



Stock Assessment

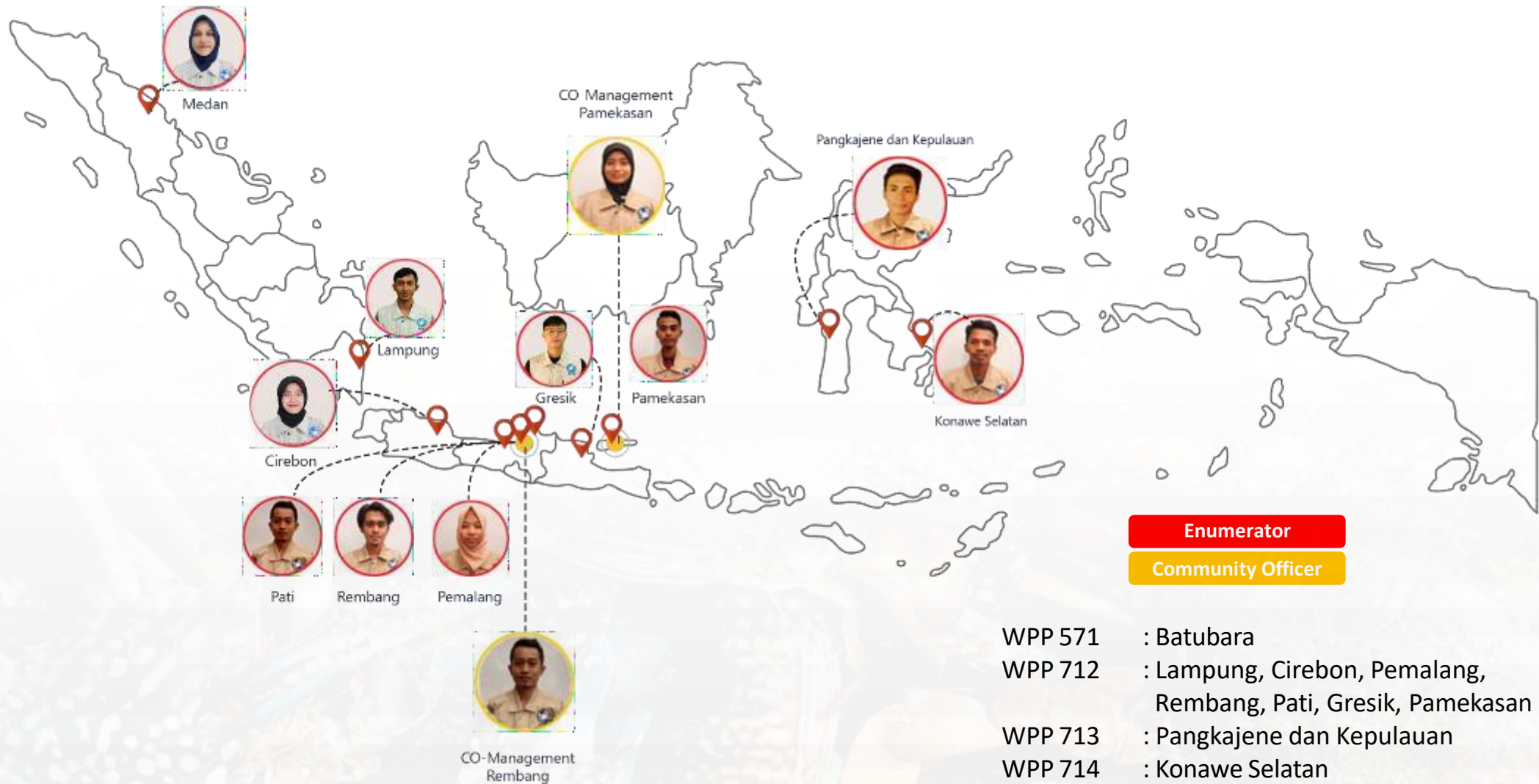
Indonesian BSC Fishery Improvement Project (FIP)

Asosiasi Pengelolaan Rajungan Indonesia (APRI)
Indonesian Blue Swimming Crab Association

