Marine Stewardship Council (MSC) Final Report

The Bahamas Spiny Lobster Fishery

On behalf of
Bahamas Marine Exporters Association

Prepared by
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Glossary

Acronym	Definition
BMEA	Bahamas Marine Exporters Association
BNT	Bahamas National Trust
BSLWG	The Bahamas Spiny Lobster Working Group
CAB	Conformity Assessment Body
CBD	Convention on Biological Diversity
COP	Contracting Parties
CFMC	Caribbean Fishery Management Council
CRFM	Caribbean Regional Fishery Mechanism
DMR	Department of Marine Resources
EEZ	Exclusive Economic Zone
FAO	Food and Agriculture Organisation (of the United Nations)
FIP	Fishery Improvement Project
IUU	Illegal, Unreported, Unregulated
MAMR	Ministry of Agriculture, Marine Resources
MSC	Marine Stewardship Council
NGO	Non-Governmental Organisation
OECS	Organisation of Eastern Caribbean States
OSPESCA	Central American Fisheries and Aquaculture Organisation
RBDF	Royal Bahamas Defence Force
SPAW	Specially Protected Areas and Wildlife (in the Wider Caribbean Region)
UoA	Unit of Assessment
UoC	Unit of Certification
TAC	Total Allowable Catch
TAE	Total Allowable Exports
TNC	The Nature Conservancy
WECAFC	Western Central Atlantic Fishery Commission
WWF	World Wildlife Fund

1 Executive Summary

This report is the Final Report (FR) for The Bahamas spiny lobster fishery (using condos (casitas) and lobster traps). The assessment team was made up of Dr Jo Gascoigne, Dr Johan Groeneveld, and Thomas Matthews. The site visit took place in The Bahamas capital of Nassau, in New Providence in February 2017.

There are two units of assessment in this fishery, which operates solely in The Bahamas Exclusive Economic Zone (EEZ) and targets spiny lobster (*Panulirus argus*) with lobster traps and collection by hand, hooks and spears from condominiums (condos, casitas). Fishing occurs during the months of August through to March, with April through July being a closed season. The key fishing areas for lobster are the Great Bahama Bank and Little Bahama Bank, where anecdotally lobster go to spawn at the edge of the deep water in February and March.

The fishery client group consists of members of The Bahamas Marine Exporters Association (BMEA), who purchase spiny lobster caught by Bahamian fishers from all around the EEZ. WWF is also included in the client group for this assessment, having been key supporters of a Fishery Improvement Project (FIP) for this fishery for several years prior to assessment.

Bahamians do not require a licence to catch and sell fish and lobster, unless their catch is ≥250 lbs or they are using a vessel >20 feet, which is required to be registered; the right to fish is a key part of Bahamian culture and is important for subsistence in the Family Islands. In this (commercial) fishery, lobster are taken either from lobster traps or using condos. Condos are lobster 'shelters' with wooden sides and a tin sheet top. Once deployed, they remain on the seafloor and are repeatedly visited by diving to collect lobsters taking shelter in them. Anyone in The Bahamas may deploy a condo, and small day boats use condos as well as professional full-time lobster fishers. Lobster fishing using traps is, on the other hand, a minority activity. The trap fishery is however the most regulated fishery in The Bahamas, and a permit is required to deploy lobster traps. In addition, traps are required to be of specific design/construction.

There are many strengths to the assessment, which has been progressively improved through the FIP. The fishery takes little bycatch and there are no primary species associated with the fishery. The management system is strong for some elements, both at the fishery-specific management system level, as well as through long-term objectives and open consultation processes. Despite many improvements in data collection practices over the past decade, lack of information remains a weak point, for example, a lack of data on condo deployment/loss or lobster removals by locals in the fishery. The monitoring, control and surveillance system also needs to be improved in order to further protect the fishery from illegal, unreported and unregulated (IUU) (in the case of this fishery, foreign unlicensed) fishing, although great strides have been made in recent years.

The aggregate scores for each Principle are as follows Principle 1 – 81.7; Principle 2 – 88.0 (condos); 84.7 (lobster traps); Principle 3 – 82.1. Overall, no single performance indicator scored below 60 and the aggregate score for each principle for each UoA was 80 or above, therefore the fishery is therefore being provisionally recommended for certification.

Four PIs scored <80 and therefore are associated with conditions; these are as follows:

Number	Condition	Performance Indicator
1	Information needs to be collected such that there is good information on all other fishery removals from the stock (unreported local and foreign IUU catch of spiny lobster in The Bahamas).	1.2.3
2	For condos, information needs to be collected on the quantity deployed, location of deployment and eventual fate (removed vs. lost) sufficient to i) provide reliable information on timing and location of fishing; and ii) evaluate the on-going risk (if any) to habitats from condo deployment. For traps, information needs to be collected on the number of traps in use and the main areas of deployment of traps, as well as trap loss rates, for the same purpose.	2.4.3
3	Information needs to be collected on the quantity deployed, location of deployment and eventual fate (removed vs. lost) of condos, sufficient to evaluate the on-going risk (if any) to ecosystems from condo deployment.	2.5.3
4	The monitoring, control and surveillance system needs to be improved such that there is no evidence of systematic non-compliance (incursions by non-Bahamian vessels, landing of undersized lobster in the non-export fishery).	3.2.3

The team also raised two recommendations for PI 2.2.1 (Secondary species outcome) and PI 2.5.1 (Ecosystem outcome). The team proposes recommendations i) that conch fishing by commercial lobster fishermen should be quantified and if necessary management measures put in place to ensure that the lobster fishery is not indirectly depleting the stocks, particularly in remote areas; and ii) that The Bahamas continue to make progress in designating and putting in place management for MPAs, based on the 20% by 2020 Caribbean Challenge.

2 Authorship and Peer Reviewers

Dr Joanna Gascoigne (Principle 2 and team leader): Dr Gascoigne is a former research lecturer in marine biology at Bangor University, Wales and a shellfisheries expert, with over 25 years' experience working in the fisheries sector. Her Principle 2 work experience comes from bycatch studies, development of management and monitoring programmes for marine protected areas, environmental impacts studies on a range of topics, including shipping accidents, cable and pipeline installations and marine fouling. Jo also used to lecture in physical oceanography and conservation and resource management.

Dr Johan Groeneveld (Principle 1): Johan has 22 years' experience working in the field of fisheries. Specifically relating to Principle 1, Johan completed his PhD in the biology and ecology of the deep-water rock lobsters *Palinurus gilchristi* and *Palinurus delagoae* in relation to their fisheries. He worked as a fisheries researcher focussed on lobster fisheries and their sustainable management for two governments, South Africa (1995-2006) and Oman (2007-2008), and is presently a senior scientist at the Oceanographic Research Institute in Durban, South Africa. He has participated in several pre-assessments, full assessments and peer-reviews of fisheries applying for MSC certification over the past 10 years, notably several lobster fisheries. He regularly publishes in the peer-reviewed literature and is on the editorial boards of the journals Fisheries Research and Western Indian Ocean Journal of Marine Science. His expertise encompasses a good mix of academic- and applied science, the latter focussed on fisheries assessments.

Thomas Matthews (Principle 3): Tom has worked almost exclusively with lobster research and management issues in Florida and the Caribbean for 27 years. He has worked on specific lobster management issues in Nicaragua, Honduras, Belize, Mexico, Puerto Rico, and the US Virgin Islands. He has also consultation with lobster researchers and managers in most countries in the Caribbean and have organised or chaired several international meetings. Tom currently works as the lobster research programme administrator for the Florida Fish and Wildlife Conservation Commission (FWC), Fish and Wildlife Research Institute in the Florida Keys. FWC is the lead agency responsible for management of the spiny lobster fishery in Florida. Here he is responsible for analysis of all lobster fishery research for management of the fishery.

The peer reviewers for this assessment were as follows:

Sandy Morison: Mr Morison has participated as part of a team undertaking MSC pre-assessments for several fisheries and is also trained as a lead auditor for MSC assessments. Of relevance Sandy has worked on the following assessments as the P1 expert on the assessment team: including the Western Rock Lobster Fishery (surveillance audits and reassessment), Peel-Harvey Inlet, blue swimmer crab and sea mullet fisheries, Western Australia deep sea crab fishery and Australian pearl oyster fishery.

Sophie des Clers: Sophie is an independent scientific expert in fisheries management systems. She has over 30 years' experience in the formulation, monitoring, and evaluation of fisheries and aquaculture projects to build management capacity in the public and the private sector. Sophie is trained in databases, applied statistics, population dynamics, microeconomics, law and public policy. Her past research and consultancy projects have

taken her to fishing ports around the UK, EU, Norway, Africa, the North Sea, Mediterranean, Atlantic, Pacific, Indian oceans and Caribbean. She has been involved in a number of previous MSC assessments and pre-assessments including lobster, cod, haddock, saithe, sole, herring, blue whiting, sardine, whelks, tuna and billfish fisheries. Sophie is a Principle 3 assessor with experience in the region.

The Risk-Based Framework was not used in this assessment.

3 Description of the Fishery

3.1 Units of Assessment (UoA) and Scope of Certification Sought

3.1.1 UoA and Proposed Unit of Certification (UoC)

Control Union Pesca (CU Pesca) confirms that the fishery under assessment is within the scope of the MSC Fisheries Standard (7.4 of the MSC Certification Requirements v2.0):

- The target species is not an amphibian, reptile, bird or mammal;
- The fishery does not use poisons or explosives;
- The fishery is not conducted under a controversial unilateral exemption to an international agreement;
- The client or client group does not include an entity that has been successfully prosecuted for a forced labour violation in the last 2 years;
- The fishery has in place a mechanism for resolving disputes, and disputes do not overwhelm the fishery;
- The fishery is an enhanced fishery as per the MSC FCR 7.4.3; and
- The fishery is not an introduced species-based fishery as per the MSC FCR 7.4.4.

Table 1. UoA 1 – Condos (casitas)

Species	Spiny lobster (*Panulirus argus*)
Geographical range	Territorial waters and EEZ of The Bahamas
Method of capture	Free diving using hooks or spears on condos with and without compressors
Stock	Caribbean Spiny Lobster – Bahamas stock
Management System	Bahamian Department of Marine Resources
Client group	Bahamas Marine Exporters Association (BMEA) and World Wildlife Fund (WWF)
Other eligible fishers	Any Bahamian lobster fisherman landing legal product. Note: For historical/cultural reasons, there is no direct requirement to have a fishing licence or permit to fish or to sell fish in The Bahamas, although fishing vessels >20 feet are required to be registered, and permits are required for catches >250 lbs, as well as for using compressors and setting lobster traps. There is therefore no such thing as an illegal Bahamian fisherman in The Bahamas, except under certain specific circumstances. (It is, however, illegal for non-Bahamians to fish in Bahamas waters without a permit.) This is the reason that 'other eligible fishers' is worded in this way.

Table 2. UoA 2 – Lobster traps

Species	Spiny lobster (*Panulirus argus*)
Geographical range	Territorial waters and EEZ of The Bahamas
Method of capture	Lobster traps
Stock	Caribbean Spiny Lobster - Bahamas
Management System	Bahamian Department of Marine Resources
Client group	Bahamas Marine Exporters Association (BMEA) and World Wildlife Fund (WWF)
Other eligible fishers	Any Bahamian lobster fisherman landing legal product. Note: For historical/cultural reasons, there is no requirement to have a fishing licence or permit to fish or to sell fish in The Bahamas, and only fishing vessels >20 feet or vessels that catch ≥250 lbs are required to have a permit. There is therefore no such thing as an illegal Bahamian fisherman in The Bahamas (although it is illegal for non-Bahamians to fish in Bahamas waters without a permit). This is the reason that 'other eligible fishers' is worded in this way.

3.1.2 Final UoCs

(PCR ONLY)

The PCR shall describe:

a. The UoC(s) at the time of certification.
b. A rationale for any changes to the proposed UoC(s) in section 3.1(c).
c. Description of final other eligible fishers at the time of certification.

(References: FCR 7.4.8-7.4.10)

3.1.3 Landings Data

The fishery is not managed via a TAC. Though there is local consumption, landings are driven by exports, because for cultural reasons there is no requirement in Bahamian law for fishers to be licenced or to declare their catch – this is explained in more detail below. The Department of Marine Resources (DMR) estimate that exports make up 90-95% of landings. Recorded exports for 2013-15 are given in Table 3, converted to live weight (based on coefficient of 3 provided by the DMR).

Table 3. Landings of lobster (tails and whole) from The Bahamas, 2014-16

TAC	Year	N/A	Amount	N/A
UoA share of TAC	Year	N/A	Amount	N/A

UoC share of total TAC	Year	N/A	Amount	N/A
Total green weight catch by UoC	Year (most recent)	2016	Landed weight (lbs.) – Tails	6,185,745
			Landed weight (lbs.) - Whole	135,839
			Landed weight (tonnes) - Tails	2805.81
			Landed weight (tonnes) - Whole	61.62
	Year (second most recent)	2015	Landed weight (lbs.) - Tails	4,761,885
			Landed weight (lbs.) - Whole	97,587
			Landed weight (tonnes) - Tails	2,159.95
			Landed weight (tonnes) - Whole	44.26
	Year (third most recent)	2014	Landed weight (lbs.) – Tails	4,804,483
			Landed weight (lbs.) - Whole	64,073
			Landed weight (tonnes) - Tails	2,179.28
			Landed weight (tonnes) - Whole	29.06

3.1.4 Scope of Assessment in Relation to Enhanced Fisheries

MSC Guidance G7.4.3 lists casita (condo) lobster fisheries as a possible 'enhanced fishery' under the category 'habitat-modified'. The team therefore considered the evidence as to whether the use of condos enhance lobster populations, vs. simply attract and concentrate them. The criteria for determining whether the fishery is enhanced are shown in Table 4.

Table 4. MSC scope criteria for enhanced fisheries.

A	**Linkages to and maintenance of a wild stock**
i	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.
ii	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.
iii	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.
iv	Where fish stocking is used in hatch-and-catch (HAC) systems, such stocking does not form a major part of a current rebuilding plan for depleted stocks. Note: 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.
B	**Feeding and Husbandry**

i	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 catch-and-grow (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.
ii	In CAG systems, production during the captive phase does not routinely require disease prevention involving chemicals or compounds with medicinal prophylactic properties.
C	**Habitat and ecosystem impacts**
i	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: Habitat modifications that are not reversible, are already in place and are 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.

