Updated BSC Stock Assessment in the Visayan Sea

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Credits to the NSAP Team



Fisheries Management Area 11



BFAR 6

FISHERIES MANAGEMENT AREA 11

Area	
Regional Composition	
Designated BFAR Lead	
Regional Offices	

- 2,038,600.00 Hectares
- : 5, 6, 7
- **BFAR Region 6**
- BFAR Regions 5, 6, 7

NIPAS Areas

1. GUIMARAS STRAIT
 2. TAÑON STRAIT
 3. VISAYAN SEA

Major Fishing Grounds

- a. Taklong Island Marine Reserve
- b. Sagay Marine Reserve
- c. Taňon Strait Protected Seascape



>10,000km² estimated area one of the major fishing area in the country multi-fishery resource with the abundance of small pelagic, marine demersal, cephalopods, &

crustaceans

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Why the Visayan Sea BSC Assessment?



Monterey Bay Aquarium Seafood Watch[®]

Blue swimming crab

Portunus pelagicus



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Philippines

Set gillnets, Pots

December 19, 2018 Seafood Watch Consulting Researcher

Final Seafood Recommendations

SPECIES/FISHERY	CRITERION 1: IMPACTS ON THE SPECIES	CRITERION 2: IMPACTS ON OTHER SPECIES	CRITERION 3: MANAGEMENT EFFECTIVENESS	CRITERION 4: HABITAT AND ECOSYSTEM	OVERALL RECOMMENDATION
Blue swimming crab Philippines Western Central Pacific, Pots, Philippines, Palawan	Red (1.526)	Red (1.732)	Red (1.000)	Green (3.240)	Avoid (1.710)
Blue swimming crab Philippines Western Central Pacific, Pots, Philippines, Visayan Sea	Red (1.526)	Red (1.732)	Red (1.000)	Green (3.240)	Avoid (1.710)
Blue swimming crab Philippines Western Central Pacific, Gillnets and entangling nets (unspecified), Philippines, Palawan	Red (1.526)	Red (1.000)	Red (1.000)	Green (3.240)	Avoid (1.491)
Blue swimming crab Philippines Western Central Pacific, Gillnets and entangling nets (unspecified), Philippines, Visayan Sea	Red (1.526)	Red (1.000)	Red (1.000)	Green (3.240)	Avoid (1.491)

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Framework for BSC Stock Conservation





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Republic of The Philippines Department of Agriculture Elliptical Road, Diliman, Quezon City



OINT DA-DILG ADMINISTRATIVE)				
ORDER NO	01:			
SERIES OF 2014)			

SUBJECT: <u>Regulation for the Conservation of Blue Swimming Crab (Portunus</u> pelagicus).



Blue Swimming Crab National Management Plan

A national framework for the Management of the Philippine Blue Swimming Crab Fisheries

Pinching the blue waves towards sustainability



The rising demand for different food products opens opportunities for seafood to be considered as one of the most important internationally traded food commodities. In the Philippines, one of the most commercially important aquatic resources is the blue swimming crab (BSC). This commodity supports a major industry that provides jobs and generates revenues at the local and national levels. However, the increasing BSC trade activities result in the growing concerns for the sustainability of the resource and the distribution of benefits from trade activities to the different stakeholders of the industry. BSC are caught in high volumes in many parts of the country. Similar to any fishery resources, the risk of overharvesting or overexploitation of BSC is high.

Section 3. Regulations. The following are the rules and regulations for the proper utilization and conservation of Blue Swimming Crab:

3.1 Minimum Size of Blue Swimming Crab. The minimum carapace width of blue swimming crab allowed for catching, collecting and trading shall be 10.2 cm, as shown in Diagram 1 which forms an integral part of this Order. Provided, that coastal municipalities may adopt a minimum size limit higher than 10.2 cm for catching BSC.

