCAL GOVERNMENT
 Quezon City

U.P. LAW CENTER
 OFFICE OF THE NATIONAL ADMINISTRATIVE SERVICES
 Administrative Files and Regulations
DEC 14 2015
RECEIVED

JOINT DA-DILG ADMINISTRATIVE ORDER
 No. **01**
 Series of 2015

SUBJECT: Establishment of a Closed Season for the Management of *Gulunggong* (roundscad; *Decapterus* spp.) in Northern Palawan

WHEREAS, *gulunggong* is an important fishery resource in Palawan that accounts for 92% of the landed catch at the Navotas fish port, and comprises 22% of the total landed catch nationwide;

SECTION 14. Effective date - This Order shall take effect fifteen (15) days after its publication in the Official Gazette and/or in two (2) newspapers of general circulation, and fifteen (15) days after registration with the Office of the National Administrative Registrar.

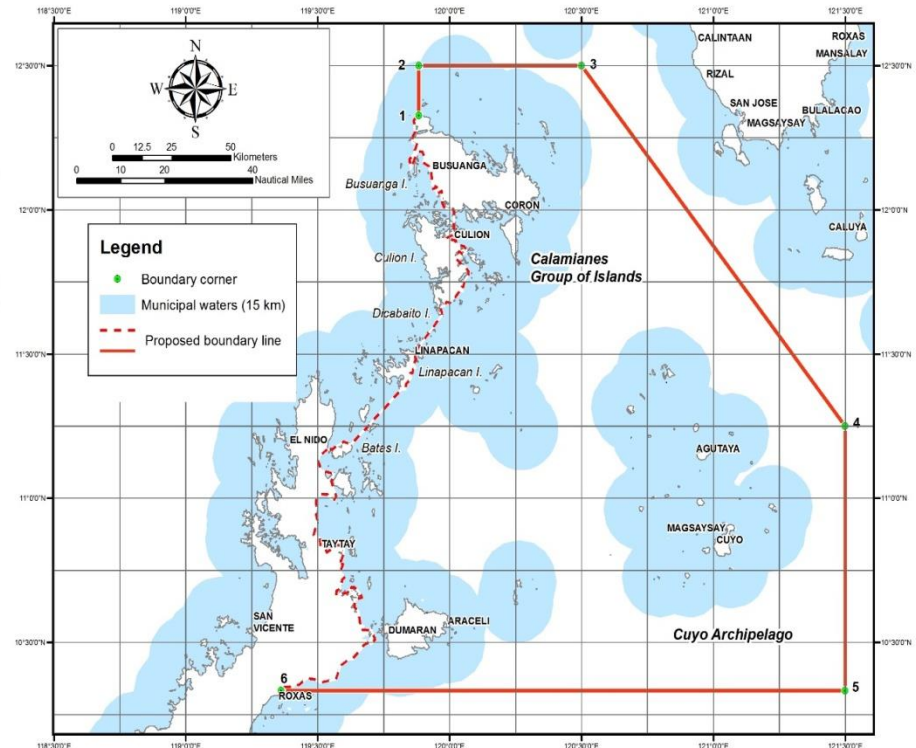
Issued this 14th day of December, 2015, in Quezon City, Philippines


PROCESO J. ALCALA
 Secretary, DA


MEL SENEN S. SARMIENTO
 Secretary, DILG

RECOMMENDING APPROVAL:


ATTY. ASIS G. PEREZ
 Undersecretary for Fisheries, DA
 Chair, NFARMC
 Director, BFAR



Decapterus macrosoma



Decapterus russelli

Case Study: Manila Bay and the Supreme Court Mandamus

(())

Republic of the Philippines
SUPREME COURT
Manila

EN BANC

G.R. Nos. 171947-48

February 15, 2011

METROPOLITAN MANILA DEVELOPMENT AUTHORITY, DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES, DEPARTMENT OF EDUCATION, CULTURE AND SPORTS,¹ DEPARTMENT OF HEALTH, DEPARTMENT OF AGRICULTURE, DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS, DEPARTMENT OF BUDGET AND MANAGEMENT, PHILIPPINE COAST GUARD, PHILIPPINE NATIONAL POLICE MARITIME GROUP, and DEPARTMENT OF THE INTERIOR AND LOCAL GOVERNMENT, Petitioners,

vs.

