A review of sea cucumber fisheries and management in Melanesia[1]

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Summary

Countries of the Melanesian Spearhead Group (MSG) – Fiji, Papua New Guinea, Solomon Islands and Vanuatu – have made steady progress in developing sea cucumber management systems over the last five years. Three of the four countries have produced new management plans that include updated minimum sizes and/or higher levies and licence fees. These plans, along with the improved capacity evident in fisheries agencies, provide the basis for improving the sustainability of the sea cucumber fishery and increasing revenue for fishers and national coffers.

Two major challenges are now evident: ensuring political and public support for fishery management interventions and prioritising the implementation of the most feasible and effective management actions from the range of tools afforded by updated legislation.

Review of status of sea cucumber fisheries and management in Melanesia

Status of global and Pacific region sea cucumber fisheries

Records on landings, exports and values of the fishery are extremely varied but available information from fisheries agencies, supplemented by data from customs authorities, allow some conclusions.

- Pacific landings and exports of beche-de-mer[3] have declined from peaks of around 2,000 tonnes (t) in the 1990s to less than one-fifth of that in recent years to the extent that all four MSG countries have had to impose moratoria on the fishery. MSG countries have lost all of their international and much of their regional dominance, even though they are still the region's major producers (Fig.1).

- Global landings have increased, with an expansion into new countries and different species; MSG countries at present do not represent a significant proportion of global landings.

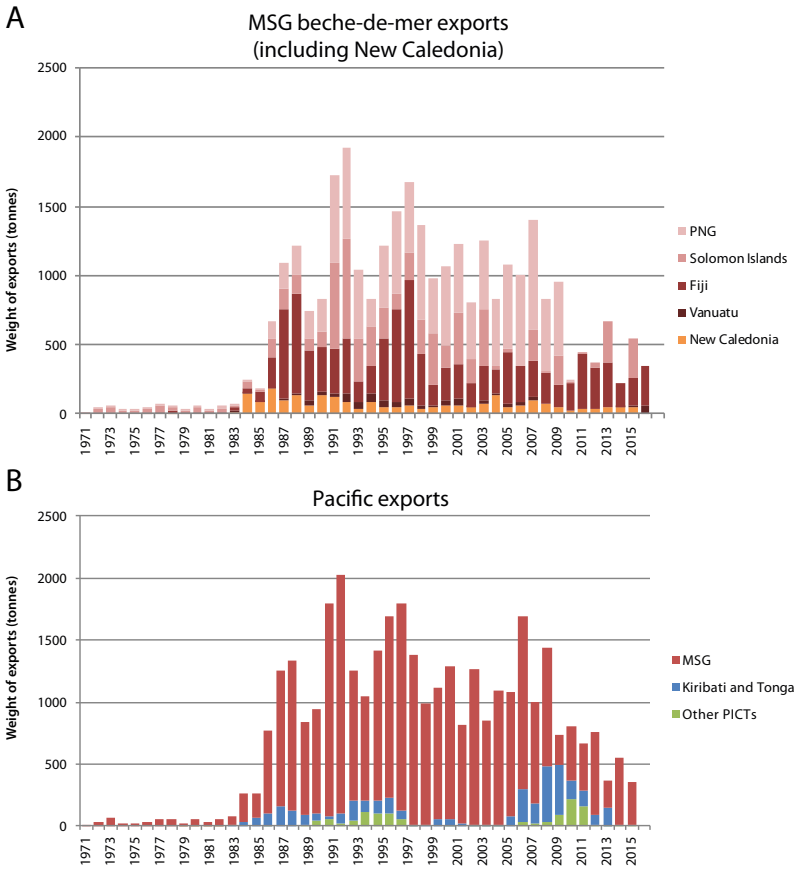

Figure 1: Records of exports of beche-de-mer in Melanesian Spearhead Group countries (A), and across all Pacific Island countries (B).

[1] This article is extracted from the report *Sea cucumber fisheries and management in Melanesia: Review and policy briefs* (http://www.msgsec.info/index.php/publicationsdocuments-a-downloads/study-reports), which is an output of the World Bank Pacific Regional Oceanscape Program (implemented by the Pacific Community) entitled: "Evaluating and providing management options and assistance for the beche-de-mer (BDM) fishery in the four Melanesian countries of Papua New Guinea (PNG), Solomon Islands, Fiji and Vanuatu".

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[3] Beche-de-mer is the name given to the sea cucumber dry processed product.

Status of MSG sea cucumber fisheries

The boom-and-bust nature of MSG countries' sea cucumber fisheries and the imposition of moratoria obscures the trends. A comparison of five-year averages shows a decrease in yearly average exports compared with 5 and 10 years previously in most countries, and a major decrease in combined MSG exports. In the last 15 years, exports averaged 682 t per year compared with the average of the previous 15-year period of 1,137 t (i.e. a 60% decrease) (Table 1).