An analysis was undertaken to establish the category of enhanced fishery, using Table 1 of the MSC Certification Requirements v2.0. It was confirmed that Criteria C of the above-mentioned Table 1 were met and was categorised as a "Habitat Modified" fishery. The fishery meets the enhanced criteria as it utilises man-made structures associated with the capture of 'fish', which are not strictly 'fishing gear'. The condos used in the fishery facilitate the capture of the spiny lobster, reducing fishing effort for fishers. These structures are removable and do not cause serious or irreversible harm to the natural ecosystem's structure and function.

As per FCR 7.7.4, if the scope of the fishery contains an enhanced fishery that is not covered in Annexes SB (enhanced bivalve fisheries) and SC (enhanced salmon fisheries), a review was completed by CU Pesca to review if any modifications were needed to the default assessment tree taking into account PIs required to assess the enhancements (FCR7.7.4.1)., the results of which are presented below.

Eggleston et al. (1990), working in Mexico, tested the hypothesis that condos enhance biomass by reducing predation on lobsters, using tethering experiments. They evaluated juvenile lobster survival at condos and in seagrass meadows, and found higher survival at condos (as would be expected), but also an effect of lobster and condo size – smaller lobsters survive better in smaller condos; survival improvements scale with the relative size of lobster and condo.

In a further set of experiments (Eggleston et al., 1990), they further evaluated the effect of different size lobsters and condos in different habitats. Their experiments suggest the following:

- Condos reduce predation on small lobsters in sparse seagrass, but less so in dense seagrass;

- Condos may increase predation on medium-larger lobsters, because they attract predators, and because these lobster suffer relatively less predation away from condos. They hypothesise that for large condos, overall survival would be enhanced if lobsters leave condos at a size of ~55-65mm CL to use smaller condos or natural shelter;
- The effect depends on condo size and lobster size; smaller condos provide more of a predation refuge for larger lobsters because they exclude large predators who can access the space under larger condos;
- There is likely to be an effect of the number of conspecifics in the shelter (protection from predation by gregarious sheltering) but this could not be quantified;
- Predation risk may depend on proximity to reef habitats (i.e. predators move off the reef to feed at condos if the reef is close by).

Eggleston and Lipcius (1999) considered the likely population-level impact of deploying condos in seagrass habitats lacking natural shelter for lobsters. They found contrasting results in Florida Bay vs. The Bahamas (Exuma Cays). In Florida Bay, there was evidence that condos increased the (local) lobster population, and they concluded that shelter was a limiting factor for lobsters in this habitat; i.e. they could potentially enhance the overall population by making more habitat available. Conversely, at the sites in The Bahamas, it appeared that lobsters used the condos more opportunistically (e.g. at one site close to a daily migration route for juvenile lobster, condos were extensively used, but at other sites they were used less or not at all). They conclude that condos cannot be used unselectively for lobster population enhancement, although it may work locally in certain areas.

Gutzler et al. (2015), working in the Florida Keys, considered the hypothesis that, far from enhancing lobster populations, condos may actually be an 'ecological trap' – i.e. lobsters are attracted to the condos even though growth and/or mortality may be poorer than in natural shelters. They found no difference in nutritional condition for lobsters collected from condos vs. natural shelters, but they found increased mortality for juvenile lobsters in condos compared to natural shelters – but no difference in mortality for adult lobsters. They surmise that condos may act to reduce survival if deployed in nursery habitats, but not when deployed in areas intended to attract adult lobsters. This agrees with the findings of Eggleston et al. (1992) in as much as they also found a negative impact of condos on medium-sized lobsters; the differences may relate to differences in condo design and the predator guild in the different research areas.

What can we surmise from this about the role of the condos used in this fishery in the population dynamics of lobster in The Bahamas? Firstly, it is important to note that the experiments described above were conducted on juvenile lobster, with shelters scaled generally to the size of juvenile lobster ('mini-casitas'; Arce et al., 1997). Conversely, the condos used in this fishery are scaled to attract adult lobster, since there is a minimum size limit in this fishery (5.5 inches TL) which is enforced by the DMR, The Royal Bahamas Defence Force (RBDF) and Police. There is evidence of the following:

- The protection from predation provided by condos is a complex function of lobster size and condo size; in general, it seems that smaller lobsters gain more

protection than larger lobsters and smaller condos provide more protection than larger condos for all size classes;
- Condos may increase as well as reduce mortality of small-medium lobsters, if deployed in nursery habitats;
- The evidence of condos enhancing local lobster population density is variable from site to site, depending on the areas habitually used by lobster for shelter and foraging, and the availability of adjacent natural shelter;
- There is no evidence of any effect on growth and nutrition from condos.

Given this evidence, the team concluded that there is not any convincing evidence that the use of condos in this fishery is systematically enhancing the lobster population in The Bahamas, although it is possible that they are enhancing local density in some areas where food is plentiful but habitat would otherwise be limiting (in fact, this is part of the point of using them, as well as for providing consistent and predictable fishing areas). The team concluded that no changes to the default tree were therefore required.

3.1.5 Scope of Assessment in Relation to Introduced Species Based Fisheries (ISBF)

This fishery is not based on an introduced species.

3.2 Overview of the fishery

3.2.1 Bahamas geography

The Bahamas is both a large country and a small country. It consists of ~700 islands, with a further 2,400 islets and cays spread around ~153,000 km^2 of shallow marine habitat (mean depth ~9m; described in detail below). There are 377,000 inhabitants, of which ~two thirds live on the island of New Providence (Figure 1).

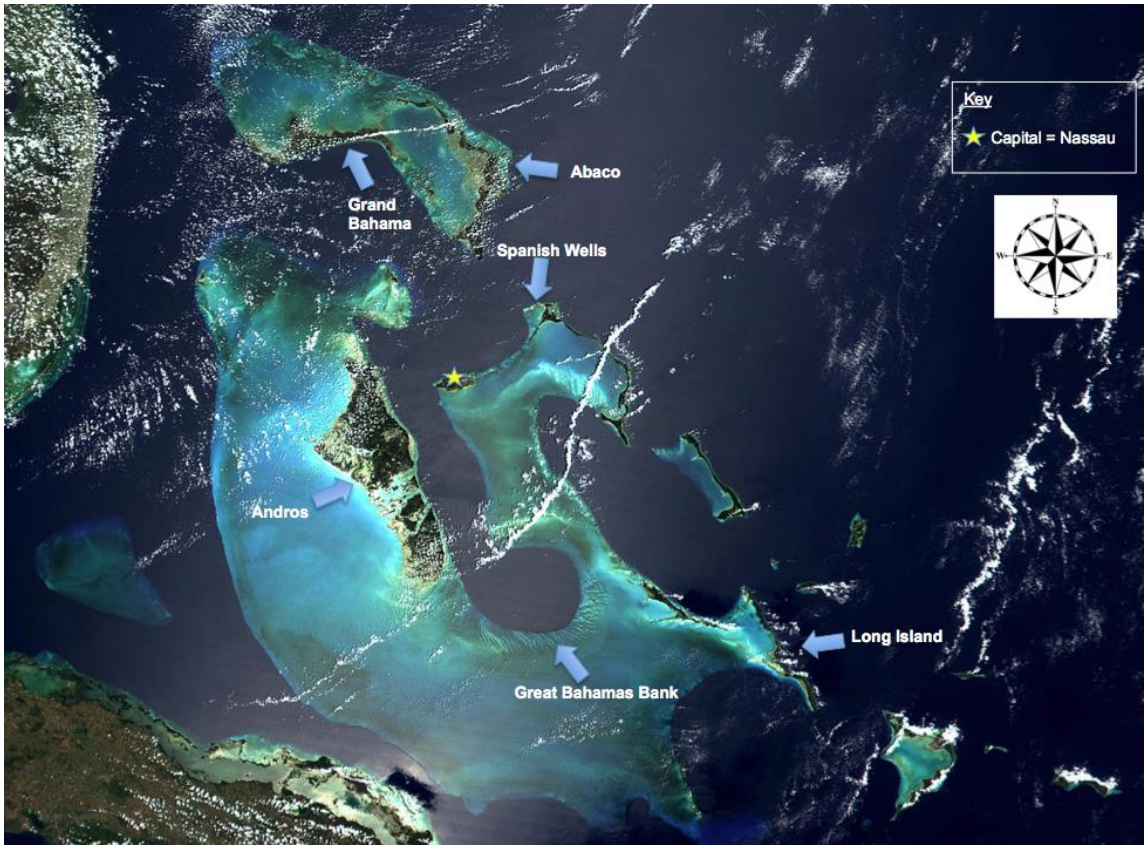

Figure 1. Map of The Bahamas indicating the main commercial fishery centres; star=New Providence / Nassau.

3.2.2 Lobster industry in The Bahamas

Exporters buy directly from fishers, and it is estimated that ~90-95% of commercial landings are exported, with ~5-10% sold locally (Lester Gittens, DMR, pers. comm.). The quantity consumed locally is, however, not estimated directly; nor is the quantity taken for subsistence use – see Section 3.1.3. Nearly all the product is landed in the form of frozen tails (see Table 3).

Bahamians do not require a licence to catch and sell fish and lobster, unless they are using a vessel >20 feet or they land ≥ 250 lbs at a time, which is required to be registered. This is because fishing for consumption and sale is considered to be part of the traditional culture and life style of The Bahamas; this freedom is jealously protected. There is therefore no legal concept of 'commercial fishers' in The Bahamas, but there are other licences available to commercial fishers, including compressor permits for diving or wooden lathe trap permits.

In practice, however, most or all the product going for export is bought from professional fishers operating large dive mother ships or trap vessels. Artisanal and small-scale fishers may sell their product freely, but on to the local market (communities, hotels, restaurants etc.). Fishers are not required to declare their landings, but fishers must report their commercial catch through the catch certificate programme. The catch certificate are then supplied to the DMR, and this provides the key data set for lobster stock assessment.

3.2.3 Client group

The Bahamas Marine Exporters Association (BMEA) is a group of licensed exporters which was founded 2010 in order to support a Fishery Improvement Project (FIP) for the fishery. Membership by lobster exporters is voluntary. As of February 2017, BMEA represented 77% of lobster exports. BMEA members buy lobster from all islands; they have buying stations or representatives in the Family Islands, and catch landed here is shipped to their plants in Nassau by mail boat. BMEA members have all signed up to a 'zero tolerance policy' (see Appendix 10 Zero Tolerance Policy for processors) which aims to minimise the landing of undersized lobster. They have in place requirements for verification and outreach to fishers, and aim to keep the proportion of undersize tails in their product to <1%. BMEA is the winner of a Seafood Champion award[1].

The other part of the client group is the World Wildlife Fund (WWF). WWF is the world's largest conservation organisation, and its scientific foundation and global reach help to ensure that our modern food system meets the needs of people while also respecting nature. WWF collaborates with foundations, governments, businesses, communities, individuals and more than 5 million members in 100 countries to conserve many of the world's most ecologically important regions, species, and commodities. WWF funded the fishery pre-assessment in 2009 and took the fishery into a Fishery Improvement Project (FIP).

3.2.4 Fishery

Lobster fishing is a very traditional activity and takes place to a greater or lesser extent around all the islands in The Bahamas. In terms of commercial (professional) fisheries, however, there are some key centres, including Spanish Wells (the largest), Abaco, Grand Bahama, Long Island and Andros. The larger vessels and the majority of landings are from fishers based in these areas. Most of the professional fishers are divers who use compressors and condos, but the use of lobster traps still continues, with trap vessels based out of Grand Bahama, and Nassau, among other places. Lobster fishing on the other Family Islands would be mainly based around diving from small day boats, with a higher proportion of local consumption and sale (e.g. to local restaurants, hotels and other tourist facilities).

The key fishing area for lobster is the Little Bahama Bank and Great Bahama Bank, where anecdotally it is believed lobster go to spawn at the edge of the deep water in February and March. The fishers report that condo fishing is best at the start of the season (August-September) when the lobster are dispersed over the banks (in the condos and on patch

[1] http://www.seafoodchampions.org/

reefs), while traps tend to fish best during the spawning season when lobster concentrate along the edges of the banks for spawning. There was previously a great deal of IUU fishing in this area (which is far from Nassau and sparsely inhabited). Fishers report, however, that the 2016 season was the best season for many years, and credit to a large extent the improvements in enforcement, both at sea and also in relation to the regulations on minimum size and reproductive females (see under Principle 3 below).

It is important to note that because there is no requirement for a commercial fishing licence in The Bahamas, and only vessels >20 feet (the minority) or vessels that land ≥ 250 lbs, must have a permit. The total number of fishers is not known nor the total number of vessels involved in the fishery on a part- and full-time basis. All Bahamians are potential lobster fishers – although it is recognised that improved licensing is needed and possibly limited entry in the future (L. Gittens, DMR, pers. comm.).

At the end of a trip, the vessels selling to BMEA land either back in their home port, or to Nassau, either of which will have suitable handling and weighing facilities.

3.2.5 Fishing using condos

First off, there are three important facts to know about condos in The Bahamas:

- Condos are not fishing gear; the fishing gear used in the 'condo fishery' is hooks, deployed by diving with or without a compressor (SCUBA is not allowed);
- The lobster sheltering underneath a condo are not legally the property of the owner of the condo;
- There is no regulation of condo deployment in The Bahamas, except for no-take zones; anyone can deploy as many condos as he/she wants, where he/she wants (except in no-take zones). Condos are set on or around seagrass beds, they are not permitted to be set on or to touch corals.

Condos are lobster 'shelters' with wooden sides and a tin sheet top, size varies but they are usually about two square metres. Anyone in The Bahamas may deploy a condo, and small day boats use condos as well as professional full-time lobster fishers. However, most condo landings, and all those going to BMEA, come from larger operations where 4 dinghies (on average) are supported by a 'mother ship' with freezer facilities, making trips of 1-5 weeks (depending somewhat on the distance to the fishing grounds). These vessels may have logged by GPS the location of thousands of condos at any given time. The dinghies are each crewed by two fishers, who take it in turns to drive the boat and dive on the condos. Diving is done using compressors ('hookah') – i.e. the diver is hooked up to a compressor on the dinghy via a hose. Commercial fishing using a compressor requires a licence and the licencee must be a trained diver in order to receive a licence. The diver lifts up one side or corner of the condo and removes the lobster by hand or using a hook or spear. As well as fishing on condos, the divers may also fish on patch reefs and other natural shelters – this is particularly the case for the small boat fishers.

