

**Marine Stewardship Council (MSC) Reduced Re-
Assessment Final Report**

Ben Tre clams (*Meretrix lyrata*)

On behalf of the Client

**Department of Agriculture and Rural development of Ben
Tre (DARD)**

Prepared by ME Certification Ltd

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Glossary

Acronym	Definition
CA	Consequence Analysis
CAB	Conformity Assessment Body
CAG	Catch and Grow
CRs	(MSC) Certification Requirements
DARD	(Ben Tre) Department of Agriculture and Rural Development
FA	Fisheries Association
HM	Habitat Modified
ICAFIS	(Vietnam) International Collaborating Centre for Aquaculture and Fisheries Sustainability
MEC	ME Certification Ltd
MEP	MacAlister Elliott & Partners Ltd
PCR	Public Certification Report
PSA	Productivity Susceptibility Analysis
RBF	Risk Based Framework
SSIFP	Southern Sub Institute for Fisheries Planning
UoA	Unit of Assessment
UoC	Unit of Certification

1. Authorship and Peer Reviewers

The authors of this report (MEC assessment team) are:

Kat Collinson (Team Leader):

Kat has a Master's Degree in Aquatic Resource Management from King's College University and has worked on a number of MSC fisheries assessments including the Menai Strait mussel fishery, Ben Tre clams and the newly certified Walker Seafoods tuna and swordfish longline fishery. She has also been responsible for the completion of pre-assessments for tuna fisheries in the Pacific and Indian Ocean against the MSC principle and criteria. Kat is a fully qualified MSC Team Leader and specialises in Principle 2 and Risk Based Framework (RBF) requirements, having passed the relevant MSC online training modules. She regularly participates in MSC CAB training sessions and workshops and has also completed over 150 separate MSC CoC audits and acts as the team's expert on traceability for the fishery. She was the team leader for this reassessment.

Dr Jo Gascoigne:

Dr Joanna Gascoigne is a former research lecturer in marine biology at Bangor University, Wales and a shellfisheries expert, with over 20 years' experience working in the fisheries sector. Dr Gascoigne has a PhD from the Virginia Institute of Marine Science in the USA, which was completed on the Allee effects of the queen conch, *Strombus gigas*.

She is a fully qualified MSC Team Leader and has been involved as expert and lead auditor in over 15 MSC pre- and full assessments. She is currently involved in a number of on-going full assessments including the FROM Nord North Sea and Eastern Channel pelagic trawl herring fishery and the Menai Straits mussel fishery. She therefore has an in-depth understanding of the MSC fisheries standard and MSC fisheries certification requirements. During her experience as an MSC auditor, Jo has gained a great deal of experience in interviewing and facilitation techniques. She has also been involved in the use of the RBF on a number of occasions, having completed the required training, and this has also furthered her experience in specific stakeholder interview.

Dr Gascoigne has recently completed the required Fishery Team Leader MSC training modules for the new V2.0 Fisheries Certification Requirements.

Tuong Phi Lai

Tuong, with an MSc in Natural Resource Management is a Vietnamese resident with a wealth of experience in fisheries and aquaculture related matters in the country. Having previously worked for both WWF and more recently the Vietnam International Collaborating Centre for Aquaculture and Fisheries Sustainability (ICAFIS), Tuong has a detailed understanding of the management systems employed for fisheries in country. Tuong has a good working knowledge of the Ben Tre clam fishery specifically having been involved in a project looking at the possibility of expanding MSC certification to other fisheries within Vietnam. Mr. Lai has experienced the MSC/FIP training granted by Poseidon and WWF in 2015.

All team members are fluent in English, additionally; Tuong Phi Lai is fluent in Vietnamese. All members of the assessment team have been involved in a number of MSC full assessments and Tuong Phi Lai is very familiar with Vietnamese fisheries and aquaculture. Furthermore Jo and Kat have been involved in the previous certification cycle and subsequent surveillances of this fishery and are therefore familiar with this fishery.

The peer reviewer for this reduced reassessment was:

Nguyen Viet Thanh Thanh is a lecturer and a researcher at the Department of Environmental and Resource Economics, Faculty of Development Economics, VNU University of Economics and Business, Vietnam. He has gained a PhD degree in Economics at the University of Southern Denmark (Denmark), a Master degree in International Fisheries Management at the University of Tromsø (Norway) and a B.Sc degree in Fishing Technology at Nha Trang University (Vietnam). Thanh's previous employment includes five years working for the Ministry of Fisheries of Vietnam, two years carrying out activities related to alternative income generation for local communities in marine protected areas in Vietnam and two years working for the Knowledge-based Sustainable Management for Europe's Seas (KnowSeas) project (WP 7, the Baltic Sea case study). Currently, Thanh is teaching microeconomics, environmental economics, environmental management and sustainable development courses at the Faculty of Development Economics, VNU University of Economics and Business. Thanh also has experience with bio economic models, ecosystem management, climate change and fisheries management. He has been a consultant for the WWF, WB, WCPFC and the FAO on MSC, tuna fisheries and trawl fisheries related matters in Vietnam. Thanh also participated in the MSC/FIP training granted by Poseidon and WWF in 2015.

2. Changes since Initial Assessment

2.1 Overview

2.1.1 Unit of Assessment

There has been no change to the Unit of Assessment since the initial certification. There have only been minor names to the cooperatives in the fishery. The names are presented in Table 1 below. The areas that the cooperatives operate in can be seen in Figure 1.

Table 1. Unit of Assessment for the reassessment

Species:	Clam (<i>Meretrix lyrata</i>)
Geographical Area:	Ben Tre Province, Vietnam
Stock	Ben Tre clam
Method of Capture:	Hand gathering, usually following re-laying of spat ('seed') in previous years
Management System:	Ben Tre People Committee, Department of Agriculture and Rural development Ben Tre province, Division of Aquaculture Ben Tre, Department of Agriculture and Rural development of Binh Dai, Ba Tri and Thanh Phu Districts, Clam Cooperatives & Clam Groups
Client Group:	Co-operative names (in Vietnamese): Đồng Tâm, Rạng Đông, Bảo Thuận, An Thủy, Tân Thủy, Thanh Phong, Thanh Bình, Thanh Lợi, Bình Minh, Tập đoàn nghề

2.1.2 Scope of the fishery in relation to enhanced fisheries

MSC's definitions of enhanced fisheries, and 'Clam FAM' assessment tree for enhanced bivalve fisheries, are new since the initial assessment of this fishery. These issues are therefore considered here from scratch.

MSC defines an enhanced fishery as a fishery involving: *'Any activity aimed at supplementing or sustaining the recruitment, or improving the survival and growth of one or more aquatic organisms, or at raising the total production or the production of selected elements of the fishery beyond a level that is sustainable by natural processes. It may involve stocking, habitat modification, elimination of unwanted species, fertilisation or combinations of any of these practices.'* (MSC-MSCI Vocabulary, version 1.1, page 10).

This fishery involves harvesting of seed (small) clams and relaying them in suitable areas and densities, in order to improve their survival and growth rates. Hence this fishery is an enhanced fishery under MSC's definition.

MSC's scope criteria for enhanced fisheries are given and evaluated below. MEC concludes that the fishery is within scope.

Linkages to and maintenance of a wild stock

- A1. At some point in the production process, the system relies upon the capture of fish from the wild environment. Such fish may be taken at any stage of the life cycle including eggs, larvae, juveniles or adults. The 'wild environment' in this context includes marine, freshwater and any other aquatic ecosystems.
- A2. The species are native to the geographic region of the fishery and the natural production areas from which the fishery's catch originates unless MSC has accepted a variation request to include introduced species for the pilot phase.
- A3. There are natural reproductive components of the stock from which the fishery's catch originates that maintain themselves without having to be restocked every year.
- A4. Where fish stocking is used in HAC systems, such stocking does not form a major part of a current rebuilding plan for depleted stocks.

Note to A4 This requirement shall apply to the "current" status of the fishery. Wild stocks shall be managed by other conventional means. If rebuilding has been done by stocking in the past, it shall not result in an out-of-scope determination as long as other measures are now in place

Evaluation of the Ben Tre clam fishery:

- A1: Seed is taken from the wild environment, and re-laid in the wild environment. Met.
- A2: The species is a native species and stock to the area. Met.
- A3: The seed derives from natural reproduction and spatfall. Met.
- A4: Not a 'hatch and catch' fishery – not applicable.

Feeding and husbandry

- B1. The production system operates without substantial augmentation of food supply. In HAC systems, any feeding is used only to grow the animals to a small size prior to release (not more than 10% of the average adult maximum weight), such that most of the total growth (not less than 90%) is achieved during the wild phase. In CAG systems, feeding during the captive phase is only by natural means (e.g. filter feeding in mussels), or at a level and duration that provide only for the maintenance of condition (e.g. crustacean in holding tanks) rather than to achieve growth.
- B2. In CAG systems, production during the captive phase does not routinely require disease prevention involving chemicals or compounds with medicinal prophylactic properties.

Evaluation of the Ben Tre clam fishery:

- B1: There is no augmentation of the food supply. Met.
- B2: There is no attempt at disease prevention, except relaying at lower density. No chemicals or medical products are used. Met.

Habitat and ecosystem impacts

C1. Any modifications to the habitat of the stock are reversible and do not cause serious or irreversible harm to the natural ecosystem's structure and function.

Note to C1 Habitat modifications that are not reversible, are already in place and not created specifically for the fishery shall be in scope. This includes:

- Large-scale artificial reefs
- Structures associated with enhancement activities that do not cause irreversible harm to the natural ecosystem inhabited by the stock, such as salmon fry farms next to river systems

Evaluation of the Ben Tre clam fishery:

- C1: There is no habitat modification in the fishery, except that associated with the harvesting technique (hand rakes; covering both seed and commercial harvest). This is evaluated as normal under Principle 2. Met.

MEC therefore concludes that the fishery is within scope for an enhanced fishery.

The fishery has been determined to be a 'catch-and-grow' (CAG) bivalve fishery. MSC's definition of a 'catch-and-grow' fishery is: '*Production systems that involve wild harvest followed by a grow-out phase (e.g. mussel farming based on wild spat collection)*' (CR version 1.3, definitions p48). This corresponds to the activities of this fishery (wild harvest of seed clams, followed by grow-out in the relaying areas).

MSC requires that CAG bivalve fisheries are scored following Annex CK of the Certification Requirements (version 1.3). The team's determination as to any modifications to the default assessment tree for enhanced bivalve fisheries are considered under 'Overall Changes to the Fishery' below.

2.1.3 Other scope questions

This fishery remains in conformity with the MSC scope requirements (FCR 7.4):

- The fishery does not target amphibians, birds, reptiles or mammals;
- The fishery does not use poisons or explosives;
- The fishery does not operate under a controversial unilateral exemption to an international agreement;
- None of the cooperatives have been successfully prosecuted for a forced labour violation in the last 2 years;
- The fishery management framework includes a mechanism for resolving disputes and the fishery is not overwhelmed by disputes.

The fishery is not an Introduced Species Based Fishery as per the MSC FCR 7.4.4.

2.1.4 Criteria for reduced re-assessment

According to the Certification Requirements (version 2.0, paragraph 7.24.6), a fishery is eligible for reduced re-assessment if:

- The fishery was covered under the previous certification or scope extension;
- The fishery had no conditions remaining after the 3rd surveillance audit, and;
- The CAB confirms that all standard-related stakeholder comments have been addressed by the 3rd surveillance audit.

The fishery was covered under the [previous assessment](#) in its entirety, since there have been no changes to the UoA.

The fishery was certified with three conditions, which were closed at the first or second surveillance audits (Table 2).

Table 2. Conditions on the first assessment of this fishery, and their outcomes.

Condition	PI*	Requirement	Year closed
1	2.1.4.4	Effect on sandflat communities	Year 2 audit
2	2.2.1.3	Effect of disturbance on shore birds	Year 3 audit
3	3A.1.4	External review	Year 3 audit

* NB numbering of PIs does not correspond to PIs in CR version 1.3 or 2.0.

2.1.5 TAC and catch data

The fishery is not managed by a fixed overall TAC, although catch limits are set. Each cooperative decides annually the volume of seed harvest (for relaying) and commercial harvest for that year, based on the results of surveys (this may be adjusted mid-year if necessary). The total areas and volumes of commercial and seed harvest for the period 2009-2014 is given in Table 3. The clam production by co-operative for the last three years is shown in

Table 3. Area under cooperative management and total harvest, 2009-2014.

Year	Areas (hectares)			Harvest (tonnes)			Harvest per unit area (tonnes per hectare)	
	Area under management by cooperatives	Area of commercial harvest	Area of seed harvest	Total harvest	Seed harvest	Commercial harvest	Seed harvest	Commercial harvest
2009	7170	3151	304	6922	1316	5607	4.33	1.78
2010	7170	3230	526	6458	1120	5338	2.13	1.65
2011	7164	3122	525	2672	739	1933	1.41	0.62
2012	7164	2181	283	4166	1153	3013	4.07	1.38
2013	7164	2561	482	4490	641	3849	1.33	1.50
2014	7164	2561	482	4341	1169	3172	2.42	1.24

Table 4.

Table 3. Area under cooperative management and total harvest, 2009-2014.

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2014	7164	2561	482	4341	1169	3172	2.42	1.24

Table 4. Clam production weights per clam processing plants 2013-2015

Year	Names of co-operatives in the fishery											
	XN thủy sản Ba Tri-Bến Tre	Cty CP thủy sản Bến Tre	Cty CP thủy sản Sông Tiền	Cty CP XNK thủy sản Bến Tre	Cty TNHH Anh Nguyên Sơn	Cty CP Gò Đăng	Cty TNHH Đông Đông Hải	Cty TNHH Tân Thành Lợi	XN đông lạnh Thắng Lợi -APT	Cty TNHH XNK thực phẩm Á Châu	Cty TNHH thực phẩm Việt	Weight (kg)
2013	300	2613611	262719	308829	201093	124082	66027	5000	11000	27000	0	3619661

2014	500	3701980	350088	381543	142007	140141	132562	48726	5214	0	18000	4920761
2015	0	1342278	15000	129115	237818	151272	0	49000	500	0	0	1924983

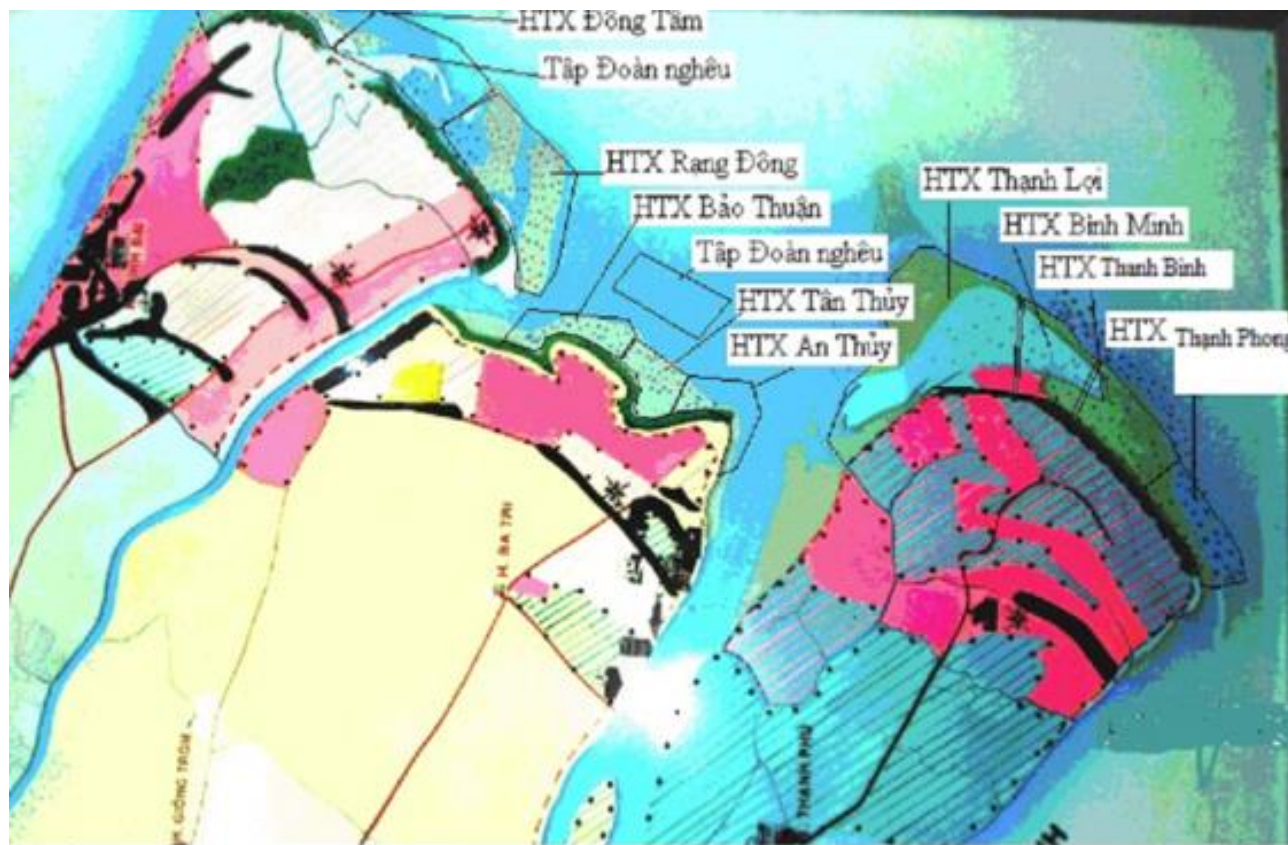


Figure 1. Co-operative names and fishing grounds.

2.2 Specific Changes since Initial Assessment

2.2.1 Overall

There have been no significant overall changes to the fishery operation or management framework since certification. There have been a few minor changes, which are noted under the relevant principle below.

There have, however, been considerable changes to the MSC standard and procedures since this fishery was certified. As noted above, re-assessment of this fishery will take place under Annex SB of the Certification Requirements (version 2.0) for enhanced bivalve fisheries. Under Annex SB, there are two key questions that determine the assessment tree to be used:

- Does the fishery significantly impact the parent stock?
- Does the fishery involve translocations?

Impacts on the parent stock: Although the fishery tries to reduce mortality rates of the clams below commercial size via husbandry (relaying), there is no reason to suppose that the fishery does not have any impact on the parent stock.

Translocations: The cooperatives harvest seed from their area according to their needs for relaying, but also according to its availability, since spatfall can be quite variable in time and space. Cooperatives with surplus seed may sell it on to cooperatives with insufficient supply, within Ben Tre province, and may also sell seed to other fisheries elsewhere in Vietnam. However, although seed may be sold out of the UoA, seed is never brought into the UoA from outside.

The question is thus whether movement within Ben Tre province, between cooperatives, should be considered 'translocation'. The maximum distance involved (as the crow flies) would be about 50km, this being the straight-line width of the coast of the province.

MSC does not provide a definition of translocation, but the MEC team considered that the key question was whether the area within which the seed was moved within Ben Tre constituted different clam stocks (Principle 1) or different ecological systems (Principle 2).

According to various sources, the tidal range at the mouth of the Mekong River is ~2.6-3m¹. This relatively high tidal range combined with the low relief of the area (the whole province is only on average one to two metres above sea level) means that tidal currents in the channels and along the coast are strong, with reportedly a net southwards current along the coast². Tidal effects are perceptible as far upstream as Phnom Penh (~400 km). This

¹ See Louisiana State University <http://www.geol.lsu.edu/WDD/ASIAN/Mekong/mekong.htm> and NASA http://disc.sci.gsfc.nasa.gov/geomorphology/GEO_5/GEO_PLATE_D-7.shtml who give slightly different figures – presumably there is spring-neap variation which may account for it.

² <http://www.geol.lsu.edu/WDD/ASIAN/Mekong/mekong.htm>

suggests that erosion and transport of sediment, mixing of water bodies and littoral transport rates are all likely to be high in the clam harvesting areas.

M. lyrata has a planktonic trochophore phase, the duration of which is not completely clear (and probably variable depending on area and environmental conditions) (Phu, 2001). During this phase, it is reported that the trochophore post-larvae show vertical migration behaviour, remaining close to the bottom during the day and on the ebb tide (Luu et al. 2009). It is presumed that one of the functions of this behaviour is to minimise the extent to which the larvae are transported offshore.

Overall, the team considered that despite larval behaviour which would (to some extent) reduce the likelihood of mixing between different areas, the nature of the environment and the extensive distribution of clams wherever there is suitable habitat was highly likely to mean that the clams in Ben Tre province belong overall to a single stock or metapopulation (see below). (Note that this does not contradict the view of local scientists and fishermen that recruitment comes largely from local broodstock.) From the perspective of Principle 2 components (bycatch species, birds, habitats and the ecosystem), likewise, the team considered that the area covered by the UoA could best be thought of as a single system.

The team therefore concluded that the movement of seed between cooperative areas should NOT be considered to be translocation.

These conclusions (CAG fishery, possible impact on the parent stock, no translocations) mean that there are no changes to the assessment tree relative to the 'normal' tree under CR 2.0 (i.e. Principle 1 scored as normal, genetic PIs not required, translocation PIs not required).

2.2.2 Principle 1

There have been no major changes that might impact Principle 1. The area and quantity harvested of seed and commercially sized clams has varied from year to year (Table 3), as has the membership of the cooperatives; these are tracked in the surveillance reports.

Over the last few years, there have been several episodes of mass mortalities of clams. A recently-published research report (Sang, 2013) concluded that these mortalities were driven by a combination of environmental circumstances, notably high temperature, low salinity, low rates of water exchange and high density, during the period when clams were spawning or getting ready to spawn. Husbandry techniques have been adapted to try and reduce these mortality events (e.g. moving clams to less susceptible areas or thinning them out to lower densities).

The previous PCR (Luu, 2009) notes that relaying clams at size smaller than 5000 clams/kg was not allowed. This restriction has not changed and seed may not be harvested for relaying until they are of suitable size.

Definition of the stock: MSC TO on this report (see Appendix XX) requested more detail on the definition of 'stock' in this fishery, in relation to the scoring of Principle 1; specifically,

whether the stock can be defined as a ‘metapopulation’, and if so how this is dealt with in management.

The available information on stock structure is detailed in the PCR for the previous assessment (Luu et al. 2009) and also summarised above in relation to translocations. Details of the population structure are not known, but a metapopulation structure is certainly possible, with sub-populations (defined by sources of recruitment from areas of high brood stock) linked by larval transport and post-larval and adult migrations as well as by movement of seed between areas as part of the husbandry element of the fishery.

Generally speaking (more detail is given in the response to the MSC TO, Appendix 3) where population structure is uncertain, it is more precautionary to manage stocks at the level of local sub-populations, because it avoids the risk of local depletion. This is clearly the case here where there is very detailed spatial management of the spat, and management of the broodstock is also at the local (cooperative) level. The only exception to this would be the case for a metapopulation whereby ‘sink’ populations depend on a ‘source’ population, which should then be exploited such that recruitment to the sinks as well as the source is not impaired. However, the husbandry element of this fishery presumably removes any possibility of source/sink dynamics in this case, so this would not apply here. Overall, therefore, the team was satisfied that while the details of stock structure are uncertain, the approach to management (at the cooperative level) is likely to be robust to this uncertainty.

2.2.3 Principle 2

This section of the report outlines the fishery’s potential impacts on the wider ecosystem. Five key components are considered to cover the range of potential ecosystem elements that may be impacted by the fishery. These are:

- **Primary species**, non-target species: species where management tools and measures are in place, intended to achieve stock management objectives reflected in either limit or target reference points.
- **Secondary species**: non-target species: species where management tools and measures are **not** in place, intended to achieve stock management objectives reflected in either limit or target reference points.
- **ETP species**: Endangered Threatened or Protected species (see SA 3.1.5 of MSC CRs for full details).
- **Habitats**: the habitats within which the fishery operates
- **Ecosystem**: broader ecosystem elements such as trophic structure and function, community composition, and biodiversity.

‘Bycatch’

Version 2.0 requires that bycatch be separated into 'primary' vs. 'secondary' species – the distinction being whether or not there is management of the stock in question. MSC defines the intent as follows (FCRG Table GSA2):

Primary: *Managed, in-scope (e.g. fish and shellfish) species. Primary species will usually be species of commercial value to either the UoA or fisheries outside the UoA, with management tools controlling exploitation as well as known reference points in place. In addition, the institution or arrangement that manages the species (or its local stock, see below) will usually have some overlap in jurisdiction with the fishery in the UoA.*

Secondary: *Secondary species include fish and shellfish species that are not managed according to reference points and birds/mammals/reptiles/amphibians (all species that are out of scope of the standard) that are not ETP species. These types of species could in some cases be landed intentionally to be used either as bait or as food for the crew or for other subsistence uses, but may also in some cases represent incidental catches that are undesired but somewhat unavoidable in the fishery. Given the often unmanaged status of these species, there are unlikely to be reference points for biomass or fishing mortality in place, as well as a general lack of data availability.*

There have been no changes in the species associated with the clams (see previous [PCR](#) Sections 2.7-2.10, Luu, 2009). One other species of bivalve is harvested commercially and managed in a similar way to *M. lyrata*, although on a smaller scale – the blood cockle *Anadara granulosa*. This species occurs mainly in different (although overlapping areas) to *M. lyrata* – essentially in more muddy habitats. The fisheries do not overlap – the two species are not harvested at the same time. Hence it was concluded that *A. granulosa* does not constitute a 'primary' species in this fishery.