2023



Data Collection Sites



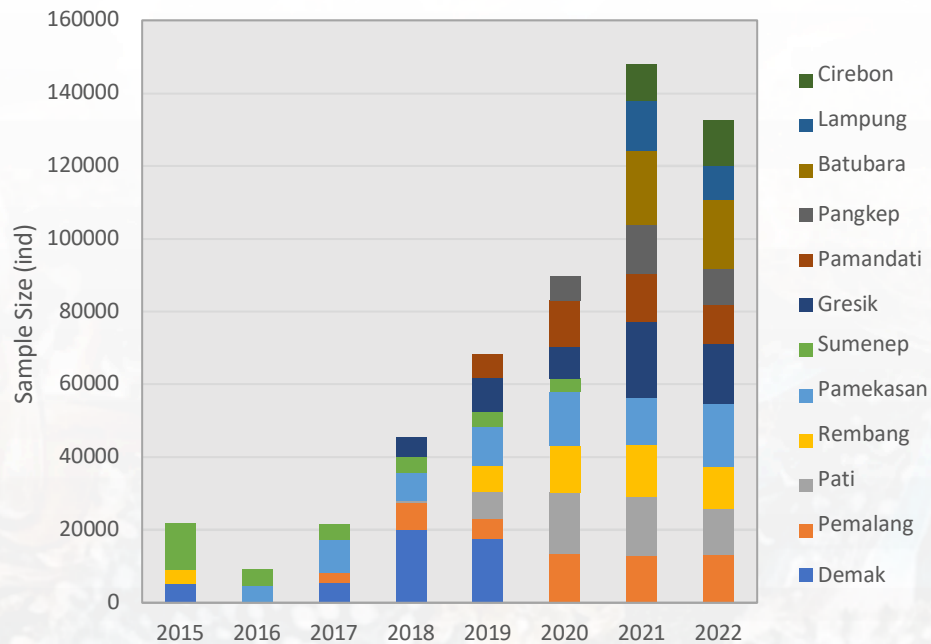
Biological Data Collection

Data Type

- (1) BSC size – carapace width (mm) and weight (g)
- (2) Sex Type (Male/Female)
- (3) Gonad Maturity Level (1,2,3)