The condos are placed mainly on areas of limestone hard-bottom, sand and/or seagrass (all of which are very extensive in The Bahamas; details and analysis under Principle 2 below). Fishers estimate that condos last roughly between five and seven years before breaking up,

and the professional condo fishers use the closed season mainly to repair and replace their condos.

An interesting analysis in Callwood (2016) asked Bahamian fishers their opinions about condos; unsurprisingly these were largely dictated by whether they used them or not. The proportion in agreement with various statements about condos are given in Table 5 (for interest).

Table 5. Proportion of Bahamian fishers agreeing with the statement about the lobster fishery in semi-structured interviews (Callwood, 2016)

Statement	Percentage of fishers in agreement
Lobster habitats are in good condition	66%
Local fishing effort on lobster is appropriate	60%
Bahamian fishing effort on lobster is appropriate	44%
Condos are good for the environment	73%
Condos are bad for the environment	27%
Condos should be regulated	55%

Condos are used extensively in other parts of the Caribbean (where they are generally called casitas) but are banned in Florida[2], because they are considered to facilitate poaching and because of the risk of damage to seagrass (considered under Principle 2 below).

3.2.6 Trap fishing

Lobster fishing using traps is a minority activity; DMR estimates that 10.3% of landings came from the trap fishery in the 2014-15 season, and 1.6% in the 2015-16 season (Lester Gittens, DMR, pers. comm.). The lobster trap fishery is the most regulated fishery in The Bahamas: a permit is required to deploy lobster traps and traps are required to be of the following construction (Fishery Regulations; the regulations state that other designs can be used if permission is granted by the Minister, but in any case, non-wooden traps must have a biodegradable panel to last no longer than 6 weeks):

- Wooden (generally they have a concrete base – this is not a requirement);
- Not more than 3 feet long, 2 feet wide and 2 feet high;
- Slats not less than one inch apart.

Traps are set in lines of 20-25 traps, with ~120 feet of line between each trap (i.e. the line is ~half a mile long in total). The location of the traps is marked by GPS but trap fishers do not use surface buoys (because of the risk of theft); this is important because documented interactions of lobster traps with ETP species comes almost entirely from entanglement in the trap-surface buoy lines (see Principle 2 section 1.1). Cow hide is used as bait, but if

[2] http://www.nmfs.noaa.gov/stories/2012/07/07_30_12casistas.html

caught, one or more (up to three) undersized lobsters may be kept inside the trap to attract others.

Trap fishing operates roughly on a 15 day cycle: approximately five days fishing the lobster traps, then another five days on separate fish traps, then back to the lobster traps again. Fishers will adjust their schedule, however, to take advantage of conditions – e.g. if a cold front passes through, lobster traps will be fished immediately after, since it is known that lobsters are more likely to move around and enter traps during rough weather.

3.2.7 Trap ghost fishing

One of the reasons that the regulations require that lobster traps be wooden (as opposed to plastic or wire) is to limit the amount of ghost fishing associated with lost traps. Nevertheless, experiments in Florida suggest that wooden traps can stay intact for a long time (wooden slat traps ~500 days on average; Butler and Matthews, 2015), and may continue to fish during this time, although they do break up quicker than other types of traps (Butler and Matthews, 2015; Matthews et al., 2012). (The fishers met at the site visit disputed that lost traps would last that long in The Bahamas.)

Trap loss may be significant; in Florida it is estimated that ~18% of the traps in the fishery may be lost during the course of a season. There are, however, reasons to suppose that the situation in The Bahamas is different. Bahamian fishers deploy traps in strings of 20-25 traps, unlike in Florida where they are usually deployed singly – this makes traps loss much less likely in The Bahamas. Furthermore, the biggest source of trap loss is recreational boaters, which are much less numerous in The Bahamas than in the Florida Keys. In addition, Bahamian trap fishers do not put in a surface buoy on their trap lines (to reduce theft of trap contents), making boat entanglement less likely.

Lost traps may ghost-fish other species as well: the only information comes from a study in Florida (Butler and Matthews, 2015) and is reviewed in Section 3.4.5 below. If trap loss rate is the same in The Bahamas as in Florida, these figures would imply a hidden mortality in The Bahamas of several thousand non-lobster animals per year on top of the bycatch evaluated above. However, trap loss rates in The Bahamas are likely to be much lower than in Florida, so hidden bycatch mortality is also likely to be much lower than this in practice. The team concluded that it is not likely to be significant, over and above observed levels of bycatch.

3.2.8 How many condos and traps are there?

Condos are not regulated, so there is no formal estimate by DMR of the total number of condos deployed in The Bahamas at any one time. Based on surveys and fisher interviews, as well as the time they take to deteriorate, Callwood (2016) estimated that there are most likely one million condos or more (this is 6.5 condos per sq. km of bank habitat – although in practice they are not likely to be evenly spread).

She also noted from her research that fishers who deploy condos set ~400 per year on average (although some may set up to several thousand). Since condos cost $50-60 in materials, this is a significant investment. Conversely, more than half of the fishers that use condos never deploy any at all.

Higgs (2016b) estimated that 105,000 lobster traps were in use in The Bahamas in 2001. The DMR considers, however, that this number has decreased significant over the last two decades, as new fishers tend to prefer diving to trap fishing. Dahlgren (2012) estimated that ~60,000 lobster traps were in use in 2009, and DMR estimates that a total of ~43,000 traps were used by fishers with permits in the 2012-13 season (Lester Gittens, DMR, pers. comm.).

3.2.9 Regulations

The key regulations for the management of the fishery can be summarised below (excluding the limit on exports, which is discussed under Principle 1 – Harvest strategy and control rule; below) (Fisheries Regulations).

- Any product going for export must have a catch certificate (EU and US requirement);
- The minimum legal size for landing lobster is 5.5 inches TL (~5 oz. tail), the carapace must be at least 3 ¼ inches long;
- No catching of berried females is permitted;
- No SCUBA may be used to catch lobster;
- The only fishing gear allowed is lobster traps (recalling that condos are not gear), although hooks and spears may be used to collect lobsters from under condos;
- There is a closed season from 1st April – 31st July inclusive; although the government has power to adjust it[3]. The use of compressed air for any fishing is also not allowed during this period;
- Hookah (compressed air) is only supposed to be used in the depth range 30-60 feet; however, this regulation is more honoured in the breach than the observance. In practice, hookah is used at shallower depths by all professional lobster dive fishers, who argue that free diving is inefficient and tiring, with less time to sort the lobster by size. It is not, however, used below ~60 feet (this is dangerous). A permit is required to use a compressor for fishing;
- Processors are required to be registered.

3.2.10 The Fishery Improvement Project (FIP) and their activities

The FIP began in 2009 following a MSC pre-assessment completed by MRAG Americas, with the purpose to bring the fishery in-line with the MSC Fisheries Standard. A range of stakeholders were involved in this process, including buyers from the seafood supply chain.

Activities resulting from the FIP included conducting a peer-reviewed stock assessment for *P.argus*, development of a harvest strategy, improvements to operational data including fishing effort information and use of gear and providing a public forum for stakeholder

[3] see DMR website http://www.bahamas.gov.bs/wps/portal/public/gov/government/notices/the%20closure%20of%20the%202016-2017%20crawfish%20season%20and%20the%20use%20of%20air%20compressor%20to%20assist%20in%20harvesting%20marine%20resources/

participation in the management of the fishery. The FIP ended in 2016, a review of which can be found here along with its revised action plan.

3.3 Principle One: Target Species Background

3.3.1 Biology and life history of *Panulirus argus*

The life cycle of *P. argus* has been described in detail in various easily accessible publications, so it is not described here in detail. In summary, females mate with a single male per mating cycle (of which there may be one or several during a mating season). The males provide her with a 'tar spot' of sperm, which she uses to fertilise her eggs, before incubating them under the tail ('berried' females). The eggs hatch into the water column as phyllosoma larvae which are part of the plankton for 6 months or more, before settling to the benthos in near-shore habitats as puerulus post-larvae and finally metamorphosing into juveniles. Juveniles and adults undertake seasonal onshore/offshore migrations and also tend to move into deeper waters over their lifespan. Juvenile and adult spiny lobster are gregarious. During the day they shelter in suitable structured habitats, often in groups and attracted by conspecifics, emerging by night to forage in a wide range of habitats, taking a wide range of food (invertebrates, scavenging, detritus).

3.3.2 (Meta)population definition and structure

The long larval duration of palinurid lobsters makes the definition of individual stocks on the basis of recruitment or genetics extremely difficult. For example, it has been shown that genetically, rock lobster populations at Tristan da Cunha in the South Atlantic (*Jasus tristani*) are connected to populations at St Paul and Amsterdam in the southern Indian Ocean (*J. paulensis*) although the island groups are thousands of miles apart in different oceans (Groeneveld et al., 2012). Nevertheless, there would be no logic to managing these populations together as one stock. Likewise, there is no genetic differentiation in mtDNA in *P. argus* across the wider Caribbean (populations from Venezuela to Bermuda, including Florida and the Turks and Caicos; Silberman et al., 1994), but it is clearly inappropriate (not to say impossible) to manage fisheries as if there were a single stock over this entire area.

Traditionally, four 'stocks' in the wider Caribbean have been identified based large-scale current patterns. Populations in The Bahamas, Florida, the Turks and Caicos, northern Cuba and Bermuda have been considered to be likely to have high connectivity. There is, however, no direct evidence in favour of strong connectivity over this area, or against strong connectivity with other areas. Despite the proximity of Florida and the western Bahamas, for example, they are separated by the Gulf Stream which constitutes a significant oceanographic barrier, one would think; it is not clear that there would be much transfer of planktonic larvae perpendicular to this current in either direction. This is all, however, speculation.

A more detailed analysis by Kough et al. (2013) used a combined habitat / oceanographic / larval behaviour model to evaluate larval retention and connectivity across the wider Caribbean, including The Bahamas. They found evidence of sources, sinks and self-recruitment in different areas. Notably, their analysis suggests that the lobster population in The Bahamas, as well as Cuba, Nicaragua and Venezuela, are largely self-recruiting, whereas others (most of central America, Jamaica, Puerto Rico and some other places)

depend on external larval supply. They did find, however, some connectivity of Bahamas populations with other areas, and noted that the eastern Bahamas is likely to be a source of larvae to the wider Caribbean, whereas the western Bahamas is more likely to be a sink. Figure 2 shows a 'connectivity matrix' by country based on the model outputs from Kough et al. (2013); The Bahamas is in the bottom left corner; the strong influence of local recruitment is apparent.

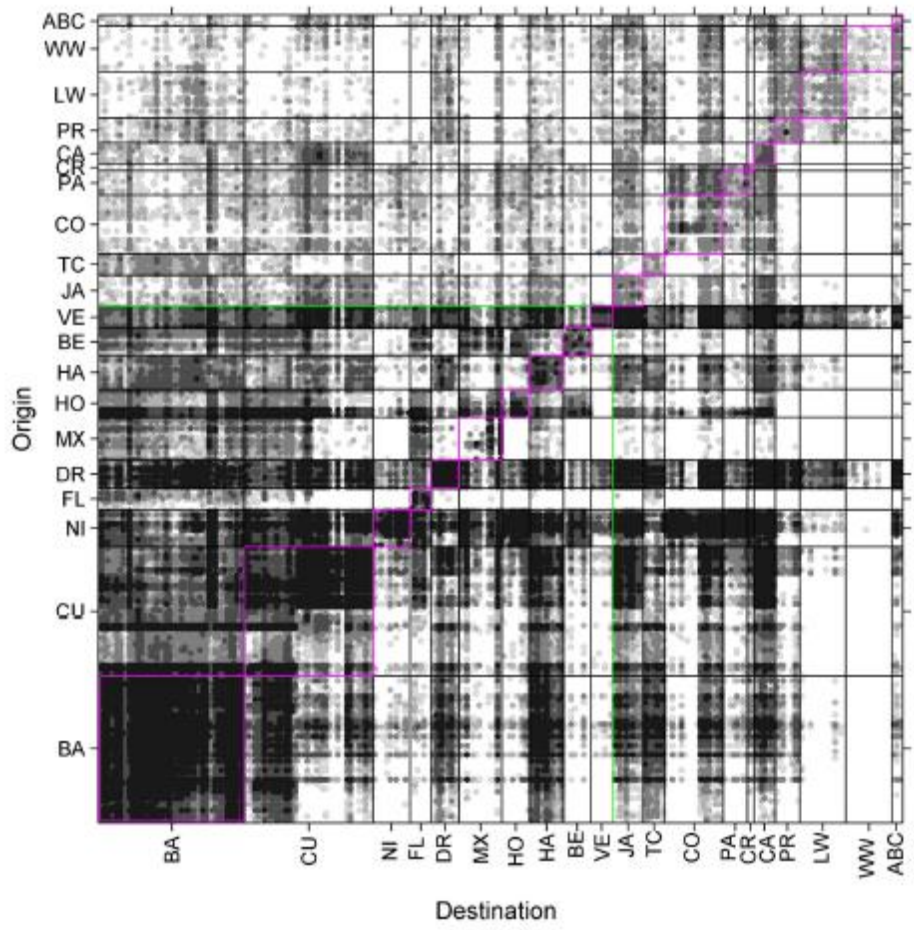

Figure 2. Connectivity matrix for lobster larvae, from the combined oceanography-habitat-behaviour model in Kough et al. (2013). The larval origin is on the y-axis and the larval destination is on the x-axis; the same origin and destination indicate self-recruitment. The proportion of larvae from/to that site is indicated by the darkness of the shading. The Bahamas (BA) is in the bottom left-hand corner. Figure 3 in Kough et al., 2013.

Callwood (2016) likewise evaluated the likely connectivity of Bahamian lobster populations with the rest of the wider Caribbean, using similar techniques. She mapped suitable lobster habitat, and pinpointed key lobster fishing areas via surveys and fisher interviews. She then used an oceanographic model to evaluate the 'dispersal kernel for each key lobster area. The model simulations suggest that The Bahamas both receives and exports larvae to other areas, but at the same time, they have a high probability of self-recruitment and recruitment from other Bahamian sources. The proportions varied between sites, with sites in the southern Bahamas tending to have higher connectivity, while the Little Bahama Bank and Tongue of the Ocean were more dependent on local or self-recruitment (unsurprisingly); this

agrees in broad terms with Kough et al.'s analysis about sources and sinks. Overall, the median 'dispersal kernel' was estimated to be 200-400 km for both Caribbean and Bahamian populations, but with long-distance genetic (but not population dynamic) connectivity probably assured by a low proportion of larval that are estimated to travel much longer distances (Figure 3 and Figure 4). Overall, however, she concludes that The Bahamas retains most of its larvae, and that these larvae also have a higher survival probability than overall for the Caribbean (25% vs. 13%).