CONCERNED RESIDENTS OF MANILA BAY, represented and joined by DIVINA V. ILAS, SABINIANO ALBARRACIN, MANUEL SANTOS, JR., DINAH DELA PEÑA, PAUL DENNIS QUINTERO, MA. VICTORIA LLENOS, DONNA CALOZA, FATIMA QUITAIN, VENICE SEGARRA, FRITZIE TANGKIA, SARAH JOELLE LINTAG, HANNIBAL AUGUSTUS BOBIS, FELIMON SANTIAGUEL, and JAIME AGUSTIN R. OPOSA, Respondents.

RESOLUTION

VELASCO, JR., J.:

On December 18, 2008, this Court rendered a Decision in G.R. Nos. 171947-48 ordering petitioners to clean up, rehabilitate and preserve Manila Bay in their different capacities. The fallo reads:

(5) Pursuant to Sec. 65 of RA 8550, the DA, through the BFAR, is ordered to improve and restore the marine life of the Manila Bay. It is also directed to assist the LGUs in Metro Manila, Rizal, Cavite, Laguna, Bulacan, Pampanga, and Bataan in developing, using recognized methods, the fisheries and aquatic resources in the Manila Bay.

(5) The Department of Agriculture (DA), through the Bureau of Fisheries and Aquatic Resources, shall submit to the Court on or before June 30, 2011 a report on areas in Manila Bay where marine life has to be restored or improved and the assistance it has extended to the LGUs in Metro Manila, Rizal, Cavite, Laguna, Bulacan, Pampanga and Bataan in developing the fisheries and aquatic resources in Manila Bay. The report shall contain monitoring data on the marine life in said areas. Within the same period, it shall submit its five-year plan to restore and improve the marine life in Manila Bay, its future activities to assist the aforementioned LGUs for that purpose, and the completion period for said undertakings.



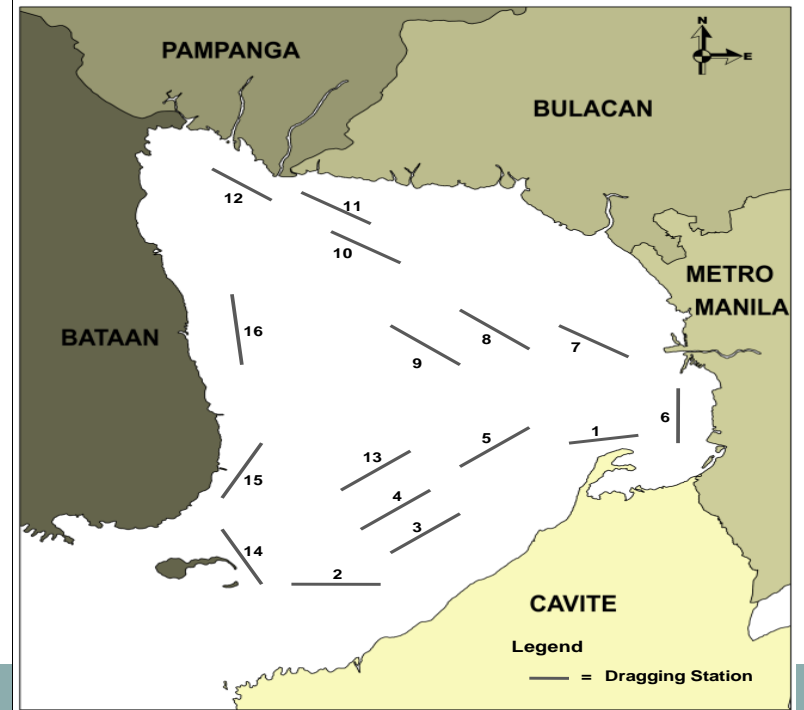
FISHERIES RESOURCES AND ECOLOGICAL ASSESSMENT OF MANILA BAY

In press
Data (2012 -2015)

Edited by:

Mudjekeewis D. Santos
Elsa F. Purio
Grace DV. Lopez
Francisco SB. Torres Jr.