- PNG, Solomon Islands and Vanuatu have imposed several moratoria and recent short openings of their sea cucumber fisheries (1–4 months), while Fiji has just imposed its first moratorium.
- There is a shift from high-value to lower-value species in all countries (data available from Fiji, Solomon Islands and Vanuatu) (see Figs. 2 and 3).
- Large proportions of sea cucumber catch are thought to be undersize in Fiji (>31%) (Tabunakawai et al. 2017) and Vanuatu (>80%) (Léopold et al. 2016), and anecdotal reports suggest the same in all MSG countries.
- Although data collection is improving, there is no (or very limited) historical data on value, which means a comparison of current values with historical values is next to impossible; in addition, real time monitoring of landings, or first purchase location for quota tracking, has been a major challenge.

Tables 2, 3 and 4 summarise available data.

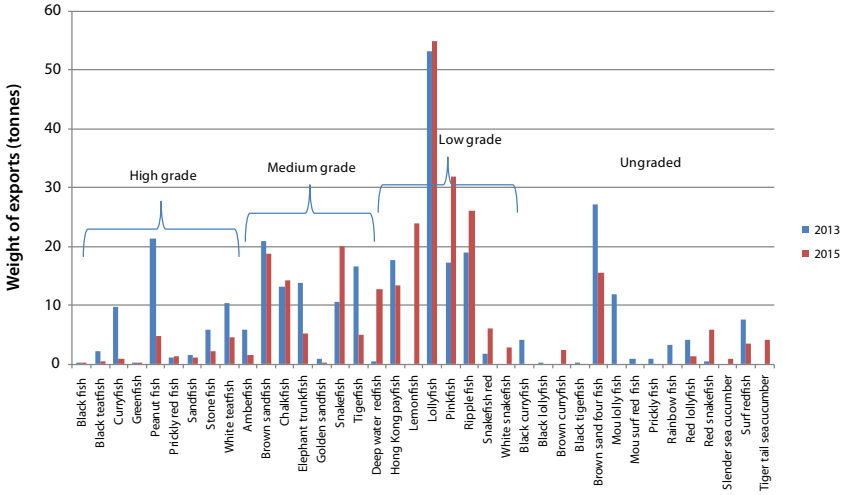

Figure 2. Comparison of different species of beche-de-mer exported in 2013 and 2015 in Solomon Islands (source: Ministry of Fisheries and Marine Resources data).

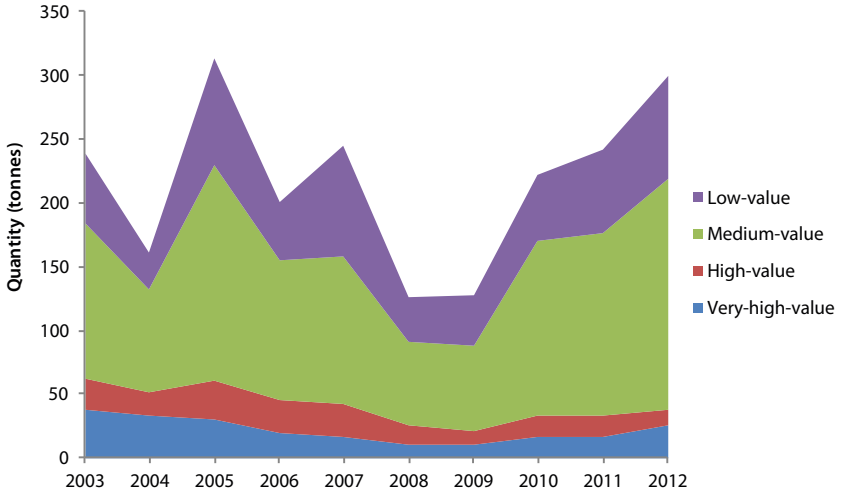

Figure 3. Comparison of different species of beche-de-mer exported from Fiji 2003–2012. Data from Fiji's Ministry of Fisheries collected in 2012.

Table 1. Beche-de-mer exports from four Melanesia Spearhead Group countries (in tonnes).

	PNG	Solomon Islands	Fiji	Vanuatu	Four countries combined
Average (1980–2016)	302.5	165.5	277.5	20.5	766.1
Maximum	791.0	715.4	862.0	66.0	1,840.7
Total (1980–2016)	11,191.9	6,125.2	10,269.2	759.3	28,345.6
Last year of harvest for which there are data	2017	2015	2016	2016	2016
5-year average preceding last year of harvest	158	126	257	16	464
Previous 5-year average (i.e. 6–10 years before last harvest)	212	92	248	6	716
Preceding 5-year average (i.e. 11–15 years before last harvest)	609	202	247	18	923
Recent 15-year average	326	103	239	13	682
Previous 15-year average	447	278	375	36	1,137

Table 2. Weights and values from the last sea cucumber harvests. Green, yellow and red highlights positive outcomes, potential issues and problems, respectively.