The other species reported to be associated with the clams are small gastropod predators of seed clams (*Polynices didyma*, *Natica maculosa*, *Lamarch* sp. and *Nassarius* sp. according to the previous PCR – no change is reported). The former two may be subject to some subsistence hand-gathering, but again this is separate from the clam fishery. If taken during clam harvesting, these species will mainly be picked out and discarded with, presumably, low mortality. Hence it was concluded that these species do not constitute 'secondary' species' of the fishery.

Birds

In response to Condition 2 on the initial certification, the Sub Institute for Fisheries Planning (SSIFP) produced a report (see Akroyd and Luu, 2013) evaluating the likely impact of the clam fishery on shore bird populations in the clam fishing areas. The conclusion of the report is that no impact is likely, and in fact that birds and clam fishers may 'help' each other: the birds indicate the presence of poachers to the local cooperative members as well as consume clam competitors or predators such as mussels and snails, while the fishing may help to turn up food for the birds by temporarily loosening and turning the sediment. The condition was closed at the 3rd surveillance audit.

The main analysis presented in the report is the results of a questionnaire from 30 respondents from the area as to their opinions on whether bird populations sizes or composition has changed over time and whether the fishery is likely to be having an impact,

either via food competition or via disturbance. While the results were a consensus around ‘no impact’ the MEC team considered that this research methodology was not particularly robust. Nevertheless, the research also identifies the main species of resident and migratory birds present on the clam areas, the main areas that they use and what they eat, which is perhaps more practical in evaluating likely impacts. This information is given in Table 5, along with information on the population status and trends. Although six of the nine species are reportedly decreasing, and four of the nine are evaluated by IUCN as ‘near-threatened’, it does not seem likely that any are dependent on clams as their main food source.

Table 5. Bird species recorded on the clam areas, their population status and main food sources

Species	Resident / migratory	Main food source	Population status / trends	IUCN red list status
Black-winged stilt (<i>Himantopus himantopus</i>)	Resident	Diverse – includes shrimp and other small crustaceans, freshwater crustaceans and insect larvae, worms, small fish, molluscs and seeds	Increasing	Least concern (BirdLife International, 2014)
Little egret (<i>Egretta garzetta</i>)	Resident	Diverse and opportunistic – small fish, aquatic and terrestrial insects, crustaceans, amphibians, molluscs, spiders, worms, reptiles and small birds	Increasing	Least concern (BirdLife International, 2015a)
Cattle egret (<i>Bubulcus ibis</i>)	Resident	Mainly terrestrial insects; also worms, spiders, crustaceans, amphibians, molluscs, fish, lizards, small birds, rodents and vegetable matter	Increasing	Least concern (BirdLife International, 2015b)
Little (striated, mangrove) heron (<i>Butorides striatus</i>)	Resident	Mainly fish; also amphibians, insects, crustaceans, molluscs, worms, birds, reptiles and mice	Decreasing due to loss of mangroves	Least concern (IUCN, 2015)
Little tern (<i>Sterna albifrons</i>)	Resident	Mainly small fish and shrimp; also insects, worms and molluscs	Decreasing	Least concern (BirdLife International, 2012a)
Red-necked stint (<i>Calidris ruficollis</i>)	Migratory (non-breeding)	Omnivorous: Insects, plant seeds, marine worms and molluscs, terrestrial snails and slugs, shrimps, spiders (Department of the	Decreasing due to loss of migratory stopover sites in Yellow Sea region	Near threatened (BirdLife International, 2015c)

		Environment, 2016)		
Eurasian curlew (<i>Numenius arquata</i>)	Migratory (non-breeding)	Mainly annelid worms and insects; will also take crustaceans, molluscs, polychaete worms, spiders, berries and seeds, and occasionally small fish, amphibians, lizards, young birds and small rodents	Probably decreasing due to loss of nesting habitat (unimproved grassland, moorland)	Near threatened (BirdLife International, 2015d)
Asian dowitcher (<i>Limnodromus semipalmatus</i>)	Migratory (non-breeding)	Polychaetes, insect larvae, molluscs	Probably decreasing; majority of population winter in a small number of wetlands in Indonesia	Near threatened (BirdLife International, 2012b)
Painted stork (<i>Mycteria leucocephala</i>)	Migratory (non-breeding)	Fish, frogs and snakes	Decreasing	Near threatened (BirdLife International, 2012c)

Sandflat habitat / ecosystem

A peer-reviewed research report was produced by SSIF in 2011 in response to the condition to evaluate the impact of the fishery on sandflat communities. The outcome of this research is summarised in the Year 2 audit report, which closed the condition (SSIFP, 2011 in Akroyd and Li, 2011).

2.2.4 Principle 3

There have only been minor changes with regard to Principle 3. No changes to laws or management systems governing the fishery were identified. The only change reported is that the original 10 co-operatives have reduced to nine (see Table 1). Two co-operative, Thanh Loc, and Doan Ket merged into Thanh Phong co-operative; and the Hai Duong co-operative has been renamed Thanh Binh.

2.3 Previous assessments

The Ben Tre fishery was first certified on the 9th November 2009 by Moody Marine Ltd, with three conditions Table 6). The overall Principle scores were as follows: Principle 1, 89; Principle 2, 84; and Principle 93.

The first to third surveillance audits were also conducted by Moody Marine Ltd, latterly Intertek Moody Marine. The fourth and fifth surveillance audits were conducted by ME Certification Ltd. The dates of these surveillances are shown in Table 6 below.

Table 6. MSC surveillance history of the Ben Tre clam fishery.

MSC Surveillance year	Surveillance date	Report published on MSC website	CAB
1	1 st – 3 rd December 2010	11th January 2011	Moody Marine Ltd
2	27 th – 29 th October 2011	22nd November 2011	Intertek Moody Marine
3	9 th – 12 th April 2013	9th May 2013	Intertek Moody Marine
4	2 nd April 2014 (remote audit)	6th May 2014	MEC (was MEP)
5 (outside of normal surveillance cycle)	31 st August 2015	5th January 2016	MEC

All surveillance had successful outcomes, with no new conditions being raised during the initial surveillance cycle.

Table 7. Summary of Previous Assessment Conditions

Condition	PI	Year closed	Justification
1. Sandflat communities The effect of clam harvesting should be investigated to determine the impact on sandflat community structure and the level of impact considered in terms of overall impacts on sandflat invertebrate communities within Ben Tre. If impacts are significant, appropriate management measures should be implemented.	2.1.4.4	Year 2	Research concluded no significant impact
2. Shorebird disturbance There should be estimation (e.g. in some representative co-	2.2.1.3	Year 3	Research evaluated shorebird presence and

operatives) of the numbers and species of shorebirds present (seasonally) and the extent to which these may be disturbed by harvesting (e.g. the distances/number of times birds need to move to find alternate feeding locations).			concluded that impacts not likely
3. External review Mechanisms exist for DARD to instigate scientific studies to answer specific management questions, and are subject to monitoring by, for example, the Ministry and PCC. However, there is no systematic and thorough independent review of the appropriateness of the entire management system from DARD to co-operative level. This may be particularly relevant given proposed changes in clam harvest areas within Ben Tre.	3A.1.4	Year 3	The assessment team concluded that a survey and review of the management system had taken place and that DARD planned for external review on an annual basis.

2.4 Changes to the Reporting Template that require an update

Version 2.0 of the CR

Principle One: Target Species Background (FA Template: BIVALVES, section 3.3)

As mentioned above in section 2.2.1, the team concluded that the fishery did not involve translocations as the nature of the environment and the extensive distribution of clams wherever there is suitable habitat was highly likely to mean that the clams in Ben Tre province belong to a single, well-mixed stock. From the perspective of Principle 2 components (bycatch species, birds, habitats and the ecosystem), likewise, the team considered that the area covered by the UoA could best be thought of as a single system.

The team therefore concluded that the movement of seed between cooperative areas should NOT be considered to be translocation, as movement is all within a single ecosystem.

Principle Two: Ecosystem Background (FA Template v2.0, Section 3.4)

The assessment team concluded that cumulative impacts do not need to be taken into account in this reassessment as the Ben Tre fishery does not overlap with any other MSC fisheries.

There are no 'main' primary or secondary species and there are no associated mortalities of ETP species with this fishery.

3. Evaluation Procedure

3.1 Assessment Methodologies

The fishery was assessed this year using the MSC Fisheries Certification Requirements version 2.0 for both procedural stages and scoring. Adjustments to the Default Assessment Tree were not required.

The MSC Full Assessment Reporting Template version 1.0 was used to produce the report.

3.2 Evaluation Processes & Techniques

3.2.1 Site Visits and Consultations

The site visit took place on the 31st August to the 3rd September 2015. Table 8 lists the stakeholders, their various organisations and meeting locations. The purpose of the consultations was to gain information as many aspects of the fishery as possible.

Table 8. List of fishery stakeholders met during the site visit

Full name	Position	Date	Location	Organisation
Nguyễn Văn Bội	PGĐ Sở	31st August 2015	Ben Tre	Vice director, DARD Ben Tre
Cao Văn Viết	PGĐ Sở	31st August 2015	Ben Tre	Vice director, DARD Ben Tre
Trần Thị Thu Nga	Chủ tịch Hội nghề cá BT	31st August 2015	Ben Tre	Chairwoman, Vietnam Fisheries Society Ben Tre
Bùi Kim Hiếu	Phó Giám đốc-Công ty Cổ phần XNK Thủy sản Bến Tre.	31st August 2015	Ben Tre	Director, Aquatic Export Company Ben Tre (Aquatex)
Nguyễn Phú Trí	Giám đốc, Cty Cp Thủy sản Bến Tre	31st August 2015	Ben Tre	Director, Seafood JSC, Ben Tre
Nguyễn Văn Dũng	Phó Chi cục trưởng, Chi cục Quản lý chất lượng NLTS Bến Tre	31st August 2015	Ben Tre	Vice director, Food Safety Control Department, DARD Ben Tre
Huỳnh Văn	Chi cục trưởng, Chi	31st August	Ben Tre	Director, Aquaculture

Cung	cục NTTS Bến Tre	2015		Dept, DARD Ben Tre
Trần Thị Kim Cương	Phó Trưởng phòng- Chi cục NTTS	31st August 2015	Ben Tre	Civil servant, Aquaculture Dept, DARD Ben Tre
Hoàng Quốc Minh	Phó Chi cục Trưởng - Chi cục NTTS.	31st August 2015	Ben Tre	Aquaculture Dept, DARD Ben Tre
Lê Văn Trung	Phó giám đốc TT. Nông nghiệp UDCNC tỉnh Bến Tre	31st August 2015	Ben Tre	Science & Technology Transfer Centre, DARD Ben Tre
Châu Văn Nhớ	Trưởng phòng quản lý NTTS- Chi cục NTTS tỉnh Bến Tre.	31st August 2015	Ben Tre	Aquaculture Dept, DARD Ben Tre
Huỳnh Văn Dư	Chuyên viên Chi cục NTTS	31st August 2015	Ben Tre	Aquaculture Dept, DARD Ben Tre
Nguyễn An Ri	Giám đốc HTX Rạng Đông	1 September 2015	Binh Dai dist, Ben Tre	Director, Rang Dong cooperative
Lê Văn Quang	Phó Giám đốc HTX Rạng Đông	1 September 2015	Binh Dai dist, Ben Tre	Vice Director, Rang Dong cooperative
Phan Thị Thuý Linh	Xã viên HTX Rạng Đông	1 September 2015	Binh Dai dist, Ben Tre	Member/fisher, Rang Dong cooperative
Vũ Thị Thanh Thảo	Xã viên HTX Rạng Đông	1 September 2015	Binh Dai dist, Ben Tre	Member/fisher, Rang Dong cooperative
Lê Quang Nhiên	Xã viên HTX Rạng Đông	1 September 2015	Binh Dai dist, Ben Tre	Member/fisher, Rang Dong cooperative
Phạm Văn Thuận	Xã viên HTX Rạng Đông	1 September 2015	Binh Dai dist, Ben Tre	Member/fisher, Rang Dong cooperative
Nguyễn Văn Hùng	Thương lái ngẫu	2 September 2015	Ben Tre	Middle-men (intermediate buyer)
Trần Thị Long	Thương lái ngẫu	2 September 2015	Ben Tre	Middle-women (intermediaet buyer)
Dương Văn	Giám đốc HTX ngẫu	3	Ba Tri dist,	Director, Tan Thuy

Hải	Tân Thủy	September 2015	Ben Tre	cooperative
Trần Văn Nghệ	PGĐ HTX nghề Tân Thủy	3 September 2015	Ba Tri dist, Ben Tre	Vice Director, Tan Thuy cooperative
Hồ Hoàng Thái	Trưởng Ban Kế hoạch HTX nghề Tân Thủy	3 September 2015	Ba Tri dist, Ben Tre	Head of Planning Dept, Tan Thuy cooperative
Nguyễn Văn Bạ	Ban Kiểm soát HTX nghề Tân Thủy	3 September 2015	Ba Tri dist, Ben Tre	Member, Monitoring Dept, Tan Thuy cooperative
Trần Thanh Sơn	Trưởng Ban Kiểm soát HTX nghề Tân Thủy	3 September 2015	Ba Tri dist, Ben Tre	Head of Monitoring Dept, Tan Thuy cooperative
Nguyễn Hoàng Duan	Xã viên (cao nghêu)	3 September 2015	Ba Tri dist, Ben Tre	Member/fisher, Tan Thuy cooperative
Đinh Văn Tùng	Xã viên (cào nghêu)	3 September 2015	Ba Tri dist, Ben Tre	Member/fisher, Tan Thuy cooperative
Nguyễn Văn Lục	Viện Hải dương học Nha Trang	4 September 2015	Nha Trang	Nha Trang Oceanography Institute
Phan Thanh Lâm	Viện Nghiên cứu NTTS 2	4 September 2015	Ho Chi Minh city	Research Institute for Aquaculture No 2, HCMC
Nguyễn Thị Bích Diệp	Kỹ sư, sản xuất ngao giống	5 September 2015	Tien Giang	Seed Breeding Hatchery, Tien Giang province
Chu Chí Thiết	Viện Nghiên cứu NTTS 1	5 September 2015	Nghe An	Research Institute for Aquaculture No 1, Nghe An
Trần Hoài Giang	Phân viện Viện Kinh tế và Quy hoạch Thủy sản tp HCMC,	6 September 2015	Ho Chi Minh city	Vietnam Fisheries Economics and Planning, HCMC
Nguyễn Thanh Tùng	Viện Kinh tế và Quy hoạch Thủy sản	6 September 2015	Ha Noi	Vietnam Fisheries Economics and Planning, Hanoi

3.2.2 Evaluation Techniques

a) Media announcements

The fishery's re-assessment was announced on the MSC website on the 16th April 2015. The MSC press release targeted a wide range of stakeholders within the sustainable seafood industry. As it is not a process requirement under version 2.0, the fishery was not announced in another media post.

b) Methodology for information gathering

Information for the assessment was gathered during the site visit and through separate consultation and correspondence with individual stakeholders. The representatives listed in Table 8 were key in providing most of the information regarding the operation and management of the fishery. Catch data for the fleets under assessment were obtained from the respective sea fisheries authorities. Scientific information was mostly available on the ICES website.

c) Scoring

Scoring was completed on a Skype call with all members of the team. Each PI was reviewed collectively and a group consensus determined.

The scores were decided as follows:

How many scoring issues met?	SG60	SG80	SG100
All	60	80	100
Half	FAIL	70	90
Less than half, most not met	FAIL	65	85
More than half, many or most	FAIL	75	95

Note that where there is only one scoring issue in the SG, the issue can be partially scored – in this case the team used their judgement to determine what proportion of it was met, e.g. at the 100 level, a small part met = 85, about half met = 90, nearly all met = 95.

d) Decision rules for final outcome

The decision rule for MSC certification is as follows:

1. No PIs scores below 60;
2. The aggregate score for each Principle, rounded to the nearest whole number, is 80 or above.

The aggregate score for each Principle is calculated by taking the average score for each component followed by the average of all the component scores (Table 12).

Table 9. Scoring elements

Component	Scoring elements	Main/not main	Data-deficient or not
1 – Target species/stock	Lyrate clam (<i>Meretrix lyrata</i>)	Target	No
2.1 - Retained species	None	N/A	N/A
2.2 – Bycatch species	None	N/A	N/A
2.3 – ETP species	None	N/A	N/A

The RBF was not used in this reduced reassessment.

4. Traceability

4.1 Eligibility Date

The current MSC certificate expires on the 15th July 2016. This came after a [variation request](#) was granted by the MSC to extend the life of the certificate. The assessment team aim to complete this reassessment before the current certificate expires, to avoid a lapse in certification for the fishery products. The new eligibility date is therefore the date of recertification.

4.2 Traceability within the Fishery

The clams are firstly harvested by fishers working for the co-operatives from the harvesting areas. The clams are weighed and graded by size and then auctioned. In most cases, the auction occurs following harvesting, but it can sometimes happen before.



Figure 2. Harvesting of clams in the Ben Tre fishery.

Each of the co-operatives have a 'selling team', whom are responsible for selling the clams to third parties, and in turn, sell to the processing plants. This is the first change of ownership. The third party buyers then negotiate a price at the auction and sell to processing companies.

After the auction, the clams are then placed into open bags. Bags are approximately 30 - 40 kilograms in weight. These bags are a standardised size across the fishery. Once in the big bags, they are not weighed again, as this could cause damage to the clams. The bags themselves do not carry labels. As all clams from the Ben Tre area are part of the MSC fishery UoC and traceability is recorded based on transport vehicle details (each transport vehicle has its own unique number), which can be found on the traceability documents, as described below. Each number identifies, the name of the driver, the volume being transported, where the clams were collected (harvest area) and the name of the co-operative that collected the clams.


Trucks wait at the landing auction site of the co-operative, where they are then taken to either to a processing factory after the auction has been completed. Clams are sold live. In some cases, they may sit in clean water whilst they await sale.

A contract for buying and selling the clams is in place for every sale, as well as an invoice. Clams sold must also be accompanied with a Bivalve Certificate of Origin (Figure 3), which is granted by National Agro-Forestry Fisheries Quality Assurance Department (NAFIQAD), a department of Ministry of Agriculture and Rural Development of Vietnam.

The Certificate of Origin contains information such as the date of harvest, the production area, quantity, the name of the clam harvester, the identification number of the transport vehicle and the lot number of the clams. A document for the monitoring of harvested bivalve is also completed and accompanies the sale. As with the Certificate of Origin, this details the identification number of the vehicle, production area and date of harvest etc.

Phụ lục IX
MẪU GIẤY CHỨNG NHẬN XUẤT XỨ NT2MV
(Ban hành kèm theo Thông tư 33 /2015/TT-BNNPTNT ngày 08 tháng 10 năm 2015 của Bộ trưởng Bộ Nông nghiệp và Phát triển nông thôn)

CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM
THE SOCIALIST REPUBLIC OF VIETNAM



GIẤY CHỨNG NHẬN XUẤT XỨ NHUYỄN THỂ HAI MÀNH VỎ
CERTIFICATE OF ORIGIN OF BIVALVE MOLLUSCS
Số/ No: XX/YYYY-ZZz

Cơ quan kiểm soát thu hoạch nhuyễn thể hai mảnh vỏ/ *Bivalve Molluscs Harvesting Control Agency*

Địa chỉ/ *Address*

CHỨNG NHẬN/ HEREBY CERTIFIES

Cơ sở thu hoạch/ *Name of harvester*

Địa chỉ/ *Address*

Số hiệu của phương tiện vận chuyển/ *Identification number of transport means*

Ngày thu hoạch/ *Date of harvesting* Loài nhuyễn thể/ *Species*

Vùng thu hoạch/ *Production area* được xếp loại/ *classified in category*

Khối lượng/ *Quantity (kgs)*

Tên và địa chỉ cơ sở tiếp nhận/ *Name and address of recipient*

Lô nguyên liệu trên ^(*) / *The lot of the above mentioned raw material ^(*)*

Ngày / *Date*

Đại diện Cơ quan kiểm soát thu hoạch/
The representative of the Harvesting Control Agency
(Ký tên, đóng dấu/ *Signature and Seal*)

* Ghi rõ yêu cầu/chế độ xử lý sau thu hoạch theo thông báo của Cơ quan kiểm tra/
Describe clearly post-harvest treatment regime according to announcement of Inspection Agency.

Figure 3. An example of a Certificate of Origin

The above-mentioned system allows each sale to be traced back through the documentation exactly to the fisher, area and date and is authenticated by the Ministry. The assessment team therefore deems this a robust management of the traceability within the fishery.

Table 10 Traceability Factors within the Fishery

Traceability Factor	Description of risk factor if present. Where applicable, a description of relevant mitigation measures or traceability systems (this can include the role of existing regulatory or fishery management controls)
Potential for non-certified gear/s to be used within the fishery	Very low risk. Shore-based fishery, without vessels, this prevents the use of a lot of heavy, immobile gear. Cannot use any other kind of gear for this artisanal fishery.
Potential for vessels from the UoC to fish outside the UoC or in different geographical areas (on the same trips or different trips)	There is no risk of this happening. This is because the clams are collected by hand using rakes. Vessels are not used in this fishery, with all clams being collected from the intertidal zone.
Potential for vessels outside of the UoC or client group fishing the same stock	As mentioned above, vessels are not used in this fishery. Also, in order to fish on the clam in the UoC, fishers must be part of the co-operatives, which manage the harvest areas. The Ben Tre Province has two types of patrolling systems. The first is a daily patrol by the co-operative themselves; the second is completed by the local government. Therefore, there is no chance of this occurring. Additionally at present there is not a financial incentive of external fishers to the fishery to fish in the UoC as the price of clam seed is low.
Risks of mixing between certified and non-certified catch during storage, transport, or handling activities (including transport at sea and on land, points of landing, and sales at auction)	All fishery products are certified, as the whole fishery is covered by the terms of the certificate. There can therefore be no mixture of certified and non-certified catch during storage, transport or handling activities. Each co-operative has its own transport vehicles. By the time it leaves the co-operative area, it has already changed ownership.
Risks of mixing between certified and non-certified catch during processing activities (at-sea and/or before subsequent Chain of Custody)	All clams from this fishery are MSC certified. All co-operatives operating in the fishery are part of the client group; therefore there is not a risk of mixing certified and non-certified catch prior to processing or before subsequent chains of custody. Processing is not carried out by the fishery and all product is sold into further chains of custody before being processed.
Risks of mixing between certified and non-certified catch during transshipment	No transshipment takes place in the fishery. As a shore based fishery, the clams are harvested and sold in the co-operative area, then transported to processors.

Any other risks of substitution between fish from the UoC (certified catch) and fish from outside this unit (non-certified catch) before subsequent Chain of Custody is required	No other risks have been identified by the assessment team. As mentioned above, the whole fishery is covered by the certification and so there is no risk of fishery products from outside the unit before subsequent CoC is required.
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4.3 Eligibility to Enter Further Chains of Custody

The following fishery products are eligible to enter into further certified chains of custody, and are therefore eligible to be sold as MSC certified and carry the MSC ecolabel, as listed in the Unit of Certification in

Table 11:

Table 11. Unit of Certification

Species:	Clam (<i>Meretrix lyrata</i>)
Geographical Area:	Ben Tre Province, Vietnam
Stock	Ben Tre clam
Method of Capture:	Hand gathering, usually following re-laying of spat ('seed') in previous years
Management System:	Fisheries Department of Ben Tre province, People's Committee and Fisheries Bureau of Binh Dai, Ba Tri and Thanh Phu Districts
Client Group:	Co-operative names (in Vietnamese): Đồng Tâm, Rạng Đông, Bảo Thuận, An Thủy, Tân Thủy, Thạnh Phong, Hải Dương, Thạnh Lợi, Bình Minh, Tập đoàn ngẫu

Eligible parties to use the fishery certificate

Only the co-operatives are listed under the certificates. There are no traders or other parties who do not take ownership acting within the fishery.

Points of landing

There are no official points of landing. As a shore-based fishery, fishers from each co-operative will gather the clams where they are the most concentrated. The concentration of clams in the substrate varies year-to-year within each co-operative.

Further chains of custody

Subsequent chains of custody are required after the first change in ownership, when the clams are sold from the fishery co-operative to third party sellers, who sell clams to processing facilities through auctions. The processing facilities have their own separate Chain of Custody certification.

4.4 Eligibility of Inseparable or Practicably Inseparable (IPI) stock(s) to Enter Further Chains of Custody

The target species is not considered an IPI stock and is not discussed further in this report.

5. Evaluation Results

5.1 Principle Level Scores

Table 12. Final Principle Scores

Final Principle Scores	
Principle	Score
Principle 1 – Target Species	81.3
Principle 2 – Ecosystem	93.0
Principle 3 – Management System	89.8

5.2 Summary of Scores

Principle	Component	Weighting	PI number	Performance Indicator	Score
1	Outcome	0.333	1.1.1	Stock status	80
			1.1.2	Stock rebuilding	N/A
	Management	0.667	1.2.1	Harvest strategy	85
			1.2.2	Harvest control rules and tools	80
			1.2.3	Information and monitoring	80
			1.2.4	Assessment of stock status	85
2	Retained species	0.2	2.1.1	Outcome	100
			2.1.2	Management	100
			2.1.3	Information	100
	Bycatch species	0.2	2.2.1	Outcome	100
			2.2.2	Management	100
			2.2.3	Information	100
	ETP species	0.2	2.3.1	Outcome	90
			2.3.2	Management	85

			2.3.3	Information	90
	Habitats	0.2	2.4.1	Outcome	90
			2.4.2	Management	85
			2.4.3	Information	95
	Ecosystem	0.2	2.5.1	Outcome	90
			2.5.2	Management	90
			2.5.3	Information	80
3	Governance and Policy	0.5	3.1.1	Legal and customary framework	95
			3.1.2	Consultation, roles and responsibilities	80
			3.1.3	Long term objectives	90
	Fishery-specific management system	0.5	3.2.1	Fishery specific objectives	90
			3.2.2	Decision making processes	85
			3.2.3	Compliance and enforcement	100
			3.2.4	Monitoring and management performance evaluation	90

5.3 Summary of Conditions

All PIs scored 80 or above, therefore no new conditions were raised or old conditions re-opened by the assessment team.