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Norvida C. Gattula

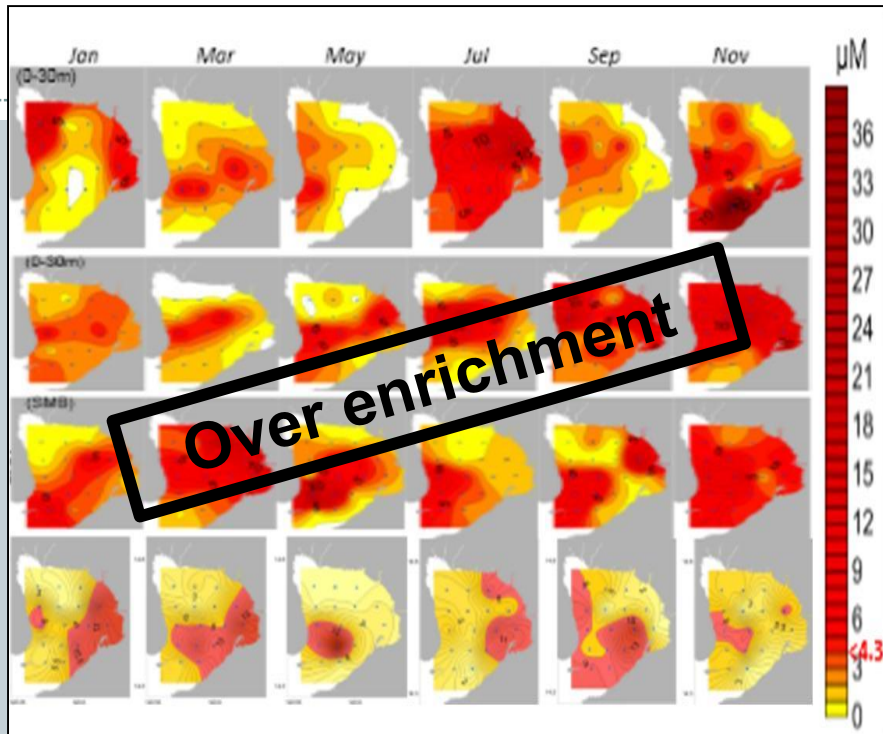


Demersal biomass in Manila Bay ~7% remaining

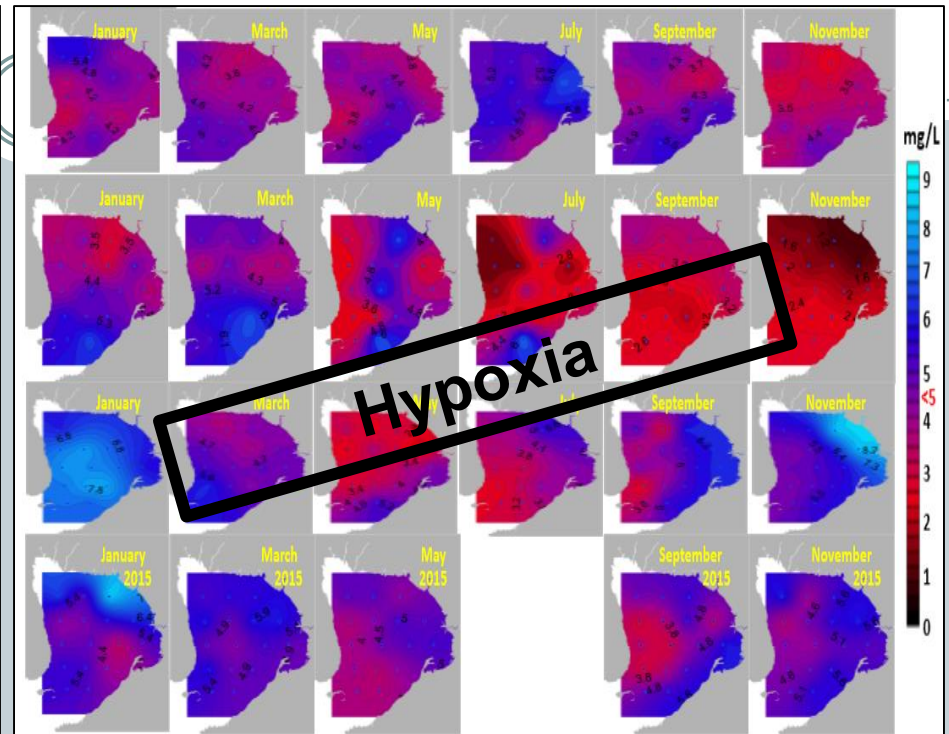
Year	Stock Density (t/km ²)	Relative Density (% of Baseline)	Source
1947	4.61	100	Warfel and Manacop, 1950
1968 - 72	1.71	37.1	Silvestre et al., 1987
1993 - 93	0.47	10.2	Armada, 1994
