

# Minimum Legal Size (MLS) for marine capture fisheries management in Maharashtra

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The marine capture fisheries sector of Maharashtra has undergone tremendous change in terms of fishing patterns, fishing methods, spatial expansion of fishing grounds, multiday fishing and innovations in crafts and gears, among others. With the increasing demand for marine fish for consumption and other non-food utilization of fishes, exploitation of juvenile fishes is becoming more common. Exploitation of juveniles which causes 'growth overfishing' is a major concern as it affects the health of fish stocks and the ecosystem which impacts livelihood of fishers and causes much economic loss to all stakeholders.

Juveniles of slow growing fishes (sharks) and high value fishes (groupers/pomfrets) are becoming a common sight in Maharashtra marine fish landings in these days. If these are allowed to grow to a minimum size by fishermen voluntarily avoiding such fishing grounds where juvenile are in abundance, the economics of trade would be different. If fishes are allowed to grow to their sexual maturity and spawn at least once before they are caught in nets, the fishery of the next

years would be better. Demand for marine fish drives the injudicious exploitation of juvenile fishes and there is no restrictions on sale of undersized fishes in Maharashtra. This can lead to collapse of fish stocks and hence, fishers, traders and consumers should be made aware of consequences of juvenile fish exploitation/ utilization and need for adoption of measures for a sustainable marine fisheries sector in Maharashtra. One of the means to discourage the indiscriminate exploitation of juveniles is to impose a Minimum Legal Size (MLS) which is the size at which a particular species can be legally caught, retained and traded. This can lead to the control in growth overfishing either by increasing or maintaining the spawning stock. Along with avoiding of juvenile fish aggregation sites and spawning grounds, implementation of MLS can maintain healthy fish stocks and ensure a sustainable fishery that delivers economic benefits to all stakeholders.

MLS for 58 species of commercially important fishes occurring in Maharashtra was estimated (Tables 1 & 2) following Mohamed *et al.*, (2014).

Table 1. Criteria and Decision Logic adopted to formulate the MLS of marine fishes of Maharashtra

Criteria	Decision Logic
Minimum size at Maturity MSM	To prevent growth overfishing in stocks which are the smallest mature fish moderately resilient to fishing pressure
Size (or weight) at maturity or size /weight at 50% maturity SFM/WFM	To prevent growth overfishing completely maturity and recruitment overfishing partially. Can be used in situations where the stock is depleted or rebuilding
Size at sexual differentiation into male and female SSD	To prevent juvenile exploitation and growth overfishing in those stocks which have high reproductive potential

Table 2. Estimated MLS (in cm) for commercially important fishes caught along Maharashtra coast.

Group	Species	English common name	Local name (Marathi)	MLS (cm)		Decision logic
Squids	<i>Uroteuthis (Photololigo) duvaucelii</i>	Indian squid	Nal Mhakul	10	DML	MSM
	<i>Uroteuthis (Photololigo) singhalensis</i>	Long barrel squid	Nal Mhakul	10	DML	MSM
	<i>Uroteuthis (Photololigo) edulis</i>	Sword tip squid	Nal Mhakul	10	DML	MSM

Group	Species	English common name	Local name (Marathi)	MLS (cm)		Decision logic
Cuttlefish	<i>Sepia pharaonis</i>	Pharaoh cuttle fish	Mhakul	11	DML	MSM
Octopus	<i>Amphioctopus neglectus</i>	Ocellate octopus	Shera Mhakul	5	DML	MSM
	<i>Cistopus indicus</i>	Old women octopus	Shera Mhakul	9	DML	MSM
Crustaceans	<i>Parapenaeopsis stylifera</i>	Kiddi prawn	Tiny	7	TL	MSM
	<i>Metapenaeus monoceros</i>	Speckled prawn	Kapshi	11	TL	SFM
	<i>Metapenaeus affinis</i>	Jinga prawn	Kolambi	9	TL	MSM
	<i>Metapenaeus dobsoni</i>	Flower tail prawn	Kolambi	6	TL	MSM
	<i>Solenocera choprai</i>	Coastal mud prawn	Goinar	7	TL	MSM
	<i>Solenocera crassicornis</i>	Coastal mud prawn	Goinar	6	TL	MSM
	<i>Portunus pelagicus</i>	Blue crab	Khekhada/Chimbore	9	CW	MSM
	<i>Portunus sanguinolentus</i>	Spotted crab	Khekhada/Chimbore	7	CW	MSM
	<i>Charybdis feriatus</i>	Crucifix crab	Khekhada/Chimbore	5	CW	MSM
	<i>Thenus unimaculatus</i>	Sand lobster	Fatfati	150	g	WFM
	<i>Panulirus ornatus</i>	Ornate spiny lobster	Shevand	500	g	WFM
	<i>Panulirus polyphagus</i>	Mud spiny lobster	Shevand	300	g	WFM
	<i>Panulirus homarus*</i>	Scalloped spiny lobster	Shevand	200	g	WFM
Elasmobranchs	<i>Scoliodon laticaudus</i>	Spadenose shark	Mushi	38	TL	MSM
	<i>Rhizoprionodon oligolinx</i>	Grey sharpnose shark	Mushi	53	TL	MSM
	<i>Gymnura poecilura</i>	Longtailed butterfly ray	Pakat	50	DW	MSM
Teleosts	<i>Megalaspis cordyla</i>	Torpedo scad	Kat Bangada	26	TL	MSM
	<i>Decapterus russelli</i>	Indian scad	Teli bangda	11	TL	MSM
	<i>Parastromateus niger</i>	Black pomfret	Halwa	17	TL	MSM
	<i>Scomberoides tala</i>	Barred queen fish	Falai	30	TL	MSM
	<i>Scomberoides tol</i>	Needle scale queen fish	Falai	23	TL	MSM
	<i>Scomberoides commersonianus</i>	Queen fish	Dago/Falai	32	TL	MSM
	<i>Sardinella longiceps</i>	Oil sardine	Tarli	10	TL	SSD
	<i>Coilia dussumieri</i>	Gold spotted anchovy	Mandeli	12	TL	MSM
	<i>Rastrelliger kanagurta</i>	Mackerel	Bangda	14	TL	MSM
	<i>Scomberomorus commerson</i>	Narrowbarred spanish mackerel	Toovar	50	FL	MSM
	<i>Scomberomorus guttatus</i>	Spotted seer	Surmai	37	FL	SFM/Lm50
	<i>Euthynnus affinis</i>	Little tunny	Telya Kupa/Gedar	38	TL	MSM
	<i>Auxis thazard</i>	Frigate tuna	Kupa/Gedar	25	FL	MSM
	<i>Auxis rochei</i>	Bullet tuna	Kupa/Gedar	18	FL	MSM
	<i>Katsuwonus pelamis</i>	Skipjack tuna	Kupa/Gedar	35	FL	MSM
	<i>Thunnus tonggol</i>	Longtail tuna	Khawalya Kupa/Gedar	48	TL	MSM
<i>Thunnus albacares</i>	Yellowfin tuna	Kupa/Gedar	50	FL	MSM	