5.4 Recommendations

The team make no recommendations.

5.5 Determination, Formal Conclusion and Agreement

Following consideration of all stakeholders' inputs and comments to the Public Comment Draft Report (PCDR), the fishery assessment team concludes that the fishery should be certified against the MSC standard. This determination remains a recommendation pending the completion of the formal objections process and the final certification decision by the MEP official decision making entity.

(REQUIRED FOR PCR)

1. The report shall include a formal statement as to the certification action taken by the CAB's official decision-makers in response to the Determination recommendation.

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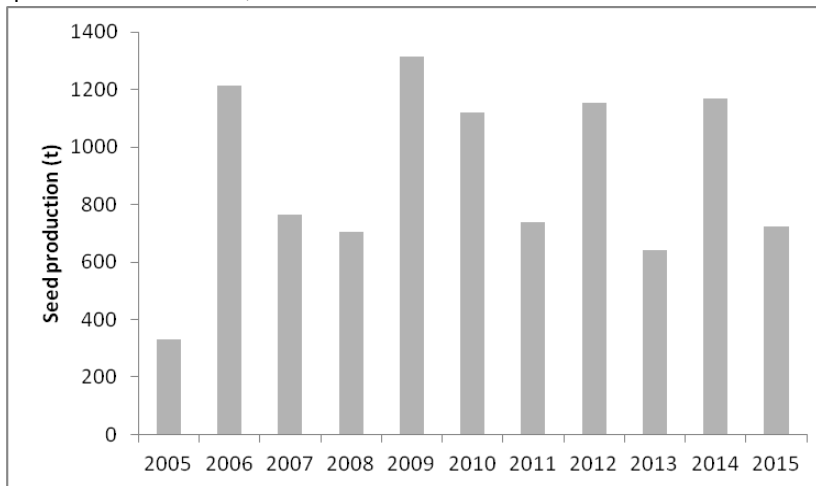
Appendices

Appendix 1 Scoring and Rationales

Appendix 1.1 Performance Indicator Scores and Rationale

Evaluation Table for PI 1.1.1 – Stock status

PI 1.1.1		The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing		
Scoring Issue		SG 60	SG 80	SG 100
a	Stock status relative to recruitment impairment			
	Guidepost	It is likely that the stock is above the point where recruitment would be impaired (PRI).	It is highly likely that the stock is above the PRI.	There is a high degree of certainty that the stock is above the PRI.
	Met?	Y	Y	N
	Justification	<p>Definition of the stock for scoring Principle 1:</p> <p>As noted in Section 2.2.2 (see also MSC TO, Appendix XX), <i>M. lyrata</i> are present over the whole Mekong Delta region, and population structure is unclear. Local scientists believe that spatfall comes mainly from local sources of broodstock, but local populations are most likely strongly connected by post-larval and adult movements as well as by the movement of seed for husbandry purposes within and between cooperatives. In this case, MSC requires the consideration of metapopulation theory. As discussed in Section 2.2.2, for a metapopulation it is always more precautionary to manage at a local/sub-population level than at a metapopulation level, except in cases where there is a risk that a source population may be over-exploited with a risk to sink populations. Since in this case seed is moved around to maximise survival, this does not apply, hence the team concluded that management at the local level is the most appropriate in this case. On this basis, Principle 1 has been scored considering the sum total of local populations in the fishery (i.e. in Ben Tre province).</p> <p>The management system is based on the protection of a proportion of the broodstock by various methods:</p> <ul style="list-style-type: none"> The total clam management area (7164 ha) is not fully used for the clam fishery – the figures are given in Table 3. This is because clams are not always present across the whole area in sufficient numbers to be commercially useful. Every year, a survey evaluates which areas are useable for each cooperative – generally, around 35-50% of the area is used by the fishery 		

PI 1.1.1		The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing																										
Scoring Issue		SG 60	SG 80	SG 100																								
		<p>each year. The remaining area will, however, have clam populations at lower densities.</p> <ul style="list-style-type: none">Each cooperative has a 'core area', which is never fished (details given under 1.2.2 below). This varies in size from 8.5-14.5 % of the total cooperative area.Each cooperative leaves a minimum of 15% of the biomass unharvested in their fished areas.The area in river mouths and in the subtidal is never touched – these areas have the largest clams because there is a migration to deeper water with age (full details given in the previous Certification Report). Clams are present in areas up to 4-6m deep which are not fished. There are no surveys in this area but anecdotally it supports a high biomass of large clams.The largest clams (>30g) are not harvested (put back) (Regulation 20-2010-OB-UBND). <p>The only direct measure of recruitment is seed production by the fishery, which has fluctuated without trend (see Figure below). It is not clear whether these fluctuations are environmentally or market driven. There is, however, no evidence of recruitment impairment. Overall, the team concluded that the management system (various methods of protecting a proportion of the broodstock) means that it is at least 'highly likely' (evaluated qualitatively) that the stock is above the PRI. SG80 is met. The team considered that it was relatively certain that the stock is above the PRI (which for this stock is likely to be at a low biomass level) but given that there is a lack of quantitative evaluation, the team concluded that SG100 is not met.</p> <div><table><caption>Seed production by the fishery, 2005-2015</caption><tr><th>Year</th><th>Seed production (t)</th></tr><tr><td>2005</td><td>320</td></tr><tr><td>2006</td><td>1200</td></tr><tr><td>2007</td><td>750</td></tr><tr><td>2008</td><td>700</td></tr><tr><td>2009</td><td>1300</td></tr><tr><td>2010</td><td>1100</td></tr><tr><td>2011</td><td>720</td></tr><tr><td>2012</td><td>1150</td></tr><tr><td>2013</td><td>620</td></tr><tr><td>2014</td><td>1150</td></tr><tr><td>2015</td><td>700</td></tr></table></div> <p>Figure: Seed production by the fishery, 2005-2015 (see table 1 below)</p>			Year	Seed production (t)	2005	320	2006	1200	2007	750	2008	700	2009	1300	2010	1100	2011	720	2012	1150	2013	620	2014	1150	2015	700
Year	Seed production (t)																											
2005	320																											
2006	1200																											
2007	750																											
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2010	1100																											
2011	720																											
2012	1150																											
2013	620																											
2014	1150																											
2015	700																											

PI 1.1.1		The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing		
Scoring Issue		SG 60	SG 80	SG 100
b	Stock status in relation to achievement of MSY			
	Guidepost		The stock is at or fluctuating around a level consistent with MSY.	There is a high degree of certainty that the stock has been fluctuating around a level consistent with MSY or has been above this level over recent years.
	Met?		Y	N
	Justification	<p>As with most bivalve fisheries, there is no estimate of B_{MSY} or any other MSY reference points, so a proxy for evaluating the MSY level is required (FCRG SA2.2.3). In evaluating the options for proxy indicators of MSY, MEC has used the rule of thumb that MSY is achieved at ~40% of unfished biomass – although this may be conservative for a highly production bivalve stock such as this.</p> <p>One option is to based the proxy for MSY on the proportion of the total clam management area fished (Table 3 in main report), which ranges from ~35-50% depending on the year. The problem with this is that while some of it is likely in high biomass areas (the cooperative 'core' areas), much of it is areas where densities are lower (according to the annual survey). On the other hand, it does not include areas which are reported to have high broodstock biomass such as the subtidal, and does not take account of biomass left in the fished areas. This is therefore not a satisfactory proxy for MSY.</p> <p>Alternatively, the individual cooperative areas can be considered individually, and the proportion of the biomass in these areas protected from fishing by the cooperative harvest control rules (see 1.2.2) can be estimated, as per Table 1 below, if we assume that the core (closed) area and the fished area starts with the same biomass. The estimate ranges from ~23-30%. Taking into account in addition to these the biomass present at low density in unfished areas, and the biomass present in the unfished areas in the river mouths and subtidal areas, it is reasonable to suppose that the total biomass left unfished will be well within the range of 40%.</p> <p>Alternatively, an estimate of the range of total fishable (i.e. market-sized) biomass in the managed area can be used, which is based on a comprehensive survey from 2000-2001 (details given in the previous Luu, 2009). This estimate is now quite old, so should be treated with caution. The estimated range of fishable biomass was 32,000-69,000 t in the clam management area. The total commercial (non-seed) production of the fishery since 2010 is given in Table 2 as a percentage of the lower end of this estimate (i.e. 32,000 t). The estimates are in the range of ~3-17%. In other words, even if fishable biomass has declined since the survey, it does not seem likely that the fishery is removing enough to deplete the stock below the MSY level.</p> <p>The team considered on this basis that the stock is at a level consistent with MSY (evaluated qualitatively / empirically) – SG80 is met. There is, however, not a 'high degree of certainty' so SG100 is not met.</p>		

PI 1.1.1		The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing			
Scoring Issue		SG 60	SG 80	SG 100	
		Table 1. Estimated proportion of biomass left unfished in each cooperative area.			
		Cooperative	Core closed area (% total area)	Minimum biomass left in fished area (%)	Total biomass unfished (%)
		Đồng Tâm	14.3	15	29.3
		Rạng Đông	11.8	15	26.8
		Bảo Thuận	10.6	15	25.6
		An Thủy	10.2	15	25.2
		Tân Thủy	9.1	15	24.1
		Thạnh Phong	13.9	15	28.9
		Thanh Bình	8.5	15	23.5
		Thạnh Lợi	10.4	15	25.4
		Bình Minh	8.2	15	23.2
		Tập đoàn nghề	10.4	15	25.4

PI 1.1.1		The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing		
Scoring Issue		SG 60	SG 80	SG 100
		Table 2. Annual production as a proportion of the minimum estimate of fishable biomass in 2000-2001 (32-69,000 t)		
		Year	Market production (t)	Production as a % of minimum estimate of fishable biomass (32,000 t) (%)
		2010	5338	17
		2011	1933	6.0
		2012	3013	9.4
		2013	3849	12
		2014	3172	9.9
		2015	904	2.8
References	Data provided by DARD Regulation 20-2010-OB-UBND Luu, 2009			
Stock Status relative to Reference Points				
	Type of reference point	Value of reference point	Current stock status relative to reference point	

PI 1.1.1	The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing		
Scoring Issue	SG 60	SG 80	SG 100
Reference point used in scoring stock relative to PRI (Sla)	See discussion in rationale for scoring issue a		
Reference point used in scoring stock relative to MSY (Sib)	See discussion in rationale for scoring issue b		
OVERALL PERFORMANCE INDICATOR SCORE:			80
CONDITION NUMBER:			N/A

Evaluation Table for PI 1.1.2 – Stock rebuilding

Since 1.1.1 scored 80, this is not required to be scored

Evaluation Table for PI 1.2.1 – Harvest strategy

PI 1.2.1		There is a robust and precautionary harvest strategy in place		
Scoring Issue		SG 60	SG 80	SG 100
a	Harvest strategy design			
	Guidepost	The harvest strategy is expected to achieve stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy work together towards achieving stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and is designed to achieve stock management objectives reflected in PI 1.1.1 SG80.
	Met?	Y	Y	N
	Justification	<p>MSC's definition of a harvest strategy is as follows (FCRG p.525): <i>The combination of monitoring, stock assessment, harvest control rules and management actions, which may include an MP or an MP (implicit) and be tested by MSE.</i></p> <p>The proximate objectives of the harvest strategy of this fishery are as follows:</p> <ol style="list-style-type: none"> 1. To protect the brood stock sufficiently that there is always maximum spatfall 2. To minimise the mortality of the seed as far as possible within the natural environment (via fishing regulations and husbandry) <p>The key elements of harvest strategy are:</p> <ul style="list-style-type: none"> • Surveys define the location of spatfall at the start of the season • A fishing strategy is defined for the open areas which aims to maximum the return of seed into marketable clams via husbandry • Husbandry is carried out throughout the season to minimise mortality and maximise growth rates: i) a minimum size at which seed may be harvested unless settlement is at very high densities; and ii) relaying at reducing densities as the clams grow • The density, growth and mortality of clams in the managed area is monitored throughout the season by the cooperatives; actions are put in place to respond to changes in stock status (see below) • A proportion of broodstock is protected via closed areas and a maximum size (details given in 1.1.1a); each individual cooperative area has its own system for this (see under 1.2.2 below) 		

PI 1.2.1		There is a robust and precautionary harvest strategy in place		
		<ul style="list-style-type: none">The Fisheries Research Institute acts as the scientific advisor to the cooperatives <p>In other words, the elements of a harvest strategy are in place (monitoring and stock assessment via surveys at the start of and throughout the season with scientific input from the Fisheries Research Institute; harvest control rules via the protection of broodstock by each cooperative and more widely – see 1.1.1 and 1.2.2; and management actions via husbandry).</p> <p>As explained in the rationale for 1.1.1, this strategy is expected to achieve the stock management objectives as in 1.1.1 SG80 – SG60 is met.</p> <p>In relation to SG80, the harvest strategy is responsive to the state of the stock, since it relies on surveys to determine where and when to fish and when clams should be relaid. Specifically, the example can be taken of a disease event – high mortality of clams when at high densities during hot weather. Husbandry techniques try to minimise the possibility that this will happen – e.g. the lifting of the size limit for relaying seed in cases where settlement density is very high. Likewise, if clams in an area show signs of mortality they will be rapidly relaid at lower density if possible. However, if there are high rates of mortality from disease despite husbandry, the cooperative will stop all fishing for that year.</p> <p>On this basis, the team conclude that the harvest strategy is responsive to the state of the stock, and that the elements (surveys, husbandry, protection of broodstock) work together to achieve the objectives – SG80 is met.</p> <p>SG100 requires that the harvest strategy is 'designed' to achieve stock management objectives. The harvest strategy has arisen empirically, which is arguably in many ways better than a 'top-down' designed system. It can be argued to be 'designed' to achieve the objectives set out at the beginning of this rationale – so in that sense, SG100 is met. However, SG100 refers to the objectives as per PI 1.1.1 – i.e. the PRI and MSY. The harvest strategy has not been designed explicitly with these objectives in mind, so SG100 is not met.</p>		
b	Harvest strategy evaluation			
	Guidepost	The harvest strategy is likely to work based on prior experience or plausible argument.	The harvest strategy may not have been fully tested but evidence exists that it is achieving its objectives.	The performance of the harvest strategy has been fully evaluated and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels.
	Met?	Y	Y	N
	Justification	The harvest strategy is likely to work, and there are various lines of evidence that it is achieving its objectives, as set out in detail in the rationales for 1.1.1. SG80 is met.		

PI 1.2.1		There is a robust and precautionary harvest strategy in place		
		In relation to SG100, the management system was reviewed by an external consultant in response to condition 3 on the previous assessment (details given in surveillance audit report for Year 3). There is an annual review meeting organised by DARD to discuss the performance of the management system and the detailed objectives for the coming year (see rationale for 3.5.2). However, it was not clear to the team that this review / evaluation process includes a quantitative analysis of, for example, the proportion of broodstock protection or the stock status in relation to other proxy reference points, or the suitability of these proxy reference points, although empirically, they appear to be suitable. SG100 is not met in full.		
c	Harvest strategy monitoring			
	Guidepost	Monitoring is in place that is expected to determine whether the harvest strategy is working.		
	Met?	Y		
	Justification	There is a survey at the start of the season to evaluate clam biomass and spatfall by area. The survey is conducted by the co-operatives. The Research Institute sets the methodology and analyses the results on completion of the data sampling. Clam growth and density is monitored throughout the season by the cooperatives in their areas. Annual seed production and marketable clam production by cooperative is monitored, as is the area used for each type of fishing. SG60 is met.		
d	Harvest strategy review			
	Guidepost			The harvest strategy is periodically reviewed and improved as necessary.
	Met?			Y
	Justification	As set out above, the fishery management system was externally reviewed in 2011 in response to a condition on the previous certification. There is also an annual meeting to review the management system and objectives for the coming year, organised by DARD. The Fisheries Research Institute provides advice to cooperatives that may cause them to adjust their harvest control rules or strategy. More generally, the harvest strategy has developed empirically, and can be seen to be adjusted in response to new circumstances or information – adaptive management. For example, in response to incidents of disease mortality, it has been allowed to remove and relay		

PI 1.2.1		There is a robust and precautionary harvest strategy in place		
		seed at a smaller size than was previously permitted when the situation suggests that high mortality is a risk. On this basis, the team considered that this is met.		
e	Shark finning			
	Guidepost	It is likely that shark finning is not taking place.	It is highly likely that shark finning is not taking place.	There is a high degree of certainty that shark finning is not taking place.
	Met?	Not relevant	Not relevant	Not relevant
	Justification	[Scoring issue need not be scored if the target species is not a shark.]		
f	Review of alternative measures			
	Guidepost	There has been a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock.	There is a regular review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock and they are implemented as appropriate.	There is a biennial review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock, and they are implemented, as appropriate.
	Met?	Not relevant	Not relevant	Not relevant
	Justification	[Scoring issue need not be scored if there is no unwanted catch of the target stock.]		
References		Presentation on the effectiveness of clam fishery management Akroyd, J., Luu, T.T. 2013. MSC Year 3 surveillance report on the Ben Tre hand-gathered clam fishery. Intertek Moody International. Available at: https://www.msc.org/track-a-fishery/fisheries-in-the-program/certified/pacific/vietnam-ben-tre-clam-hand-gathered/assessment-downloads-1/20130509_SR_CLA125.pdf Ben Tre DARD. 2014. Shellfish Situation in 2014 and orientations and measures to implement in 2015 – supplied by DARD Ben Tre		

PI 1.2.1	There is a robust and precautionary harvest strategy in place	
OVERALL PERFORMANCE INDICATOR SCORE:		85
CONDITION NUMBER:		N/A

Evaluation Table for PI 1.2.2 – Harvest control rules and tools

PI 1.2.2		There are well defined and effective harvest control rules (HCRs) in place																							
Scoring Issue		SG 60	SG 80	SG 100																					
a	HCRs design and application																								
	Guidepost	Generally understood HCRs are in place or available that are expected to reduce the exploitation rate as the point of recruitment impairment (PRI) is approached.	Well defined HCRs are in place that ensure that the exploitation rate is reduced as the PRI is approached, are expected to keep the stock fluctuating around a target level consistent with (or above) MSY, or for key LTL species a level consistent with ecosystem needs.	The HCRs are expected to keep the stock fluctuating at or above a target level consistent with MSY, or another more appropriate level taking into account the ecological role of the stock, most of the time.																					
	Met?		Y	N																					
	Justification	<p>Each cooperative has its own harvest control rule based on protecting a proportion of the broodstock, which are summarised in the table below:</p> <table border="1"> <thead> <tr> <th>Cooperative</th><th>Size of managed area (ha)</th><th>Cooperative harvest control rule</th><th>Core (unfished) area (ha) (% managed area)</th><th>Annual catch limits on seed and adult harvest?</th></tr> </thead> <tbody> <tr> <td>Đồng Tâm</td><td>800</td><td rowspan="4">Leave 15-20% of biomass unharvested in fished areas, depending on fish stock and market, but at least 15%</td><td>114 (14.3)</td><td>Y</td></tr> <tr> <td>Rạng Đông</td><td>1200</td><td>142 (11.8)</td><td>Y</td></tr> <tr> <td>Bảo Thuận</td><td>1089</td><td>115 (10.6)</td><td>Y</td></tr> <tr> <td>An Thủy</td><td>1015</td><td>104 (10.2)</td><td>Y</td></tr> </tbody> </table>			Cooperative	Size of managed area (ha)	Cooperative harvest control rule	Core (unfished) area (ha) (% managed area)	Annual catch limits on seed and adult harvest?	Đồng Tâm	800	Leave 15-20% of biomass unharvested in fished areas, depending on fish stock and market, but at least 15%	114 (14.3)	Y	Rạng Đông	1200	142 (11.8)	Y	Bảo Thuận	1089	115 (10.6)	Y	An Thủy	1015	104 (10.2)
Cooperative	Size of managed area (ha)	Cooperative harvest control rule	Core (unfished) area (ha) (% managed area)	Annual catch limits on seed and adult harvest?																					
Đồng Tâm	800	Leave 15-20% of biomass unharvested in fished areas, depending on fish stock and market, but at least 15%	114 (14.3)	Y																					
Rạng Đông	1200		142 (11.8)	Y																					
Bảo Thuận	1089		115 (10.6)	Y																					
An Thủy	1015		104 (10.2)	Y																					

PI 1.2.2		There are well defined and effective harvest control rules (HCRs) in place			
		Tân Thủy	309	28 (9.1)	Y
		Thạnh Phong	287	40 (13.9)	Y
		Thanh Bình	165	14 (8.5)	Y
		Thạnh Lợi	250	26 (10.4)	Y
		Bình Minh	425	35 (8.2)	Y
		Tập đoàn nghề	1630	170 (10.4)	Y
		<p>At the start of each season, each cooperative carries out a survey to evaluate biomass and density of adult and seed clams and (with scientific input from the Fisheries Research Institute) decide how much seed and adult clams to harvest and what proportion should be left as broodstock, depending on the density on the beds and the quantity of spatfall. The decision is taken at a general meeting of the cooperative at the start of each season.</p> <p>If in midseason the cooperative wishes to adjust the agreed limits either up or down, they will conduct another survey, request scientific input from the DARD and hold another general meeting. This may occur either if the clams develop to a higher density than predicted, or alternatively if there is migration away to other areas. If there is a mass mortality event, then all fishing is stopped.</p> <p>The team considered that while the harvest control rule is empirical, it is 'well-defined' (as set out above). As discussed in 1.1.1, it should act to keep the stock fluctuating at a biomass of high productivity (although MSY reference points cannot be estimated). Various specific elements (protection of part of the broodstock, the catch limits, the ability to stop the fishery in the event of mass mortality) should act to avoid the PRI.</p> <p>MSC TO noted uncertainties in relation to stock structure and connectivity, specifically whether the different clam areas constitute a 'meta-population'. The team concluded that since each area is managed to avoid the PRI, and since husbandry will increase overall survival and remove the likelihood of 'sink' areas, then the management system is robust to this uncertainty. Further details are given in the response to the MSC TO, Appendix XX.</p> <p>SG80 is met.</p> <p>In relation to SG100, the guidance states (GSA2.5):</p> <p><i>At the 100 level, greater certainty is required. Fisheries with HCRs that target stock levels above BMSY (eg. BMEY) should also be regarded as at least meeting the 80 level and projections in the fishery may show that the HCR would likely achieve the higher 100 score by fluctuating more above than around BMSY.</i></p>			

PI 1.2.2		There are well defined and effective harvest control rules (HCRs) in place	
		Although the SG100 wording does not say so explicitly, the team considered that the implication of this guidance is that to meet 100, this fishery would require a more quantitative definition of MSY-related reference points than the empirical proxies that it currently relies on. On this basis, SG100 is not met.	
b	HCRs robustness to uncertainty		
	Guidepost		The HCRs are likely to be robust to the main uncertainties.
	Met?	Y	N
	Justification	The main uncertainties have been identified as: <ul style="list-style-type: none">Spatfall quantity;Spatfall distribution (between different cooperative areas);Disease events;Stock structure (see above and MSC TO, Appendix 3) <p>Spatfall quantity: The key element of the harvest strategy is the protection of a proportion of the broodstock, which will act to maintain spatfall – however, it may nevertheless be variable (as for all bivalves) because of environmental drivers of settlement and survival. This inevitable variability is dealt with by setting limits on seed harvest according to the quantity available; also via husbandry (e.g. relaying seed at smaller sizes if it is very dense to avoid high mortality rates).</p> <p>Spatfall distribution is dealt with by exchange of seed between cooperatives – cooperatives may buy seed in from other cooperatives if there has been low spatfall in their management area.</p> <p>Disease events are dealt with initially by husbandry (relaying to try and minimise the conditions in which disease arises), by attempts to 'rescue' the clams and if that does not work by stopping the fishery.</p> <p>The team has concluded that management is robust to uncertainties in stock structure – see scoring issue a and Appendix 3 for details. On this basis, the team concluded that the HCRs deal with the main uncertainties. SG80 is met.</p> <p>In relation to SG100, while there is empirical evidence (the maintenance of the fishery over time, the adaptive nature of the management system) that the HCRs are robust the these uncertainties, there is nothing that would constitute 'evidence' in the scientific</p>	

PI 1.2.2		There are well defined and effective harvest control rules (HCRs) in place		
		sense (e.g. simulation modelling). The HCRs also do not explicitly take account of the ecological role of the stock, although the emphasis on maintaining the broodstock would be likely to achieve this. SG100 is not met in full.		
c	HCRs evaluation			
	Guidepost	There is some evidence that tools used or available to implement HCRs are appropriate and effective in controlling exploitation.	Available evidence indicates that the tools in use are appropriate and effective in achieving the exploitation levels required under the HCRs.	Evidence clearly shows that the tools in use are effective in achieving the exploitation levels required under the HCRs.
	Met?		Y	N
	Justification	The main tools used to implement the HCRs are: <ul style="list-style-type: none">• Closed areas;• Maximum size limit;• Catch limits (seed and adult). <p>Each cooperative has clear rules which set out these requirements. The cooperatives monitor and report the catch to ensure that catch limits are not exceeded. Observers in the field keep track of the location of harvest and husbandry, and the cooperatives have a grading team which monitors the size of landings.</p> <p>More generally, the team considered that since the harvest strategy is empirical and adaptive, it is able to respond to issues and uncertainties that arise (e.g. mortality events, changes in spatfall) in order to ensure that sufficient broodstock can be protected.</p> <p>The team considered on this basis that SG80 is met – the available evidence indicators that these tools are appropriate and effective. In terms of SG100, while the team was confident that the HCRs are being implemented successfully, there is not enough 'clear evidence' about the exploitation levels being achieved (e.g. in relation to MSY) for SG100 to be met.</p>		
References				