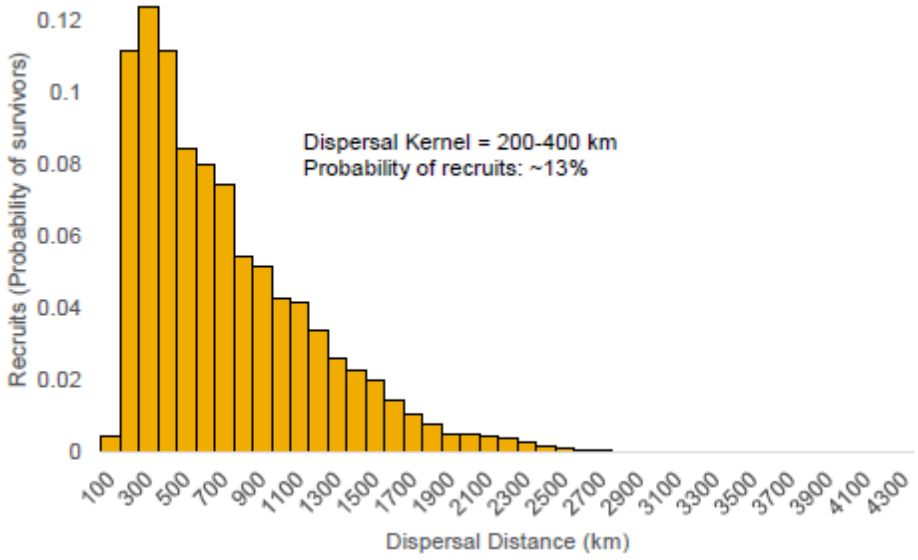

Figure 3. Dispersal Kernel: Caribbean. The dispersal kernel (DK) identifies the distance and probability that a larval particle will disperse and settle successfully. The average dispersal kernel for the entire Caribbean is 200-400 km, with ~13% successful recruits. Figure 2.4 in Callwood, 2016.

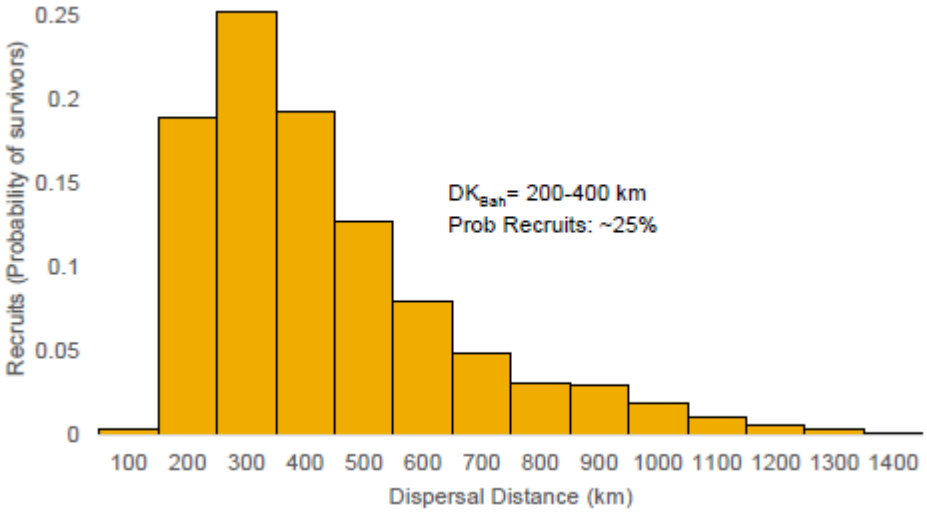

Figure 4. Dispersal Kernel: Bahamas. The average dispersal kernel for The Bahamas 200-400 km, with ~25% successful recruits. Figure 2.5 in Callwood, 2016.

From this analysis the team concluded that even though stocks are likely to be connected throughout the wider Caribbean (at least genetically, if not in terms of population dynamics), The Bahamas appears to be a rational stock management unit for spiny lobster.

3.3.3 Reference points

There are two sets of reference points. The stock assessment evaluates stock status relative to depletion-based biomass reference points (i.e. SB/SB_0), using 0.4 as a target and 0.2 as a limit (called in the stock assessment SSB40 and SSB20). (This corresponds to the MSC default proxy reference points for B_{MSY} and the PRI, for scoring PI 1.1.1, although they are most likely conservative estimates for spiny lobster.) The HCR, conversely, uses reference points expressed in terms of average CPUE for the dive (condo) fishery – these are described under the section on Harvest Strategy below. Both sets of reference points are used; the average CPUE reference points are used annually to set export limits based on the agreed HCR, while the biomass reference points are used less frequently (2011, 2015, 2017) as part of the stock assessment, to evaluate if the HCR is working properly, and if not how it should be adjusted (as was done based on the previous stock assessment; see Section 3.3.5 below).

It is worth noting that SSB40 and SSB20 are the default MSC proxies for the B_{MSY} and the PRI, across all types of fisheries (see GSA 2.2.3.1), although MSC note that it may be appropriate to adjust them upwards or downwards according to the productivity of the stock. Crustacean stocks are generally considered productive, and it is more common to set reference points for crustacean fisheries at a lower biomass level. For example, the MSC-certified fishery for Louisiana blue crab (*Callinectes sapidus*) uses reference points which translate as 26.4%SPR for the target and 17.6% as the limit (SCS, 2012). For fisheries for *Nephrops norvegicus* in northern Europe, ICES uses a default target fishing mortality of $F_{35\%SPR}$ (e.g. ICES, 2017; in some cases – alternatively it may use F_{max} or $F_{0.1}$), and $F_{35\%SPR}$ is likewise used as a target fishing mortality for brown crab in England, with $F_{15\%SPR}$ as a limit (Cefas, 2014).

3.3.4 Stock status

A new stock assessment was conducted in 2017, replacing an assessment from 2012 (Medley, 2017). The assessment has been improved following a review of the previous assessment, in particular to make full use of size composition data. The assessment concludes that while the stock is highly likely to be above any limit reference point, it is not clear whether the stock is below, at or above the target level.

The assessment of stock status is uncertain because of uncertainty in the CPUE abundance index; there is no consistent index covering the whole period of the stock assessment. Up until 2010, the only CPUE index available came from trip interviews, mainly from New Providence which (although the largest island in terms of population) is not the main island for lobster fishing. This method of collecting data was replaced in 2010 by a system whereby processors collect catch and effort data from fishers and report it to the DMR; this covers a much wider and more representative range of trips, and gives an improved index, according to the stock assessment model (Medley, 2017; Figure 5).

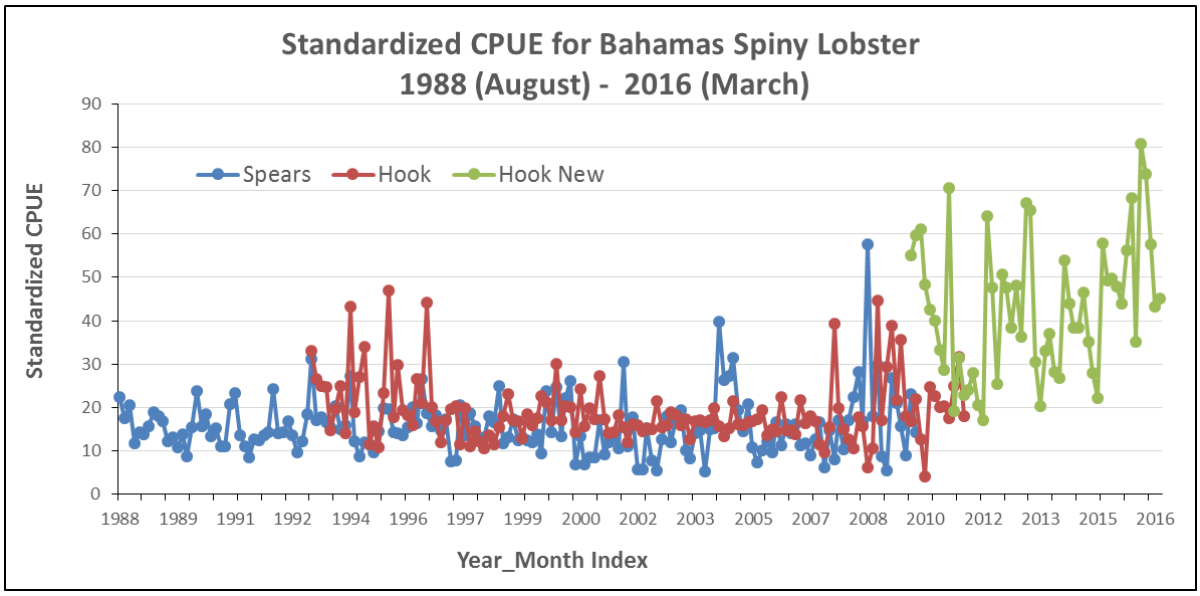

Figure 5. Standardised CPUE indices for The Bahamas lobster fishery, 1988-2016; the green index comes from data reported via the processors; previously it came from trip interviews by DMR Fisheries Officers (from Muller and Cummings, 2017).

Trap CPUE is not used in the assessment. The three CPUE time series are i) spears (diving on natural lobster habitat), ii) hooks (diving on condos – data from DMR Fishery Officers trip interviews) and ii) 'hooks new' (diving on condos – data from processors). The model uses a monthly time step, because this allows it to make use of the information content arising from the intra-season decline in CPUE as well as from inter-annual variability.

The standardised CPUE index has high variability (noise) which suggests that it is not a good reflection of abundance. In fact, it is more likely to be an index of recruitment than directly of stock biomass, because it is clear from the size structure of the landings (dominated by the smallest 5oz tails) that the fishery depends strongly on recruits. (Note that this may not reflect the size structure of the stock; but may relate to habitat preferences of different size classes, bearing in mind a tendency to migrate deeper with size). The model therefore infers stock biomass from catch and recruit information (Paul Medley, pers. comm.). In general, recruitment variability is high in broadcast spawners, because it depends to a large degree on larval dispersal patterns and mortality rates, which are sensitive to subtle changes in oceanographic conditions (i.e. temperature, current strength and direction).

The stock assessment report notes a range of issues with the older data (from DMR trip interviews), but considers that the data direct from purchase records (i.e. the 'hooks new' green time series in Figure 5) is more accurate and robust. Some problems, however, remain, including a small number of trips with unrealistically high catch rates, which may actually be consolidated data from several trips. It is hoped that these data problems are being ironed out as processors continue to emphasise to their vendors the importance of accurate effort as well as catch data.

As is clear from Figure 5, the pre-2010 and post-2010 indices are inconsistent with each other, which is perhaps not unexpected given the difference in how they were collected. The

new index is consistently higher than the old (Figure 5). This can be interpreted in two ways: either i) it is a consequence of different mean catchability (q) across the trips reported in the two indices or ii) there has been a genuine increase in recruitment at the same point as the indices change over. These assumptions are modelled as follows:

- EITHER i) by keeping the two time series separate in the model, which then means that the model considers the trends within each time series but not the difference between time series; i.e. the increase in CPUE in 2010 is assumed to be down to a change in catchability (model 'independent q');
- OR ii) by linking the two model and constraining the possible change in catchability, which means that the model also considers the increase in the transition from the old to new time series, and assumes that this is a function of increased recruitment (model 'linked q') (Figure 6).

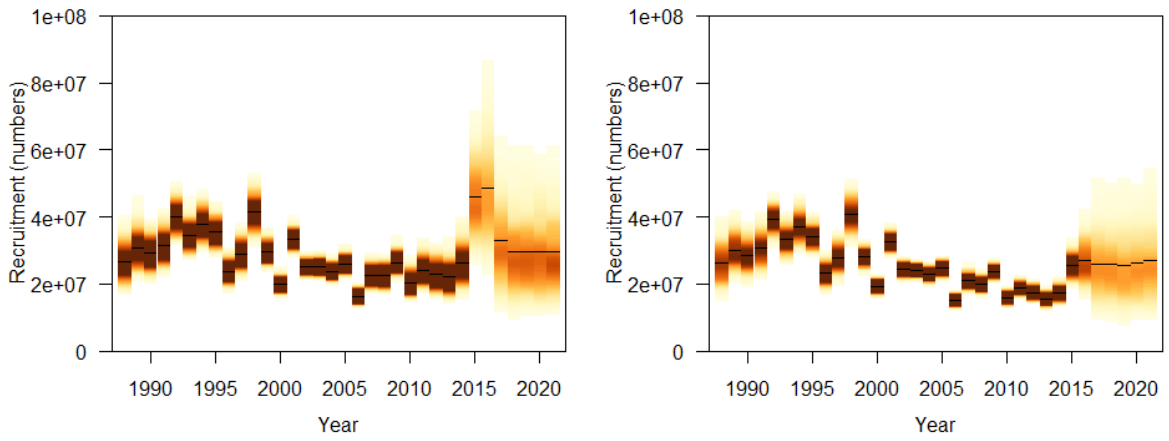

Figure 6. Recruitment estimates from the stock assessment model for the 'linked q' (optimistic) model (left) vs. the 'independent q' (pessimistic) model (right). When the change in q between the two time series is constrained, the model explains the difference via improved recruitment (left); when it is not, it explains the difference via catchability (right) (Medley, 2017).

The stock assessment report (Medley, 2017) points out that in practice neither assumption by itself is very likely: the increase in catchability in the 'independent q' model is too large to be plausible (3.4 times higher), and anecdotally fishers do in fact report an increase in catch rates at this period; conversely some change in catchability is likely in moving to a different type of sample from the fishery. The model 'independent q' gives better model fit (but this is no guarantee that it is correct).