Number of Samples

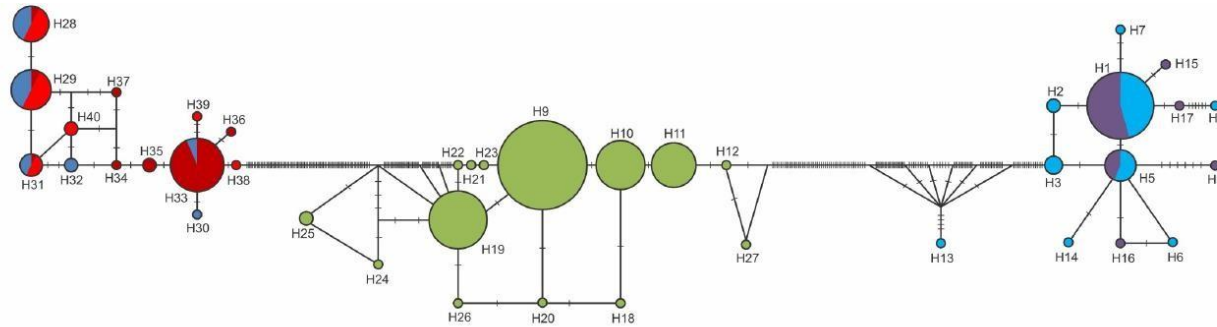
700 ind BSC female per month




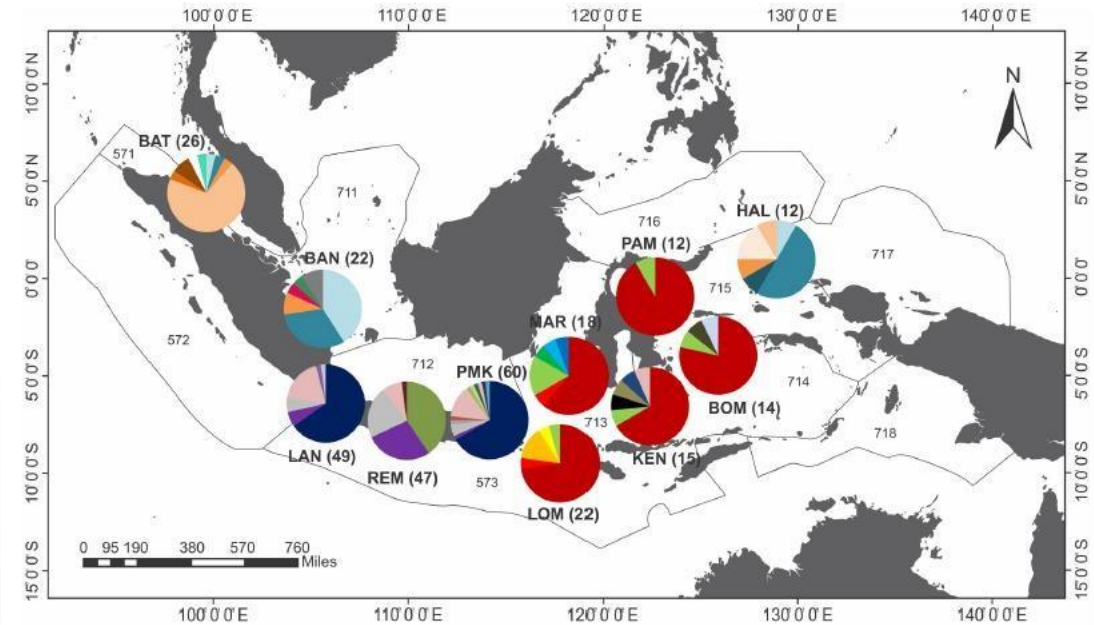
Source: APRI Documentation

BSC Population Genetic Distribution

Research results from Madduppa et al. (2021) show strength genetic sub-division between Fisheries Management Area (FMA) ($F_{ST}=0.964$, $p<0.001$)



Location	Total Sample per Haplotype				Scale
● FMA 571	H1 : 59	H11 : 16	H21 : 1	H31 : 4	 1, 2, 3, 4, 7, 11, 14, 16, 17, 19, 22, 59, 91
● FMA 711	H2 : 2	H12 : 1	H22 : 1	H32 : 2	
● FMA 712	H3 : 3	H13 : 1	H23 : 1	H33 : 19	
● FMA 713	H4 : 1	H14 : 1	H24 : 1	H34 : 1	
● FMA 714	H5 : 7	H15 : 1	H25 : 2	H35 : 2	
● FMA 715	H6 : 1	H16 : 1	H26 : 1	H36 : 1	
	H7 : 1	H17 : 1	H27 : 1	H37 : 1	
	H8 : 1	H18 : 1	H28 : 11	H38 : 1	
	H9 : 91	H19 : 22	H29 : 14	H39 : 1	
	H10 : 17	H20 : 1	H30 : 1	H40 : 2	



- ❑ BSC in FMA 712 genetically different (separated) from BSC in western area (FMA 571 and 711), and eastern area (FMA 713, 714, and 715).
- ❑ **The highest genetic diversity** in the eastern part of Indonesia (Halmahera)

Growth Parameter

Fisheries Management Area (FMA)	Sites	Asymtotic Length (L_{∞})	Growth coefficient (K)	Natural Mortality (M)	Ratio (M/K)	Maximum Age (t_{max})
571	Batubara	180.60	0.93	1.37	1.468	3.1
712	Lampung	205.80	0.93	1.36	1.466	3.1
712	Cirebon	175.35	0.77	1.13	1.466	3.8
712	Pemalang	175.35	1.03	1.51	1.470	2.8
712	Pati	178.60	1.05	1.54	1.470	2.8
712	Rembang	177.45	1.07	1.57	1.470	2.7
712	Pamekasan	179.55	0.98	1.44	1.469	3.0
712	Gresik	176.40	0.94	1.38	1.468	3.1
713	Pangkep	179.55	0.75	1.10	1.471	3.9
714	Pamandati	179.55	0.80	1.17	1.466	3.6
	^A Teluk Lasongko	173	0.68	0.86	1.268	n.a
	^B Pati	187	1.13	1.18	1.044	n.a
	^C Gulf of Thailand	167	1.13	1.7	1.504	n.a
	^D Karnakata, India	204	0.97	1.9	1.959	2.5

A: Hamid and Wardiatno (2015)

B: Ernawati (2013)

C: Kunsook et al. (2014)

D: Sukumaran and Neelakantan (1997)

Source: Ervinia et al. (2022) in press

The growth coefficient of BSC varies from 0.75-1.07, with a maximum age of 2.8-3.8 years.