PI 1.2.2	There are well defined and effective harvest control rules (HCRs) in place	
OVERALL PERFORMANCE INDICATOR SCORE:		80
CONDITION NUMBER:		N/A

Evaluation Table for PI 1.2.3 – Information and monitoring

PI 1.2.3		Relevant information is collected to support the harvest strategy		
Scoring Issue		SG 60	SG 80	SG 100
a	Range of information			
	Guidepost	Some relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.	Sufficient relevant information related to stock structure, stock productivity, fleet composition and other data is available to support the harvest strategy.	A comprehensive range of information (on stock structure, stock productivity, fleet composition, stock abundance, UoA removals and other information such as environmental information), including some that may not be directly related to the current harvest strategy, is available.
	Met?	Y	Y	N
	Justification	<p>Information available:</p> <p><u>Stock structure</u>: Annual surveys evaluating density and biomass of different sized clams in each cooperative area, plus ongoing monitoring. Wider information is also available e.g. about the migrations of the clams and the size structure in different habitats, including unfished habitats (the subtidal) – this is summarised in the previous PCR (Luu, 2009). While the details of connectivity between different areas (both inside and outside Ben Tre) are not known (and are most likely variable over time), the team concluded that this information is not required for the management system to be robust (see response to MSC TO, Appendix 3 for details).</p> <p><u>Stock productivity</u>: Surveys of spatfall, monitoring of growth and mortality and monitoring of seed harvest and relaying (see 1.1.1).</p> <p><u>Fleet composition</u>: Cooperative members (see Figure 1Figure 1. Co-operative names and fishing grounds. in main report); also monitoring of total marketable harvest by size class for each cooperative</p> <p>Other data to support the harvest strategy are also available; e.g. knowledge of clam biology and behaviour causes and triggers of mass mortality events, husbandry techniques to minimise mortality and maximise growth. SG80 is met.</p> <p>In relation to S100, there are still some information gaps; for example there are no estimates of total broodstock biomass (including across closed areas and unfished areas plus contribution of >30g clams), which allows a precise quantitative assessment of the proportion of broodstock protected by the harvest strategy (see analysis in 1.1.1). SG100 is not met.</p>		
b	Monitoring			
	Guidepost	Stock abundance and UoA removals are	Stock abundance and UoA removals are	All information required by the harvest

PI 1.2.3		Relevant information is collected to support the harvest strategy		
		monitored and at least one indicator is available and monitored with sufficient frequency to support the harvest control rule.	regularly monitored at a level of accuracy and coverage consistent with the harvest control rule , and one or more indicators are available and monitored with sufficient frequency to support the harvest control rule.	control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of inherent uncertainties in the information [data] and the robustness of assessment and management to this uncertainty.
	Met?		Y	N
	Justification	<p>Surveys take place at the start of each season (the basis of the catch limit aspect of the harvest control rule) and continue periodically during the season in each cooperative area (which may be used to adjust catch limits if required – another full survey is required for this). Fisheries removals are monitored by the cooperatives to enforce the catch limits. SG80 is met.</p> <p>SG100 is not met; for example there is <95% confidence in survey results, the total broodstock in unfished areas is not estimated etc.</p> <p><u>Comment in relation to MSC TO:</u> Although the detailed stock structure (metapopulation connectivity, dispersal pathways etc.) is not fully understood (in common with most fisheries) it was considered that the harvest strategy is robust to this uncertainty (see discussion in Section 2.2 and PI 1.1.1), therefore this information is not required to support the harvest control rule.</p>		
c		Comprehensiveness of information		
	Guidepost		There is good information on all other fishery removals from the stock.	
	Met?		Y	
	Justification	<p>The whole Ben Tre fishery is under the control of the cooperatives – there are no fisheries outside the UoC in this area.</p> <p>The two nearby provinces (on each side) have similar ecological characteristics although lower clam populations (less spatfall). The fisheries in these provinces were previously open access but they are now developing a similar system to Ben Tre. It is not thought, however, that the fisheries in these areas has any ecological or management implications for the Ben Tre fishery.</p> <p>The landings from these provinces are known (2013: 9890 t from Tien Giang and 4800 t from Tra Vinh).</p>		
References				
OVERALL PERFORMANCE INDICATOR SCORE:				80

PI 1.2.3	Relevant information is collected to support the harvest strategy		
CONDITION NUMBER:			N/A

Evaluation Table for PI 1.2.4 – Assessment of stock status

PI 1.2.4	There is an adequate assessment of the stock status		
Scoring Issue	SG 60	SG 80	SG 100
a	Appropriateness of assessment to stock under consideration		
	Guidepost	The assessment is appropriate for the stock and for the harvest control rule.	The assessment takes into account the major features relevant to the biology of the species and the nature of the UoA.
	Met?	Y	Y
	Justification	<p>Note on the definition of 'stock': The MSC TO raised a concern regarding metapopulation and source-sink dynamics. The details of local and wider population connectivity are not known for this stock (nor are they for most exploited stocks whether of bivalves, fish or other species). This being the case, it is most appropriate to manage local populations carefully, to ensure that biomass and recruitment is maintained at sustainable levels. The team has concluded that this is the case here (see 1.1.1, 1.2.1, 1.2.2 and Appendix 3), hence the assessment is appropriate for the stock structure despite various uncertainties.</p> <p>The key element of the harvest control rule is the protection of a proportion of the broodstock via closed and unfished areas, as well as a maximum size. Not a great deal of assessment is required to use this harvest control rule. However, there are also annual catch limits (seed and adult) for each cooperative, which are set via an annual survey in each cooperative area. The surveys operate as follows: the clam area is stratified into high, medium and low density areas – a series of random samples are taken from each area with 3m² quadrat; an average density for each area is estimated by size class, from which the total biomass of different size classes is estimated. This assessment is empirical but is appropriate for the stock and the harvest control rule – SG80 is met.</p> <p>In relation to SG100, the team considered that the methodology takes into account clam biology – e.g. it stratifies the area, considers seed separate from commercial size classes, takes into account distribution in relation to tidal height etc. Scientific guidance to the cooperatives is</p>	

PI 1.2.4		There is an adequate assessment of the stock status		
		provided by clam biologists from DARD. SG100 is met.		
b	Assessment approach			
	Guidepost	The assessment estimates stock status relative to generic reference points appropriate to the species category.	The assessment estimates stock status relative to reference points that are appropriate to the stock and can be estimated.	
	Met?	Y	Y	
	Justification	As set out in 1.1.1, the proportion of the broodstock protected by the closed areas is not calculated directly, although it can be estimated in general terms. However, considering the stock assessment specifically (as we are here), the relevant question is whether the annual surveys and catch limits can estimate a 'reference point' (although it is not called that). Each cooperative harvest control rule includes a limit reference point of at least 15% of the total adult biomass (decided annually; it may be more - see 1.2.2a), which is estimated via the survey. SG80 is met.		
c	Uncertainty in the assessment			
	Guidepost	The assessment identifies major sources of uncertainty.	The assessment takes uncertainty into account.	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a probabilistic way.
	Met?	Y	Y	N
	Justification	(For uncertainties in stock structure, see scoring issue a.) The output of the survey is not probabilistic or a range – it provides a deterministic estimate of the biomass of clams in each size class / area, which is certainly uncertain. Nevertheless, surveys to keep track of density, growth and mortality in the cooperative areas are ongoing throughout the season, and any proposed change in catch limits (up or down) requires another full survey. More generally, since the assessment and the harvest control rule are empirical, they do a better job at considering uncertainty than an assessment based on mathematical models from indirect indicators of stock biomass. On this basis, the team considered that SG80 is met. SG100 is not met.		

PI 1.2.4		There is an adequate assessment of the stock status	
d	Evaluation of assessment		
	Guidepost		The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.
	Met?		N
	Justification	Not met. No alternative methods have been tried.	
e	Peer review of assessment		
	Guidepost		The assessment of stock status is subject to peer review.
	Met?	Y	N
	Justification	As a condition of the previous assessment, there was a full external review of the management system, including the role of cooperatives and the DARD, how they make the rules, what information is gathered and how it is used, the role of different stakeholders etc. In addition, the Oceanographic Institute has conducted a study, which was looking specifically at the factors resulting in mass mortalities, but also considered the survey techniques used to evaluate density (since high density is a key trigger). On this basis, the team concluded that the stock assessment system has been peer reviewed. There is, however, not a formal ongoing system of internal and external peer review, so SG100 is not met.	
References		Presentation on the effectiveness of clam fishery management Sang, H.M. 2014 Luu, 2009	
OVERALL PERFORMANCE INDICATOR SCORE:			85

PI 1.2.4	There is an adequate assessment of the stock status		
CONDITION NUMBER:			N/A

Evaluation Table for PI 2.1.1 – Primary species outcome

PI 2.1.1		The UoA aims to maintain primary species above the PRI and does not hinder recovery of primary species if they are below the PRI.		
Scoring Issue		SG 60	SG 80	SG 100
a	Main primary species stock status			
	Guidepost	Main primary species are likely to be above the PRI OR If the species is below the PRI, the UoA has measures in place that are expected to ensure that the UoA does not hinder recovery and rebuilding.	Main primary species are highly likely to be above the PRI OR If the species is below the PRI, there is either evidence of recovery or a demonstrably effective strategy in place between all MSC UoAs which categorise this species as main , to ensure that they collectively do not hinder recovery and rebuilding.	There is a high degree of certainty that main primary species are above the PRI and are fluctuating around a level consistent with MSY.
	Met?	Y	Y	Y
	Justification	There are no main primary species in this fishery, so SG100 is met by default.		
b	Minor primary species stock status			
	Guidepost			Minor primary species are highly likely to be above the PRI OR

PI 2.1.1		The UoA aims to maintain primary species above the PRI and does not hinder recovery of primary species if they are below the PRI.		
				If below the PRI, there is evidence that the UoA does not hinder the recovery and rebuilding of minor primary species
	Met?			Y
	Justification	There are no minor primary species in this fishery, so this is met by default.		
References				
OVERALL PERFORMANCE INDICATOR SCORE:				100
CONDITION NUMBER:				N/A

Evaluation Table for PI 2.1.2 – Primary species management strategy

PI 2.1.2		There is a strategy in place that is designed to maintain or to not hinder rebuilding of primary species, and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch.		
Scoring Issue		SG 60	SG 80	SG 100
a	Management strategy in place			
	Guidepost	There are measures in place for the UoA, if necessary, that are expected to maintain or to not hinder rebuilding of the main primary species at/to levels which are likely to above the point where recruitment would be impaired.	There is a partial strategy in place for the UoA, if necessary, that is expected to maintain or to not hinder rebuilding of the main primary species at/to levels which are highly likely to be above the point where recruitment would be impaired.	There is a strategy in place for the UoA for managing main and minor primary species.

PI 2.1.2		There is a strategy in place that is designed to maintain or to not hinder rebuilding of primary species, and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch.		
	Met?	Y	Y	Y
	Justification	As there are no primary species retained or discarded in this fisher, SG100 is met by default.		
b	Management strategy evaluation			
	Guidepost	The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/species).	There is some objective basis for confidence that the measures/partial strategy will work, based on some information directly about the fishery and/or species involved.	Testing supports high confidence that the partial strategy/strategy will work, based on information directly about the fishery and/or species involved.
	Met?	Y	Y	Y
	Justification	As there are no primary species retained or discarded in this fisher, SG100 is met by default.		
c	Management strategy implementation			
	Guidepost		There is some evidence that the measures/partial strategy is being implemented successfully .	There is clear evidence that the partial strategy/strategy is being implemented successfully and is achieving its overall objective as set out in scoring issue (a).
	Met?		Y	Y
	Justification	As there are no primary species retained or discarded in this fisher, SG100 is met by default.		
d	Shark finning			
	Guidepost	It is likely that shark finning is not taking place.	It is highly likely that shark finning is not taking place.	There is a high degree of certainty that shark finning is not taking place.
	Met?	N/A	N/A	N/A

PI 2.1.2		There is a strategy in place that is designed to maintain or to not hinder rebuilding of primary species, and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch.		
	Justification	[Scoring issue need not be scored if no Primary species are sharks.]		
e	Review of alternative measures			
	Guidepost	There is a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of main primary species.	There is a regular review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of main primary species and they are implemented as appropriate.	There is a biennial review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of all primary species, and they are implemented, as appropriate.
	Met?	N/A	N/A	N/A
	Justification	[Scoring issue need not be scored if there are no unwanted catches of Primary species.]		
References				
OVERALL PERFORMANCE INDICATOR SCORE:				100
CONDITION NUMBER:				N/A

Evaluation Table for PI 2.1.3 – Primary species information

PI 2.1.3		Information on the nature and extent of primary species is adequate to determine the risk posed by the UoA and the effectiveness of the strategy to manage primary species		
Scoring Issue		SG 60	SG 80	SG 100
a	Information adequacy for assessment of impact on main primary species			
	Guidepost	Qualitative information is adequate to estimate the impact of the UoA on the main primary species with respect to status. OR If RBF is used to score PI 2.1.1 for the UoA: Qualitative information is adequate to estimate productivity and susceptibility attributes for main primary species.	Some quantitative information is available and is adequate to assess the impact of the UoA on the main primary species with respect to status. OR If RBF is used to score PI 2.1.1 for the UoA: Some quantitative information is adequate to assess productivity and susceptibility attributes for main primary species.	Quantitative information is available and is adequate to assess with a high degree of certainty the impact of the UoA on main primary species with respect to status.
	Met?	Y	Y	Y
	Justification	There are no main or minor primary species in this fishery, so SG100 is met by default.		
	Information adequacy for assessment of impact on minor primary species			
b	Guidepost			Some quantitative information is adequate to estimate the impact of the UoA on minor primary species with respect to status.
	Met?			
	Justification	As there are no primary species retained or discarded in this fisher, SG100 is met by default		

PI 2.1.3		Information on the nature and extent of primary species is adequate to determine the risk posed by the UoA and the effectiveness of the strategy to manage primary species		
c	Information adequacy for management strategy			
	Guidepost	Information is adequate to support measures to manage main primary species.	Information is adequate to support a partial strategy to manage main Primary species.	Information is adequate to support a strategy to manage all primary species, and evaluate with a high degree of certainty whether the strategy is achieving its objective.
	Met?			
	Justification	As there are no primary species retained or discarded in this fisher, SG100 is met by default		
References				
OVERALL PERFORMANCE INDICATOR SCORE:				100
CONDITION NUMBER:				N/A

Evaluation Table for PI 2.2.1 – Secondary species outcome

PI 2.2.1		The UoA aims to maintain secondary species above a biologically based limit and does not hinder recovery of secondary species if they are below a biological based limit.		
Scoring Issue		SG 60	SG 80	SG 100
a	Main secondary species stock status			
	Guidepost	Main Secondary species are likely to be within biologically based limits. OR	Main secondary species are highly likely to be above biologically based limits OR	There is a high degree of certainty that main secondary species are within biologically based limits.

PI 2.2.1		The UoA aims to maintain secondary species above a biologically based limit and does not hinder recovery of secondary species if they are below a biological based limit.		
		If below biologically based limits, there are measures in place expected to ensure that the UoA does not hinder recovery and rebuilding.	If below biologically based limits, there is either evidence of recovery or a demonstrably effective partial strategy in place such that the UoA does not hinder recovery and rebuilding. AND Where catches of a main secondary species outside of biological limits are considerable, there is either evidence of recovery or a, demonstrably effective strategy in place between those MSC UoAs that also have considerable catches of the species, to ensure that they collectively do not hinder recovery and rebuilding.	
	Met?	Y	Y	Y
	Justification	There are no main secondary species in this fishery, so SG100 is met by default.		
b		Minor secondary species stock status		
	Guidepost			Minor secondary species are highly likely to be above biologically based limits OR If below biologically based limits', there is evidence that the UoA does not hinder the recovery and rebuilding of secondary species
	Met?			Y

PI 2.2.1		The UoA aims to maintain secondary species above a biologically based limit and does not hinder recovery of secondary species if they are below a biological based limit.	
	Justification	There are no minor secondary species in this fishery, so SG100 is met by default.	
References			
OVERALL PERFORMANCE INDICATOR SCORE:			100
CONDITION NUMBER:			N/A

Evaluation Table for PI 2.2.2 – Secondary species management strategy

PI 2.2.2		There is a strategy in place for managing secondary species that is designed to maintain or to not hinder rebuilding of secondary species and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch.		
Scoring Issue		SG 60	SG 80	SG 100
a	Management strategy in place			
	Guidepost	There are measures in place, if necessary, which are expected to maintain or not hinder rebuilding of main secondary species at/to levels which are highly likely to be within biologically based limits or to ensure that the UoA does not hinder their recovery.	There is a partial strategy in place, if necessary, for the UoA that is expected to maintain or not hinder rebuilding of main secondary species at/to levels which are highly likely to be within biologically based limits or to ensure that the UoA does not hinder their recovery.	There is a strategy in place for the UoA for managing main and minor secondary species.
	Met?	Y	Y	Y
	Justification	There are no main or minor secondary species in this fishery, so SG100 is met by default.		
b	Management strategy evaluation			
	Guidepost	The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar UoAs/species).	There is some objective basis for confidence that the measures/partial strategy will work, based on some information directly about the UoA and/or species involved.	Testing supports high confidence that the partial strategy/strategy will work, based on information directly about the UoA and/or species involved.
	Met?			
	Justification	There are no main or minor secondary species in this fishery, so SG100 is met by default		
c	Management strategy implementation			
	Guidepost		There is some evidence that the measures/partial strategy is being implemented successfully .	There is clear evidence that the partial strategy/strategy is being implemented successfully and is achieving its objective as

PI 2.2.2		There is a strategy in place for managing secondary species that is designed to maintain or to not hinder rebuilding of secondary species and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch.		
				set out in scoring issue (a).
	Met?			
	Justification	There are no main or minor secondary species in this fishery, so SG100 is met by default		
d	Shark finning			
	Guidepost	It is likely that shark finning is not taking place.	It is highly likely that shark finning is not taking place.	There is a high degree of certainty that shark finning is not taking place.
	Met?	Not relevant	Not relevant	Not relevant
	Justification	[Scoring issue need not be scored if no secondary species are sharks.]		
e	Review of alternative measures to minimise mortality of unwanted catch			
	Justification	There is a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of main secondary species.	There is a regular review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of main secondary species and they are implemented as appropriate.	There is a biennial review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of all secondary species, and they are implemented, as appropriate.
	Met?	Not relevant	Not relevant	Not relevant
	Guidepost	[Scoring issue need not be scored if are no unwanted catches of secondary species.]		
References				

PI 2.2.2	There is a strategy in place for managing secondary species that is designed to maintain or to not hinder rebuilding of secondary species and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch.
OVERALL PERFORMANCE INDICATOR SCORE:	100
CONDITION NUMBER:	N/A

Evaluation Table for PI 2.2.3 – Secondary species information

PI 2.2.3		Information on the nature and amount of secondary species taken is adequate to determine the risk posed by the UoA and the effectiveness of the strategy to manage secondary species.		
Scoring Issue		SG 60	SG 80	SG 100
a	Information adequacy for assessment of impacts on main secondary species			
	Guidepost	Qualitative information is adequate to estimate the impact of the UoA on the main secondary species with respect to status. OR If RBF is used to score PI 2.2.1 for the UoA: Qualitative information is adequate to estimate productivity and susceptibility attributes for main secondary species.	Some quantitative information is available and adequate to assess the impact of the UoA on main secondary species with respect to status. OR If RBF is used to score PI 2.2.1 for the UoA: Some quantitative information is adequate to assess productivity and susceptibility attributes for main secondary species.	Quantitative information is available and adequate to assess with a high degree of certainty the impact of the UoA on main secondary species with respect to status.
	Met?	Y	Y	Y
	Justification	There are no main or minor secondary species in this fishery, so SG100 is met by default.		
	Information adequacy for assessment of impacts on minor secondary species			
b	Guidepost			Some quantitative information is adequate to estimate the impact of the UoA on minor secondary species with respect to status.
	Met?			Y
	Justification	There are no main or minor secondary species in this fishery, so SG100 is met by default.		

PI 2.2.3		Information on the nature and amount of secondary species taken is adequate to determine the risk posed by the UoA and the effectiveness of the strategy to manage secondary species.		
c	Information adequacy for management strategy			
	Guidepost	Information is adequate to support measures to manage main secondary species.	Information is adequate to support a partial strategy to manage main secondary species.	Information is adequate to support a strategy to manage all secondary species, and evaluate with a high degree of certainty whether the strategy is achieving its objective .
	Met?	Y	Y	Y
	Justification	There are no main secondary species in this fishery, so SG100 is met by default.		
References				
OVERALL PERFORMANCE INDICATOR SCORE:				100
CONDITION NUMBER:				N/A

Evaluation Table for PI 2.3.1 – ETP species outcome

PI 2.3.1		The UoA meets national and international requirements for the protection of ETP species The UoA does not hinder recovery of ETP species		
Scoring Issue		SG 60	SG 80	SG 100
a	Effects of the UoA on population/stock within national or international limits, where applicable			
	Guidepost	Where national and/or international requirements set limits for ETP species, the effects of the UoA on the population/stock are known and likely to be within these limits.	Where national and/or international requirements set limits for ETP species, the combined effects of the MSC UoAs on the population/stock are known and highly likely to be within these limits.	Where national and/or international requirements set limits for ETP species, there is a high degree of certainty that the combined effects of the MSC UoAs are within these limits.
	Met?	Not relevant	Not relevant	Not relevant
	Justification	[Scoring issue need not be scored if there are no national or international requirements that set limits for ETP species.] The ETP species the team has identified as interacting with the fishery are birds, which are protected under the Law for Biodiversity Protection and associated regulations (decree). The team are not aware of any specific limits, so this issue is not scored.		
b	Direct effects			
	Guidepost	Known direct effects of the UoA are likely to not hinder recovery of ETP species.	Known direct effects of the UoA are highly likely to not hinder recovery of ETP species.	There is a high degree of confidence that there are no significant detrimental direct effects of the UoA on ETP species.
	Met?	Y	Y	Y
	Justification	Direct effects are taken to mean mortality or injury. There are no direct interactions between the clam fishery and birds resulting in mortality or injury to any species of birds. SG100 is met.		
c	Indirect effects			
	Guidepost		Indirect effects have been considered and are thought to be highly likely to not create	There is a high degree of confidence that there are no significant detrimental indirect

PI 2.3.1		The UoA meets national and international requirements for the protection of ETP species The UoA does not hinder recovery of ETP species		
			unacceptable impacts.	effects of the fishery on ETP species.
	Met?		Y	N
	Justification	<p>Possible indirect effects are i) disturbance and ii) competition for food.</p> <p>In response to Condition 2 on the initial certification, the Southern Sub Institute for Fisheries Planning (SSIFP) produced a report (SSIFP, 2012) evaluating the likely impact of the clam fishery on shore bird populations in the clam fishing areas. The conclusion of the report is that no impact is likely (details given in Section XX). The condition was closed at the 3rd surveillance audit. The team did not find the methodology particularly robust, but it does provide some evidence that there has been no evident change in shorebird populations over time in the areas used by the clam fishery.</p> <p>Perhaps more usefully, the research also identifies the main species of resident and migratory birds present on the clam areas, the main areas that they use and what they eat (Table 5). Six species are reportedly decreasing, and four are evaluated by IUCN as 'near-threatened', but in all cases where a cause could be identified, the issue was around habitat loss, either in areas far away from Ben Tre (migratory species) or specific to mangroves. None of the species depended on clams as a main source of food – many do not eat clams at all. All use a wider range of habitats than just sandflats.</p> <p>Overall, therefore, the team considered that it is not likely that any of these species depend on the clam management areas either for food or as habitat, but rather use them opportunistically alongside a range of other habitats and food sources. On this basis, it is highly unlikely that periodic activity from the fishery or surveys will have any significant impact on the population dynamics of these species. There is a high degree of confidence that food competition is not an issue, since clams are one of many (or in some cases none of many) food sources for these species. SG80 is met. In relation to SG100, lacking more quantitative data either on trends in bird numbers on the sand flats over time, or the proportion use of this vs. other habitats, the team concluded that there is not overall a 'high degree of certainty' about indirect effects. SG100 is not met.</p>		
References		<p>BirdLife International. 2012a. <i>Sternula albifrons</i>. The IUCN Red List of Threatened Species 2012: e.T22694656A38877509. http://dx.doi.org/10.2305/IUCN.UK.2012-1.RLTS.T22694656A38877509.en. Downloaded on 2 March 2016.</p> <p>BirdLife International. 2012b. <i>Limnodromus semipalmatus</i>. The IUCN Red List of Threatened Species 2012: e.T22693351A38294260. http://dx.doi.org/10.2305/IUCN.UK.2012-1.RLTS.T22693351A38294260.en. Downloaded on 2 March 2016.</p> <p>BirdLife International. 2012c. <i>Mycteria leucocephala</i>. The IUCN Red List of Threatened Species 2012: e.T22697658A37857363. http://dx.doi.org/10.2305/IUCN.UK.2012-1.RLTS.T22697658A37857363.en. Downloaded on 2 March 2016.</p> <p>BirdLife International. 2014. <i>Himantopus himantopus</i>. The IUCN Red List of Threatened Species 2014:</p>		