	Fiji	PNG	Solomon Islands	Vanuatu
Year of last harvest	2017 (2016 data)	2017	2015	2015
Export (Fisheries Dept. data, in tonnes)	NA	764	286	77
Export (Customs data, in tonnes)	289	791	328	56
Last harvest free on board value (local currency)	FJD 18,550,000		SBD 32,225,876	VUV 224,000,000
Last harvest export value (local currency)	FJD 18,550,000	PGK 81,530,092	SBD 29,460,332	VUV 300,000,000
Last harvest value (USD)	USD 8,912,348	USD 25,213,181	USD 3,794,491	USD 2,805,000
Value of imports to Hong Kong for that year (USD)	USD 7,148,880	NA	USD 2,581,106	USD 278,863 (USD 375,269 if incl. 2014)
Value (USD tonne^{-1})	USD 30,839	USD 33,002	USD 13,267	USD 36,429
Export markets (for last year of harvest)	Hong Kong (90%), Vanuatu (7%), US (2%), Australia and New Zealand (1%)	NA	Hong Kong (75%) and Vietnam (23%) with 1% to Sri Lanka and New Zealand combined	Hong Kong (97.7%) and Fiji (2.3%)
Main species by weight	In 2012 65% of exports comprised (in order): lollyfish, amberfish, snakefish, tigerfish and brown sandfish[a]	NA	In 2015 50% of exports comprised (in order): lollyfish, ripplefish, pinkfish, lemonfish, snakefish, brown sandfish, Hong Kong payfish[a]	In 2014–15: surf redfish 30% with tigerfish, brown sandfish and black teatfish accounting for 37%[a]

[a] See Table 5 of Annex 1 on p. 38 for correspondences with scientific names

Sea cucumber management

- Management plans have been in place for Solomon Islands, Vanuatu and PNG since 2015–16.
- Vanuatu tested, implemented and evaluated a comprehensive management plan.
- PNG and Vanuatu set total allowable catches (TACs) based on stock assessments.
- Customs authorities collect valuable and potentially independent or at least complementary data but require better support from fisheries agencies.
- TACs were significantly exceeded, where applied, and the lengths of harvest seasons exceeded technical recommendations.
- Enforcement capability and/or political will is generally low – fines and licence suspensions were only issued in Vanuatu.
- Village and provincial enforcement has not proven logistically feasible.
- Exporter enforcement is not implemented and there is much room for improvement:
  - Few checks on sizes (except Vanuatu) and no penalties;
  - Little if any verification of exporters' reported data (value, species, grades) and there is suspected under-valuing.

Table 3. Management measures in place in each of the four countries. Green, yellow and red highlights positive outcomes, potential issues and problems, respectively.

	Fiji	PNG	Solomon Islands	Vanuatu
Management plan	No, in draft	2016	2014	2015
National total allowable catch (TAC)	No	350 t dry weight	No	21 t dry weight
Provincial TAC	No	Yes, 150%–680% exceeded	No	Yes but not issued
Individual species TAC		Possible but not applied		Yes but not enforced
Quota per export licence	No	No	No	No
Compliance with quotas	Not applicable	223% overharvest (but TAC had been precautionary)	Not applicable	240% overharvest (but TAC had been precautionary)
Length of last season	Open until 1/11/17	1 April–30 September 2017 / 6 months	1 December 2014–31 March 2015 / 4 months	September–December / 4 months
Size limits	Yes, too low (7.6cm)	Yes [a]	Yes [b]	Yes, updated [c]
Estimate of undersize harvest	35% below legal limits,[d] 60–100% below biologically recommended limits	Not available	"Sizes getting smaller"	>80%[e]
Community management	Some access control	1 example (Manus)	Unreported	A few communities / conflicts reported
Other prohibitions	Recent UBA ban	Various, no underwater breathing apparatus (UBA)	Long list in licence conditions: No UBA	Long list: Only harvest by resource owners, no UBA, daytime, presence of an authorised officer
Enforcement	Patrols / MoF staff	Compliance officers in provinces	Several cases of enforcement. No fines	Observers / DoF staff
Penalties	Low (~FJD 500), not applied	Compliance bond and penalties not exceeding for: crew member PGK 25,000; natural person PGK 500,000; corporation PGK 5,000,000	SBD 500,000 or imprisonment up to 4 months or both (regs 2014) / not applied	4 fines (up to VUV 150k) / 2 licence suspensions
Penalties max (USD)	240	7,700; 150,000; 1,500,000	64,400	1,403

[a] Size limits in 3 groups 8, 10, 15 cm; [b] Size limits in three groups: 10, 15, 20 cm; [c] Size limits calculated relatively precisely: 7,10,12,15,17, 20 cm; [d] Tabunakawai-Vakalalabure et al. 2017; [e] Léopold et al. 2016

Economics, market and prices

- Hong Kong remains the major market for sea cucumbers, with small reported exports to Vietnam (both of which are "grey routes" to China), Australia, New Zealand or the United States (US), which may be commanding higher values in some cases.
- Export is by sea and, increasingly, by air (PNG, Vanuatu and possibly Fiji) although data are not comprehensively collected.
- Monitoring and comparison of prices paid to fishers and exporters is complicated by the wide variety of grades and degree of processing of sea cucumber products traded by fishers. Improvements in processing and establishment of standard grades for the different species (and possibly minimum prices) have much potential for increasing the value left in country.