Group	Species	English common name	Local name (Marathi)	MLS (cm)		Decision logic
	<i>Rachycentron canadum</i>	Cobia	Sakala/Modusa	61	FL	SFM/Lm50
	<i>Sphyræna putnamae</i>	Sawtooth barracuda	Tok/Badri	28	FL	MSM
	<i>Coryphaena hippurus</i>	Dolphinfish	Popat/Habnus	55	TL	MSM
	<i>Trichiurus lepturus</i>	Ribbonfish	Bala	45	TL	MSM
	<i>Nemipterus japonicus</i>	Threadfin bream	Rani/Chiri	13	TL	MSM
	<i>Nemipterus randalli</i>	Threadfin bream	Rani/Chiri	10	TL	MSM
	<i>Lactarius lactarius</i>	False trevally	Saundala	10	TL	MSM
	<i>Pampus argenteus</i>	Silver pomfret	Pamflet	14	SL	MSM
	<i>Pampus chinensis</i>	Chinese pomfret	Pamflet	14	SL	MSM
	<i>Epinephelus diacanthus</i>	Spinycheek grouper	Hekru	18	TL	MSM
	<i>Saurida tumbil</i>	Lizard fish	Chor bombil	17	TL	MSM
	<i>Saurida undosquamis</i>	Lizard fish	Chor bombil	12	TL	MSM
	<i>Harpodon nehereus</i>	Bombay duck	Bombil	18	TL	MSM
	<i>Otolithes cuvieri</i>	Tiger-toothed croaker	Dhoma	16	TL	MSM
	<i>Otolithes ruber</i>	Tiger-toothed croaker	Dhoma	18	TL	MSM
	<i>Protonibea diacanthus</i>	Black spotted croaker	Ghol	70	TL	MSM
	<i>Cynoglossus arel</i>	Largescale tongue sole	Lep	15	TL	MSM
	<i>Plicofollis tenuispinis</i>	Thinspine sea catfish	Shingala	29	TL	MSM
	<i>Osteogeneiosus militaris</i>	Soldier catfish	Shingala	25	TL	MSM

#### Abbreviations

TL - Total Length, FL - Fork length, SL - Standard Length, CW - Carapace Width, DML - Dorsal Mantle Length in case of Cephalopods, DW - Disc Width,  $L_{m50}$  - Length at which 50% of the fishes are mature, SSD- Size at Sex Differentiation, MSM - Minimum Size at Maturity or Size of the smallest mature fish, WFM - Weight at first maturity or the weight of the animal where 50% of the fishes are mature \*notified as legally permitted weight for export by Marine Products Export Development Authority, Govt.of India.

For recognizing the catch as juvenile fishing or below MLS, a random species-wise subsample (about 30-50 numbers) of the catch should be examined and if catch consists more than 50% below the prescribed MLS, the catch can be considered as violation of MLS, if a law is enacted. Inspections may preferably be carried out at sea or in the landing centre using unsorted samples. The Mumbai Research Centre of ICAR- CMFRI conducted a Stakeholders Meet on 03.05.2018 to know their views and concerns on MLS for marine fishes as recommended for Maharashtra. Some further actions

recommended were the introduction of log-book, mandatory installation of Vessel Monitoring System (VMS) or Automatic Identification System (AIS) in fishing boats. Monitoring for science-based management actions are required in the sector. Participatory research and fisheries management obligations where fishers must share information with researchers about the regions of high juvenile fish aggregations on a temporal and spatial scale can help in ensuring that fisheries are sustainable.