PI 2.3.1	The UoA meets national and international requirements for the protection of ETP species The UoA does not hinder recovery of ETP species	
	<p>e.T22727969A40835763. http://dx.doi.org/10.2305/IUCN.UK.2014-2.RLTS.T22727969A40835763.en. Downloaded on 2 March 2016. BirdLife International. 2015a. <i>Egretta garzetta</i>. The IUCN Red List of Threatened Species 2015: e.T62774969A67367671. http://dx.doi.org/10.2305/IUCN.UK.2015-4.RLTS.T62774969A67367671.en. Downloaded on 2 March 2016. BirdLife International. 2015b. <i>Bubulcus ibis</i>. The IUCN Red List of Threatened Species 2015: e.T22697109A85006112. . Downloaded on 2 March 2016. BirdLife International. 2015c. <i>Calidris ruficollis</i>. The IUCN Red List of Threatened Species 2015: e.T22693383A83969564. http://dx.doi.org/10.2305/IUCN.UK.2015-4.RLTS.T22693383A83969564.en. Downloaded on 2 March 2016. BirdLife International. 2015d. <i>Numenius arquata</i>. The IUCN Red List of Threatened Species 2015: e.T22693190A84634058. http://dx.doi.org/10.2305/IUCN.UK.2015.RLTS.T22693190A84634058.en. Downloaded on 2 March 2016. Law of Biodiversity Protection 2009 Decree 157/2013/ND-CP issued on 11/11/2013 for penalties of actions for violations of law on forest management, development, and management of forest products SSIFP. 2012. Assessment of the impact of the clam management system on the shore birds in Ben Tre province. Implemented Agency Southern Sub Institute for Fisheries Planning (SSIFP)</p>	
OVERALL PERFORMANCE INDICATOR SCORE:		90
CONDITION NUMBER:		N/A

Evaluation Table for PI 2.3.2 – ETP species management strategy

PI 2.3.2		The UoA has in place precautionary management strategies designed to: <ul style="list-style-type: none">• Meet national and international requirements;• Ensure the UoA does not hinder recovery of ETP species. Also, the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of ETP species.		
Scoring Issue		SG 60	SG 80	SG 100
a	Management strategy in place (national and international requirements)			
	Guidepost	There are measures in place that minimise the UoA-related mortality of ETP species, and are expected to be highly likely to achieve national and international requirements for the protection of ETP species.	There is a strategy in place for managing the UoA's impact on ETP species, including measures to minimise mortality, which is designed to be highly likely to achieve national and international requirements for the protection of ETP species.	There is a comprehensive strategy in place for managing the UoA's impact on ETP species, including measures to minimise mortality, which is designed to achieve above national and international requirements for the protection of ETP species.
	Met?	Not relevant	Not relevant	Not relevant
	Justification	[Scoring issue need not be scored if <u>there are no</u> requirements for protection or rebuilding provided through national ETP legislation or international agreements]. The legislation does not provide explicit quantitative requirements for protection or rebuilding, so the alternative wording below is scored.		
	b	Management strategy in place (alternative)		
Guidepost		There are measures in place that are expected to ensure the UoA does not hinder the recovery of ETP species.	There is a strategy in place that is expected to ensure the UoA does not hinder the recovery of ETP species.	There is a comprehensive strategy in place for managing ETP species, to ensure the UoA does not hinder the recovery of ETP species
Met?		Y	Y	N
Justification		[Scoring issue need not be scored if <u>there are</u> requirements for protection or rebuilding provided through national ETP legislation or		

PI 2.3.2		<p>The UoA has in place precautionary management strategies designed to:</p> <ul style="list-style-type: none">• Meet national and international requirements;• Ensure the UoA does not hinder recovery of ETP species. <p>Also, the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of ETP species.</p>		
		<p>international agreements.]</p> <p>The operation of the fishery (hand-gathering, limited footprint, specific habitat on which birds do not depend, target species which is not a key food source) can be regarded as a 'strategy' for ETP species in this case. As argued in 2.3.1, there are no direct effects, and reasonable confidence that indirect effects are not significant. SG80 is met.</p> <p>As a result of a condition on the previous assessment, the strategy was evaluated and found to be appropriate. Although MEC does not disagree with the outcome of the strategy, the evaluation was not robust enough to provide total (i.e. SG100-level) confidence in relation to indirect effects, so the team concluded that it does not constitute a 'comprehensive strategy'. SG100 is not met.</p>		
c	Management strategy evaluation			
	Guidepost	The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/species).	There is an objective basis for confidence that the measures/strategy will work, based on information directly about the fishery and/or the species involved.	The strategy/comprehensive strategy is mainly based on information directly about the fishery and/or species involved, and a quantitative analysis supports high confidence that the strategy will work.
	Met?	Y	Y	N
	Justification	As noted above, information about the species (habitat use, food) and fishery (operation) as well as a research study, provide an objective basis for confidence that the strategy will work. SG80 is met. The study does not, however, provided 'quantitative analysis', so SG100 is not met.		
d	Management strategy implementation			
	Guidepost		There is some evidence that the measures/strategy is being implemented successfully.	There is clear evidence that the strategy/comprehensive strategy is being implemented successfully and is achieving its

PI 2.3.2		<p>The UoA has in place precautionary management strategies designed to:</p> <ul style="list-style-type: none"> • Meet national and international requirements; • Ensure the UoA does not hinder recovery of ETP species. <p>Also, the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of ETP species.</p>		
				objective as set out in scoring issue (a) or (b).
	Met?		Y	Y
	Justification	Since the 'strategy' is the nature of the fishery, there is clear evidence that it is being implemented successfully and having a minimal impact on birds. SG100 is met.		
e	Review of alternative measures to minimize mortality of ETP species			
	Guidepost	There is a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of ETP species.	There is a regular review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of ETP species and they are implemented as appropriate.	There is a biennial review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of ETP species, and they are implemented, as appropriate.
	Met?	N/A	N/A	N/A
	Justification	Since there is no evidence of any UoA-related mortality of ETP species. This scoring issue has not been scored as per the guidance in GSA3.11 of version 2.0 of the MSC Certification Requirements.		
References				
OVERALL PERFORMANCE INDICATOR SCORE:				85
CONDITION NUMBER:				N/A

Evaluation Table for PI 2.3.3 – ETP species information

PI 2.3.3		Relevant information is collected to support the management of UoA impacts on ETP species, including: <ul style="list-style-type: none">Information for the development of the management strategy;Information to assess the effectiveness of the management strategy; andInformation to determine the outcome status of ETP species.		
Scoring Issue		SG 60	SG 80	SG 100
a	Information adequacy for assessment of impacts			
	Guidepost	Qualitative information is adequate to estimate the UoA related mortality on ETP species. OR If RBF is used to score PI 2.3.1 for the UoA: Qualitative information is adequate to estimate productivity and susceptibility attributes for ETP species.	Some quantitative information is adequate to assess the UoA related mortality and impact and to determine whether the UoA may be a threat to protection and recovery of the ETP species. OR If RBF is used to score PI 2.3.1 for the UoA: Some quantitative information is adequate to assess productivity and susceptibility attributes for ETP species.	Quantitative information is available to assess with a high degree of certainty the magnitude of UoA-related impacts, mortalities and injuries and the consequences for the status of ETP species.
	Met?	Y	Y	Y
	Justification	As set out in 2.3.1, there is a high degree of certainty that there are no interactions of the fishery with birds which result in mortality or injury; hence the consequence for the status of bird populations from this fishery can be quantitatively evaluated to be negligible. SG100 is met.		
b	Information adequacy for management strategy			
	Guidepost	Information is adequate to support measures to manage the impacts on ETP species.	Information is adequate to measure trends and support a strategy to manage impacts on ETP species.	Information is adequate to support a comprehensive strategy to manage impacts, minimize mortality and injury of ETP species, and evaluate with a high degree of

PI 2.3.3		<p>Relevant information is collected to support the management of UoA impacts on ETP species, including:</p> <ul style="list-style-type: none"> • Information for the development of the management strategy; • Information to assess the effectiveness of the management strategy; and • Information to determine the outcome status of ETP species. 		
				certainty whether a strategy is achieving its objectives.
	Met?	Y	Y	N
	Justification	As set out in 2.3.2, there is a strategy in the form of the nature, footprint and operation of the fishery, which has been evaluated via various lines of evidence. This strategy does not require additional information to be gathered – hence SG80 is met. Since it was not considered to be a 'comprehensive strategy' due to lack of information (see 2.3.2 scoring issue b), then SG100 is not met here.		
References				
OVERALL PERFORMANCE INDICATOR SCORE:				90
CONDITION NUMBER:				N/A

Evaluation Table for PI 2.4.1 – Habitats outcome

PI 2.4.1		The UoA does not cause serious or irreversible harm to habitat structure and function, considered on the basis of the area covered by the governance body(s) responsible for fisheries management in the area(s) where the UoA operates.		
Scoring Issue		SG 60	SG 80	SG 100
a	Commonly encountered habitat status			
	Guidepost	The UoA is unlikely to reduce structure and function of the commonly encountered habitats to a point where there would be serious or irreversible harm.	The UoA is highly unlikely to reduce structure and function of the commonly encountered habitats to a point where there would be serious or irreversible harm.	There is evidence that the UoA is highly unlikely to reduce structure and function of the commonly encountered habitats to a point where there would be serious or irreversible harm.
	Met?	Y	Y	N
	Justification	<p>Commonly encountered (only) habitat: intertidal sand flats.</p> <p>A condition of the first certification was to evaluate the impact of the fishery on the sandflat ecosystem; this was closed at the Year 2 surveillance audit. The study did not evaluate habitat specifically (e.g. sediment grain size etc.) but rather looked at the diversity of different species categories (phytoplankton, zooplankton and zoobenthos). The methodology was to follow up a study done prior to MSC certification (2008) – it is not particularly clear from the information provided but presumably this was prior to significant clam exploitation in the area concerned. Some differences were found in biodiversity between the two studies – notably fewer zoobenthic species – but these differences were attributed to other changes in the ecosystem; notably an increase in temperature and saline water intrusion which is known to have resulted in mortalities of infauna – including the clams.</p> <p>The gear used by this fishery is a hand rake – i.e. a light gear. Raking the sediment to extract the clams may have short-term effects (e.g. in loosening the sediment – it is reported that this may benefit shorebirds), but is not expected to have any significant long-term impacts (i.e. any changes are not 'irreversible').</p> <p>It is also worth noting that only a portion of the sandflats are exploited at any given time – even in the open areas, some have clams and some do not.</p> <p>Finally, it is clear that the habitat in question (intertidal sandflats) suffers frequent physical disturbance (tides, storms) and therefore is resilient to perturbation of the top layers of sediment.</p> <p>Overall, the team considered that the fishery is highly unlikely to cause serious or irreversible harm. There are various lines of evidence, but most are indirect, so SG100 is not met in full.</p>		
b	VME habitat status			

PI 2.4.1		The UoA does not cause serious or irreversible harm to habitat structure and function, considered on the basis of the area covered by the governance body(s) responsible for fisheries management in the area(s) where the UoA operates.		
	Guidepost	The UoA is unlikely to reduce structure and function of the VME habitats to a point where there would be serious or irreversible harm.	The UoA is highly unlikely to reduce structure and function of the VME habitats to a point where there would be serious or irreversible harm.	There is evidence that the UoA is highly unlikely to reduce structure and function of the VME habitats to a point where there would be serious or irreversible harm.
	Met?	Not relevant	Not relevant	Not relevant
	Justification	[Scoring issue need not be scored if there are no VMEs] There are no VMEs in the area used by the fishery – clams live exclusively in sand.		
c	Minor habitat status			
	Guidepost			There is evidence that the UoA is highly unlikely to reduce structure and function of the minor habitats to a point where there would be serious or irreversible harm.
	Met?			Y
	Justification	No minor habitats have been identified, so this is met by default.		
References				
OVERALL PERFORMANCE INDICATOR SCORE:				90
CONDITION NUMBER:				N/A

Evaluation Table for PI 2.4.2 – Habitats management strategy

PI 2.4.2		There is a strategy in place that is designed to ensure the UoA does not pose a risk of serious or irreversible harm to the habitats.		
Scoring Issue		SG 60	SG 80	SG 100
a	Management strategy in place			
	Guidepost	There are measures in place, if necessary, that are expected to achieve the Habitat Outcome 80 level of performance.	There is a partial strategy in place, if necessary, that is expected to achieve the Habitat Outcome 80 level of performance or above.	There is a strategy in place for managing the impact of all MSC UoAs/non-MSC fisheries on habitats.
	Met?	Y	Y	Y
	Justification	The operation of the fishery (harvesting by hand with a light gear, only partial use of the habitat at any given time) can be considered to constitute a strategy to manage the impact of the fishery on clam habitat. There are no other overlapping fisheries. SG100 is met.		
b	Management strategy evaluation			
	Guidepost	The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar UoAs/habitats).	There is some objective basis for confidence that the measures/partial strategy will work, based on information directly about the UoA and/or habitats involved.	Testing supports high confidence that the partial strategy/strategy will work, based on information directly about the UoA and/or habitats involved.
	Met?	Y	Y	N
	Justification	The fishery is known to have a light impact on the habitat, and the habitat (intertidal sandflats) is known to be resilient to physical disturbance. SG80 is met. There are various direct lines of evidence as described in 2.4.1a, but nothing that constitutes direct 'testing' as required by SG100.		
c	Management strategy implementation			
	Guidepost		There is some quantitative evidence that the measures/partial strategy is being	There is clear quantitative evidence that the partial strategy/strategy is being

PI 2.4.2		There is a strategy in place that is designed to ensure the UoA does not pose a risk of serious or irreversible harm to the habitats.		
			implemented successfully.	implemented successfully and is achieving its objective, as outlined in scoring issue (a).
	Met?		Y	N
	Justification	Since the strategy is the operation of the fishery, there is clear evidence that it is being implemented. In relation to 'quantitative evidence' – figures such as the areas used vs not used in a given year could be used to justify the implementation of the strategy – i.e. SG80. SG100 (presumably) requires quantitative evidence of habitat impacts, which might require something like a study of changes in sediment characteristics as a result of harvesting – this is not available, so SG100 is not met.		
d	Compliance with management requirements and other MSC UoAs'/non-MSC fisheries' measures to protect VMEs			
	Guidepost	There is qualitative evidence that the UoA complies with its management requirements to protect VMEs.	There is some quantitative evidence that the UoA complies with both its management requirements and with protection measures afforded to VMEs by other MSC UoAs/non-MSC fisheries, where relevant.	There is clear quantitative evidence that the UoA complies with both its management requirements and with protection measures afforded to VMEs by other MSC UoAs/non-MSC fisheries, where relevant.
	Met?	Not relevant	Not relevant	Not relevant
	Justification	[Scoring issue need not be scored if there are no VMEs]		
References				
OVERALL PERFORMANCE INDICATOR SCORE:				85
CONDITION NUMBER:				N/A

Evaluation Table for PI 2.4.3 – Habitats information

PI 2.4.3		Information is adequate to determine the risk posed to the habitat by the UoA and the effectiveness of the strategy to manage impacts on the habitat.		
Scoring Issue		SG 60	SG 80	SG 100
a	Information quality			
	Guidepost	<p>The types and distribution of the main habitats are broadly understood.</p> <p>OR</p> <p>If CSA is used to score PI 2.4.1 for the UoA:</p> <p>Qualitative information is adequate to estimate the types and distribution of the main habitats.</p>	<p>The nature, distribution and vulnerability of the main habitats in the UoA area are known at a level of detail relevant to the scale and intensity of the UoA.</p> <p>OR</p> <p>If CSA is used to score PI 2.4.1 for the UoA:</p> <p>Some quantitative information is available and is adequate to estimate the types and distribution of the main habitats.</p>	<p>The distribution of all habitats is known over their range, with particular attention to the occurrence of vulnerable habitats.</p>
	Met?	Y	Y	Y
	Justification	The fishery operates only in one kind of habitat – intertidal sandflats. The habitat type over the entire range of the fishery is known. SG100 is met.		
b	Information adequacy for assessment of impacts			
	Guidepost	<p>Information is adequate to broadly understand the nature of the main impacts of gear use on the main habitats, including spatial overlap of habitat with fishing gear.</p> <p>OR</p>	<p>Information is adequate to allow for identification of the main impacts of the UoA on the main habitats, and there is reliable information on the spatial extent of interaction and on the timing and location of use of the fishing gear.</p>	<p>The physical impacts of the gear on all habitats have been quantified fully.</p>

PI 2.4.3		Information is adequate to determine the risk posed to the habitat by the UoA and the effectiveness of the strategy to manage impacts on the habitat.			
		<p>If CSA is used to score PI 2.4.1 for the UoA:</p> <p>Qualitative information is adequate to estimate the consequence and spatial attributes of the main habitats.</p>	<p>OR</p> <p>If CSA is used to score PI 2.4.1 for the UoA:</p> <p>Some quantitative information is available and is adequate to estimate the consequence and spatial attributes of the main habitats.</p>		
	Met?	Y	Y	N	
	Justification	The spatial extent and timing of the use of the fishing gear is known fully. The impacts of the fishery on the sandflats can be identified (see 2.4.1a). SG80 is met. The physical impacts of the gear have been quantified to some extent (e.g. in terms of biodiversity) but not fully (e.g. sediment characteristics were not looked at, and changes seemed mainly attributable to variables other than the fishery). SG100 is not met.			
c	Monitoring				
	Guidepost		Adequate information continues to be collected to detect any increase in risk to the main habitats.	Changes in habitat distributions over time are measured.	
	Met?		Y	Y	
	Justification	The habitats in the area of the fishery are known in full and will continue to be known, unless people start fishing with their eyes shut. Met.			
References		Southern Sub Institute for Fisheries Planning. 2011. Assessment of the impact of clam harvesting on the biodiversity at sand flat areas in Ben Tre Province.			
OVERALL PERFORMANCE INDICATOR SCORE:					95
CONDITION NUMBER:					N/A

Evaluation Table for PI 2.5.1 – Ecosystem outcome

PI 2.5.1		The UoA does not cause serious or irreversible harm to the key elements of ecosystem structure and function.		
Scoring Issue		SG 60	SG 80	SG 100
a	Ecosystem status			
	Guidepost	The UoA is unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.	The UoA is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.	There is evidence that the UoA is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.
	Met?	Y	Y	P
	Justification	As noted in the rationale for 2.4.1a, the fishery responded to a condition on the previous certification by carrying out a study on the impact of the fishery on sandflat ecosystems, which provided no evidence of 'serious or irreversible harm' (see argument in 2.4.1a). No species have been identified which rely on clams as a key food source (i.e. birds – see list in Table XX). The study of the sandflat ecosystem provides 'evidence' as required for SG100, but since changes found (e.g. in zoobenthos) appeared to be attributable to several variables other than the fishery, it was not designed such that it provided definitive evidence on the fishery impact on the ecosystem – sufficient for SG80 to be met but SG100 only partially.		
References		Southern Sub Institute for Fisheries Planning. 2011. Assessment of the impact of clam harvesting on the biodiversity at sand flat areas in Ben Tre Province.		
OVERALL PERFORMANCE INDICATOR SCORE:				90
CONDITION NUMBER:				N/A

Evaluation Table for PI 2.5.2 – Ecosystem management strategy

PI 2.5.2		There are measures in place to ensure the UoA does not pose a risk of serious or irreversible harm to ecosystem structure and function.		
Scoring Issue		SG 60	SG 80	SG 100
a	Management strategy in place			
	Guidepost	There are measures in place, if necessary which take into account the potential impacts of the fishery on key elements of the ecosystem.	There is a partial strategy in place, if necessary, which takes into account available information and is expected to restrain impacts of the UoA on the ecosystem so as to achieve the Ecosystem Outcome 80 level of performance.	There is a strategy that consists of a plan , in place which contains measures to address all main impacts of the UoA on the ecosystem, and at least some of these measures are in place.
	Met?	Y	Y	N
	Justification	The various lines of evidence set out in the rationale for 2.4.1a and 2.5.1 suggest that there is no need for an explicit strategy to protect the ecosystem from this fishery; the 'partial strategy' can be considered to be the operation of the fishery and the nature of the habitat/ecosystem (intertidal sandflats). SG80 is met. There is no 'strategy that consists of a plan' so SG100 is not met.		
b	Management strategy evaluation			
	Guidepost	The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ ecosystems).	There is some objective basis for confidence that the measures/partial strategy will work, based on some information directly about the UoA and/or the ecosystem involved	Testing supports high confidence that the partial strategy/strategy will work, based on information directly about the UoA and/or ecosystem involved
	Met?	Y	Y	N
	Justification	There is an objective basis for supposing that the fishery will not have any significant ecosystem impacts (light gear, resilient habitat type, small footprint, no evidence of competition with other clam predators). S80 is met. Also there is some evidence (see 2.4.1), there is nothing that would fully constitute 'testing', so SG100 is not met.		
c	Management strategy implementation			

PI 2.5.2		There are measures in place to ensure the UoA does not pose a risk of serious or irreversible harm to ecosystem structure and function.		
	Guidepost		There is some evidence that the measures/partial strategy is being implemented successfully .	There is clear evidence that the partial strategy/strategy is being implemented successfully and is achieving its objective as set out in scoring issue (a) .
	Met?		Y	Y
	Justification	Clear evidence that the partial strategy is meeting its objectives is demonstrated through the operation of the fishery.		
References				
OVERALL PERFORMANCE INDICATOR SCORE:				90
CONDITION NUMBER:				N/A

Evaluation Table for PI 2.5.3 – Ecosystem information

PI 2.5.3		There is adequate knowledge of the impacts of the UoA on the ecosystem.		
Scoring Issue		SG 60	SG 80	SG 100
a	Information quality			
	Guidepost	Information is adequate to identify the key elements of the ecosystem.	Information is adequate to broadly understand the key elements of the ecosystem.	
	Met?	Y	Y	
	Justification	Bycatch is negligible Interactions with birds have been evaluated (at least to a sufficient extent to show low impact) Habitats are known over the entire range of the fishery Impacts of the gear on the sandflat ecosystem has been evaluated and is likely to be negligible / short-lived. The ecology of the clams is understood (i.e. what they eat, what eats them, their habitat, migrations, growth etc.) In other words, the key elements of the ecosystem in relation to the fishery are understood.		
b	Investigation of UoA impacts			
	Guidepost	Main impacts of the UoA on these key ecosystem elements can be inferred from existing information, but have not been investigated in detail.	Main impacts of the UoA on these key ecosystem elements can be inferred from existing information, and some have been investigated in detail .	Main interactions between the UoA and these ecosystem elements can be inferred from existing information, and have been investigated in detail .
	Met?	Y	Y	N
	Justification	The impacts of the UoA on various ecosystem elements can be inferred with quite high confidence, as set out in the rationales for 2.3.1, 2.4.1 and 2.5.1. The most significant impacts are i) disturbance of birds and ii) changes to the sandflat habitat/ecosystem – but both can be evaluated to be minimal. There have been several studies carried out (as a consequence of previous conditions) – e.g. on bird interactions and on sandflat biodiversity. On this basis, SG80 is met, but since most of the argument is by inference, SG100 is not met.		

PI 2.5.3		There is adequate knowledge of the impacts of the UoA on the ecosystem.		
c	Understanding of component functions			
	Guidepost		The main functions of the components (i.e., P1 target species, primary, secondary and ETP species and Habitats) in the ecosystem are known .	The impacts of the UoA on P1 target species, primary, secondary and ETP species and Habitats are identified and the main functions of these components in the ecosystem are understood .
	Met?		Y	N
	Justification	The main components are: i) clams; ii) clam predators (gastropods, perhaps shore birds); iii) sandflat habitat. The ecology of the clam species in Ben Tre is well understood (see full description in previous PCR); the role of predation on clam populations is not thought to be significant relative to bottom-up forcings (see previous PCR), the biodiversity of the sandflat ecosystem has been studied. SG80 is met. In relation to SG100, the impact of the fishery on the various components has been identified (see previous scorings in P2). The impact of all the various components in the ecosystem can be inferred but perhaps cannot be described as 'understood' in a quantitative / scientific sense (e.g. gastropods, birds) – SG100 is not met in full.		
d	Information relevance			
	Guidepost		Adequate information is available on the impacts of the UoA on these components to allow some of the main consequences for the ecosystem to be inferred.	Adequate information is available on the impacts of the UoA on the components and elements to allow the main consequences for the ecosystem to be inferred.
	Met?		Y	N
	Justification	The impact of the fishery on the various components (bycatch, ETP, habitats) can be inferred with reasonable confidence as set out in the rest of P2. SG80 is met. In relation to SG100, ecosystem 'elements' are defined as trophic structure and function, community composition and biological diversity. Some of these elements have been studied; e.g. sandflat biodiversity; but not to the extent that any impacts of the fishery can easily be parsed out from other impacts such as temperature/salinity events. SG100 is not met in full.		