3.2 Crab Fishing Gear Limitation

- a. **Mesh Size/Diameter hole.** The minimum mesh size for the following gears shall be implemented:
 - a.1. Crab Entangling Nets (single layer only) and Crab Liftnets shall have a minimum mesh size of 11 cm and 3 cm stretch mesh, respectively.
 - a.2. Crab Pots/Traps shall have a 5 cm minimum hole diameter.
 - **3.3 Closed Season/Area.** To prevent overexploitation/overfishing, a closed season shall be imposed by the LGUs, in consultation with the FARMC based on scientific data gathered. The NFRDI and BFAR Regional Field Offices through its NSAP, other research institutions/agencies and academe shall provide such data.
 - **3.4 Other Subjects for Regulations.** If public interest so requires, based on sound scientific evidence and/or the precautionary approach in fisheries management based on the recommendation of the LGUs and BFAR, in consultation with FARMC and other stakeholders, the Secretaries of DA and DILG may issue regulations on any or all of the following: 1) the number of registered crab fishers to be allowed to operate for the catching of blue swimming crab in any areas in Philippine waters; 2) limit the number of crab pots/traps allowed per boat/banca; 3) limit the length/depth and number of nets a fisher could own and operate; and 4) specific closed fishing season for BSC by municipality.



Blue Swimming Crab Stock Profile

- BFAR 6



- Major commodity for Visayan Sea
- Region 6 as the major source of crab raw material for export
- Fisheries management supported by National Policy (JAO 01s.2014) & local ordinances (Provincial Ordinances of Iloilo and Negros Occidental
- Commodity of concern in the international market with the RED list status at the Seafood Watch in US & New England Aquarium





Region6	
Processing Plant	5
Picking Station	60
2 Maria and a second	

Region7	
Processing Plant	5
Picking Station	7

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BSC Stock Assessment from 2019 to present in partnership with BFAR Regions 5, 6, and 7

Total Landing Centers Monitored - **36** Region 5 - 4 Region 6 - 28 Region 7 - 4







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Tabuelan

Sagay Cit

Dumangas

Monitoring process:

BFAR 6

Catch & effort thru BSC boat landings







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Five point scale of female gonadal maturity used for *P. pelagicus* (Sumpton *et.al.*, 1994)



Premature



FI Stage/Immature



ture FII Stage/Developing



FIII Stage/Ripening



FIV Stage/Spawning



FV Stage/Spent



Internal macro identification of stages







Demersal, 8.82

Bivalve, 0.00

Cephalopod, 0.13

Crustacean, 0.58

Gastropod, 0.03

Ray, 0.15 Shark, 0.04 Small pelagic, 0.19

Catch Composition of Crab gears

BSC,

90.05

Recorded BSC gears incidental catch information for Visayan Sea for the CY 2015 to 2020



Bottomset gillnet/Crab entangling net

Group	%
BSC	91.8
Others	8.2
Finfish	3.7
Cephalopods	0.09
Other Crustacean	3.1
Gastropod	0.6
Bivalves	0.01
Sharks	0.3
Rays	0.4



Group	%
BSC	83.8
Others	16.2
Finfish	1.0
Cephalopods	0.04
Other Crustacean	15.14
Gastropod	0.03
Bivalves	-
Sharks	-
Rays	-

Crab Pot/Panggal or timing

TIMENT OF AGAIC



Recorded Incidental Catch as of CY 2022

Gear	% BSC	% By-Catch
BSGNC	91	9
СР	80	20
СТ	88	12

Primary species	Gillnets (%)	Traps (%)	Pots (%)	
Aetobatus narinari	0.001			
Carcharhinus sorrah	0.002			
Chiloscyllium plagiosum		0.013		
Chiloscyllium punctatum	0.151			
Secondary species	Gillnets (%)	Traps (%)	Pots (%)	
Charybdis feriata	0.525	1.096	6.763	
Portunus sanguinolentus	0.019	0.004	9.474	
Scolopsis taenioptera	0.070	5.245	0.132	
Podophthalmus vigil	1.881	0.586	0.419	
Charybdis natator	0.931	0.007	0.682	
Thalamita crenata	0.084	0.097	0.395	
Melo broderipii	0.536			
Onigocia spinosa	0.894			
Pseudorhombus arsius	0.667	0.001		
Neotrygon orientalis	0.464			
	6	7	18	