Since the model 'independent q' takes no account of the apparent increase in the CPUE time series in the transition between time series, the conclusions of this model are more pessimistic than those of the model 'linked q'. It was not possible to select one over the other as a reference case in the analysis, so the results of both are presented in parallel. The optimistic scenario suggests that the stock dipped below the target biomass (SB/SB_0=0.4) from ~2003-2015 but did not reach the limit biomass (SB/SB_0=0.2) and is likely to have recovered above this level in 2016, as a consequence of increased recruitment. The

pessimistic scenario suggests the same historic decrease, but with a low-medium risk of declining below the limit biomass and with the recovery in 2015-16 avoiding the limit biomass but not reaching the target biomass (Figure 7; note the projections shown in this figure of biomass from 2017 and onwards are discussed below).

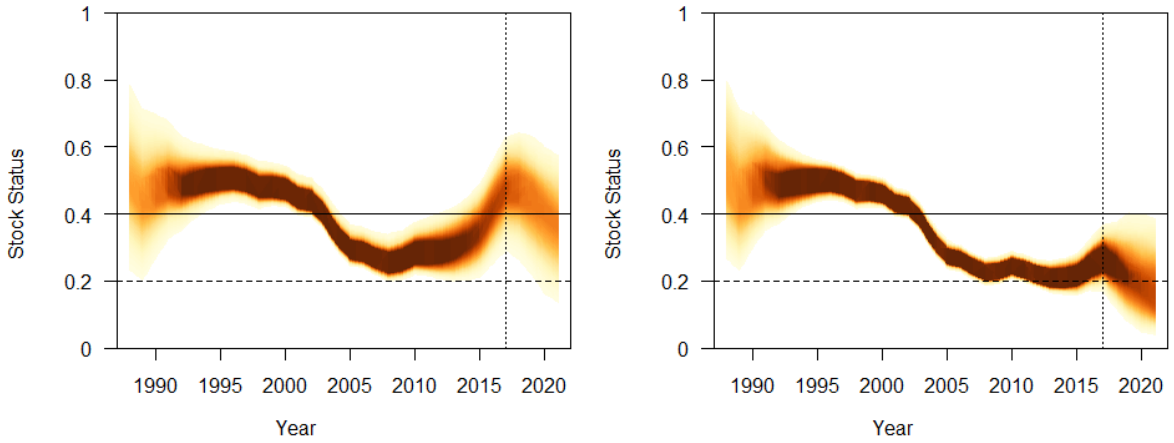

Figure 7. Estimated spawner biomass trajectory from the stock assessment model relative to SB_0, for the 'independent q' (optimistic) model (left) and the 'linked q' (pessimistic) model (right). From Medley, 2017.

3.3.5 Harvest strategy and control rule

One of the main successes of the FIP was to bring industry and the DMR together to agree a harvest strategy (Bahamas Spiny Lobster Working Group, 2015) and a harvest control rule (HCR). Since the fishery is monitored mainly via CPUE and total exports (as well as catch size), the HCR is expressed in these terms as well. The HCR was initially defined as follows (Medley, 2017):

- The Total Allowable Export pounds tail weight quota shall be set at:
- Maximum 7 million pounds when the indexed catch index is at or above the target index.
- a linearly declining value when the current index is above the trigger index, but below the target index, according to the calculation (TAE in millions of pounds processed tail weight):
- TAE = 5 + 2*(Current Index – Trigger Index) / (Target Index – Trigger Index)
- a linearly declining value when the current index is above the limit index, but below the trigger index, according to the calculation (TAE in days at sea per vessel):
- TAE = 5*(Current Index – Limit Index) / (Trigger Index – Limit Index)
- zero (there is an export moratorium) if the current index is at or below the limit index.

The current index for each year shall be calculated as the average between the previous year's index value and the catch rate of the previous year (i.e. a moving average). The catch rate will be based on reported catch and effort data for all vessels operating divers (trap

catch rates are excluded). The catch rate is calculated as the total landings of processed crawfish tails weight in pounds divided by the total number of boat days-at-sea[4].

The HCR Index in any given year *t* (I_t) is calculated as:

$$I_t = 0.5\left(I_{t-1} + \frac{C_{t-1}}{D_{t-1}}\right)$$

Where C_{t-1}=catch (pounds processed tail weight) in the year *t-1* (i.e. season August-July) and D_{t-1} = total boat days-at-sea required to catch C_{t-1}. The index calculation should include all observed reliable catch and effort data in each fishing year.

It may be more conveniently summed up in table form (Table 6).

Table 6. Reference points and export limits used in the initial harvest control rule.

Stock status relative to reference point	Reference point level: Dive CPUE (pounds processed tail weight per boat day at sea – mean across the season)	Total allowable export limit (million lbs.)
Stock is at or above Target Reference Point	Target Ref. Point = 50	7 million lbs
Stock is at Trigger Reference Point	Trigger Ref. Point = 40	5 million lbs
Stock is at or below Limit Reference Point	Limit Ref. Point = 20	0 (export ban)
Stock is between target and trigger	CPUE in range 40-50	Linear function between 5 at 40 and 7 at 50
Stock is between Trigger and Limit	CPUE in range 20-40	Linear function between 0 at 20 or 5 at 40

The new stock assessment from August 2017 (Medley, 2017), however, incorporated some projections as to future outcomes with this HCR, which suggested that under both models, it may not be precautionary, and under the pessimistic model, it is predicted to result in the stock declining below the biomass limit reference point (see Figure 7 above, projections from 2016 to 2021).

It is important to emphasise that these projections are based on a rather improbable scenario of maximum exports permitted by the HCR throughout the projection period, whereas in practice, exports have only reached this level in three of the last ~30 years (in the early 2000s) – it is, however the worst case scenario allowed by the HCR, so it is an appropriate method of testing the ability of the HCR to rebuild the stock to the target level under all circumstances (Figure 8).

[4] The boat days-at-sea refers to the number of dinghies, not just mother boats.

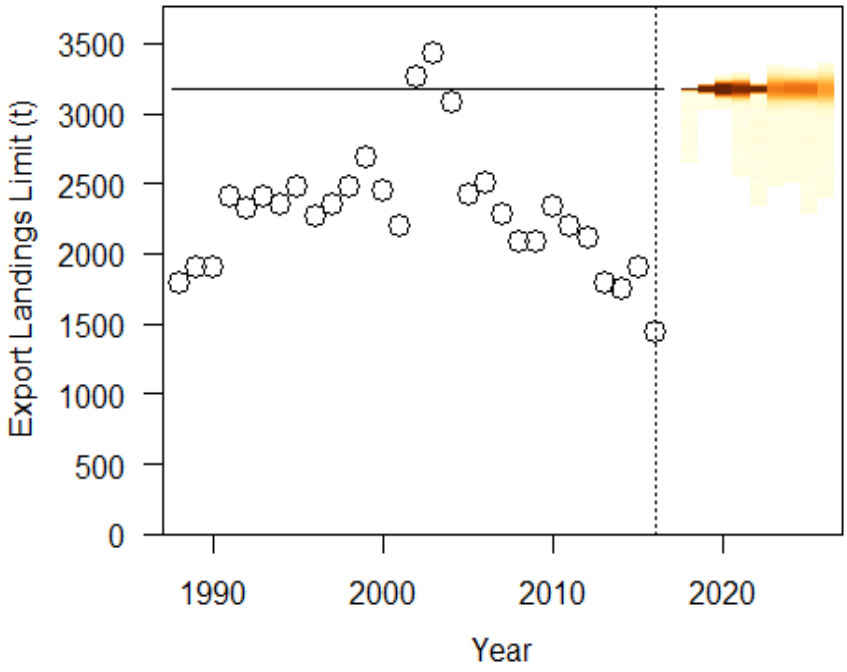

Figure 8. Observed annual catches 1988-2016 (O) and projected catches based on the current HCR. 2016 represents only a partial year, so annual catch is underestimated. The horizontal solid line represents the upper catch limit 7 million lbs. (Medley, 2017)

The stock assessment examines several alternative HCRs, including one whereby the upper target CPUE level and export limit of 7 million lbs. is removed; i.e. the trigger CPUE level becomes the target/upper reference point, with 5 million lbs. the maximum permitted level of exports.

The projections from this revised HCR are shown below (Figure 9); it is clear that this revised HCR is much more successful at maintaining the spawner biomass close to the biomass target level.

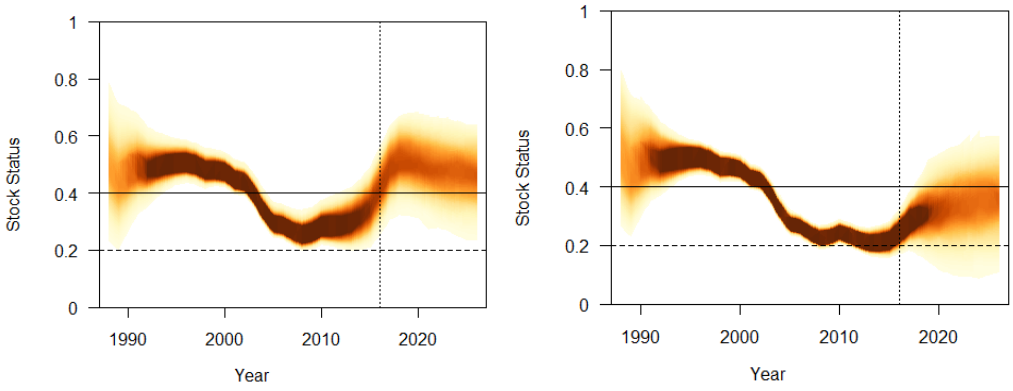

Figure 9. Spawner biomass projections as in Figure 7 but with the upper export limit fixed at 5 million lbs.; left: 'linked q' (optimistic); right: 'independent q' (pessimistic) (Medley, 2017).

In response to this analysis, The Bahamas Spiny Lobster Working Group requested that the DMR adjust the HCR. They put forward a proposal for the forthcoming season as follows (letter from BSLWG to Minister of Marine Resources, Renward Wells MP, 16 January 2018; see Appendix 6 BSLWG Support Letter for Lobster HCR); Bahamian exporters also pledged support for the adjustment of the maximum export limit to 5 million lbs. (letter from 14 exporters including all four members of BMEA to Minister of Marine Resources Renward Wells MP, 23 January 2018; see Appendix 5 Letter of Support for Responsible Fishing from):

Commencing 1st August, at the start of the 2018/2019 spiny lobster / crawfish season, a new Harvest Control Rule (HCR) for The Bahamas will take effect. The export quota for spiny lobster / crawfish tails (or its equivalent weight in whole weight or live lobster) will be set at 5 million pounds. Exports will be monitored by the Department of Marine Resources and, after adequate notice is given, commercial exports will cease when the limit of 5 million pounds has been reached. If 5 million pounds is not exceeded, the fishery will close on March 31st, as usual. This export quota will be enacted on a seasonal basis. If the export limit is reached during one season, subject to normal authorisations, exports will again be allowed beginning August 1st of the subsequent season. Revisions of the export quota amount, and its implementation, will take place as needed. This HCR does not negate applicable laws pertaining to fisheries or exports.

The issue was discussed by The Bahamas Cabinet on 30 January, 2018; and the new HCR was formally approved (team notified by email by Lester Gittens, DMR on 28th February 2018 – Appendix 7. It will apply from the next season (2018/19). The DMR will now monitor exports on an on-going basis (during season) and cease exports if the exports reach 5 million pounds. The season will re-open on schedule during the subsequent season. The BSLWG and the DMR will evaluate implementation protocols for the HCR as needed.

The new HCR, as formally approved and applied from 2018, is summarised in Table 7.

Table 7. Reference points and export limits used in the revised, current harvest control rule.

Stock status relative to reference point	Reference point level: Dive CPUE (pounds processed tail weight per boat day at sea – mean across the season)	Total allowable export limit (million lbs.)
Stock is at or above Trigger Reference Point	Trigger Ref. Point = 40	5 million lbs
Stock is at or below Limit Reference Point	Limit Ref. Point = 20	0 (export ban)
Stock is between Trigger and Limit	CPUE in range 20-40	Linear function between 0 at 20 or 5 at 40

The stock assessment review (Muller and Cummings, 2017; described below) also reviewed the HCR and its implementation, and made recommendations as follows:

- The department should monitor CPUE and exports within season rather than applying the HCR between seasons; processors should be requested to report within an appropriate timeframe so that this can be done;
- The performance of the HCR should be re-evaluated at a minimum every 3-4 years, alongside an updated stock assessment.

3.3.6 Stock rebuilding

As is clear from Figure 7 and Figure 9 above, the stock needs rebuilding to the target biomass level. It is therefore important to examine the rebuilding probability and timeframe under each model scenario (independent q and linked q – 'optimistic' and 'pessimistic'). The results of stock biomass projections are given in Table 8. For the optimistic model (linked q) the biomass has a high probability of remaining above the target biomass throughout the projection time period. For the pessimistic model (independent q), the projections suggest a slow rebuilding of the biomass over the projection time period, with a ~30% probability that rebuilding is complete by the end of the period (10 years).

Table 8. Optimistic and pessimistic model projections with new HCR for the years 2017 - 2026. p(SSB>20%) means probability that SSB is above 20% of SSB_0. Projections provided by Paul Medley (author of the stock assessment).

Optimistic	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
p(SSB>20%)	1	1	1	1	1	1	1	1	1	1
p(SSB>35%)	0.986	0.994	0.996	0.991	0.983	0.979	0.963	0.945	0.931	0.933
p(SSB>40%)	0.915	0.968	0.956	0.945	0.915	0.889	0.865	0.844	0.825	0.801
Pessimistic	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**
p(SSB>20%)	0.995	0.993	0.989	0.978	0.972	0.968	0.964	0.96	0.96	0.963
p(SSB>35%)	0.02	0.169	0.303	0.365	0.409	0.44	0.47	0.501	0.525	0.535
p(SSB>40%)	0	0.018	0.078	0.14	0.191	0.21	0.243	0.255	0.279	0.303

3.3.7 Information

As already explained above, the key data sets for the stock assessment are as follows:

- Total exports of spiny lobster (estimated to make up ~90 - 95% of commercial landings), plus other landings as quantified by Fisheries Officers (see below);
- Dive (condo) fishery CPUE, previously evaluated by fisher interviews and now evaluated via catch reports collected from fishers by processors and provided to the DMR (a requirement for the DMR to provide catch certificates for exports);
- Catch size-frequency data taken from sampling and catching grading at the processing plants.

The recent change in the method of collecting CPUE data (driven by the FIP) reflects a big step forward towards a robust recruitment index for the stock, although it has thrown up some problems in terms of matching the new and old indices, as explained above. There remain, however, some problems with this data set as an abundance index; there are, for

example, outliers which report very high catch rates – it may be that in some case, the catch from several trips is consolidated into one report.