PI 2.5.3		There is adequate knowledge of the impacts of the UoA on the ecosystem.	
e	Monitoring		
	Guidepost		<p>Adequate data continue to be collected to detect any increase in risk level.</p> <p>Information is adequate to support the development of strategies to manage ecosystem impacts.</p>
	Met?		<p>Y</p> <p>N</p>
	Justification	<p>Since the P2 impacts of the fishery can be confidently evaluated to be small, the existing management and data collection system is adequate to ensure that any changes / increase in risk would be detected – most likely would be an ongoing increase in disease events, which are closely studied and carefully managed as set out in Principle 1.</p> <p>It is not clear that there is sufficient data about, for example, trophic linkages or changes in biodiversity in different situations (e.g. different areas in the intertidal, at different time periods pre- and post-fishing) for a full strategy to be developed, nor is this really necessary. SG100 is not met in full.</p>	
References			
OVERALL PERFORMANCE INDICATOR SCORE:			80
CONDITION NUMBER:			N/A

Evaluation table 1 - PI 3.1.1

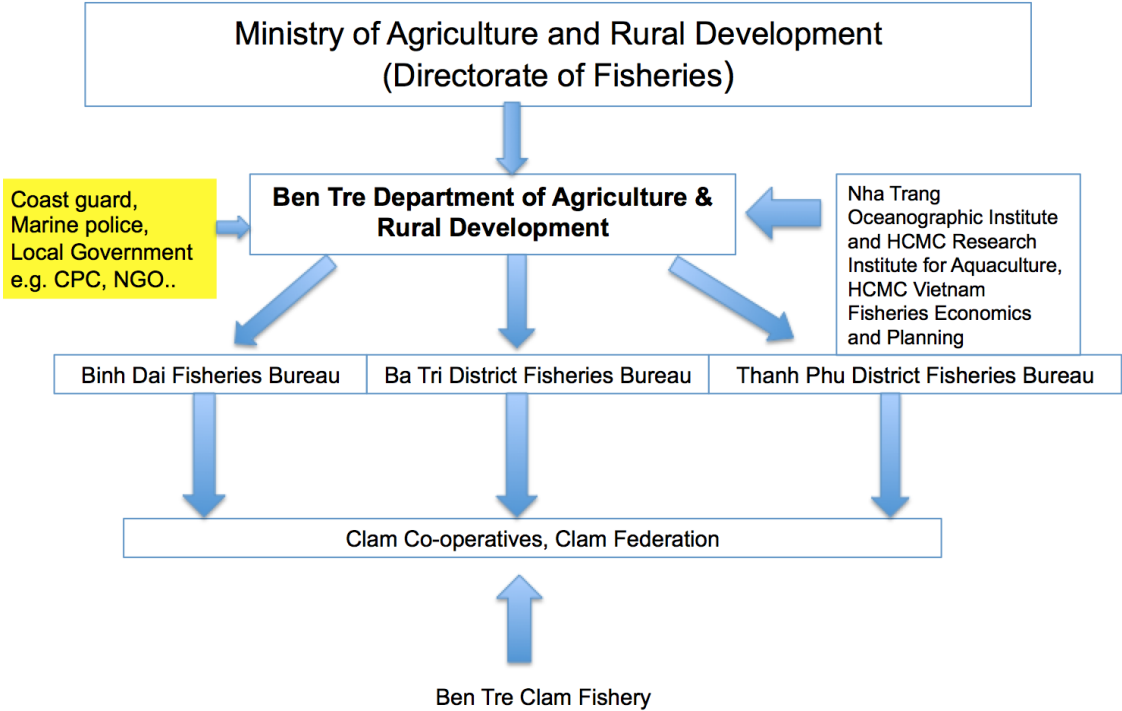
PI 3.1.1		The management system exists within an appropriate legal and/or customary framework which ensures that it: <ul style="list-style-type: none"> Is capable of delivering sustainability in the UoAs; and Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and Incorporates an appropriate dispute resolution framework. 		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	There is an effective national legal system and a framework for cooperation with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2	There is an effective national legal system and organised and effective cooperation with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2.	There is an effective national legal system and binding procedures governing cooperation with other parties which delivers management outcomes consistent with MSC Principles 1 and 2.
	Met?	Y	Y	Y
	Justification	<p>Fisheries Law and Decree No 33/2010/ND-CP states that the government needs to cooperate with other parties, where necessary, to enhance effective management of fisheries (including clam). In the case of Ben Tre clams, the Law of the Cooperative also calls for effective management. The Law of the Land supports this by providing land title/exclusive rights for clam cooperatives. The Fisheries Law also includes protection of environment and habitat (Article 15).</p> <p>Others laws also provide a framework for Principle 2; e.g. Biodiversity Protection Law (see Luu. 2009, p22), Law of Marine Resources and Environment, Law on Environment Protection. There are various decrees underneath these laws</p> <p>Vietnam Civil Law sets out requirements for the Ministry to collaborate with other sectors and local government to achieve objectives of laws. No other countries are involved – no international binding procedures are required.</p> <p>There is an effective national legal system to achieve management outcomes consistent with both P1 and P2; binding procedures with cooperation where required (at national level only – international not relevant). SG100 is therefore met.</p>		

b	Guidepost	The management system incorporates or is subject by law, to a mechanism for the resolution of legal disputes arising within the system.	The management system incorporates or is subject by law to a transparent_mechanism for the resolution of legal disputes which is considered to be effective in dealing with most issues and that is appropriate to the context of the fishery.	The management system incorporates or subject by law to a transparent mechanism for the resolution of legal disputes that is appropriate to the context of the fishery and has been tested and proven to be effective .
	Met?	Y	Y	Y
	Justification	<p>Fisheries Law, Article 51 – requires a system for resolution of legal disputes but it is not prescriptive as to what that system must be.</p> <p>Civil Law – requires dispute resolution by negotiation; if the negotiation fails, then legal proceedings are enacted via the court, and there is a clear legal system for this process.</p> <p>Some legal issues have arisen in this fishery before – serious cases being taken to court. Court hearings are held in public for transparency. Records are kept of hearing and rulings and may be reported in media. Cooperatives involved receive copies of judgements, as does DARD and the local government. Court archiving systems allow these records to be accessed publically too.</p> <p>The Regulation (internal rules) of Clam fisheries cooperatives highlight the disputes resolutions, which are very transparent and have been tested and prove to be effective, e.g. in Dong Tam and Thanh Phong cooperatives (had disputes now resolved). In this arrangement there are three levels: 1) Low disputes can be solve at community level 2) Medium disputes can be solved at local government level or local mediation 3) High disputes can be solved at legal body e.g. court.</p> <p>Also, the Regulation of Cooperation (or MoU) between different parties e.g. cooperatives, local authorities, police, fisheries inspectors (Surveillance), forest rangers etc. highlight the roles of different parties in MCS of the clam fishing grounds. They monitor each others in clam management activities.</p> <p>As another example, in cooperatives where the management were misusing funds, they were taken to court by members of cooperatives. This resulted in the resignation of those prosecuted members and the return of the funds. New leadership was then put in place.</p> <p>In conclusion, there are transparent dispute resolution systems at all levels of management and these have been tested in various ways as per the examples given above, which were proved effective.</p> <p>On this basis, SG100 is met.</p>		
c	Guidepost	The management system has a mechanism to generally respect the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.	The management system has a mechanism to observe the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.	The management system has a mechanism to formally commit to the legal rights created explicitly or established by custom of people dependent on fishing for food and livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.

	Met?	Y	Y	N
	Justification	<p>Yes, the Fisheries Law, Law of Marine Resources and Environment and Civil Law of Vietnam respect the customs/bylaw of groups of people e.g. fishing community depending on fish or any issues related to sustainable use of resources. Also, the local government provides the land title. These are exclusive rights for clam cooperatives to use the land for sustainable use of clam resources (harvest, equal benefit sharing and conservation). Based on this land title (a kind of territorial fishing right), Fisheries Cooperatives (FCs) set the rules, to specify the law and make it more practical, reflecting the local characteristics under consensus and democratic manners. These rules are reviewed and approved by the local government.</p> <p>Anyone living in the commune has the right to be members of the cooperative – any local may participate in the fishery. In other words, rights of cooperatives are enshrined in law; no member of the community is excluded from cooperatives.</p> <p>All this within a context of sustainable management as set out in scoring issue a, i.e. the management system formally commits to legal rights of users, consistent with the MSC standard – SG100 is met</p>		
	References	<p>Fisheries Law Biodiversity Law Civil Law Law of Marine Resources and Environment Law on Environment Protection Cooperative rules</p>		
OVERALL PERFORMANCE INDICATOR SCORE:				95
CONDITION NUMBER:				N/A

Evaluation table 2 - PI 3.1.2

PI 3.1.2		<p>The management system has effective consultation processes that are open to interested and affected parties.</p> <p>The roles and responsibilities of organisations and individuals who are involved in the management process are clear and understood by all relevant parties</p>		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are generally understood .	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are explicitly defined and well understood for key areas of responsibility and interaction.	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are explicitly defined and well understood for all areas of responsibility and interaction.
	Met?	Y	Y	N
	Justification	At the local level, functions, roles and responsibilities of different stakeholders in key area of the clam fishery management have been clearly identified and are well understood. However these are not explicitly defined in all areas.		

		 <p>Based on the above chart, roles and responsibilities are well defined and clear for each organisation. SG80 is met. But for every issue, it is not completely understood by everyone who would be responsible for what (e.g. some of the fishermen may not have a grasp on all the details) – so for SG100, while functions, roles and responsibilities are probably ‘explicitly defined’ for all areas, they may not be ‘well understood for all areas’ i.e. SG100 not met in full.</p>
b	Guidopost	<div>The management system includes consultation processes that obtain relevant information from the main affected parties, including local knowledge, to inform the management system.</div> <div>The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge. The management system demonstrates consideration of the information obtained.</div> <div>The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge. The management system demonstrates consideration of the information and explains how it is used or not used.</div>

	Met?	Y	Y	N
	Justification	<p>The consultation processes regularly seeks and accepts relevant information, including local knowledge. The management system demonstrates consideration of the information obtained, but does not fully explain how it is used or not used. The local government conducts a consultation meeting, gathering information, and considers the concerns and requests of fisheries cooperative/fishers.</p> <p>Consultations – annual meetings are held between cooperatives, DARD and the Fisheries Bureau. Other stakeholders may be invited e.g. researchers, Coast Guard. Cooperatives may also call meetings for help if they have an issue – e.g. when there are disease outbreaks. Cooperatives then conduct surveys, providing local information and this forms a key part of management system.</p> <p>Cooperatives hold monthly internal meetings of steering committees, others fishery stakeholders may be invited e.g. other fishers.</p> <p>In other words, there is a very extensive consultation process, which regularly seeks and accepts local knowledge and other information (e.g. scientific where required) as input to management. SG80 met but SG100 not fully met – because do not always explain how information is used or not used.</p>		
c	Guided post		The consultation process provides opportunity for all interested and affected parties to be involved.	The consultation process provides opportunity and encouragement for all interested and affected parties to be involved, and facilitates their effective engagement.
	Met?		Y	N
	Justification	<p>Yes, the consultation process/procedures is transparent and public, so that any interested and affected parties can be involved, and facilitates their effective engagement – SG80 met as described above (scoring issue b).</p> <p>In relation to SG100 ‘facilitates their effective engagement’:</p> <p>Participants would normally be invited by DARD or by cooperatives. MoUs are made with the key stakeholders who have agreed to participate. Some fishers may have barriers to participating in DARD meetings e.g. transport costs – but they can organise their own meeting and invite DARD. DARD will then travel to them. This action facilitates the fishers’ inclusion and involvement.</p> <p>NGOs can ask to join the consultation process and would normally be invited. This does not however happen publically and is not open to anyone.</p> <p>Overall, SG80 is met but SG100 not fully met because involvement is not necessarily facilitated for all stakeholders (it is for fishermen but perhaps not for NGOs, although they are normally given the opportunity if they request it).</p>		
References		<p>MoUs between DARD, District People Committee, Coast Guard and Forest Ranger Force and Fisheries Cooperatives</p> <p>Minutes of DARD annual meetings, Minutes of monthly cooperative meetings</p>		

OVERALL PERFORMANCE INDICATOR SCORE:	80
CONDITION NUMBER:	N/A

Evaluation table 3 - PI 3.1.3

PI 3.1.3		The management policy has clear long-term objectives to guide decision-making that are consistent with MSC Principles and Criteria, and incorporates the precautionary approach		
Scoring Issue		SG 60	SG 80	SG 100
a	Guided post	Long-term objectives to guide decision-making, consistent with the MSC Fisheries Standard and the precautionary approach, are implicit within management policy	Clear long-term objectives that guide decision-making, consistent with MSC Fisheries Standard and the precautionary approach are explicit within management policy.	Clear long-term objectives that guide decision-making, consistent with MSC Fisheries Standard and the precautionary approach, are explicit within and required by management policy.
	Met?	Y	Y	P

PI 3.1.3		The management policy has clear long-term objectives to guide decision-making that are consistent with MSC Principles and Criteria, and incorporates the precautionary approach
	Justification	<p>The National and Provincial Fisheries Planning, National Fisheries Strategy to 2020 and Decision 29/2010/QĐ-UBND of local government Ben Tre, all have clear long-term objectives to guide decision-making of the sustainable use of fishery resources. These are consistent with MSC Principles and Criteria, and incorporate the precautionary approach. These are explicit within but not fully required by management policy.</p> <p>In this arrangement, long term use of clam resources has been identified, not just food for export, but also for poverty reduction/livelihood of local community, clam fishery must be managed under scientific bases, in harmonisation with environment protection, and habitat protection, prevents overfishing and over capacity, and prohibits destructive fishing.</p> <p>Also, risk management is important, and local government supports water quality monitoring (e.g. oil spill), including climatic changes in clam areas, and monitoring of clam quality (food safety). Monitoring and surveillance of clam area is conducted, as is monitoring of the clam catch. Additionally, there is enhanced local community management of the mangrove forests, where clam resources heavily rely, and the fishing ground/habitat of clams itself.</p> <p>Legislation such as the Biodiversity Law and Environment Law dictate 'sustainable use' of natural resources. The precautionary approach is not explicit but is implicit – e.g. requires research and planning before any activities are licenced or permitted. Objectives are consistent with precautionary approach – SG80 is met in relation to the MSC standard P1 and P2.</p> <p>In relation to SG100:</p> <p>MSC Standard Principle 1 – sustainable use explicitly required by management policy (e.g. Fisheries Law, National Fisheries Strategy etc. as described above) – SG100 is therefore met.</p> <p>MSC Standard P2 and precautionary approach - government working on incorporating ecosystem approach into the Fishery Law but not yet done; precautionary approach not explicitly required (although implicit in objectives and regulations) - SG100 not met here.</p> <p>SG100 overall is half met (P1 but not P2) so an overall score of 90 has been awarded.</p>
	References	<p>National and Provincial Fisheries Planning, National Fisheries Strategy to 2020</p> <p>Decision 29/2010/QĐ-UBND of local government Ben Tre</p> <p>Biodiversity Law or Environment Law for P2 related objectives</p>
OVERALL PERFORMANCE INDICATOR SCORE:		90
CONDITION NUMBER:		N/A

Evaluation table 4 - PI 3.2.1

PI 3.2.1		The fishery-specific management system has clear, specific objectives designed to achieve the outcomes expressed by MSC's Principles 1 and 2		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	Objectives , which are broadly consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are implicit within the fishery's management system	Short and long-term objectives , which are consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are explicit within the fishery's management system.	Well-defined and measurable short and long-term objectives , which are demonstrably consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are explicit within the fishery's management system.
	Met?	Y	Y	P
	Justification	<p>The clam fishery has clear short and long-term objectives, but some are difficult to measure in figures e.g. annual catch and clam area. The fishery employs more of an adaptive management strategy, but it is demonstrably consistent with achieving the outcomes expressed by MSC's Principles 1 and 2. The objective of the clam fishery is ensure the long-term use of clam resource (good catch volume, protection of habitat and environment, contribute to reducing poverty, equal benefit sharing, minimise conflicts etc.)</p> <p>However, it is not fully explicit within the fishery's management system, the Decision 29/2010/QĐ-UBND of local government Ben Tre said Fisheries Associations (FAs) should use some areas for brood-stock conservation but not regulate how many hectares for conservation; fishermen's incomes should increase but not specified by how much.</p> <p>Additionally, co-operative charters have clearly defined protocols for decision-making procedures; elections, meetings, terms of operation of cooperative and establishment and dissolutions.</p> <p>Co-operative regulations cover many areas including benefit sharing, M&E; patrol & conservation, finance management, penalty for illegal fishing and rewards for sustainable fishing.</p> <p>Overall, it was concluded that objectives are 'explicit' (80 met); they are 'well-defined' but as not all are 'measurable' SG100 is only half met.</p> <p>Overall a score 90 is given.</p>		
References		Provincial Law - Decision 29/2010/QĐ-UBND		

	Cooperative charters and regulations
OVERALL PERFORMANCE INDICATOR SCORE:	90
CONDITION NUMBER:	N/A

Evaluation table 5 - PI 3.2.2

PI 3.2.2		The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives, and has an appropriate approach to actual disputes in the fishery under assessment.		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	There are some decision-making processes in place that result in measures and strategies to achieve the fishery-specific objectives.	There are established decision-making processes that result in measures and strategies to achieve the fishery-specific objectives.	
	Met?	Y	Y	
	Justification	The fishery management system has established decision-making processes, resulting in problem solving (e.g. illegal fishing in clam area, disputes). More or less, the problems solving also lead to achieve the fishery-specific objectives. Decision-making processes can be further demonstrated through the setting of catch limits and how they may be modified in response to significant changes in the fishery (for example mass mortality of clams – see 1.2.1 and 1.2.2 above). On this basis SG80 is met.		
b	Guidepost	Decision-making processes respond to serious issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take some account of the wider implications of	Decision-making processes respond to serious and other important issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider	Decision-making processes respond to all issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of

		decisions.	implications of decisions.	decisions.
	Met?	Y	Y	N
	Justification	<p>Between 2011-2012, in the Fisheries Cooperative of Rang Dong and Thanh Phong, a lot of decision-making actions were made to solve the issue of illegal fishing in the clam area. These were identified via the monitoring and consultation process. Within the management system, there are two levels 1) Community level 2) Local Government level. For the internal issues at Fisheries Cooperative level, the Fisheries Cooperative decision making process can solve those e.g. IUU/disputes between fishers within a Fisheries Cooperative. In the case where two Fisheries Cooperative have conflicts e.g. clam fishing area, the local government will become involved. Depending on the seriousness and importance of the issues, these can be solved at commune, district or provincial government. Not very often, the issues may have to be solved at national level. In 2013-2015, wide-scale clam mortalities were recorded, due to extreme weather events. This was escalated to the national level to support a study to identify the causes for these deaths in Ben Tre. This is a good demonstration of the 'established decision-making processes' in place in the fishery, as per scoring issue a.</p> <p>SG80 is met as all serious and important issues are addressed in an adaptive way. SG100 is not however met, as 'all issues' are not responded to by the decision-making process. For example, it is not really known how much broodstock is present in the subtidal.</p> <p>For as long as the system seems to be working well, there is no incentive to address this question or incorporate it into management in any more detail. On this basis, SG80 is met but SG100 not.</p>		
c	Guidpost		Decision-making processes use the precautionary approach and are based on best available information.	
	Met?		Y	
	Justification	<p>In some years, 2010-2012, the price of baby clams increased significantly, some Fisheries Cooperative therefore requested to harvest the baby clams at very small-size, but the DARD and local government did not agree. This was in order to prevent harm to the clam resources, which would have occurred if harvested too early at a very small-size.</p> <p>Decision-making processes, demonstrating a clearly precautionary management system, are again reflected through changes to catch limits in response to disease outbreaks and additional surveys in response to such an event. See rationales 1.2.1 and 1.2.2 above for more details.</p>		

d	Guidepost	Some information on fishery's performance and management action is generally available on request to stakeholders.	Information on fishery performance and management action is available on request , and explanations are provided for any actions or lack of action associated with findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.	Formal reporting to all interested stakeholders provides comprehensive information on fishery performance and management actions and describes how the management system responded to findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.
	Met?	Y	Y	N
	Justification	<p>Fisheries Cooperatives convey information on clam performance through reporting regularly to DARD and the local government (e.g. clam catch, clam harvest area, baby clam area, illegal cases etc.). DARD also provides information e.g. from bivalve quality monitoring programme to Fisheries Cooperatives. The Coast Guard informs/reports the illegal fishing to Fisheries Association (FA) and DARD. The Local Government provides information on new regulations, planning, policy etc. to Fisheries Cooperative (FC), Coast Guard etc. Similarly, academia e.g. VIFEP, RIA, Can Tho University, Nong Lam University, Nha Trang Oceanography Institute supplies scientific information based on request or contract. Information is scattered across many organisations, and not concentrated in a single coordination body. Cooperatives produce an annual report, which is submitted to DARD and overall, there is a high level of 'formal reporting'.</p> <p>In this management arrangement, they have both formal and informal reporting systems, however information on fishery performance and management actions is not considered fully comprehensive as the management system does not describe how it has responded to findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.</p> <p>Information is available on request, for example NGOs or others parties could submit a request to DARD or the cooperatives to get information, but the information is not necessarily available 'to all interested stakeholders' directly.</p> <p>An explanation would be provided on management decision-making e.g. in the course of the various consultative meetings (e.g. annual cooperative/DARD meetings) but this is not 'formally reported' in all cases. Due to this, SG80 is met but SG100 not met in full.</p>		
e	Guidepost	Although the management authority or fishery may be subject to continuing court challenges, it is not indicating a disrespect or defiance of the law by repeatedly violating the same law or regulation necessary for the sustainability for the fishery.	The management system or fishery is attempting to comply in a timely fashion with judicial decisions arising from any legal challenges.	The management system or fishery acts proactively to avoid legal disputes or rapidly implements judicial decisions arising from legal challenges.
	Met?	Y	Y	Y

	Justification	<p>There have been many cases of action against illegal fishing in the fishery previously. Presently very few illegal fishing has been reported and observed in clam area. In all three districts, task forces have been empowered against illegal fishing. There is more focus on clam area, and this has shown to be very effective recently and continues to improve.</p> <p>Similarly, the court system also has improved. For example, a case in the Rang Dong clam cooperative, relating to disputes of corruption within Rang Dong FA. After the Rang Dong case, the reconciled/mediation approach was improved; as was the transparency at the community level. As a result better, clearer communication earlier in the process is now required, to reduce the chance of escalation to more serious issues.</p> <p>On this basis, the team have awarded SG100. The management system shows that it has acted proactively to avoid legal disputes – as in example given above. No legal challenges have arisen to the management system. SG100 is met.</p>
	References	<p>Vietnam Law of cooperative Decision 29/2010/QĐ-UBND Report on Causes identification for the massive mortalities of clam and blood-cockle in Ben Tre conducted by Nha Trang Oceanography Institute Most recent reports of cooperative and DARD annual reports District Task force for illegal fishing e.g. regulation</p>
OVERALL PERFORMANCE INDICATOR SCORE:		85
CONDITION NUMBER:		N/A

Evaluation table 6 - PI 3.2.3

PI 3.2.3		Monitoring, control and surveillance mechanisms ensure the fishery's management measures are enforced and complied with		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	Monitoring, control and surveillance mechanisms exist, are implemented in the fishery under assessment and there is a reasonable expectation that they are effective.	A monitoring, control and surveillance system has been implemented in the fishery under assessment and has demonstrated an ability to enforce relevant management measures, strategies and/or rules.	A comprehensive monitoring, control and surveillance system has been implemented in the fishery under assessment and has demonstrated a consistent ability to enforce relevant management measures, strategies and/or rules.
	Met?	Y	Y	Y
	Justification	<p>Before 2009, MCS was not very good and several illegal destructive fishing gears had been reported, but now it has seen a significant improvement. There has been two main reasons for the improvement 1) cooperative daily patrols and better enforcement 3) more active involvement of the local government in patrolling e.g. in Ba Tri district, the Task Force (formed of the Coast Guard, Mangrove Forest Ranger and the police) for patrolling has been established and stopped illegal fishing.</p> <p>Catch monitoring is maintained, and data sharing of catch is better between cooperatives and DARD (Department of Aquaculture, and Department of Food safety control). The Master Plan of Aquaculture development in Ben Tre has been reviewed and updated (including plan for clam fishing ground protection & development).</p> <p>Fisheries monitoring, control and surveillance (MCS) in Vietnam is conducted at different levels and scale. At the national level, MCS is conducted by Vietnam Fisheries Surveillance Authorities (VFSA) under the Directorate of Fisheries (Dfish). Along with MARD, VFSA collaborates with National Coast Guard and National Marine Police. Sometimes they have joint programme called the Joint Sector Task Force, who acts to patrol the sea of Vietnam (East Sea). VFSA has four branches in four regional geographical areas of Vietnam, including the South West regional branch where Ben Tre is located.</p> <p>Parallel with the national task force, MCS at the provincial is run through by the Fisheries Inspection Office, under Department of Fisheries (DoF) (under DARD Ben Tre). It is responsible for patrolling and regulations set for the fisheries. The Department of Aquaculture and Department of Planning under DoF is responsible for monitoring of clam resources/data. These organisations have to work closely, and hold a monthly meeting under the DARD meeting plan. Very often, the patrolling is collaborated with the provincial Coast Guard, and police of the local government (Provincial People Committee, District People Committee and Commune People Committee), who work on a case-by-case basis. In clam fisheries, these tasks very often collaborate with Coastal Forest Rangers.</p>		