- Increase in government revenue generated in Solomon Islands and Vanuatu through increased licence fees and an export levy (Solomon Islands).
- Solomon Islands is moving towards market price certification to control export prices (declared) and guidelines on fisher buyer prices.

Table 4. Values of exporting and processing licences in the four Melanesian Spearhead Group countries. Green, yellow and red highlight positive outcomes, potential issues and problems, respectively.

	Fiji	PNG	Solomon Islands	Vanuatu
Export licence (local currency)	FJD 15–150[a]	Export + storage + 5 buyers = ~10,000	SBD 210,000	3,000,000
Export licence (number)	~5	80 (buyers' licences: 395)	10	6
Export licence (USD)	~USD 50	USD 3,093	USD 27,048	USD 28,050
Processing licence (local currency)	NA		SBD 50,000	VUV 120,000
Processing licence (number)	NA		0	12
Processing licence (USD)	NA		USD 6,440	USD 1,122
Export levy	No ("tax" 2,000)[a]	PNG removed tariffs on seafood products	10% (SBD 3,222,587 export duty)	5% not implemented
Export fee	FJD 30–4000 [a]		Permit fee SBD 200	
Value of harvest tracked: fishers / export (local currency)	NA/ FJD 18.5 million	~PGK 40,000,000 / ~PGK 82,000,000	Collected but not tabulated / SBD 32,225,876	VUV 105 million / VUV 300 million
Government revenue (last year of harvest) (local currency)	licences ~USD250	Licences ~ PGK 800,000	SBD 5,322,587	VUV 22,000,000
Government revenue (USD)	Negligible	USD 247,400	USD 685,549	USD 205,700

[a] Source: Mangubhai et al. 2016

Recommendations of review for consideration

Country experiences and improved legislation and management plans provide an adequate basis for moving towards strategic implementation of management actions. National institutional capacity is limited and staff are rarely able to invest the time and effort needed for strategic implementation of management actions. Experience strongly suggests focussing on one or two specific areas for improvement that have the most likelihood of regulating fishing pressure and increasing returns to fishers.

National actions

The main technical recommendation is to increase the control of exports and exporters with a view to progressively implement export quotas and rigorously enforce these and associated rules (e.g. minimum sizes, prices). Particular support will be needed from trade and economic specialists and media and public relations personnel.

- Prepare a strategy for the control and enforcement of exporters, including:
  - declared export prices and accuracy of reported exports (i.e. size, grade, species);
  - develop and improve procedures with customs and/or inland revenue;
  - improve transparency and process of consultative mechanisms with exporters, together with other stakeholders; and
  - define and implement total allowable effort as a main, or backup, catch control mechanism.
- Specific country actions as defined elsewhere, such as review fees, set size limits, deliver information programmes, improve the process for sharing information, and access important MSG-level information on markets.

Political will

The major impediment to regulating the beche-de-mer trade and increasing the value to countries relates to political or other influences exerted by exporters, traders and communities, as well as the lack of clarity of both the public and politicians with regard to the intent of management regulations. This may be influenced and improved by:

- the targeted use of regional mechanisms to work with leaders and ministers (including MSG, the Pacific Island Development Forum, the Pacific Islands Forum Secretariat, and the Pacific Community (SPC); and
- specifically designed support for proactive media and public relations ,and information and awareness raising campaigns that help to increase understanding and suppot, and target leaders and the public .

Regional

Regional support includes technical support from SPC, the Australian Centre for International Agricultural Research, universities and non-governmental organisations. This level of support can help inform regional political influence and build the capacity of MSG to share and collect information. Data collection, the establishment of minimum sizes and licence fee schedules, and information on markets and prices are improving but would benefit from increased sharing between countries, which would be facilitated by:

- establishing an MSG trade and information-sharing office with staff (supported initially by SPC/Pacific Regional Oceanscape Program, PROP);
- developing a basis for common terms and conditions that all countries can adopt to improve their overall control and value retained, including on standard grades and quality (SPC/PROP with MSG in the interim);
- providing economic and trade advice to countries in specific areas, such as calculating minimum buyer prices, minimum export prices, and determining appropriate level of penalties, fees, licences and levies;
- initiating or completing data collection and sharing of companies and prices paid;
- continuing supporting the exploration of longer term opportunities (e.g. branding, Parties to the Nauru Agreement and cartel opportunities); and
- addressing political will.