2014	0.32	6.9	NFRDI, 2015



Manila Bay seafloor appears to be biologically dead...



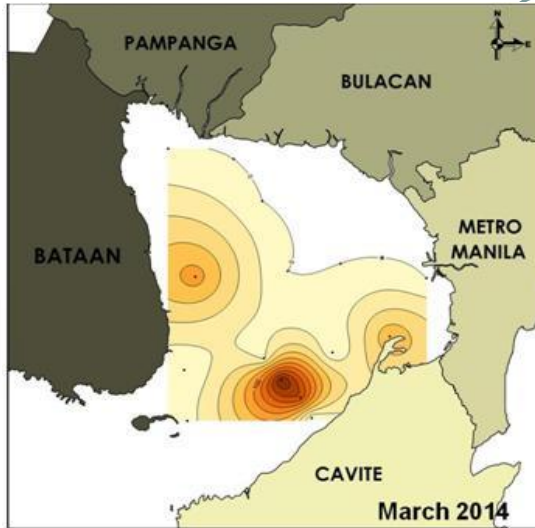
Average nitrate (NO_3) profile of Manila Bay from 2012 – 2015



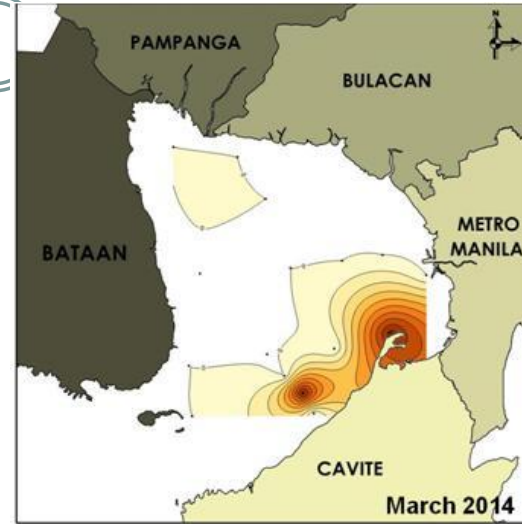
Average dissolved oxygen (DO) concentration in the Water Column of the Bay (mg/L) (2012-2015)

Distribution of sardine ggs, larvae, spawners in Manila Bay (March)