The DMR receives data from the following sources:

- Landing forms (departure/arrival time, crew and vessel details, areas fished, days spent fishing, gear, catch by species);
- Processor monthly reports (quantity purchased, sources, size grading);
- Reports from Fishery Officers (fisher interviews – an overview of the magnitude of non-export landings and effort).

The data arrives either in electronic form (from processors) or on paper (from fishers) and are entered into an electronic data management system (FISMIS). There is a process for QA checking. Old (paper) data has also been entered into this system. Fishers, vessels and processing companies are registered in FISMIS (so for example it is not possible to enter catch information from a vessel not registered in the system).

There are clearly some significant gaps in the data available on the stock. Although it is estimated by DMR that 90-95% of commercial are exported and therefore covered by the data collection system (in catch certificates and processor reports), there are also significant and largely unquantified subsistence landings. As already noted, subsistence fishing is an essential part of the Bahamian way of life, particularly on the Family Islands, and the relatively unreported nature of this activity is a philosophical choice by the government. Despite the need for improvement of recording in the subsistence fishery, the fishery is not unregulated – there are, for example, several no-take zones, a MLS for conch and a closed season for Nassau grouper as well as the rules for lobster set out in Section 3.2.9; all these rules apply to everyone). Further to this, lobsters caught by foreign sport fishers have catch limits, which caps lobsters per vessel to ten[5], at any time. Annual closed season is 1 April to 31 July. Minimum size limits are 3 1.4" carapace length or 5 1/2" tail length. Egg-bearing female lobsters are protected (see Fisheries Resources (Jurisdiction and Conservation) Regulations)[6].

According to DMR, due to the lack of reporting, a key task for Fishery Officers is to try and capture these landings, by visiting landing sites in their district. This information is entered into FISMIS and is used in the stock assessment as part of the estimate of total landings.

There is also an unquantified level of IUU fishing on lobster from non-Bahamian vessels; notably by vessels from the Dominican Republic in the remoter areas of the southern Bahamas. The level of IUU fishing has reduced significantly in recent years, as The Royal Bahamas Defence Force (RBDF) has been allocated additional resources for at-sea patrols and inspections, but IUU has most likely not been eradicated.

[5]Section 48(1)(f)(iii) of Fisheries Resources Jurisdiction and Conservation Regulations

[6]http://laws.bahamas.gov.bs/cms/images/LEGISLATION/SUBORDINATE/1986/1986-0010/FisheriesResourcesJurisdictionandConservationRegulations_1.pdf

The stock assessment deals with this source of uncertainty in total removals via a sensitivity run which assumes that the entire lobster landings of the Dominican Republic come from The Bahamas stock. Since this is unlikely, it is assumed that this will be sufficient to account for unquantified subsistence landings as well as IUU (Medley, 2017). Since this assumption does not change the overall conclusions of the stock assessment, it is assumed that the analysis of stock status and the operation of the HCR is robust to these uncertainties.

There are also some other possible sources of unobserved mortality; e.g. ghost fishing by lost traps and the retention of undersized lobster in traps to attract conspecifics, which it is assumed will result in some mortality. Ghost fishing by lost traps in Florida is thought to be significant (Butler and Matthews, 2015) but several factors suggest it is likely to be much less significant in The Bahamas:

- The relatively low number of traps in use in the fishery (see Section 3.2.8);
- They are deployed in strings, rather than singly as in Florida, making them less likely to be lost;
- Only wooden traps are permitted and a minimum slat separation is required (see 'Regulations' above); Butler and Matthews (2015) show that ghost fishing by wooden traps is less likely than by wire or hybrid traps.

Regarding the use of undersized lobster in traps, the DMR considers based on trap experiments (Lester Gittens, DMR, pers. comm.) that most undersized lobsters can escape from traps.

Overall, the team concluded that these sources of unobserved mortality are not likely to be significant.

3.3.8 Stock assessment

The new stock assessment model (Medley, 2017) was developed to take account of the key recommendation of an external peer review of the previous model (Muller and Puga, 2012) to use all the available size-composition data. The model is a statistical catch-at-age model implemented in Stan and using Bayesian techniques. Input data are as follows:

- Catch and effort data, monthly, August 1988-December 2016;
- Total annual catch, 1957-1988;
- Monthly catch by size category, 1996-2016;
- Size, sex and maturity sampling data, compiled by month (available for 21 months total);
- A growth sub-model based on available data on a meta-analysis of spiny lobster age and growth;
- Estimates of natural mortality, female maturity and length-weight conversions, based on the data or the literature.

A detailed analysis of various morphometric relationships was developed to allow conversion between size data in different units (i.e. carapace length vs. tail length vs. tail weight etc.), and a detailed analysis is also provided, showing how commercial size grade data can be adapted into a form that the model can use. Because males are an increasing proportion of

the catch in the larger size grades, the model was run separately for males and females. Growth was estimated using a von Bertalanffy growth function, selectivity was estimated using a dome-shaped function for diving and a logistic function for traps, based on length. Recruitment was modelled by fitting a Beverton-Holt stock-recruit relationship to the data (i.e. steepness was estimated by the model instead of fixed externally). The average annual catch for 10 years (1978-1987) prior to the start of the model was used to provide priors for the maximum recruitment and initial depletion parameters. The model time-step was one month.

The stock assessment evaluated the sensitivity of the model output to various assumptions. A list of the various model runs is given in Table 9.

Table 9. Summary of model sensitivity analyses and results (Medley, 2017)

Change	Objective	Summary result
Initial Model	Original stock assessment model	
Low sd for the linked ***q*** prior	To test the effect of the prior linking the CPUE time series	Higher sd allows the time series to be more independent, i.e. the model outcome is more similar to the 'pessimistic' model
High sd for the linked ***q*** prior		
All data dropped from before 2000	To test the effect of older data on current estimates of stock status	Little effect on current stock status
Remove random sampling data	To test the effect of the random sampling data on the assessment results.	No significant change; slightly higher uncertainty
Estimate a separate August q	To test whether August catchability could be estimated within the assessment.	Standardisation of the catch-effort data seems to remove the 'August effect' successfully
Estimate a separate August q for each gear. (new base case)	To test whether the August effect on catchability was different for each gear.	Significant differences were found between gears, so this model became the new base case.
Separate observation error sd (new base case)	To test whether the differences between CPUE series could be attributed to changes in observation error.	Not much impact on stock status but reduced the sensitivity to linked vs. independent q somewhat; more plausible from the diagnostics. This is the 'optimistic' base case model.
Added DR landings	To test whether IUU could have had a significant undetected impact on stock status.	Inclusion of IUU raised the apparent productivity of the stock, but did not affect stock status.

Change	Objective	Summary result
Removed commercial size data for 2008/9	To test the impact of the commercial size category data for 2008 and 2009 which contains many outliers	No significant effect.
Independent q for CPUE series (Alternative base)	To develop an alternative assessment case.	'Pessimistic' base case model.

The stock assessment was peer reviewed by two external reviewers (Muller and Cummings, 2017). In summary, they concur with the approach taken in the assessment, as well as its conclusions in relation to the stock status and the HCR, and note that it is a significant improvement on previous assessments. In relation to the stock assessment data and methodology, their key recommendations for future assessments are as follows:

- Useful to estimate growth parameters directly from the Bahamian stock, as well as seasonal growth patterns;
- Consider expanding the catch/effort data collected from processor, if a representative sample across the whole spatial extent of the fishery can be obtained;
- Catch by size data should be sampled by island according to quantity of landings;
- Considering tracking catch/effort in more detail from some individual fishers or vessels, to be able to account for differences by vessel/fisher;
- Investigate options for improved estimates of unreported legal catch;
- Update the model at a minimum every 3-4 years;
- The report should include information about model fits to the different components.

3.3.9 Key LTL

Under Principle 1, MSC have tighter criteria for species considered to play a key ecosystem role as 'key low trophic level' species (key LTL species). Spiny lobster have a catholic diet but are mainly predators, so *a priori* would not come into this category, but to be precautionary this is reviewed under the MSC criteria.

Spiny lobster are not in any of the taxa listed in the FCR Box SA1, so to be considered potential key LTL species would need to meet the following requirement (SA2.2.9.b.i) [assessment team comments in square brackets]:

The species feeds predominantly on plankton [no]*; has a trophic level of about 3 (but potentially ranging from 2 to 4)* [yes]*; is characterised by small body size, early maturity, high fecundity and short life span (default values: <30cm long as adults, mean age at maturity <= 2, >10,000 eggs/spawning, maximum age <10 years respectively)* [yes]*; and forms dense schools* [no].

Since only two out of four of the criteria are met, spiny lobster are not required to be considered further under the key LTL requirements.

3.4 Principle Two: Ecosystem Background

3.4.1 Designation of species under Principle 2

The designation of species as Primary, Secondary or Endangered, Threatened or Protected (ETP) species is based on the following criteria.

Primary species (MSC Component 2.1):

- Species in the catch that are not covered under P1
- Species that are within scope of the MSC program, i.e. no amphibians, reptiles, birds or mammals
- Species where management tools and measures are in place, intended to achieve stock management objectives reflected in either limit (LRP) or target reference points (TRP). Primary species can therefore also be referred to as 'managed species'.

Secondary species (MSC Component 2.2):

- Species in the catch that are not covered under P1
- Species that are not managed in accordance with limit or target reference points, i.e. do not meet the primary species criteria
- Species that are out of scope of the programme, but where the definition of ETP species is not applicable (see below).

ETP (Endangered, Threatened or Protected) species (MSC Component 2.3) are assigned as follows:

- Species that are recognised by national ETP legislation
- Species listed in binding international agreements (e.g. CITES, Convention on Migratory Species (CMS), ACAP, etc.)
- Species classified as 'out-of scope' (amphibians, reptiles, birds and mammals) that are listed in the IUCN Redlist as vulnerable (VU), endangered (EN) or critically endangered (CE).

Both primary and secondary species are defined as '**main'** if they meet the following criteria:

- The catch comprises 5% or more by weight of the total catch of all species by the UoC;
- The species is classified as 'less resilient' and comprises 2% or more by weight of the total catch of all species by the UoC. Less resilient is defined here as having low to medium productivity, or species for which resilience has been lowered due to anthropogenic or natural changes to its life-history;
- The species is out of scope but is not considered an ETP species (secondary species only);
- Exceptions to the rule may apply in the case of exceptionally large catches of bycatch species.

3.4.2 The Bahamas marine ecosystem

The Bahamas has large areas of littoral, bank, seagrass, bank edge and reef habitat with a low population density and low fishing pressure relative to the rest of the Caribbean and the Florida Keys (Chiappone et al., 2000; see Figure 10). It therefore has generally a higher abundance of larger piscivores such as large-bodied grouper species and sharks than elsewhere in the Caribbean (Chiappone et al., 2000); The Bahamas reportedly has the greatest concentration of sharks in the wider Caribbean (Ward-Paige, 2010) and it is one of the only places left where the large-bodied Nassau grouper (a talismanic species in The Bahamas) remains relatively abundant.

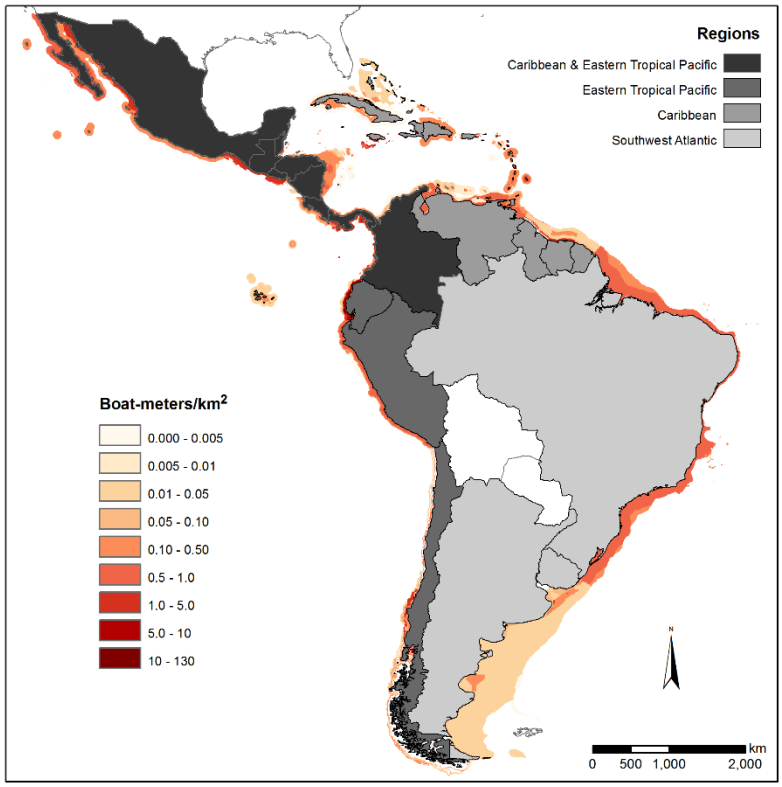

Figure 10. Fishing boats (boat-metre per km^2), Caribbean and Latin America; Stewart et al., 2010.

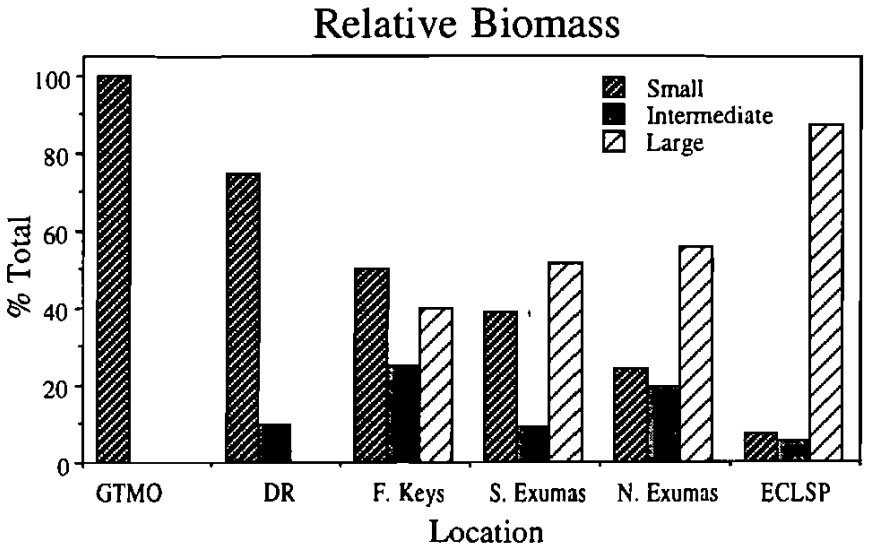

Figure 11. Relative biomass of small, medium and large groupers at various locations around the northern wider Caribbean: GTMO=Guantanamo Bay, Cuba; DR=Dominican Republic; ECLSP=Exuma Cays Land and Sea Park – the right-hand three locations are in the central Bahamas (Chiappone et al., 2000).