Other issues

Processing remains a major issue but further information is required as to the proportions and quality of beche-de-mer processed at village and provincial levels. Major efforts may be required to maximize value but this will be distracting from the proposed first priority actions above and it is suggested this be addressed in a second phase.

Note

The full report (http://www.msgsec.info/index.php/publicationsdocuments-a-downloads/study-reports) ends with six short and detailed briefs that summarise the areas proposed for harmonisation, current status and the proposed way forward. It has been decided to reproduce here the main part of three of these briefs, as we are currently working on an article based on the findings of the original report's "Brief 1: Maximising long-term economic value and ecological sustainability of sea cucumbers", "Brief 2: Recovering the value of sea cucumber fisheries in Melanesia" and "Brief 5: Political will, transparency and information". This article will be published in a coming issue of this newsletter.

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Brief A:
Setting minimum size limits for Melanesian Spearhead Group sea cucumber fisheries[4]

Summary

- Minimum size limits are an important management tool for sea cucumber fisheries.
- These size limits bear review and improvement in all four MSG countries.
- Adopting simple, more easily enforceable categories based on reasonable biological advice.
- MSG countries are encouraged to review and harmonise these size limits to be implemented by the next harvest period.

Rationale

Setting minimum size limits is a strongly recommended strategy for ensuring sustainability and improving value for sea cucumber fisheries.

Setting minimum size limits:

- allow animals to reproduce and replenish stocks;
- help fishers earn more for each sea cucumber they catch;[5]
- encourage fishers to shift their effort once catches drop below a threshold; and
- provide a brake on fishing effort and slowing a "free-for-all" approach or mentality.

The minimum legal sizes in all MSG countries should be reviewed and improved. A common standard for minimum sizes would be advantageous for:

- reducing the focus of companies on countries with the least ecologically sustainable regulations; and
- common technical studies, awareness-raising materials and training for communities, fisheries and customs officers.

The proposed size limits should:

- be based on the best available biological data relating to reproductive sizes;
- be relatively easy to apply;
- be for live and dry animals, as well as providing the number of animals per given weight (e.g. 1 kg);
- have a reduced number of size classes to reduce complexity and confusion, owing to species identification;
- be enforced, at a minimum, at the point of export, and will need customs authorities to be involved and trained in their application, and for shipments to be separated by species and, optimally, sizes.
- be subject to an intense and thorough awareness-raising programme for all communities, fishers and stakeholders involved in the fishery; and
- be reviewed in future on a regular basis (possibly along with management plans).

Proposed size limits

The most recent work that addresses the criteria raised in the above paragraphs, and relevant to Melanesia was produced in 2017 by Fiji's Ministry of Fisheries and the Wildlife Conservation Society (MoFF/WCS). National minimum sizes are compared with the minimum size limits proposed by MoFF/WCS for dry and wet individuals in Table 5.

[4] The original report includes six briefs, although only briefs 3, 4 and the first part of brief 5 are reproduced in this article.

[5] In general, larger sized beche-de-mer command higher prices than smaller individuals. Market preferences for some species such as *Holothuria fuscogilva* and *H. fuscopunctata* are for medium sized animals but these are still larger than the proposed minimum legal sizes, and so imposing size limits would not represent a foregone commercial opportunity. *H. scabra, H. lessoni,* and *H. fuscogilva* show exponential increases in price with size, and larger size limits should be considered, which will increase fishery economic performance in the long term (Purcell 2014 and pers. comm.).

Table 5: Comparison of live (or wet) and dry minimum size limits for the four Melanesian countries in 2017. Green shading represents sizes that would not need modification (i.e. could be adopted) in a first phase, other shading represents the level of discrepancies.