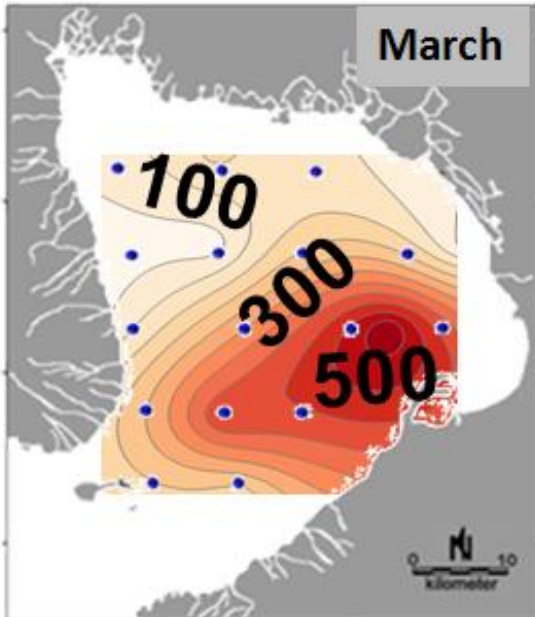
Sardinella gibbosa
(Stage IV = gravid)



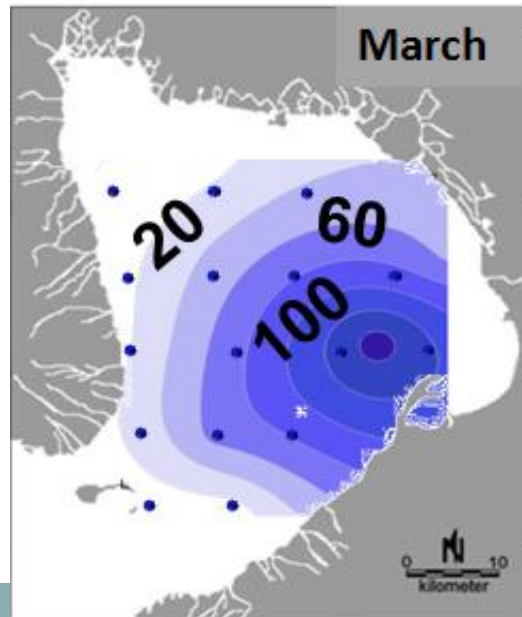
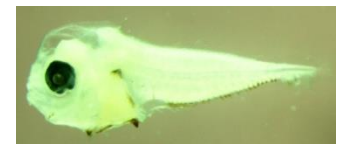
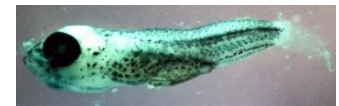
Sardinella fimbriata
(Stage IV = gravid)



Fish eggs
(Total)