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Annual CPUE of Major BSC Gears monitored in the Visayan Sea for CY 2015 to 2022







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Monthly frequency distribution of gonadal stages of female *P. pelagicus* using consolidated Visayan Sea data for the period of CY 2022



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Size and Maturity (Froese) TRP: 80% Mature

25

TRP: 80% Mature LRP: 50% Mature











Reference Indicator:



Performance Indicators	Target Reference Point	Limit Reference Point	2012	2020	2022	
FROESE	80% mature	50% mature	40%	63%	60%	
Fishing Mortality (F)/LBAR	F/M < 1	F = 1.5M	2.00	1.73	2.1	
Exploitation Value (E)	0.5	0.6	0.68	0.67	0.63	
Length at first Maturity	Increasing	Stable	11.5	11.7	12.0	
SPR	30%	20%	10	23	27	
CPUE @ MSY (Schaefer) <u>CPUE_{current}/</u> CPUE _{MSY}						
	>1	<1		0.48		

SPR Original Result

Controls

Catch or Population?	Per-Recruit?
 Catch 	O No
O Population	⊖ Yes
Plots	Length or Weight?
O All	 Length
C Length Frequency C Weight	
O Maturity/Selectivty	
○ Growth	
○ Yield Curve	
SPR Size	Point Size
1 5 10	1 5 10
	1 2 3 4 5 6 7 8 9 10

Y-Axis Spawning Potential Ratio Spawning Stock Biomass Relative Yield

X-Axis

O SPR

O SSB

• F/M

Yes

O No

Show SPR?

- Recruitment
 - Show Points? Yes O No

Axis Size Label Size 1 12 20 1 14 Antotolo 11111 1 3 5 7 9 11 13 15 17 1920 1 3 5 7 9 11 13 15 17 1920

Legend Size



Biological Parameters

Life history ratios

Asymptotic Length

Relative Absolute





Length-at-Maturity



Steepness

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3

200

250

SPR Simulation

Exploitation Parameters



Selectivity-at-Length



Biological Parameters

Life history ratios

Asymptotic Length





IRE

Length-at-Maturity



Steepness





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Growth performance:

TRP – Increasing values LRP- Stable values

Year	L∞	Lm	L ₅₀ (Probability of Capture)	L	Mode
2012	19.1	11.5	11.0	11.3	10.8
2020	20.5	11.7	11.9	12.0	12.8
2022	21.8	12.0	11.6	12.4	12.6

Note: All variables used the centimetre gauge (cm)

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TOEAC			
Findings/ Analysis	Harvest Control Rules	Management Action	Specific Actions
Low % catches of mature sized crab (Froese)	Increase survival of juvenile & spawner	Improve HCRs to protect the spawning population	 Implementation of closed season Review and improve BSCNMP and JAO 01 series of 2014 Identification of area with spawning aggregates and declaration of MPA or permanent closure
Decreasing catch rates of BSGNC (CPUE Trend)	Increase catch rates	Equitable distribution of fishing opportunities to resource user	 Attrition/Reduce number of fishing boats operating by 34%* (staggered reduction) Or Reduce the number of effort (no. of panels (Gillnet); no. of pots (Crab pot) per boat-operation
High exploitation ratio	Reduction of Fishing Mortality	Reduce fishing effort and/or put limits on fisheries output	 Staggered reduction of number of fishing boats operating by 22% in five years Or Reduce the number of fishing days operation per boat Gear swapping to ecofriendly fishing gears



Basis in the declaration of Closed Fishing Season???

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