		On this basis, SG100 is met		
b	Guidepost	Sanctions to deal with non-compliance exist and there is some evidence that they are applied.	Sanctions to deal with non-compliance exist, are consistently applied and thought to provide effective deterrence.	Sanctions to deal with non-compliance exist, are consistently applied and demonstrably provide effective deterrence.
	Met?	Y	Y	Y
	Justification	<p>Sanctions to deal with non-compliance is clearly stated in the Law of Fisheries. Local regulation including FA' regulation/rules/bylaw exhibits very good enforcement that have demonstrably provided effective deterrence. Now, the awareness of fishers have been improved significantly on responsible fishing practices, with the result that very few violations of fishing regulation have been recorded, and almost no sanctions applied within the last two years.</p> <p>Penalties in the fishery work on a scale basis. Generally speaking, simple cases will receive a warning e.g. for a first-time violation of a co-operative regulation by a fisher, where the damage is not severe. For moderate cases e.g. use of electronic gears or middle-scale damage, confiscation of fishing gears or a small fine may be enacted. If rules or regulations are violated for a third time, a fisher's licence or fishing gear may be revoked or a heavier fine received. In some cases fishers can be expelled from the cooperative. If the damage is on a large-scale and there are negative impacts to many people or the ecosystem, or a dispute has lead to injury or death of other people, the fishers can be given to the court after arrested by the police.</p> <p>The team feels that this demonstrates that sanctions are applied for non-compliance, at a suitable scale for the violation, which provides demonstrably effective deterrence. SG100 is met.</p>		
c	Guidepost	Fishers are generally thought to comply with the management system for the fishery under assessment, including, when required, providing information of importance to the effective management of the fishery.	Some evidence exists to demonstrate fishers comply with the management system under assessment, including, when required, providing information of importance to the effective management of the fishery.	There is a high degree of confidence that fishers comply with the management system under assessment, including, providing information of importance to the effective management of the fishery.
	Met?	Y	Y	Y
	Justification	<p>Now, fishers comply well with the management, they also report/feedback to improve the management regulation, as explained above in scoring issues a and b – SG100 is met because 'high degree of confidence'.</p> <p>With regard to the provision of information, cooperatives check harvest of each member, as well as compliance with maximum size limit. More detail is provided back in the scoring rationale for PI 1.2.3.</p>		

		SG100 is therefore met.		
d	Guidepost		There is no evidence of systematic non-compliance.	
	Met?		Y	
	Justification	No systematic violation of regulation of clam management – as demonstrated above. This scoring issue is therefore met at the SG80 level.		
References		Notes/Records of Cooperative meetings Annual reports of DARD Ben Tre on clam related issues Cooperative rules MoU of DARD, local government, Coast Guard, Forest Rangers, Police and Cooperatives		
OVERALL PERFORMANCE INDICATOR SCORE:				100
CONDITION NUMBER:				N/A

Evaluation table 7 - PI 3.2.4

PI 3.2.4		There is a system of monitoring and evaluating the performance of the fishery-specific management system against its objectives There is effective and timely review of the fishery-specific management system		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	The fishery has in place mechanisms to evaluate some parts of the management system.	The fishery has in place mechanisms to evaluate key parts of the management system	The fishery has in place mechanisms to evaluate all parts of the management system.
	Met?	Y	Y	Y
	Justification	Every year, DARD organises an annual meeting to review and evaluate the performance against its objectives, inviting key stakeholders (FA, seafood processing plants, Coast Guard, and district/commune government officials) or wider stakeholders depending on what is necessary (Universities, academia, NGO etc.). Any party may raise an issue if they wanted a review – e.g. NGOs could request an issue to be raised and it would be evaluated. SG100 is met.		
b	Guidepost	The fishery-specific management system is subject to occasional internal review.	The fishery-specific management system is subject to regular internal and occasional external review.	The fishery-specific management system is subject to regular internal and external review.
	Met?	Y	Y	N
	Justification	The fishery undergoes regular internal review as described in scoring issue a. Dfish and VIFEP at the central government, and sometimes the independent organisations e.g. academia can complete an external review. The completion of an external review was one of the conditions of the fishery's initial certification and was carried out during the first certification cycle. Last year a review was conducted by VIFEP. These external reviews occur occasionally or periodically and its frequency does not necessarily constitute 'regular'. On this basis, SG100 not met in full and SG80 is awarded.		
References		Minutes or agenda of DARD review meeting Study reports on effectiveness of current clam fisheries management system in Ben Tre against MSC by VIFEP		

PI 3.2.4	<p>There is a system of monitoring and evaluating the performance of the fishery-specific management system against its objectives</p> <p>There is effective and timely review of the fishery-specific management system</p>
OVERALL PERFORMANCE INDICATOR SCORE:	90
CONDITION NUMBER:	N/A

Appendix 2. Peer Review Report

Appendix 2.1 Peer Review

Summary of Peer Reviewer Opinion

Has the assessment team arrived at an appropriate conclusion based on the evidence presented in the assessment report?	Yes/ No	CAB Response
<u>Justification:</u> 1) Clear and updated information on stock biomass and reference points haven't been presented. Furthermore, the productivity of the seed and commercial harvest reduced from 4.3 tonnes/ha and 1.7 tonnes/ha in 2009 to 2.4 tonnes/ha and 1.2 tonnes/ha in 2014 respectively. In addition, there have been several episodes of mass mortalities of clams over the last few years. Therefore, it is likely that the stock is just above the point where recruitment would be impaired 2) Catch limits have been mentioned, however, the state of the stock hasn't been described. In this case, the harvest strategy is just expected to achieve stock management and it is likely to work on prior experience. 3) HCRs have been described, however, it is not clearly related to PRI (e.g. why has the fixed 15-20% of biomass unharvested rule been chosen?) and to maintaining uncertainties (e.g. how have HCRs responded to several episodes of mass mortalities of clams over the last few years?). 4) Sufficient relevant information related to stock structure, stock productivity to support the harvest strategy hasn't been clearly described in the report. 5) The assessment of stock status hasn't also been fully described in the report.		<u>See reply to detailed comments on 1.1.1</u> <u>See reply to detailed comments on 1.2.1</u> <u>See reply to detailed comments on 1.2.2</u> <u>See reply to detailed comments on 1.2.3</u> <u>See reply to detailed comments on 1.2.4</u>

Do you think the condition(s) raised are appropriately written to achieve the SG80 outcome within the specified timeframe? [Reference: FCR 7.11.1 and sub-clauses]	Yes/No	CAB Response
<u>Justification:</u>	N/A	

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
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Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
1.1.1	No	No	NA	<p>The certifier gave a score of 80 for this PI. The 80 scoring guidepost asks that there is evidence that it is highly likely that the stock is above the PRI and the stock is at or fluctuating around a level consistent with MSY. However, no clear and update information on proxy indicators and reference points has been presented in the report. Furthermore, the productivity of the seed and commercial harvest reduced from 4.3 tonnes/ha and 1.7 tonnes/ha in 2009 to 2.4 tonnes/ha and 1.2 tonnes/ha in 2014 respectively (the fishery is not managed by a fixed overall TAC and around 35-50% of the most productive areas are annually harvested). In addition, there have been several episodes of mass mortalities of clams over the last few years. Therefore, It is likely that the stock is just above the point where recruitment would be impaired (probably a score of 60 -70).</p>	<p>Scoring issue a at SG80 requires it to be 'highly likely' that the stock is above the PRI, while SG100 requires 'a high degree of certainty'. Where it is possible to define these in quantitative terms, MSC suggests cut-off limits of $p > 0.8$ and $p > 0.95$ respectively for 'highly likely' and 'high degree of certainty'.</p> <p>While there are no estimates of biomass or reference points in the way that would normally be required for a finfish fishery, the means by which this fishery is managed is not unusual for a bivalve fishery and needs to be seen in those terms.</p> <p>To take scoring issue a first, the team considered that there were several lines of evidence that the stock is well above the PRI, as set out in the rationale</p>
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Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response														
					<ul style="list-style-type: none">Some areas are not harvested;Some biomass is left in harvested areas;Large (i.e. highly fecund) clams are not harvested;In common with most other bivalve species, the clams are known to be highly productive;The mass mortality events are actually further evidence that the stock is well above the PRI, since one of the trigger factors is high density settlement. <table><tr><th>Seed harvest</th><th>Commercial harvest</th></tr><tr><td>4.33</td><td>1.78</td></tr><tr><td>2.13</td><td>1.65</td></tr><tr><td>1.41</td><td>0.62</td></tr><tr><td>4.07</td><td>1.38</td></tr><tr><td>1.33</td><td>1.50</td></tr><tr><td>2.42</td><td>1.24</td></tr></table>	Seed harvest	Commercial harvest	4.33	1.78	2.13	1.65	1.41	0.62	4.07	1.38	1.33	1.50	2.42	1.24
Seed harvest	Commercial harvest																		
4.33	1.78																		
2.13	1.65																		
1.41	0.62																		
4.07	1.38																		
1.33	1.50																		
2.42	1.24																		
3000R05A ME Certification Ltd.				105															

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
					<p>Spat settlement is somewhat variable in time and space, as is common for most bivalve species, but taking overall production per unit area (as per the figures quoted by the reviewer), the full set of figures 2009-2014 is now provided in Table 3 – repasted above.</p> <p>It is clear that the production per unit area has fluctuated without trend over time (seed production particularly). It is reported that the quantity of seed harvested is partly related to the market rather than the amount of seed available. In any case, there is no evidence from these figures of any trend in productivity, nor of any relationship between biomass and recruitment (e.g. a large harvest leading to lower seed productivity the following year).</p> <p>Overall, despite the very reasonable questions raised by the reviewer, the team were comfortable with the conclusion that the stock is at least 'highly likely' to be above the PRI.</p>

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
					<p>In relation to scoring issue b, again as the reviewer notes there are no direct estimates of MSY-based reference points (as is usual for bivalve and indeed most other invertebrate fisheries – in fact, for bivalves the entire concept of 'MSY' is perhaps questionable, given that it implies a stock which can reach some kind of equilibrium steady state).</p> <p>Nevertheless, various proxies for MSY are available, as reviewed in the rationale – none are perhaps completely satisfactory but taken together the team concluded that they give a convincing picture.</p>
1.1.2	No	No	N/A	The certifier didn't give a score for this PI	Since the score was not reduced below 80 for 1.1.1, this PI was not scored.

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
1.2.1	No	No	N/A	The certifier gave a score of 85 for this PI. The 80 scoring guidepost asks: (a) the harvest strategy is responsive to the state of the stock and the elements of the harvest strategy work together towards achieving stock management objectives; (b) the harvest strategy may not have been fully tested but evidence exists that it is achieving its objectives; (c) Monitoring is in place that is expected to determine whether the harvest strategy is working. In the report, catch limits are mentioned, however, no information on the state of the stock has been showed. In this case, the harvest strategy is just expected to achieve stock management and it is likely to work on prior experience.	<p>The reviewer's main concern here is that there is not a measure of the state of the stock, in terms of estimates of stock biomass or some proxy – hence for scoring issues a and b, SG80 should not be met.</p> <p>For scoring issue a, the question is whether the strategy is 'expected' to achieve objectives (SG60) vs whether it 'responsive to the state of the stock' (SG80). The team was confident that the strategy is responsive to the state of the stock, since it relies on surveys at the start of each season to define the details of the operational fishing strategy for each cooperative for that season, because changes to the strategy mid-season (e.g. if the cooperative would like to take additional seed) requires another survey, and because management responds to events such as mortality events via husbandry.</p>

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
					<p>On this basis, the team was happy that SG80 is met, even if management is not via a standard 'stock assessment→TAC' type system (which is not generally suitable for the management of bivalve fisheries).</p> <p>For scoring issue b, the question is whether the strategy is 'likely to work' (60) vs. shows 'evidence of achieving its objectives' (80).</p> <p>The main line of argument used in the rationale as 'evidence' (80) is the same arguments that are used in 1.1.1 – i.e. that the team considered it was 'highly likely' that the stock is above the PRI and fluctuating around a level which would be a suitable proxy for MSY (at least, for the intent). Since the scoring of 1.1.1 has not changed, this still applies.</p>

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
1.2.2	No	No	N/A	The certifier gave a score of 80 for this PI. The 80 scoring guidepost asks that well defined HCRs are in place that ensure that the exploitation rate is reduced as the PRI is approached; the HCRs are likely to be robust to the main uncertainties; available evidence indicates that the tools in use are appropriate and effective in achieving the exploitation levels required under the HCRs. HCRs have been described, however, it is not clearly related to PRI (e.g why has the fixed 15-20% of biomass unharvested rule been chosen?) and to maintaining uncertainties (e.g how have HCRs responded to several episodes of mass mortalities of clams over the last few years?).	<p>The main questions the reviewer asks here are: i) how are the HCRs related to the status of the stock and ii) how do they respond to uncertainties (such as mortality events)?</p> <p>The HCRs are essentially empirical, as are the evaluations of stock status. Nevertheless, the HCRs are clearly related to stock status via annual surveys which evaluate the stock status in each management area. Since spatfall is surveyed in this way, it would immediately be apparent if recruitment was impaired and the HCR can respond immediately (by defining catch limits and fishing areas, as well as via husbandry).</p> <p>In relation to uncertainties, it is clear that biomass and spatfall is variable in time and space (as is normally with bivalve populations), hence this empirical approach is reasonable, precisely because stock biomass is too variable and uncertain to manage via a modelling approach.</p>

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
					For mass mortalities specifically, the management system responds rapidly via husbandry – if this is unsuccessful at averting high mortality rates, the fishery can be closed.

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
1.2.3	No	No	N/A	The certifier gave a score of 80 for this PI. The 80 scoring guidepost asks that sufficient relevant information related to stock structure, stock productivity, fleet composition and other data are available to support the harvest strategy. However, this information hasn't been clearly described in the report.	The critical question for this PI is whether sufficient information is available to support the harvest strategy – the information available is largely empirical (i.e. annual surveys) but so is the harvest strategy, and in the view of the team (as already noted) this is entirely reasonable given the nature of the stock and fishery. SG80 specifically mentions stock structure, stock productivity and fleet composition, and the available data are described in the rationale. Since this is a re-assessment, the team are not required to set out in detail data where it has not changed from the previous assessment (e.g. in relation to the biology of the species). it was not at all practical to provide the results of the annual surveys for each management area (a very large data set available only in Vietnamese) – the team concluded that it was sufficient to describe how it is carried out (see 1.2.4a for the methodology).

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
1.2.4	No	No	N/A	The certifier gave a score of 85 for this PI. The 80 scoring guidepost asks: (a) the assessment is appropriate for the stock and for the harvest control rule; (b) the assessment estimates stock status relative to reference points that are appropriate to the stock and can be estimated; (c) the assessment of stock status is subject to peer review. However, the assessment of stock status hasn't been fully described in the report.	Not so – the survey methodology (which is of concern here) is described in the rationale for scoring issue a.
2.1.1	Yes	Yes	N/A		
2.1.2	Yes	Yes	N/A		
2.1.3	Yes	Yes	N/A		
2.2.1	Yes	Yes	N/A		
2.2.2	Yes	Yes	N/A		

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
2.2.3	Yes	Yes	N/A		
2.3.1	Yes	Yes	N/A		
2.3.2	Yes	Yes	N/A		
2.3.3	Yes	Yes	N/A		
2.4.1	Yes	Yes	N/A		
2.4.2	Yes	Yes	N/A		
2.4.3	Yes	Yes	N/A		
2.5.1	Yes	Yes	N/A		
2.5.2	Yes	Yes	N/A		
2.5.3	Yes	Yes	N/A		

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
3.1.1	No	No	N/A	<i>The certifier gave a score of 100 for this PI. The 100 scoring guidepost asks (a) There is an effective national legal system and binding procedures governing cooperation with other parties which delivers management outcomes consistent with MSC Principles 1 and 2; (b) The management system incorporates or subject by law to a transparent mechanism for the resolution of legal disputes that is appropriate to the context of the fishery and has been tested and proven to be effective; (c) The management system has a mechanism to formally commit to the legal rights created explicitly or established by custom of people dependent on fishing for food and livelihood in a manner consistent with the objectives of MSC Principles 1 and 2</i>	The team recognise the peer reviewer comments and based on this, have decreased the PI score from 100 to 95. This is because as the peer reviewer states, it is difficult for the management to formally commit to the customary legal rights of the people fishing within the cooperatives on the Ben Tre clam stocks. The scoring issue c score has therefore been reduced from 100 to 80. Text has been adjusted in the scoring rationales to support this conclusion.

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
				<i>However, property rights of coastal water areas for fisheries and aquacultures haven't been applied in practice (although these rights are mentioned in Degree No 51/2014/NĐ-CP dated 21st May 2014), it is hard for cooperatives to formally protect their fishing grounds and clam stocks.</i>	
3.1.2	Yes	Yes	N/A		
3.1.3	Yes	Yes	N/A		
3.2.1	Yes	Yes	N/A		
3.2.2	Yes	Yes	N/A		
3.2.3	Yes	Yes	N/A		
3.2.4	Yes	Yes	N/A		

Optional: General Comments on the Peer Review Draft Report (including comments on the adequacy of the background information if necessary) can be added below and on additional pages

All through this is a re-assessment report and stock status has been referred to the previous assessment report, a summary of update information on biology, status of biomass of target species should be presented. In addition, time series data of estimated biomass, reference points and social economics of fishing communities should also be described.

MEC response: MEC does not consider it useful to provide information, which is not required in MSC's template (and in fact some of the information which is required in MSC's template isn't all that useful either). Overly long reports burdened with unnecessary detail have been (and still are) a scourge of MSC assessments. MEC's view is that sufficient information should be provided to allow an informed stakeholder to make a judgement as to whether the scoring is reasonable. In some cases, this may require the stakeholder to refer to the previous PCR, and this has been signalled where necessary in our report.

Appendix 3. Stakeholder submissions

Ref	Type	Page	Requirement	Reference	MSC comment	PI	MEC response
20627	Major		FCR-7.4.7 v.2.0	7.4.7 The CAB shall confirm the proposed unit of assessment (UoA) (i.e., what is to be assessed) to include: 7.4.7.1 The target stock(s); 7.4.7.2 The fishing method or gear type/s, vessel type/s and/or practices, and; 7.4.7.3 The fishing fleets or groups of	The target stock has been defined as the clam from Ben Tre Province. However, any reference or justification have been provided showing that Ben Tre clam can be considered as an independent and well-delimited population of clam (<i>Meretrix lyrata</i>). We note that Principle 1 (see introduction to the Certification Requirements) applies to the whole of the fish stock exploited by the fishery	1.1.1, 1.2.2, 1.2.3, 1.2.4	<p>In relation to stock structure, please recall that this is a reduced re-assessment report, following the reduced re-assessment template. On this basis, we are not required to give full details in relation to the background for scoring each Principle – only to described what has changed since the previous assessment.</p> <p>The previous PCR gives quite extensive information about the population structure of <i>M. lyrata</i> in the Mekong Delta area (see pages 6-7). In summary:</p> <ul style="list-style-type: none"> • Although there is a trochophore (planktonic larvae) phase, larval behaviour (vertical migration) promotes local retention; • There may be local post-settlement dispersal at the second larval (veliger) phase, during which larvae are embysed to the substrate; • There is also an ontogenetic migration, which sees adult clams tending to move down the intertidal and into the subtidal as they age; • <i>M. lyrata</i> is widely distributed in the Mekong Delta region (specifically Can Gio District (Ho Chi Minh City, HCMC), Go Cong Dong District (Tien Giang province), Districts of Binh Dai, Ba Tri, Thanh Phu

				<p>vessels, or individual fishing operators pursuing that stock, including any other eligible fishers that are outside the unit of certification.</p>	<p>seeking certification.</p> <p>On the other hand, the MSC recognizes that the application of the “stock” concept may vary depending on the knowledge available and complexity in management and that in some cases stocks may be structured as “metapopulations”. However, if that were the case, teams should include (see G7.4.7) detailed information, clarifying whether the unit stock is based on one or more local populations or on a metapopulation</p>	<p>(Ben Tre province), Districts of Cau Ngang, Duyen Hai (Tra Vinh province), Vinh Chau District (Soc Trang province), Vinh Loi District (Bac Lieu province) and Ngoc Hien District (Ca Mau province); however it is most abundant in Ben Tre province;</p> <ul style="list-style-type: none"> Local scientists believe based on observation that recruitment (spatfall) is largely derived from local sources and hence that it is appropriate to manage the fishery at a local level (by cooperative); there is not, however, any scientific peer-reviewed or grey literature to back this up, as far as we could discover. <p>In other words, the existing evidence suggests that <i>M. lyrata</i> populations are most likely relatively local. Presumably these populations are linked (as are all adjacent populations, including fish stocks) but to what extent is not known, and is most likely variable from year to year and area to area. As for sources and sinks, while considerable scientific effort has gone into trying to identify sources and sinks in a metapopulation, this has rarely been convincingly achieved in practice, and again it seems likely that the structure will be variable over time. Sources and sinks in metapopulations remain, in the view of the team, a theoretical concept in ecology more than practical concept for the management of fisheries, with a few exceptions. In practice, the majority of fish ‘stocks’ are probably either a meta-population or a</p>
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					<p>as a whole. Details should be provided on the appropriateness of the level of assessment and management chosen, explaining: in the case that management is based on the whole metapopulation, how it is expected to avoid local depletion. If based on one or more local populations, whether these are believed to be sources or sinks, the relationship among subpopulations and how management avoids over exploitation within both the selected</p>	<p>sub-population within a meta-population, or both, and most likely to a variable extent over time, and with sources and sinks, if any, not identified, and most likely also variable over time. This fishery is therefore no different to most MSC fisheries in this regard.</p> <p>The situation is further complicated here by the existence of local-scale movements of seed (husbandry), within cooperative areas or between cooperatives within the Ben Tre fishery. Seed is moved from areas of dense spatfall (which results in low growth and high mortality) to areas which are known to be suitable for clams but which receive less or no spatfall at that given moment (spatfall being highly variable in time and space, as is usual for bivalves). This would obviously blur distinctions of source vs sink, and tend to enhance spat survival and hence productivity of the overall metapopulation. (This situation is analysed in the report in relation to the question of translocations – see Section 2.2.1.)</p> <p>In general, lacking concrete information on the details of population structure (as for most fisheries) the team did not find it particularly helpful to speculate on the question. The critical question is to establish whether the management structure is robust to these uncertainties. In practice, if population structure is uncertain, then population assessment and fisheries management at the sub-population level is nearly always more precautionary than at the meta-</p>
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					<p>local populations and more broadly in the whole metapopulation.</p> <p>Note that further requirements would also apply for scoring PI1.2.2 (about uncertainties relating to the metapopulation structure), PI 1.2.3 (Understanding dispersal pathways and population connectivity), PI1.2.4 (appropriateness of the stock assessment in relation to the metapopulation structure).</p>	<p>population level, because of the risk of local depletion (as the reviewer notes). If a given sub-population is acting as a source for recruitment for neighbouring populations, then as long as it is managed such that recruitment is not impaired, the metapopulation will also be sustainably managed. This type of dynamics is discussed in relation to fisheries management in, for example, Secor 2001 and Kell et al. 2009 (full references given below – others are also available, these are just examples). It is also important to note that the system of moving seed between areas to enhance survival will tend to eliminate sources and sinks and hence reduce further the risks associated with the management of a metapopulation.</p> <p>In order to address this question in the main body of the report, a section has been added in Section 2.2.2 (Principle 1) as well as at the top of the rationale for PI 1.1.1 discussing this question and setting out the approach taken to the definition of the stock in scoring Principle 1.</p> <p>The points made by the reviewer in relation to 1.2.2, 1.2.3 and 1.2.4 have also been addressed within these rationales, where required.</p> <p>Secor DH 2001. Is Atlantic bluefin tuna a metapopulation? ICES SCRS Workshop on bluefin</p>
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							<p>tuna mixing, September 2001.</p> <p>Kell, L. T., Dickey-Collas, M., Hintzen, N. T., Nash, R. D. M., Pilling, G. M., and Roel, B. A. 2009. Lumpers or splitters? Evaluating recovery and management plans for metapopulations of herring. ICES Journal of Marine Science, 66: 1776–1783.</p>
20628	Major	25	FCR-7.7.6 v.2.0	<p>The CAB shall use the criteria in Table 3 to make a decision on whether a fishery may or may not be data-deficient with respect to one or more PI.</p>	<p>Stock status reference points derived either from analytical stock assessment or using empirical approaches seems to be not available. However, RBF has not been used in this case. According to Table 3 (Criteria for triggering the use of the RBF) this fishery would be considered as data-deficient with respect to PI 1.1.1 and therefore required (FCR</p>	<p>1.1.1, 1.2.4, 1.2.2</p>	<p>MEC first notes FCRG version 2.0 7.7.6.4:</p> <p>Uncertainties in the stock definition or stock assessment models shall not be used as a rationale for using Annex PF in cases where some form of indicators and reference points are available for the fishery</p> <p>Also:</p> <p>SA2.2.3 Where information is not available on the stock status relative to the Point of Recruitment Impairment (PRI) or MSY levels, proxy indicators and reference points may be used to score PI 1.1.1. !!</p> <p>SA2.2.3.1 Where proxy indicators and reference points are used to score PI 1.1.1, the team shall justify their use as reasonable proxies of stock biomass for the PRI and/or MSY.</p> <p>Also in GSA2.2.3.1:</p> <p>In this section the term “reference point” is used in relation to determination of status, not in relation to harvest control rules (see additional guidance on this distinction in GSA2.6).</p> <p>Writing the PISGs in terms of biomass and fishing rate metrics creates an appearance that the MSC fisheries standard is not well suited for other than large industrial fisheries with formalised</p>