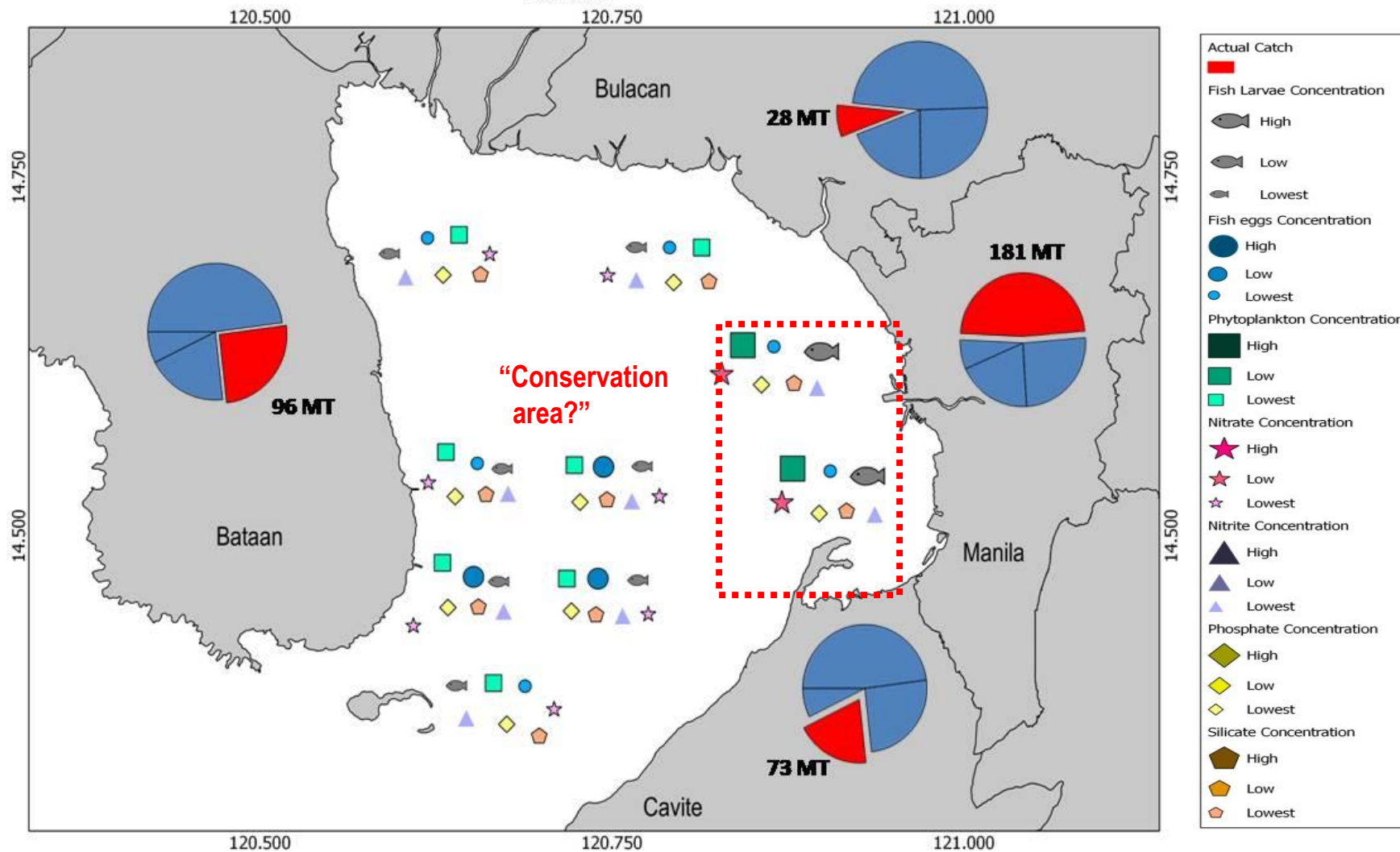


Fish larvae
(Total)