Within 8 months, BSC can reach a carapace width of up to 10 cm. This shows that BSC is a crustacean with **fast growth and a relatively short life cycle.**



Blue Swimming Crab
(*Portunus pelagicus*)

K= 0.74 – 1.13 per year

Tmax= 2.7 – 3.9 years

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Mud Crab
(*Scylla serrata*)

K= 0.63 – 0.93 per year

Tmax= 2.5 – 3.5 years

Yudiati et al. (2020)



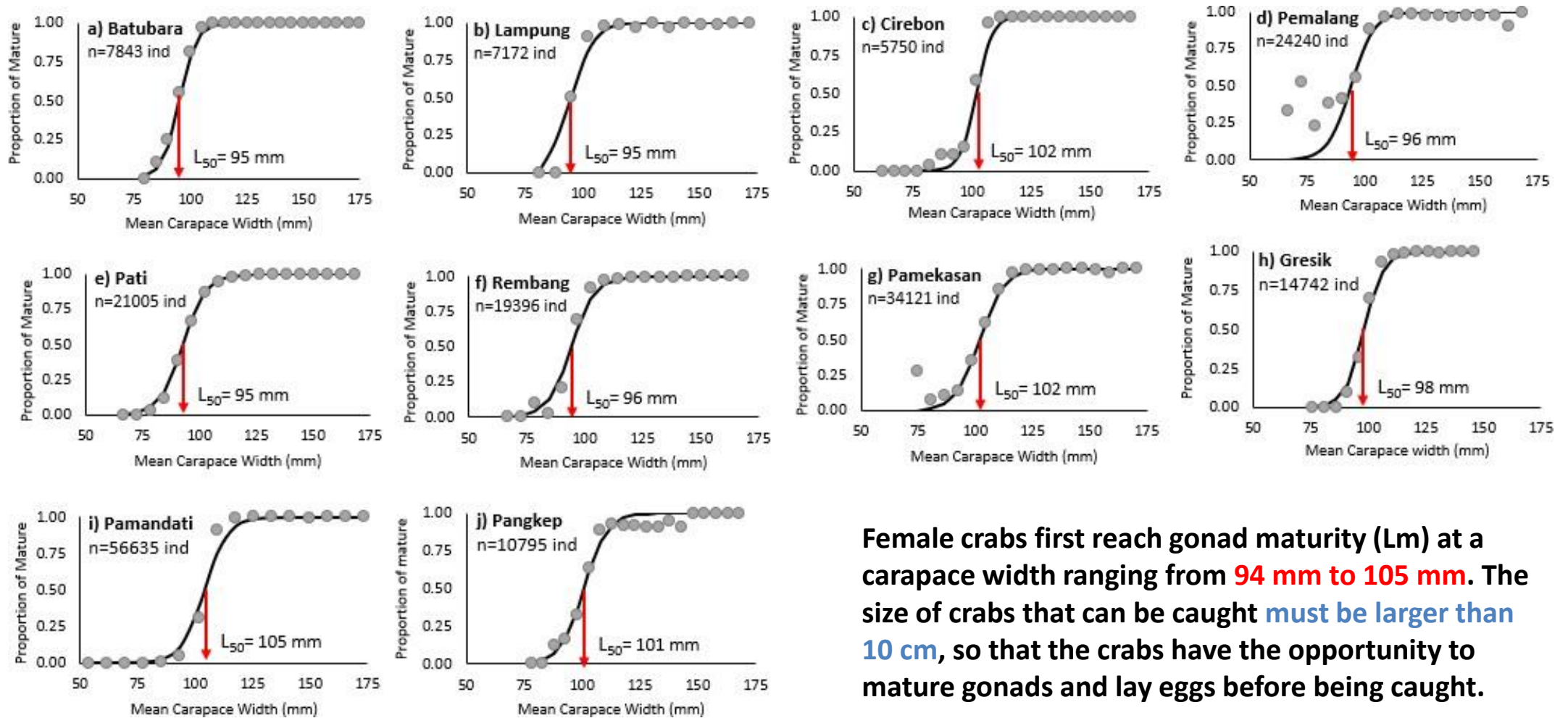
Red Snapper
(*Lutjanus malabaricus*)

k=0.22

t_{max} = 15-20 years

Wahyuningsih (2013)