3.4.3 Marine conservation in The Bahamas

Under the Caribbean Challenge, The Bahamas has made a commitment to protect 20% of near-shore resources by 2020, and at time of writing, ~10% of near shore marine habitats were covered by marine reserves, although most of them do not yet have any management in place. There are some exceptions; the long-standing Exuma Cays Land and Sea Park and the MPA covering the west side of Andros Island are both no-take zones (the ECLSP since 1958). There is a Master plan for The Bahamas National Protected Area System (2014), and progress is underway with various elements (e.g. surveys for an ecological gap analysis for marine species; Craig Dahlgren, Perry Institute of Marine Science, pers. comm.)

There is a range of organisations involved in MPAs in The Bahamas. Most longstanding is The Bahamas National Trust (BNT) who have for many years been in charge of the management of National Parks, including the ECLSP. BNT have reportedly been working to create national parks (with a marine component – which is difficult to avoid in The Bahamas) in other islands as well, although the locations and process of these are a little unclear (to the team, not to BNT). DMR are in charge of six marine protected areas[7] in the Berry Islands, the Abacos, Bimini, Exuma and Eleuthera, none of which have any formal management at present. According to BNT, management plans are reportedly in preparation for these areas, and ultimately, DMR expressed the intent to turn them over to local communities for management. (Meanwhile, however, NGOs expressed some concern that DMR was vulnerable to pressure from commercial interests in these areas, although the intent is to avoid commercial activities in the MPAs.) Reportedly, at present ~10% of the total

[7] Bimini and Exuma are yet to be gazetted. The other mentioned have been.

banks area is gazetted in MPAs of one kind or another, although most (aside from the ECLSP and a no-take zone on the Andros west side) have no associated management for the moment.

The Bahamas Protected Area Fund is in development; this NGO has a board and has hired an Executive Director. The aim of this body is to support applications for external funding for the MPAs, particularly by developing structures for improving accountability and transparency.

3.4.4 Bycatch in condos

Condos are fished by diving, with the lobsters individually hooked and brought to the surface by hand. There is therefore no bycatch associated with condo fishing.

3.4.5 Bycatch in traps

Bycatch in lobster traps has been evaluated in two reports by MRAG for The Nature Conservancy (TNC) (TNC 2015a,b), one of which reviews the literature on bycatch in lobster traps, and one of which summarises and evaluates the available data.

Direct data on trap bycatch in The Bahamas are also available from some studies conducted by the Department of Marine Resources, involving scientific observers on board trap-fishing vessels. These data are analysed in TNC (2015b); the outcome is summarised in Table 10.

Table 10. DMR studies of lobster trap bycatch in The Bahamas fishery (summarised in TNC, 2015b).

Study	Location / date	Lobster catch	Bycatch	Discarded alive	% Bycatch	No. species
1	S. Andros / 3/13	123.8 kg	45.8 kg / 116 individuals	15.8 kg / 51 individuals	37 % total by weight; 24 % dead	at least 16
2	S. Andros / 2/15	78 individuals (10 released due to size)	270 individuals	Not known	80 % total by number	at least 17
3	Key Lobos / ?	Not known	51 individuals	Not known	Not known	10
4	? / 4/15	187.3 kg; 153 individuals (retained)	88 kg / 109 individuals	40.3 kg / 80 individuals	32 % total by weight; 22 % dead	at least 16

The two studies (Study 1 and Study 4) which provide information on the proportion of bycatch by weight suggest that total bycatch can be significant as a proportion of the total lobster catch; ~20-25% even leaving aside the proportion discarded alive. However, a large number of different species are involved. The bycatch taxa making up >5% or 2-5% of the total catch (including lobster) for each study are given in Table 11.

Table 11. Most frequent bycatch taxa in the four DMR studies of trap bycatch (summarised from TNC, 2015b)

Freq.	Study 1 (by weight)	Study 2 (by number)	Study 4 (by weight)
>5 %	Margate (white, *Haemulon album* and blac, *Anisotremus surinamensis* combined)	Triggerfish (*Balistes vetula*), Margate (black and white combined), Crab (various), Goatfish (yellow *Mulloidichthys martinicus* and spotted *Pseudupeneus maculatus*), Snapper (*Lutjanus* spp.), Grunt (*Haemulon* spp.) Lionfish (*Pterois volitans*; invasive species)	Lionfish Hermit crab (various)
2-5 %	Crab (various) Boxfish (Ostraciidae) Lionfish Triggerfish (locally known as turbot) (Balistidae)	Grouper (Epinephelinae) Hogfish (*Lachnolaimus maximus*)	Tang (blue *Acanthurus caeruleus*) white margate (*Haemulon album)*

It is clear from Table 11 that trap bycatch can be quite variable in time and space; the drivers are unclear but presumably it relates mainly to the fish which are generally abundant in that specific area.

The literature review (TNC 2015a), which is based mainly on studies conducted in Florida, also suggests that fish are retained in lobster traps to a variable extent, depending largely on the construction of the traps. Wooden traps, as used in this fishery, have a proportion of fish bycatch and also catch species such as stone crabs, spider crabs, hermit crabs and urchins (Matthews et al., 1995; Matthews and Donahue, 1997). Fish bycatch came from a wide range of species – grunts, porgies, triggerfish, cowfish, snapper, grouper and lionfish are reported (Matthews et al., 1995) – i.e. the general groups are the same as those found in the DMR studies (Table 11) even if the species may be different. The impact on fish taken as bycatch is unclear; small individuals can escape but the mortality of larger individuals depends on duration of capture, trap soak time and (it is hypothesised) the amount and type of handling during release.

Butler and Matthews (2015) looked at ghost fishing of traps in Florida; they reported that wooden traps took on average 3.71 lobsters / trap (during the first year of the experiment) plus 0.167 fish / trap (over the whole study period) of which white grunt *Haemulon plumierii* were the most common. These figures suggest an overall catch rate of fish of 4.5% by number (i.e. 95.5% lobster); which is a lot lower than the papers cited in the literature review – but ghost fishing traps of course do not operate the same way as traps which are being actively baited and checked.

Matthews and Donahue (1997) evaluated bycatch in wooden lobster traps, again finding mainly grunts (tomtates and white grunts; *Haemulon aurolineatum* and *H. plumierii*). They noted that many individual fish could escape the traps; 90% of snapper were estimated to escape within 24 hours (Bahamian regulations require slats to be a separated by a gap of minimum one inch). They estimated an overall daily mortality for wooden traps at 0.0009-0.0027 animals / trap (excluding lobster but included fish and non-fish bycatch). It is hard to

say what this means for The Bahamas trap fishery, however, because we do not know how many traps there are nor for how many days on average they are soaking during the year. 10,000 traps soaking for on average 200 days / year would give 1,800-5,400 individuals per year across all species; but we can't compare this calculation to reality.

From behavioural observations of fish in lobster traps (Tom Matthews, pers. obs.), fish that enter lobster traps can generally exit; they may often enter the trap during the day and leave at night. They are less likely to enter the trap if it contains lobster, with the except of triggerfish who are reported to use lobsters in traps as a convenient feeding station.

Overall, based on the various sources of information above, there is no strong evidence for any 'main' bycatch species for the trap fishery; i.e. a species which consistently makes up >5% of the total catch from the traps. From Table 11 (the only direct information from The Bahamas), white margate is a possible candidate. Combining Study 1 and Study 4 (which evaluated bycatch by weight) gives an estimate for the proportion of margates in the catch of 5.3%, but this combines two species. Furthermore, these studies also suggest that a proportion of this bycatch is discarded alive (Study 1 – 44%; Study 4 – 73%), although there is no information on the species composition of live discards, nor the rate of post-discard mortality.

Nevertheless, species may be considered 'main' at lower catch levels if they are less resilient to fishing pressure. Table 12 evaluates all the species from Table 11 (as far as they can be determined – i.e. when not grouped into larger taxa). Although two species are listed by IUCN as potentially depleted, this analysis does not include The Bahamas in either case, and since fishing is considered the primary cause in both cases, and neither species is fished much in The Bahamas, it is not likely that the listing is relevant to this fishery. On this basis, the team concluded that there are no 'main' bycatch species for the trap fishery.

Table 12. Species from Table 11; evaluation of potential vulnerability

Species	Redlist status	Bahamian situation	Ref.
White margate - *Haemulon album*	Data deficient	Relatively abundant in The Bahamas (habitat preference for oligotrophic areas); not an important component of fisheries	Lindeman et al., 2016a
Black margate - *Anisotremus surinamensis*	Data deficient	Not an important component of fisheries	Lindeman et al., 2016b
Queen triggerfish – *Balistes vetula*	Near-threatened	Not an important component of fisheries; reported declines in W. Africa and Brazil account for listing; also main prey used to be *Diadema* (before mass mortality) and may be prey species for lionfish	Liu et al., 2015
Yellow goatfish – *Mulloidichthys*	Least concern		Dooley et al., 2015a

Species	Redlist status	Bahamian situation	Ref.
martinicus			
Spotted goatfish – *Pseudupeneus maculatus*	Least concern		Dooley et al., 2015b
Hogfish - *Lachnolaimus maximus*	Vulnerable	Decline reported mainly in Florida; thought due to recreational fishing; not an important component of fisheries in The Bahamas	Choat et al., 2010
Blue tang – *Acanthurus coeruleus*	Least concern		Choat et al., 2012

3.4.6 Bycatch of vulnerable but non-ETP species

Queen conch and Nassau grouper are talismanic species in The Bahamas, and are known to be vulnerable and overfished in many (most) areas. In The Bahamas they are managed via fisheries regulations, but are not ETP species because they are still commonly fished (indeed, eating them is part of the Bahamian way of life[8]).

Grouper are mainly taken from reef areas, and are likely to be targeted by small-scale fishers fishing on reefs for lobster and fish species (e.g. in Andros). Condos are known to provide habitat for juvenile Nassau grouper (Higgs, 2016a), but these are protected by a minimum size limit; there is also a closed season to protect spawning aggregations. Conch inhabit sand and seagrass areas which may also used to set condos or traps, but do not interact with either gear type.

According to the evidence available (as per analysis and references above), neither of these species are taken as direct bycatch in the lobster fishery, either by trap or condo. It is certainly the case, however, that lobster fishers will fish these species opportunistically while fishing for lobster. This might result in heavier fishing pressure on these stocks than would otherwise be the case, and might also result in populations in remote areas of the banks or bank edges being exploited, while they would otherwise be inaccessible. The team considered that this type of indirect interaction should not be considered as 'bycatch', but a separate fishery.

3.4.7 ETP species

ETP (endangered, threatened and protected) species are defined as those protected by national legislation or international treaties. In The Bahamas, ETP species are the following:

- Turtles (fully protected in 2009; paras 29-32 of Fisheries Regulations);
- Sharks (para. 36 of Regulations);

[8] See https://www.youtube.com/watch?v=IYCsTSjc4N8

- Cetaceans and manatees (para. 41 of Regulations);
- Corals (para. 12; considered under 'habitats' below).

Adimay et al. (2014) looked at interactions and mortalities of protected species with fishing gear in Florida, and show that ETP species can and do interact with traps. In Florida, in the five years 2005-09, mortalities were recorded from trap gear of 62 turtles (28 loggerhead, 20 green, 11 leatherback, 1 hawksbill and 2 Kemps ridley), 39 manatees and 12 bottlenose dolphins. It is important to note, however, that this study confounds spiny lobster traps, blue crab traps and stone crab traps – it does not provide separate figures but notes that the manatee mortalities all came from blue crab traps. Nevertheless, this indicates that there is at least a theoretical possibility of mortality of ETP species from this fishery.

Turtles

There is not apparently any direct evidence of turtle mortality from this fishery in The Bahamas. Higgs (2016a) reports that loggerheads forage on condos, and other species may be attracted to them as structure; there is no reason to suppose, however, that this would be a source of mortality. Anecdotally, loggerheads may try to enter traps (causing damage and potentially entangling themselves), but to what extent is not clear.

Lester Gittens (DMR) studied predators on traps and condos as part of his doctoral research (currently in preparation[9]). He notes:

Based on the data that I collected to evaluate predation on lobsters at condos compared to the natural environment, I only saw one turtle among 17,000+ still photos. It turned out to be a loggerhead and it was found in a natural area (in other words not next to fishing gear).

When I started my research in Abaco, I would occasionally meet some of my condos flipped over. I suspected turtles among possible culprits. This led me to wonder if turtles were a nuisance to fishers and that interactions possibly existed. However, I have not received a single complaint from fishermen and fishers would definitely advise if that were such a problem. I also did not see any evidence of turtles breaking apart my wooden traps to extract lobsters.

Five species of turtles are present in The Bahamas (same as those listed above); of which loggerheads, greens and leatherbacks may nest, but it does not appear that nesting is significant in The Bahamas for any turtle species. Genetic studies suggest that green turtles in The Bahamas come mainly from the population that nests in Costa Rica, with significant contributions also from Mexico (Yucatan) and Florida; loggerheads nest mainly in Florida, which is the most significant loggerhead nesting area in the wider region (Bjorndal and Bolten, 2008; Bass and Witzell, 2000). Population trends in The Bahamas have been studied in some areas, such as Union Creek reserve in Inagua and at Conception Island (green turtles); they are also studied at the key rookeries (Costa Rica and Florida).

[9] Dissertation now finished and will be freely available in about a year. The chapter relevant to this has been accepted for publishing in Bulletin of Marine Science, although the publication date is not yet known. Dr Gittens presented the results at the Bahamas Natural History Conference on March 21st 2018.

Sharks
There is no evidence that this fishery interacts with sharks, except to a very limited extent (e.g. nurse sharks may forage on condos, discarded bodies may be scavenged) (Higgs, 2016a). The Bahamas is thought to have highest densities of sharks in the wider Caribbean (Ward-Paige, 2010).