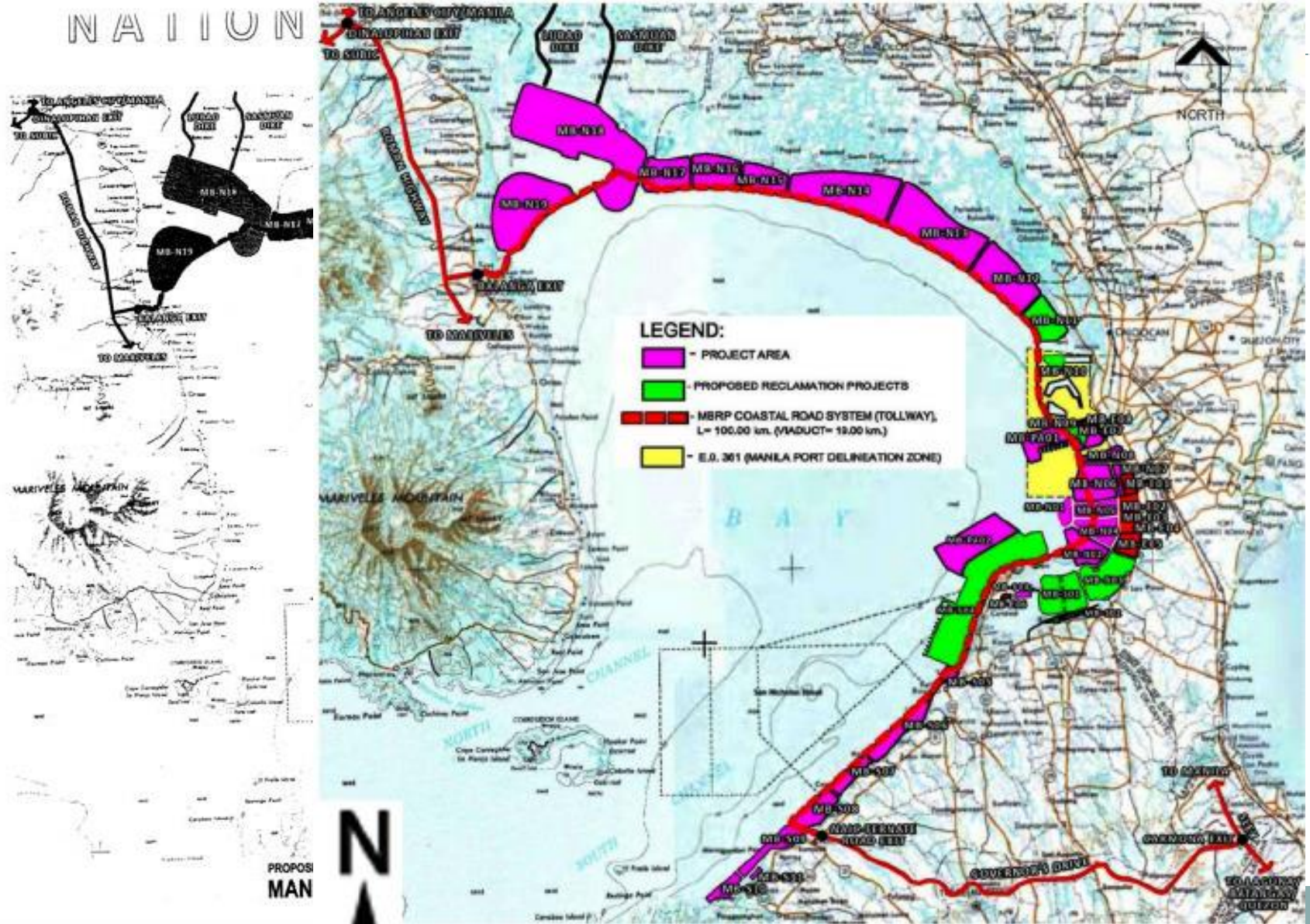


Southeast Side of Manila Bay: Conservation Area for Sardines?

March



Source: Philippine Reclamation Authority



“Solar City”



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Solar City soon to rise in Manila Bay

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BY THE MANILA TIMES ON DECEMBER 8, 2016

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Mayor Joseph Estrada on Thursday said the construction of Solar City, a multi-billion state-of-the-art green urban center in Manila Bay, will provide thousands of jobs and bring the city government additional revenues.

The Solar City reclamation project will start soon since President Rodrigo Duterte has given his nod to the creation of a tourism, commercial and residential district along Manila Bay.

Estrada said the city government is almost done processing the documentary requirements and clearances of Manila Goldcoast Development Corp. (MGDC), which won the contract in 1991.



“New Manila Bay International Community”

SECTIONS Sunday, April 16, 2017

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Erap OKs 3rd reclamation project

By: **Aie Balagtas See - Reporter** / @ABalagtasSeeINQ Philippine Daily Inquirer / 12:10 AM February 08, 2017



The future “city within a city,” as envisioned in this artist’s presentation, is touted as the country’s most advanced reclamation project.—photo courtesy of manila city government

Manila Mayor Joseph Estrada has approved another multibillion-peso reclamation project on the city’s section of Manila Bay, the third to get the green light since the former President became the city’s chief executive in 2013.