Estimation of Size at First Maturity (Lm)



Female crabs first reach gonad maturity (L_m) at a carapace width ranging from **94 mm to 105 mm**. The size of crabs that can be caught **must be larger than 10 cm**, so that the crabs have the opportunity to mature gonads and lay eggs before being caught.

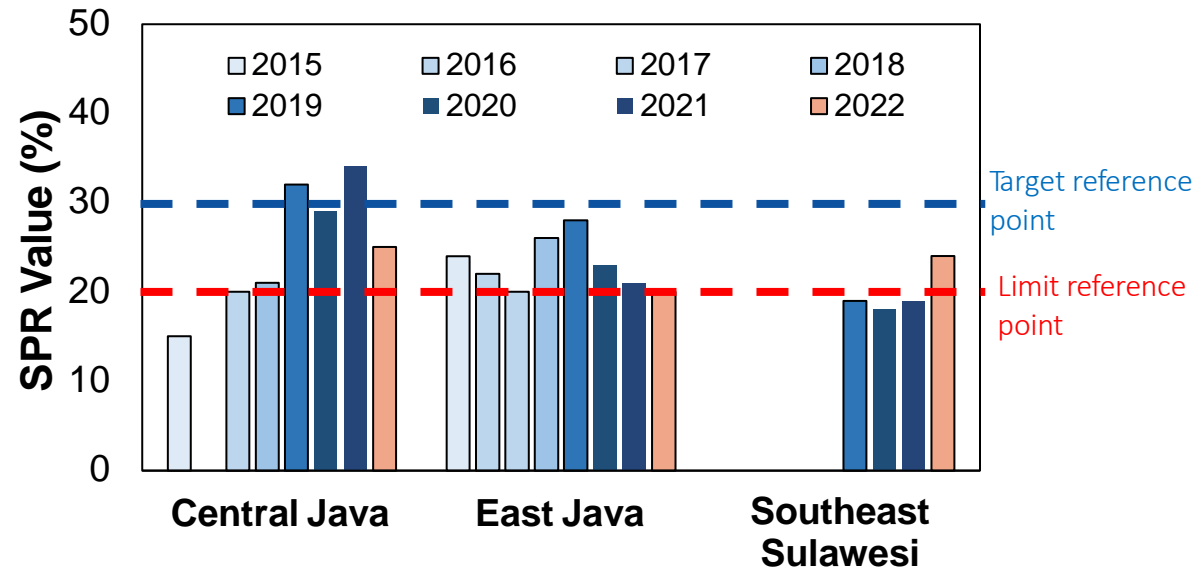
Source: Ervinia et al. (2022) in press



SPAWNING POTENTIAL RATIO (SPR)