				<p>7.7.6) to use Annex PF (RBF).</p> <p>We also note that the team has not explicitly responded (page 29-30) to the questions related to Stock Status relative to Reference Points: Type of reference point? Value of reference point? Current stock status relative to reference point? but refers instead to justification found in PI 1.1.1 Sla (PRI) and Slb (MSY). The team provides their own considerations on what the probabilities are that stock levels are above PRI or fluctuating around</p>	<p>stock assessments and biomass based reference points. This is not the intent.</p> <p>SA2.2.3 confirms that teams may allow the use of surrogate or proxy indicators and reference points in scoring both stock biomass and exploitation rate. The terms “likely”, and “highly likely” are used to allow scoring by either qualitative or quantitative approaches.</p> <p>□ Examples of qualitative interpretation include analogy with similar situations, plausible argument, empirical observation of sustainability and qualitative risk assessment.</p> <p>In relation to 1.1.1, Table 3 states that it should not be used if</p> <p>Stock status reference points are available, derived either from analytical stock assessment or using empirical approaches</p> <p>In other words, the RBF need not be used if proxies for stock status reference points are available, even if the definition of the stock is unclear. These reference points need not be formally used in management (see for example the adjudication on the WWF objection to the Cook Islands albacore fishery certification: (https://www.msc.org/track-a-fishery/fisheries-in-the-program/certified/pacific/cook-islands-tuna/assessment-downloads)). In the scoring, the team considers three such proxies, finds that two are fairly suitable (although one is based on old data) and both are most likely met at the SG80 level.</p> <p>The reviewer is correct that the team has not explicitly responded to the questions on reference points – the rationale makes it clear why not. Noting</p>
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					<p>MSY. However, these levels have not been formally defined and adopted by the management as proper reference points (e.g. points considered desirable and which management is trying to achieve, or avoid).</p>	<p>that the SGs make no reference at all to reference points (they are asking about the PRI and B_{MSY}, or proxies), the team considered that this was reasonable in this case, noting the possibility of qualitative interpretations as set out in GSA2.2.3.1 (given above).</p> <p>Having said all this, in order to establish that our analysis is robust to these choices, MEC have prepared a PSA for <i>M. lyrata</i> in this fishery. Note that this should not be considered a formal PSA because formal stakeholder input has not been used to score susceptibility. This has been inserted into the report after this MSC TO table. The PSA conclusion supports the team's previous findings. A provisional PSA score of 88 was determined.</p> <p>Overall, this fishery falls in a grey area in the MSC requirements between the default SGs and the RBF, since there are no explicit reference points but there are various options for proxies, although mainly semi-quantitative rather than fully quantitative. The team felt that, given a choice between the default PIs and SGs and the RBF, the default tree provides a considerably more robust analysis of stock status. It is well known that the 'susceptibility' element of the PSA is both difficult to evaluate quantitatively and has a disproportionate influence on the outcome – such that, for example, a change in one of the four susceptibility attributes from 1 to 2 to 3, without</p>
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							changing anything else, can lead to scores of >80, 60-80 and fail; there may be an element of guesswork in scoring this attribute. Thus overall, the PSA is not a robust analysis and should in the view of the team be used only where there are no other options. This is not the case here, as I hope we have demonstrated.
20629	Major	25-44	FCR-7.10.6.1 v.2.0	A rationale shall be presented to support the team's conclusion.	<p>Rationale does not support the team's conclusion.</p> <p>PI 1.1.1 (see comments above on FCR 7.7.6 to use RBF)</p> <p>PI 1.2.1 (SIb). In absence of reference points and noting that total harvest in last years has decreased with respect to the first two years of the series provided (table 3) it is unclear what is</p>	1.1.1, 1.2.1, 1.2.3, 1.2.4, 3.2.4	<p>1.1.1 – see response to comment above.</p> <p>1.2.1 – Harvest strategy achieving its objectives</p> <p>The team notes GSA2.4</p> <p>Assessing informal approaches against PI 1.2.1:</p> <p>...</p> <p><input type="checkbox"/> Teams should further consider how elements of the strategy are combining to ensure that the fishery is moving in the desired direction or operating at a low risk level and that qualitative or semi-quantitative objectives are being achieved.</p> <p><input type="checkbox"/> There should be evidence that the expected objectives are being achieved. Evidence may be demonstrated through local knowledge or research.</p> <p>In other words, objectives can be 'qualitative or semi-quantitative'. In the rationale, the team cites the conclusions of PI1.1.1 as a justification for the conclusion that objectives are being achieved; the scoring of PI1.1.1 concludes that the harvest strategy outcome is consistent with MSY proxies, as evaluated in a semi-quantitative way. Evidence is provided in the form of data on recruitment, fished</p>

				<p>the evidence supporting the team conclusion that the harvest strategy is achieving its objectives.</p> <p>PI 1.2.2 (Sla). It is unclear how the HCRs ensure that the exploitation rate is reduced as the PRI is approached (SG60), and how can keep the stock fluctuating around a target level consistent with (or above) MSY (SG80).</p> <p>The HCR requires to leave 15-20% of biomass</p>	<p>areas and fishable biomass estimates. The team also notes that a decrease in harvest is not evidence that harvest strategy objectives are not being met – it could equally be evidence that the harvest strategy is able to adjust the amount of harvest based on what is sustainable. In practice, the reduction in catch in recent years relates to events of mass mortality due to high temperatures, on which there has been extensive research and for which changes in husbandry practices have been implemented, as described in detail in the report.</p> <p>1.2.2 – Sla How does the HCR ensure that exploitation rate is reduced as the PRI is approach, and how does it keep the stock fluctuating around a level consistent with MSY? i.e. how is it responsive to the state of the stock?</p> <p>The management system is essentially empirical (which is not the same as arbitrary), and limits and targets (as well as husbandry activities) are agreed in each cooperative each year according to the outcome of surveys and the knowledge of scientists and fishers about the stock and fishery dynamics. In the view of the team, this kind of empirical management is more directly responsive to the state of the stock than a model-based system, in as much as the model intervenes between direct knowledge about the state of the stock (which is possible here unlike in most fisheries) and management decision-making.</p>
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					<p>unharvested in fished areas, depending on fish stock and market, however, it is unclear on which basis these percentages have been selected. The team estimates “that each cooperative carries out a survey to evaluate biomass and density of adult and seed clams and (with scientific input from the Fisheries Research Institute) decide how much seed and adult clams to harvest and what proportion should be left as broodstock, depending on the density on the</p>	<p>Furthermore, the HCR allows for adjustments to be made mid-season should the situation change (e.g. in the case of mortalities, or supplementary settlement). Furthermore, husbandry allows for the management system to intervene before mortalities take place, to maximise the output from recruitment.</p> <p>In relation to the PRI specifically, it seems very unlikely, given the HCR (as described in the rationale for 1.2.2a) that the PRI would ever be approached in this fishery, given the reproductive biology of the species (high fecundity, broadcast spawning), the improbability of a strong stock-recruit relationship and the husbandry element. In relation to the proportion of the stock which is protected (evaluated in 1.1.1 as being consistent with MSY), the core areas and the subtidal areas as well as the large clams are left unharvested come what may – a proportion of the remainder is taken based on surveys. Hence even if the proportion was 100%, this HCR is still arguably consistent with a precautionary harvest strategy consistent with maintaining the stock at an appropriate level (see 1.1.1b).</p> <p>No change has been made to the scoring of 1.2.2a.</p> <p>1.2.2 – SIb Uncertainties relating to the definition of the UoA (i.e. the ‘stock’). See response above. This has been added to the rationale.</p>
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				<p>beds and the quantity of spatfall". However, no details are given about that biomass and density of adult and seed found; no information is given on how the cooperatives calculate the proportion that can be harvested (what is the rule, or it is arbitrary?).</p> <p>(Sib) HCR seems to not have considered uncertainties related to the definition of the UoA (see comments above on FCR 7.4.7 Target stock).</p> <p>PI 1.2.3 (Sib)</p>	<p>1.2.3 – SIb Details on biomass and density found in surveys – An example from the Rang Dong Aquaculture Co-operative was obtained from June 2016. This is provided in Appendix 6.</p> <p>1.2.3 – SIb Information on dispersal pathways and population connectivity Since it has been concluded that the harvest strategy is robust to uncertainties about population structure (see discussion above, also in Section 2.2), therefore this information is not required to support the harvest control rule (as per the wording of SG80 and SG100). A note has been added to this effect in the rationale, but the scoring has not been changed.</p> <p>1.2.4 – SIa Details of the stock assessment The team again notes that 'empirical' is not the same as 'arbitrary'. An example from the Rang Dong Aquaculture Co-operative was obtained from June 2016. This is provided in Appendix 6</p> <p>1.2.4 – SIb How does the assessment estimate stock status relative to reference points. The reviewer is right that this SG is problematic since it is contradictory to the MSC guidance regarding proxy reference points and qualitative approaches, set out above. Presumably this is a hangover from version 1.3 (which had a PI explicitly about reference points, now removed). The team concluded that since proxies and semi-quantitative approaches are</p>
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					<p>Stock abundance and removals seems to be regularly monitored, however no details are given in the report of that biomass and density of adult and seed found (see comment on PI 1.2.2)</p> <p>(SIb) Information on dispersal pathways and population connectivity seems to have not been considered when assessing available information on stock structure, abundance and removals (see comments above)</p>	<p>acceptable in regard to PI 1.1.1 and in the harvest strategy and control rule, then logically they must be acceptable here. In any case, it is possible to estimate empirical reference points using the data available (see 1.1.1a and b; GSA 2.7), and these are suitable for the stock and the fishery in question. Hence the team concluded that this scoring issue is met at the 80 level.</p> <p>1.2.4 – SIc See comments above.</p> <p>3.2.4 – SIb All parts of the management system The evaluation meeting is open – i.e. any party may raise any issue for consideration. This constitutes a ‘mechanism to evaluate all parts of the management system’ as required by SG100, although it does not necessarily mean that all parts are evaluated every time (but this is not the requirement).</p>
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					<p>on FCR 7.4.7 Target stock).</p> <p>PI 1.2.4 (Sla). It is unclear whether an adequate assessment of the stock status exists. As above, the team estates that each cooperative carries out a survey to evaluate biomass and density of adult and seed clams. However, no details are given in the report of that biomass and density of adult and seed found; or how these assessments are done; no information is given on how the cooperatives calculate the</p>		
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					<p>proportion that can be harvested (what is the rule, or it is arbitrary?).</p> <p>(SIb), in absence of reference points (see comments above on FCR 7.7.6 to use RBF), it is unclear how can this SI (“the assessment estimates stock status relative to reference points that are appropriate to the stock and can be estimated”) can be met, or even scored.</p> <p>(SIc), uncertainties related to the definition of the UoA seems to not have been</p>		
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					<p>considered (see comments above on FCR 7.4.7 Target stock).</p> <p>PI3.2.4 (SIb): The rationale does not justify the score of 100 for this scoring issue, as it does not explain how all parts of the management system are evaluated.</p>		
20630	Guidance	14	FCR-7.6.1 v.2.0	7.6.1 The CAB shall nominate a date from which product from a certified fishery is eligible to be sold as MSC certified or bear the MSC ecolabel (the	On page 14, the report states the current certificate expires 31st May 2016. However, the certificate appears to have been subsequently extended again until 15th August 2016. Please update section 4.1		MEC has updated this point.

				<p>eligibility date). This shall be either: 7.6.1.1 The date of the certification of the fishery; or 7.6.1.2 The publication date of the first Public Comment Draft Report.</p>	<p>accordingly (including link to variation). Otherwise there will be a lapse in the certificate between existing validity and recertification, where product would be unable to be sold from the fishery as certified.</p>		
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First of each scoring element	Family name	Scientific name	Common name	Species type	Fishery descriptor
First	Veneridae	<i>Meretrix lyrata</i>	Hard Clam	Invertebrate	Hand Rakes

Productivity Scores [1-3]									Susceptibility Scores [1-3]					PSA Score
Average age at maturity	Average max age	Fecundity	Average max size	Average size at Maturity	Reproductive strategy	Trophic level	Density Dependence	Total Productivity (average)	Availability	Encounterability	Selectivity	Post-capture mortality	Total (multiplicative)	
1	2	1			1	2	3	1.67	3	3	1	3	1.65	2.35

MSC PSA-derived score	Risk Category Name	MSC scoring guidepost
88	Low	≥80

PI number	1.1.1 – Target Species	
A. Productivity		
Scoring element (species)	Lyrate Clam (<i>Meretrix lyrata</i>)	
Attribute	Rationale	Score
Average age at maturity.	18 months (Sinh, L.X., 2011)	1
Average maximum age	11 years (Luu et al. 2009)	2
Fecundity	Between 3 – 8 million eggs (NTOI, 2001)	1
Reproductive strategy	Broadcast spawner (NTOI, 2001)	1
Trophic level	2.25 – Proxy bivalve TL value was used as there was no data on <i>M.lyrata</i> (Pinnegar et al. 2003)	1
Density dependence	There is no evidence either way, as far as the team could find out. As per Guidance to Table PF4 in the MSC CRs, lack of evidence means that the team allocated a score of 3 to this attribute.	3
B. Susceptibility		
Attribute	Rationale	Score
Areal Overlap	The UoC defines the stock as Ben Tre. The fishery takes place throughout the Ben Tre Province. The highest susceptibility score has therefore been allocated by the team.	3
Encounterability	Since the species is confined to the seabed, as is the gear, then encounterability automatically scores ‘high risk’. Three is also the default score for target species.	3
Selectivity of gear type	The gear is designed to harvest clams, which are removed from the substrate by the fishers themselves. This makes the gear highly selective.	1
Post capture mortality	Three is the default score for the target species.	3

Appendix 4. Surveillance Frequency

1. The report shall include a rationale for any reduction from the default surveillance level following FCR 7.23.4 in Table 4.1.
2. The report shall include a rationale for any deviations from carrying out the surveillance audit before or after the anniversary date of certification in Table 4.2
3. The report shall include a completed fishery surveillance program in Table 4.3.

Table 4.1: Surveillance level rationale

Year	Surveillance activity	Number of auditors	Rationale
e.g. 3	e.g. On-site audit	e.g. 1 auditor on-site with remote support from 1 auditor	e.g. From client action plan it can be deduced that information needed to verify progress towards conditions 1.2.1, 2.2.3 and 3.2.3 can be provided remotely in year 3. Considering that milestones indicate that most conditions will be closed out in year 3, the CAB proposes to have an on-site audit with 1 auditor on-site with remote support – this to ensure that all information is collected and because the information can be provide remotely.

Table 4.2: Timing of surveillance audit

Year	Anniversary date of certificate	Proposed date of surveillance audit	Rationale
e.g. 1	e.g. May 2014	e.g. July 2014	e.g. Scientific advice to be released in June 2014, proposal to postpone audit to include findings of scientific advice

Table 4.3: Fishery Surveillance Program

Surveillance Level	Year 1	Year 2	Year 3	Year 4
e.g. Level 5	e.g. On-site surveillance audit	e.g. On-site surveillance audit	e.g. On-site surveillance audit	e.g. On-site surveillance audit & re-certification site visit

Appendix 5. Objections Process

(REQUIRED FOR THE PCR IN ASSESSMENTS WHERE AN OBJECTION WAS RAISED
AND ACCEPTED BY AN INDEPENDENT ADJUDICATOR)

The report shall include all written decisions arising from an objection.

(Reference: FCR 7.19.1)

Appendix 6 – Additional fishery information

AQUACULTURE CO-OPERATIVE
RANG DONG

Socialist Republic of Vietnam
Independence – Freedom – Happiness

MEETING MINUTES

Subject: Agreement on the quantity, selling price, type, impurities, water, sample box, and labor costs

- In accordance with the situation of the clams biomass of the aquaculture co-operative Rang Dong in the survey dated 16/06/2016 of the Planning and Business Unit along with the director, the deputy directors, the inspection board, the members of the management board, and the supervision team.
- In accordance with the current market price.

At 7:30 the 17th June 2016, in the meeting room of Aquaculture Co-operative Rang Dong:

I/ Attendants:

- | | |
|-------------------------|--|
| 1. Mr. Nguyen An Ri | Position: Director |
| 2. Mr. Nguyen Van An | Position: Deputy Director |
| 3. Mr. Le Van Quang | Position: Deputy Director |
| 4. Mr. Huynh Thanh Hung | Position: Chief Accountant |
| 5. Ms. Le Cam Loan | Position: Head of the inspection board |
| 6. Mr. Nguyen Van Hoi | Position: Representative of the supervision team |

II/ Agenda:

The agenda of the meeting is the agreement on the quantity, selling price, type, impurities, water, sample box, and labor costs relating to the batches of clams of Aquaculture Co-operative Rang Dong.

- According to the survey of the Planning and Business Unit, along with the director, the deputy directors, the inspection board, the members of the management board, and the supervision team, it is estimated as follows:

Batch 1: Non-processed clam seeds from the area outside point Ha Long

- | | |
|--|---|
| + Area: | 3 ha |
| + Estimated quantity: | 15,000 kg |
| + Estimated harvest quantity: | 9,000 kg |
| + Type: | Non-processed clam seeds (350 clams per kg) |
| + Selling price: | 40,000 VND per kg |
| + Upon the survey, there is approximately 0.5 kg in an area of 1m2 | |

Batch 2: Medium-sized non-processed adult clams from the area of Hang day Ong Bay

- | | |
|--------------------------------|--|
| + Area: | 12 ha |
| + Approximate quantity: | 120,000 kg |
| + Quantity planned to exploit: | 80,000 kg |
| + Type | Medium-sized non-processed adult clams (68 |

- clams per kg)
14 000 VND per kg
- + Selling price
- + Upon the survey, there is approximately 1.5 kg in an area of 1m2
- After discussion, the survey team has agreed that the harvest quantity of the first batch is 9,000 kg and the second batch 80,000 kg
 - Aquaculture Co- operative Rang Dong ensures that after the harvest, 20% - 25% of the biomass is left untouched in order to maintain the clam parents
 - In case the weather condition does not allow the harvest, the two parties discuss to reach an agreement within the time of one tide without leaving the matter unresolved to the next tide or the two parties can terminate the contract.
 - Time of the clients' meeting: 14:00, 12/06/2016 (13 May lunar calendar)
- End of the minutes, the meeting ended at 8:30./.

Secretary
Huynh Minh Nhut
(signed)

Director
Nguyen An Ri
Aquaculture Co- operative
Rang Dong
(signed and sealed)

THE PLAN OF
Clams Harvest and Sale

In accordance with the resolution of the Annual General Meeting of the representative members in 2016;

In accordance with the plan of production and sales in 2016 of Aquaculture Co-operative Rang Dong;

In accordance with the minutes of the meeting attended by the chairman of the management board, the director, the deputy directors, the inspection board on the clams harvest and sale

I. OBJECTIVE AND REQUIREMENTS:

1. Objective:

The objective is to provide regular employment for the members of the co-operative and to facilitate the enhancement of life conditions of the members.

2. Requirements:

- The workers must implement correctly the work assignment coupons issued by the Co-operative
- The workers must be present at the biomass on time, in the right plot, and implement correctly the prescribed size of the net

The Planning and Business Unit has set up a plan of clams harvest and sale as follows:

II. CONTENT

1. Plots, quantities, types, selling prices:

1.1 Batch 1: Non-processed clam seeds from the area outside point Ha Long

+ Quantity of the batch:	9,000 kg
+ Type:	Non-processed clam seeds
+ Selling price:	40,000 VND per kg

1.2 Batch 2: Medium-sized non-processed adult clams from the area of Hang day Ong Bay

+ Quantity of the batch:	80,000 kg
+ Type:	Medium-sized non-processed adult clams
+ Selling price:	14,000 VND per kg

2. Estimated turnover of the two batches : 1,480,000,000 VND

(One billion four hundred and eighty million dong)

3. Labor costs, number of coupons, and the elimination of impurities and water:

3.1 Labor costs:

- + Batch 1: 240,000 VND per coupon
- + Batch 2: 150,000 VND per coupon

3.2 For each coupon: two boxes will be given

3.3 Elimination of impurities and water:

+ Batch 1: 9%

+ Batch 2: 10%

4. Planned harvest time:

- Harvest time: 3 days. From 18 June 2016 to 20 June 2016 (From 14 Mai to 16 Mai Lunar calendar)
- Registration time and sample preview: 16:00, 16 June 2016 (12 May Lunar calendar)
- Purchasers' meeting time: 14:00, 17 June 2016 (13 May Lunar calendar)

III. IMPLEMENTATION

1. The Planning and Business Unit invite the members of Management Board, the director, the deputy directors, and the Inspection Board of the co-operative to participate in the survey of each clam biomass that will be exploited.
2. There will be an announcement on the radio of the commune and the hamlet to inform the clients of the registration.
3. Organization of regular security forces in the area of the clams plots and biomass that will be harvested.
4. There is daily harvest schedule to coordinate closely all the board, the Units, and the Security Team in the implementation of the plan.
5. Before the harvest day, daily detailed harvest schedule is widely announced to the members: the quantity, the place, the selling price, the labor costs.
6. After the harvest day, the result will be announced to the members: the quantity harvested, the selling price, total amount in VND, and the labor costs
7. At the end of the harvest tide, a synthesis of the harvest results will be announced on the radio and sent to all the members of the management board.

IV. TASK ASSIGNMENT

In order to implement of the harvest plan correctly, the director assigns each member to be responsible for and carry out a task as follows:

1. Mr. Nguyen An Ri, Director, is in charge of the general management
2. Mr. Nguyen Van An, Deputy Director, is in charge of setting up the harvest plan, the clients' meeting, the delivery to the clients.
3. Mr. Le Quang Nhien, officer of the Planning and Business Unit, is in charge of the harvest area, establishing of meeting minutes, harvest information sheet, payment sheet for each batch, monitors the deposit and advance payment of each client for each batch, and participates in the delivery to the clients.
4. Mr. Dang Hong Quan, officer of the Planning and Business Unit, is in charge of the biomass, the separation of harvest area, observation of tides, decision on the harvest time, and participates in the clients' meeting and in the delivery to clients.
5. Mr. Mai Van Do, officer of the Planning and Business Unit, assist the harvest management, the tide observation, and participates in the clients' meeting and the delivery to clients.
6. Mr. Huynh Minh Nhut, officer of the Planning and Business Unit, is in charge of the establishment of Purchase and Sales Agreement, meeting minutes, report of arising problems in the biomass, origin document, participates in the delivery to clients,

synthesizes the daily harvest data, announces the results, and submits for signature and issuance

7. Mr. Tran Cong Thanh, Team leader of the Security Team, directly manages the security force in the management of the separation and mobilization of transporting boats of the clients.
8. Mr. Pham Van Thuan, officer of the Organization and Administration Unit, is in charge of the organization of the selection, the quantity supervision and record, the box leveling, the invitation of the members of the management board, the supervision team to participate in the survey, and to directly verify if the box leveling and quantity record are implemented according to the plan.
9. Mr. Tong Ngoc Vu Doan, officer of the Organization and Administration Unit, is in charge of the work assignment team, the daily coupon issuance as planned
10. Mr. Huynh Thanh Hung, chief accountant of the co-operative, manages the Accounting and Finance Unit, collects payments from clients, and assigns the Accounting team to record the quantity delivered to clients as planned.
11. The inspection board will be invited to participate in the examination and supervision of the survey and implementation of the harvest plan.
12. The police and military force of the commune and the executive team of Border Defense will be invited to assist the security of the planned harvest.

At the end of the harvest tide, all the organs that have been assigned a task in the plan will organize a meeting for a review of lessons learned.

Mentioned above is the clams harvest and sale plan of the Planning and Business Unit addressed to the board, the units, the security team, and all the relating bodies for the co-ordination and implementation./.

Recipients:

- The party executive committee, people's committee of the commune
- The chairman of the management board of the co-operative
- The director and the deputy directors of the co-operative
- The inspection board of the co-operative
- The security team of the co-operative
- The member management unit, and the accounting unit
- The radio station of the commune and the hamlet
- Archives and records

The planner
Nguyen Van An
(signed)

APPROVED

The plan is approved

No. 22/KH-HTX KHKD dated 17 June 2016

DIRECTOR

NGUYEN AN RI

(signed and sealed)

**AQUACULTURE CO-OPERATIVE
RANG DONG**
No.: 89/TB-HTX KHKD

Socialist Republic of Vietnam
Independence – Freedom – Happiness
Thoi Thuan, 17 June 2016

ANNOUNCEMENT

Subject: Meeting of clams purchasers

In accordance with the minutes of the meeting between the Chairman of the management board, the director, the deputy directors, and the Inspection board, on 17 June 2016 on the clams harvest and sale:

The Planning and Business Unit of Aquaculture Co-operative Rang Dong would like to inform clients of a meeting for selling 02 batches of clams as follows:

Batch 1: Non-processed clam seeds from the area outside point Ha Long

+ Quantity of the batch: **9,000 kg**
+ Type: **Non-processed clam seeds**
+ Selling price: **40,000 VND per kg**

Batch 2: Medium-sized non-processed adult clams from the area of Hang day Ong Bay

+ Quantity of the batch: **80,000 kg**
+ Type: **Medium-sized non-processed adult clams**
+ Selling price: **14,000 VND per kg**

Time of the meeting: 14:00, 17 June 2016 (13 May Lunar calendar)

We would like to inform all the members and the clients./.

Recipients:

- The party executive committee, people's committee of the commune
- The chairman of the management board of the co-operative
- The director and the deputy directors of the co-operative
- The inspection board of the co-operative
- The security team of the co-operative
- The member management unit, and the accounting unit
- The radio station of the commune and the hamlet
- Archives and records

Director
Nguyen An Ri
Aquaculture Co- operative
Rang Dong
(signed and sealed)