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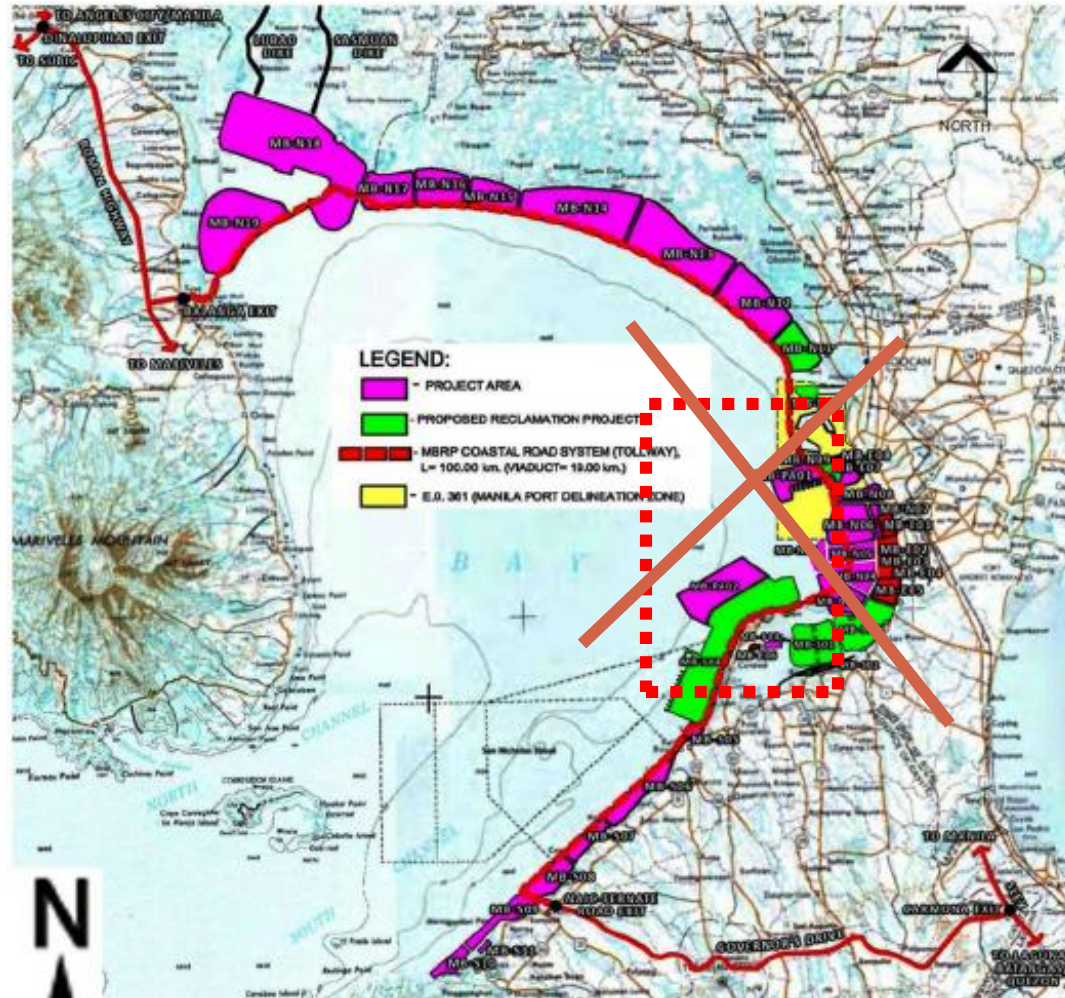
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Exact impact of Manila Bay reclamation to fish spawning not yet known, but likely NOT good !!!



Impacts of Land Reclamation to fisheries ...

- destruction of natural spawning and nursery grounds,
- local extinctions of fish populations,
- loss of seagrass and wetlands flora,
- loss of benthic communities,
- interference with seabird (and wetland bird) breeding sites and reduction in nesting habitat,
- altered water flow and habitat.

Question is not only impact but more importantly ...

- Fish or Buildings ?
- Food security or Economic Security ?
- Supreme Court mandamus or Executive Branch directive ?
- For Manila Bay: Revival or Reclamation ?
- Fisheries Code or Reclamation Authority ?
- Conservation or Development ?

Who will answer these
questions and
implement
recommendations ???

Thank you !!!

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