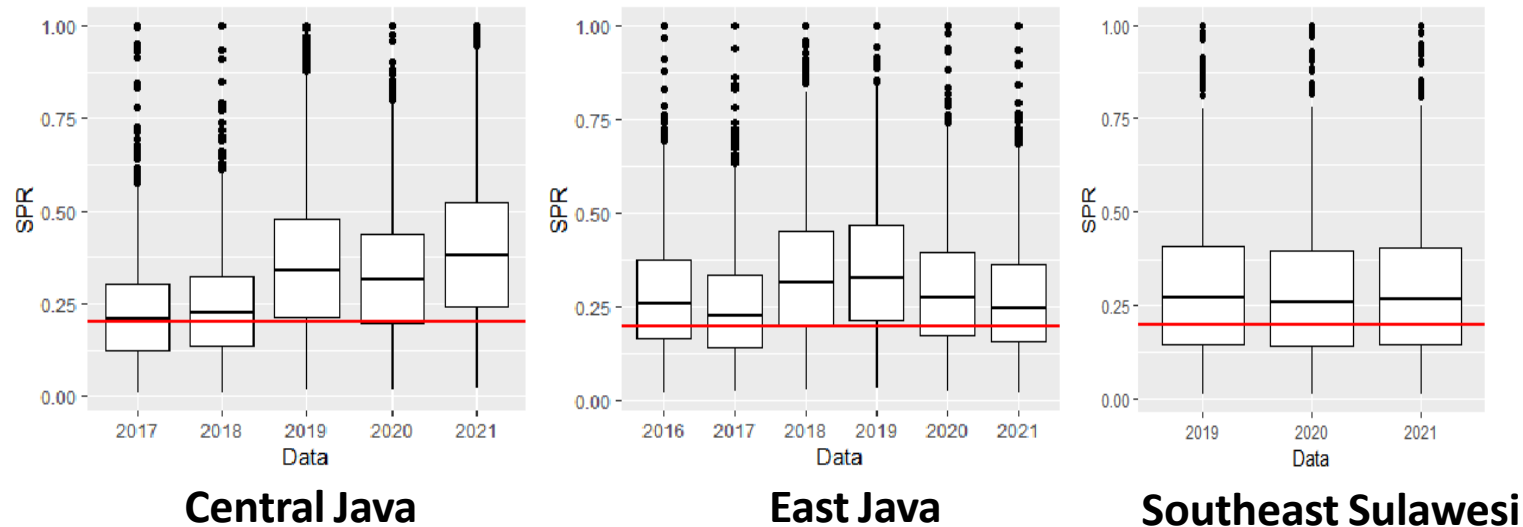


DETERMINISTIC SPR



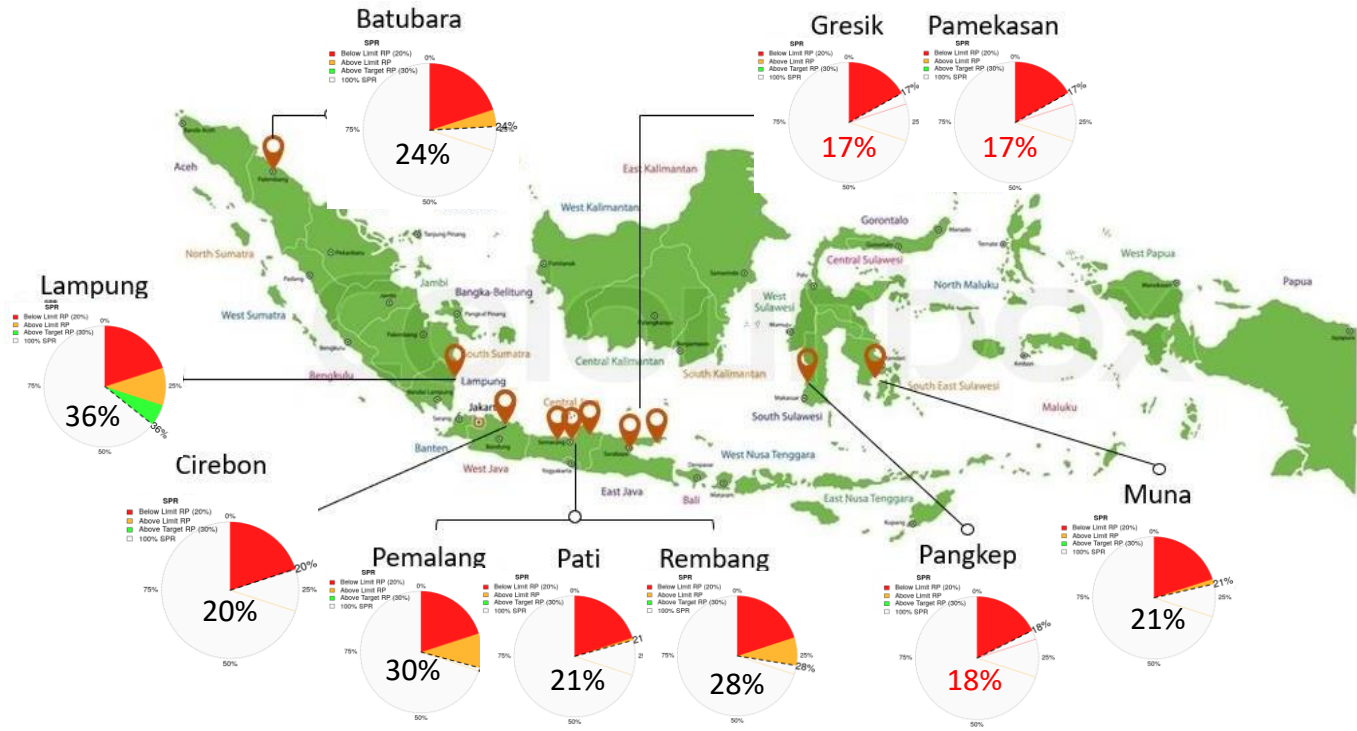
- BSC SPR value are **fluctuated** during 2015-2022
- BSC SPR value in **Central Java** **tend to increase** in 2015-2021, and tend to decrease in 2022, but still above the *limit reference point* (SPR20%)
- Estimation of SPR value with **Stochastic method are better** because considering the uncertainty of growth parameter