Common name	Scientific name	FAO code[a]	Live minimum length (cm)				Dry minimum length (cm)				
			MoFF/WCS proposed	PNG	Solomon Islands	Vanuatu	MoFF/WCS proposed	Fiji	PNG	Solomon Islands	Vanuatu
Amberfish	*Thelenota anax*	HLX	40	20	40	40	15	7.6	10	15	15
Black teatfish	*Holothuria whitmaei*	JDG	30	22	30	30	15	7.6	10	15	15
Blackfish/Hairy blackfish	*Actinopyga miliaris*	KUQ	25	15	20	20	10	7.6	10	10	10
Brown curryfish	*Stichopus vastus*	JPW	25	25		20	10		10		10
Brown sandfish	*Bohadschia vitiensis*	BDV	35	20	25	25	15	7.6	10	10	12
Chalkfish	*Bohadschia similis*	BDX	25	20	20	15	10	7.6	10	10	7
Curryfish	*Stichopus herrmanni*	JNG	35	25	35	35	15	7.6	10	15	15
Deepwater redfish	*Actinopyga echinites*	KUE	25	25	20		10	7.6	15	10	
Deepwater blackfish	*Actinopyga palauensis*	YGP	30	20		30	15		10		15
Elephant trunkfish	*Holothuria fuscopunctata*	HOZ	35	45	40	40	15	7.6	15	20	20
Flowerfish/Black spotted sea cucumber	*Pearsonothuria graeffei*	EHV	30	25	30	30	15	7.6	10	15	15
Golden sandfish	*Holothuria lessoni*	JCO	25	22	25	25	10	7.6	10	10	12
Greenfish	*Stichopus chloronotus*	JCC	20	20	20	20	10	7.6	10	10	10
Lemonfish/ Candyfish	*Thelenota rubralineata*	JDZ		25	30				10	15	
Lollyfish/Reef lollyfish	*Holothuria atra*	HFA	30	30	30	20	10	7.6	15	15	10
Peanutfish/Dragonfish/ Selenka's sea cucumber	*Stichopus horrens*	KUN	20	20	15	20	10	7.6	10	10	10
Pinkfish	*Holothuria edulis*	HFE	30	25	20	20	15	7.6	10	10	10
Prickly redfish	*Thelenota ananas*	TFQ	45	25	35	35	20	7.6	10	15	17
Sandfish	*Holothuria scabra*	HFC	20	12	25	20	10	7.6	10	10	10
Snakefish	*Holothuria coluber*	HHW	40	30	30	40	20	7.6	15	20	20
Snakefish red	*Holothuria flavomaculata*	JCI		30	20	30			15	10	15
Snakefish white/White threadfish	*Holothuria leucospilota*	HFQ		25	20				10	10	
Stonefish	*Actinopyga lecanora*	YVV	20	15	20	20	10	7.6	10	10	10
Surf redfish	*Actinopyga mauritiana*	KUY	25	20	25	25	10	7.6	8	10	12
Tigerfish/Leopardfish	*Bohadschia argus*	KUW	30	20	30	30	15	7.6	10	15	15
Tigertail sea cucumber	*Holothuria hilla*	JCK		25					10		
White teatfish	*Holothuria fuscogilva*	HFF	35	35	35	35	15	7.6	15	15	16
Other species still pending proper identification											
Labuyo	TBC			30					15		
Loli's mother	TBC		40				20				
Ocellated curryfish	TBC			25					10		
Pink curryfish	TBC			25					10		

[a] The Food and Agriculture Organization of the United Nations (FAO) species codes are not commonly used but there is a need for countries to adopt a common and agreed coding for species in order to reduce any confusion caused by varied local names.

These MoFF/WCS sizes, summarised in Table 6, are presented for adoption and could be incorporated into management plans and regulations for the next open season. In Fiji's case, a period of moratorium would present the opportunity to subsequently implement size limits without creating a major impact on established fishers. Correct estimations of the maximum number of pieces per kilo need to be determined for the species for which Vanuatu has not already provided estimates (10 out of 33 species).

Table 6. Proposed initial harmonised size limits for beche-de-mer in Melanesia. For dry lengths, there are three size categories (10, 15 and 20 cm) and for live lengths there are six (20, 25, 30, 35, 40 and 45 cm). These sizes are broadly comparable to those in place in New Caledonia. Red typing indicates that these sizes need to be reviewed.

Common name	Scientific name	FAO code	Proposed minimum limits		
			live length (cm)	dry length (cm)	pieces kg^{-1} (dry weight)
Amberfish	*Thelenota anax*	HLX	40	15	12
Black teatfish	*Holothuria whitmaei*	JDG	30	15	10
Blackfish/Hairy blackfish	*Actinopyga miliaris*	KUQ	25	10	29
Brown curryfish	*Stichopus vastus*	JPW	25	10	96
Brown sandfish	*Bohadschia vitiensis*	BDV	35	15	35
Chalkfish	*Bohadschia similis*	BDX	25	10	128
Curryfish	*Stichopus herrmanni*	JNG	35	15	25
Deep water redfish	*Actinopyga echinites*	KUE	25	15	TBC[a]
Deepwater blackfish	*Actinopyga palauensis*	YGP	30	15	12
Elephant trunkfish	*Holothuria fuscopunctata*	HOZ	45	20	4
Flowerfish/Black spotted sea cucumber	*Pearsonothuria graeffei*	EHV	30	15	53
Golden sandfish	*Holothuria lessoni*	JCO	25	12	19
Greenfish	*Stichopus chloronotus*	JCC	20	10	222
Lemonfish/Candyfish	*Thelenota rubralineata*	JDZ	30	15	TBC
Lollyfish/Reef lollyfish	*Holothuria atra*	HFA	30	15	71
Peanutfish /Dragonfish/ Selenka's sea cucumber	*Stichopus horrens*	KUN	20	10	132
Pinkfish	*Holothuria edulis*	HFE	30	15	166
Prickly redfish	*Thelenota ananas*	TFQ	45	20	11
Sandfish	*Holothuria scabra*	HFC	25	10	66
Snakefish	*Holothuria coluber*	HHW	40	20	73
Snakefish red	*Holothuria flavomaculata*	JCI	30	15	100
Snakefish white/White threadfish	*Holothuria leucospilota*	HFQ	25	10	TBC
Stonefish	*Actinopyga lecanora*	YVV	20	10	30
Surf redfish	*Actinopyga mauritiana*	KUY	25	12	33
Tigerfish/Leopardfish (SI)	*Bohadschia argus*	KUW	30	15	31
Tigertail sea cucumber	*Holothuria hilla*	JCK	25	10	TBC
White teatfish	*Holothuria fuscogilva*	HFF	35	16	8
Other species still pending proper identification					
Brown curryfish	TBC		25	10	TBC
Honpai fish, pigfish	TBC		0	0	TBC
Labuyo	TBC		30	15	TBC
Loli's mother	TBC		40	20	TBC
Ocellated curryfish	TBC		25	10	TBC
Pink curryfish	TBC		25	10	TBC