STOCHASTIC SPR

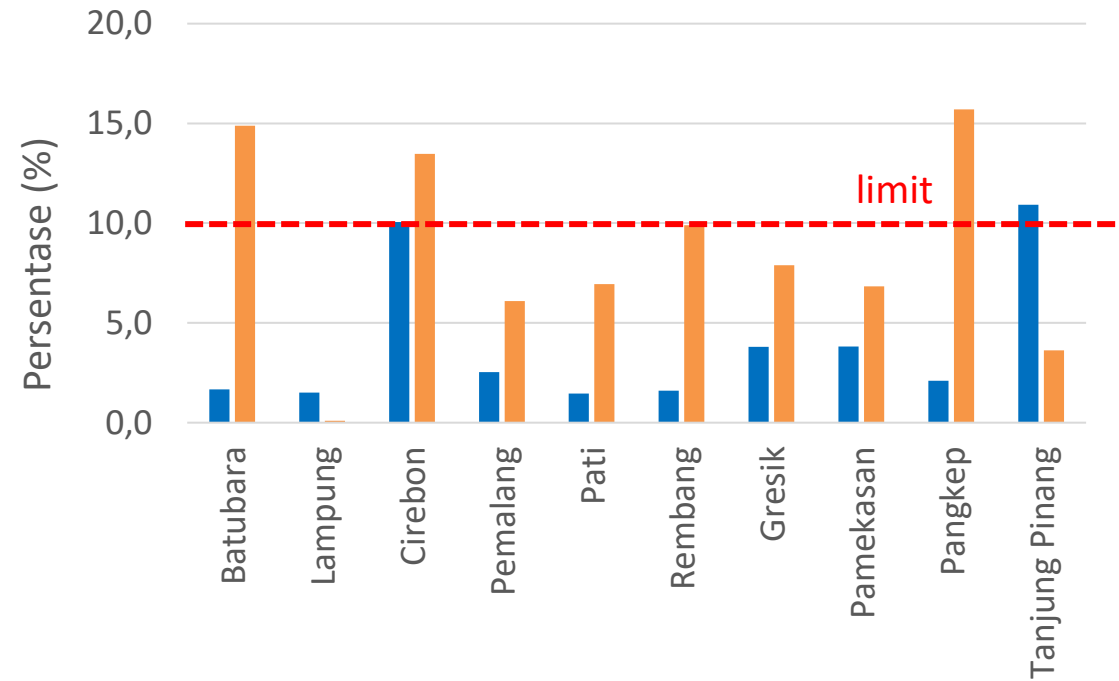




BSC Spawning Potential Ratio (SPR) Jan-Mar (2023)



Percentage of Undersize and EBF Crab (Jan-Mar 2023)



- **Highest SPR** showed in **Lampung and Pemalang (SPR>30)**
- Some locations not reach the *limit reference point*, namely **Gresik, Pamekasan, and Pangkep (SPR<20)**

■ Rajungan Kecil (<10 cm) ■ Rajungan Bertelur

Terima Kasih

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