[a] TBC: to be confirmed

Brief B:

Approximating buyer and market prices for beche-de-mer for Melanesia (October 2017)

Summary

- Data are sometimes urgently required to support unforeseen management actions at the national level. Such an occasion arose in Solomon Islands in September 2017, with the unexpected opening of the sea cucumber fishery.
- Data required for management decisions include prices afforded to fishers by buyers, export values and buyer prices in Hong Kong and China, which can be used to set minimum recommended prices for fishers, fair market prices for export, levy calculations and to determine license values.
- More emphasis on routine collection and sharing of available information on buyer prices, export values and trade information in both published and grey literature can provide a factual basis for decisions at short notice.

Prices paid by buyers to fishers

Table 7 provides a sample of recent prices from other Melanesian Spearhead countries. Note that large variations between and within countries may be affected by quality and size of processed beche-de-mer. Some traders have wet weight and dry weight prices. Wet weight prices are often higher than proportional dry weight prices. The absence of national or regional standards for the grading of beche-de-mer is a challenge.

Table 7. Average price for dry weight (kg) high-grade beche-de-mer.

Common name	Scientific name	FAO code	Value range	Price (USD)			
				Fiji 2015[a]	PNG 2017[b]	PNG 2017[c]	Vanuatu 2015[d]
Amberfish	*Thelenota anax*	AMF	L	6	6		3
Black teatfish	*Holothuria whitmaei*	BTF	M	24	40		26
Blackfish	*Actinopyga miliaris*	BF	L			22	10
Brown sandfish	*Bohadschia vitiensis*	BSF	L	6	9		8–27
Chalkfish	*Bohadschia similis*	CHF	L	8	5		7
Curryfish	*Stichopus herrmanni*	CF	L	19	28	25	9
Deep water redfish	*Actinopyga echinites*	DRF	M	13			
Deepwater blackfish	*Actinopyga palauensis*	BF	M	23			30
Elephant trunkfish	*Holothuria fuscopunctata*	ETF	VL	23	3		1
Flowerfish	*Pearsonothuria graeffei*	FF	L	7			4
Golden sandfish	*Holothuria lessoni*	GSF	M		55	23	
Greenfish	*Stichopus chloronotus*	JCC	M	43	29	15	13
Lollyfish	*Holothuria atra*	LF	VL	3	5		3
Peanutfish	*Stichopus horrens*	PNF	L				7
Pinkfish	*Holothuria edulis*	PKF	VL	3			
Prickly redfish	*Thelenota ananas*	PRF	M	28	32	19	17
Sandfish	*Holothuria scabra*	SF	H	29	65	34	30
Snakefish	*Holothuria coluber*	SNF	L	6	7		3
Stonefish	*Actinopyga lecanora*	STF	L	18	34	25	3
Surf redfish	*Actinopyga mauritiana*	SRF	M	18	31	20	21
Tigerfish	*Bohadschia argus*	TF	L			9	22
White teatfish	*Holothuria fuscogilva*	WTF	H	51	49	37	57

[a] From: Mangubhai et al. 2016. Average purchase price.
[b] From: Kinch J., personal communication. New Ireland, best trader price.
[c] From: Kinch J., personal communication. Kiwali, Milne Bay.
[d] Using dry weight conversion ratios from Carleton et al. 2013

Export value declared to government at point of export

Values declared by exporters to national customs authorities are detailed below. To date, only Solomon Islands levied an export tax based on the percentage of the declared value, and this may account for the low value reported. For 2015, the average value per tonne of beche-de-mer was: Fiji, USD 30,839, Vanuatu, USD 36,429, PNG approximately USD 32,000; but in Solomon Islands it was only USD 13,267. Note that because these data rely on voluntary declarations, Carleton et al. 2013 proposed that exporters should show a commercial invoice from Hong Kong importers with the buying value in Hong Kong dollars. The feasibility of obtaining such an invoice needs to be tested.

Table 8. Sample of recent average export values declared to governments.

Common name	FAO code	Average declared export values (USD kg^{-1})		
		Fiji 2015	Solomon Islands 2015	Vanuatu 2015
Amberfish	AMF	45	21	
Black teatfish	BTF	148	39	62
Blackfish	BF	96	38	
Brown sandfish	BSF	38	14	16
Chalkfish	CHF	17	19	15
Curryfish	CF	97	37	25
Deep water redfish	DRF	103	10	
Deepwater blackfish	BF	113		14
Elephant trunkfish	ETF	28	12	11
Flowerfish	FF	46	8	6
Golden sandfish	GSF	103	19	
Greenfish	JCC	110	35	27
Lollyfish	LF	18	10	11
Peanutfish	PNF	124	42	7
Pinkfish	PKF	13	10	
Prickly redfish	PRF	94	32	32
Sandfish	SF	83	35	58
Snakefish	SNF	36	11	7
Stonefish	STF	68	41	34
Surf redfish	SRF	68	36	90
Tigerfish	TF	45	14	24
White teatfish	WTF	183	41	70

Hong Kong and China buying prices

Exporters do not necessarily report accurate selling prices, and so gaining an independent estimate of the Hong Kong buying price is useful. Recent studies have shown that this is possible but that data are still emerging.

Table 9. Estimated wholesale prices (USD kg^{-1}) in China (Guanghzou) and Hong Kong based on 2011 data from Purcell 2012 and inflated to 2015 prices at 2.9% per year.

Common name	Guangzhou retail/wholesale price (USD kg^{-1}), 2015	Hong Kong retail price (USD kg^{-1}), 2015
Black teatfish	88.57	
Burying blackfish	16.82	
Curryfish	135.66	220.87
Deepwater blackfish	118.84	
Deepwater redfish	70.63	
Dragonfish	24.67	
Elephant trunkfish	53.81	
Golden sandfish	76.24	201.81
Greenfish		431.64
Hairy blackfish	88.57	
Leopardfish	65.03	
Peanutfish	77.36	
Prickly redfish	145.75	
Sandfish	153.60	339.71
Snakefish	42.60	
Stonefish	105.39	
Surf redfish	84.09	162.57
White teatfish	134.54	215.26

This exercise demonstrated that based on publicly available information, contact with select regional experts, and advice from SPC staff, it is possible to compile a defensible estimation of prices at various levels although this could be more up to date and complete.

- The Pacific Regional Oceanscape Program regional project responded to the request to provide best available data at short notice for improved decision making.
- The exercise also tested whether ongoing low-level data collection by staff at regional organisations such as SPC or MSG could provide useful information in this type of scenario.

Brief C:
Harmonisation of conditions for sea cucumber fisheries management in Melanesia

Background

The Melanesian Spearhead group's memorandum of understanding (MoU) on technical cooperation in coastal fishery and aquaculture development 2015[6] called for cooperation and collaboration on coastal fisheries and aquaculture. The MoU in relation to sea cucumbers states:

The Members agree to:

- develop harmonised systems for sea cucumber fisheries in the areas of policy, technical cooperation development and management; and to
- align management, monitoring and compliance approaches within the MSG sea cucumber fisheries to avoid illegal transhipment of product between Member countries to get around local management measures.

The MSG roadmap for inshore fisheries management and sustainable development 2015–2024 committed Heads of Governments to:

- improve data collection and sharing by and between fisheries departments and customs departments;
- improve coordination and sharing of harvesting, operator and market information between MSG members to increase prices and facilitate control; and
- harmonise prices and licence conditions, and maintain a regional database, including detailed information on all exporters.

Objectives of harmonising terms and conditions

- Share information that is useful to improving the sustainability of the beche-de-mer industry and maximising the proportion of the value that stays in countries and with fishers.
- Reduce or remove the incentive for illegal transshipment of product between MSG countries to get around local management measures.
- Engage Melanesian solidarity to increase control over the value and sustainability of the sea cucumber fisheries and to maximise benefits to communities.
- Adopt common standards that are more resilient to local interference and reinforce sustainable management and local value maximisation.
- Ensure a common high standard that improves the international image of Melanesian beche-de-mer as sustainable and high-quality products from pristine environments.

Aligning management, trade and market policy and information sharing

It is proposed that MSG fisheries agencies seek to align, at the earliest feasible opportunity, policies to achieve the mutually agreed objectives above in the following broad areas:

- harvest control rules and regulations;
- pricing and market information and standards; and
- fiscal, economic, trade, companies and customs measures.[7]

[6] http://www.msgsec.info/index.php/documents-of-cooperation/1225-2015-26-jun-mou-on-msg-coastal-fishery-and-aquaculture-development

[7] This brief is followed in the original report by three sub-briefs relating to: "Harvest control rules and regulations"; "Pricing and market information and standards"; and "Fiscal, economic, trade, companies and customs measures".