Cetaceans
The Bahamas hosts a variety of species of cetaceans, but most of them occur offshore or in the deep sounds. The bottlenose dolphin is the only cetacean species occurring on the banks in any numbers, and therefore overlapping with the fishery. Dolphin populations appear to be healthy – large and with high genetic diversity (Higgs, 2016a). Dolphins may also forage around condos and try to enter traps, but there is no evidence or mechanism for any significant impacts.

Manatees
There are thought to be about 15 manatees in The Bahamas as of 2015, which has seemingly never been a core population area, probably because manatees need access to surface freshwater, which is rare to negligible in The Bahamas. No information is available regarding fishing gear entanglement, but collision with vessels seems to be the main issue[10]. In Florida, entanglement is an issue which related to surface buoy lines for traps; Bahamian traps, conversely, are not marked by surface lines.

3.4.8 Habitats: MSC definitions

MSC defines habitats into three categories; commonly-encountered, VMEs and minor (all other) habitats, as follows:

SA3.13.3.1 A commonly encountered habitat shall be defined as a habitat that regularly comes into contact with a gear used by the UoA, considering the spatial (geographical) overlap of fishing effort with the habitat's range within the management area(s) covered by the governance body(s) relevant to the UoA.

SA3.13.3.2 A VME shall be defined as is done in paragraph 42 subparagraphs (i)-(v) of the FAO Guidelines (definition provided in GSA3.13.3.2). This definition shall be applied both inside and outside EEZs and irrespective of depth.

Definition of VMEs:

VMEs have one or more of the following characteristic, as defined in paragraph 42 of the FAO Guidelines:

- Uniqueness or rarity – an area or ecosystem that is unique or that contains rare species whose loss could not be compensated for by similar areas or ecosystems;

[10] See https://rollingharbour.com/2015/10/05/manatees-in-the-bahamas-a-short-history-1904-2015/

- Functional significance of the habitat – discrete areas or habitats that are necessary for survival, function, spawning/reproduction, or recovery of fish stocks; for particular life-history stages (e.g., nursery grounds, rearing areas); or for ETP species;
- Fragility – an ecosystem that is highly susceptible to degradation by anthropogenic activities;
- Life-history traits of component species that make recovery difficult – ecosystems that are characterised by populations or assemblages of species that are slow growing, are slow maturing, have low or unpredictable recruitment, and/or are long lived;
- Structural complexity – an ecosystem that is characterised by complex physical structures created by significant concentrations of biotic and abiotic features.

The FAO Guidelines' Annex identifies the following species groups, communities, and habitat-forming species that may form VMEs and may be indicative of the occurrence of VMEs:

- Certain coldwater corals and hydroids (e.g., reef builders and coral forest, such as stony corals, alcyonaceans, gorgonians, black corals, and hydrocorals)
- Some types of sponge-dominated communities;
- Communities composed of dense emergent fauna where large sessile protozoans and invertebrates (e.g., hydroids and bryozoans) form an important structural component of habitat;
- Seep and vent communities comprised of invertebrate and microbial species found nowhere else (i.e., endemic).

The FAO Guidelines' Annex also lists various geographical features that are often associated with these communities.

The MSC's intent is that, even though the FAO Guidelines were written for deep-sea fisheries, the Guidelines' VME characteristics also apply to non-deep-sea fisheries. Further, when the FAO Guidelines are applied in shallow, inshore waters, the definition of VME could include other species groups and communities (e.g., seagrass beds, complex kelp-dominated habitats, biogenic reefs).

MSC also notes that habitats should be defined (as far as possible) according to three characteristics: i) substratum; ii) geomorphology and iii) biota.

3.4.9 Marine habitats in The Bahamas

Higgs (2016b) provides a habitat map of The Bahamas, reproduced from the Khalid bin Sultan Living Oceans Foundation. Most of the area of the Little and Great Bahama Banks is sand or seagrass, although these areas do include some patch reefs within them. The 'sand' may by biogenic or oolitic, and may include various types of habitats within it: clean coarse wave-rippled sand in shallower areas, or sand with a dense top layer of diatoms, grazed by conch and fish, in slightly deeper areas; a thin coating of sand over hard-bottom substrate (limestone) also occurs commonly on the banks. Reef and soft coral habitats tend to occur

around the edges of the banks, but there may be more of it that this map indicates – for example, the whole western edge of Andros island is fringed with reef, although this is not apparent from the map – possibly the grey shade for 'reef crest' does not show up very well.. Habitat map of The Bahamas, reproduced by Higgs (2016b) from the Khalid bin Sultan Living Oceans Foundation, Bahamas Webmap (Higgs, 2016b) (Note: It doesn't include Cay Sal Bank, which is off the bottom left-hand edge and is similar in terms of habitat.)

3.4.10 Commonly-encountered and vulnerable (VME) habitats

According to Callwood (2017), the majority of condos (60%) are placed in seagrass, with the remainder in sand, hard-bottom or mixed habitats. These three habitat types are therefore the 'commonly-encountered' habitats for condos. Hard-bottom habitat may be what is called 'gorgonian plain', but Higgs (2016b) distinguishes between octocoral- / sponge-dominated (the gorgonian plain) and algal-dominated hard-bottom habitats (the latter more abundant than the former). There is less information about the habitats in which traps are used. It is presumed that they are largely used in the same types of areas as condos – indeed, placing the traps close to condos is likely to be a profitable and therefore common fishing practice.

In relation to reefs, traps are not allowed by law to set directly on reefs (Craig Dahlgren, pers. comm.), but it is possible that traps may be set on reef areas, or a line of traps may be set over a patch reefs by mistake. Condos are not set on reefs either, but debris from disintegrating condos may end up on reefs.

NOTE: Seagrass and hard-bottom habitats are 'commonly-encountered' for this fishery, but also fall under the MSC definition of VMEs. The wording of the Scoring Guideposts is the same for each, but definitions e.g. of 'serious and irreversible harm' is more precautionary for VMEs – these two habitats have therefore been covered under VMEs rather than common-encountered habitats (since it does not make sense to assess them twice).

The habitats described above as interacting with the fishery have been defined as far as possible according to MSC's three characteristics (Table 13).

Table 13. Definition of habitats overlapping with the fishery according to MSC's requirements

Habitat	MSC category	Substratum	Geomorphology	Biota
Seagrass beds	VME	Oolitic or biologically-derived limestone sand	Shallow flat banks (mainly; seagrass is also abundant in bank edge and inter-island channels, but currents are very strong in these areas (and they are close to habitation) they are probably not a popular place for condos)	Seagrasses: turtle grass (*Thalassia testudinum*) and manatee grass (*Syringodium filiforme*); shoal grass (*Halodule wrightii*) may also occur but mainly in very shallow, turbid areas which are likely not used for fishing. Algae: *Penicillus* sp., *Acetabularia crenulata*, *Laurencia obtusa*, *Caulerpa sertularioides* and other species, as well as diatoms Other: Seagrass beds often contain patch reefs, from the size of a single boulder upwards; hydroids and bryozoans may grow on seagrass blades
Sand	commonly-encountered	As above	As above; rippled in shallow areas	Limited: in deeper areas often has a thick diatom layer which is grazed by conch and fish, in shallow areas usually clean and mobile
Hard-bottom	VME	Limestone (lithified limestone sand)	As above; tends to have holes and crevices made by erosion or rock boring urchins (*Echinometra lucunter*)	Algal-dominated or octocoral/sponge-dominated; either way, cover of sessile invertebrates is typically low (Higgs, 2016b)
Reefs	VME	Biogenic limestone	High relief patch or linear features	Reef-building corals, although with a relatively low cover of live coral in most areas (<10%); main ground cover is algae (species as above and many others); also sponges, tunicates, soft corals and other sessile biota as above. Relatively high biomass of fish and invertebrates relative to other habitat types.

3.4.11 Habitat impacts of condos

Condos are placed by divers rather than dropped from a vessel, so are not likely to land, for example, on top of a patch reef by mistake. The main possibilities for habitat impacts from condos are therefore i) shading of the habitat directly under the condo; ii) impacts from the

fact that condos act as habitat themselves, for lobsters and other animals, mobile and sessile; and iii) impact of broken up and lost condos (debris).

Shading: The impact of shading is mainly an issue for seagrass, and it is clear that a condo in position for several years will kill the seagrass directly underneath it, although since seagrass spreads via rhizomes, the patch will presumably be re-colonised fairly quickly once the condo is gone. Taking the estimates of Callwood (2016) as to the size and number of condos and their location, if 60% of one million condos are deployed on seagrass, each approximately 1.75m long and wide, this would shade a total area of ~1.8 million m^2 or 1.8 km^2. If the area of the banks is 156,000 km^2, and ~~50% is seagrass, condos would kill 0.002% of the total area of seagrass. Even if each condo impacts an area of 10X its actual size (see below), then the total impact is still not significant.

Condos as habitat: Condos themselves remain in situ for several years and therefore act as habitats themselves. They have been recorded as providing settlement substrate for organisms such as hard and soft corals (Higgs, 2016b), and are known to attract fish and other animals in the same way as do natural patch reefs and other areas of structure. A study from Florida (Hunt, 2011; cited in Dahlgren, 2012) showed more than twice the % cover of sessile animals (corals, sponges, tunicates etc.) on the condos as at control sites. However, as natural patch reefs, condos often have a 'halo' around them with lower densities of algae and other sessile organisms within a certain radius – this is usually attributed to the effect of grazing and movement by the animals living in or attracted to the condo or reef area (Dahlgren, 2012).

Lost condos and debris: It is estimated that condos last ~5 years and are (therefore) replaced at a rate of ~20% per year. It is not clear whether condos in need of repair are fixed up and put back, brought back on land or left to disintegrate – probably all three depending on fisherman and circumstance. Clearly, debris moving around on the seabed can damage fragile organisms, but it is not clear that this is likely to be a significant problem; much of the material will degrade and/or be buried, and since it is not attached to a buoy line or similar, it may not move around that much. It is known, however, that debris advected on to reefs can cause significant damage (Tom Matthews, pers. obs.).

3.4.12 Habitat impacts of traps

Traps do not remain in situ long enough to cause shading or to act as habitats; the main impact of traps is likely to be damage to fragile sessile organisms (branching corals, sponges, sea fans) from setting and hauling or if they are moved or lost during storms.

Traps are reportedly not used on reefs (see above); this is consistent with what is observed in Florida (Lewis et al., 2009). In Florida, as has already been noted, a large number of traps are lost, creating debris; but this is thought to be less likely in The Bahamas because they are deployed in strings rather than singly (see Section 3.2.7). Traps may also move, causing damage by scraping (Dahlgren, 2012), but again, since Bahamian traps are deployed in lines and without surface buoy lines, they are less likely to be moved around by wind and waves. Nevertheless, Higgs (2016b) cites recent survey information where trap debris was found on reefs in the Joulter Cays, north Andros (although what kind of trap and the source is not known).

3.4.13 Ecosystem role of spiny lobster

All fisheries have an ecosystem impact by virtue of the fact that they remove biomass of the target species (and bycatch species if relevant) from the system. This results in a reduced abundance, particularly of larger size classes.

Lobsters are generalised benthic predators / scavengers, and fishers in The Bahamas have a perception that they play a role in 'cleaning' the reef. According to interviews conducted by Callwood (2016), some reef fishers believe that increased biofouling ('moss') on the reef is caused by a reduction in the number of lobsters, which they blame on condos. There are, however, many other factors involved in ecosystem changes on Bahamian reefs: coral disease and bleaching, the *Diadema* die-off, direct fishing for lobster and large fish, eutrophication in some areas, and so on.

Boudreau and Worm (2012) reviewed the ecosystem role of large decapods, including spiny/rock lobsters. They identified three main roles (aside from anthropogenic impacts):

- As prey items (Nassau grouper, octopus, triggerfish, nurse sharks etc.; they note that there is no evidence for any predator that depends solely on spiny lobster);
- As predators (main prey items molluscs and crustaceans but omnivorous and opportunistic; also sometimes cannibalistic);
- Non-consumptive interactions (e.g. interference competition, competition for habitat – this perhaps more relevant to clawed decapods which are more agonistic; spiny lobster are generally gregarious).

They note some examples of trophic cascades involving rock lobsters; e.g. lobsters/ urchins/ kelp in southern California and New Zealand; the mechanisms would not apply in (sub)tropical ecosystems, however. Higgs (2016b) also notes the possibility that a reduction in the number of larger size classes (an effect of fishing) might have an impact on deeper reef habitats which are not directly fished, since lobsters migrate to these areas ontogenetically and also seasonally (for spawning); there is no evidence for or against this effect, which would presumably depend largely on the status of the stock (see Principle 1).

3.4.14 Ecosystem impact of condos

Various possible ecosystem impacts of condos have been hypothesised:

- Condos attract lobsters away from reef ecosystems;
- Condos enhance lobster populations by providing supplementary shelter; or conversely:
- Condos act as a 'ecological trap' for lobsters by aggregating lobsters in areas of poorer habitat or close to predators;
- Condos act as artificial reefs.

Attraction of condos: No objective information could be found in relation to whether condos deplete reefs of lobsters by providing more attractive habitat – presumably this effect would be site specific, and is difficult to unpick from the role of condos in increasing catchability and therefore probably fishing mortality. Spiny lobsters are, however, known to be very mobile

(Bertelsen, 2013) – so most likely, whether they are in Shelter A on the reef or Shelter B in a condo a few hundred metres away is ecologically insignificant.

Population enhancement by condos vs. condos as ecological trap: This issue is considered in Section 3.1.4 (enhanced fisheries). The ecological effect of condos is related to the type of shelter they provide – i.e. whether they are scaled for large or small (juvenile) lobster (Eggleston et al., 1990). Small juveniles have higher survival under small condos, but may have lower survival under large (adult-height) condos, due to increased predation (Eggleston et al, 1992). Gutzler et al. (2015) also examined this issue in the Florida Keys, and their results also suggest different effects in different locations. They assessed relative nutritional status and mortality rates for juvenile and adult lobster in condos and in natural shelters. They found no differences in nutritional status and no differences in mortality rates for adults, but some differences in mortality rates for juveniles, depending on location. The inference that condos, which attract juveniles in nursery habitats, might in some circumstances increase juvenile mortality by increasing predation rates. The condos deployed in this fishery, however, are scaled (in terms of the height of the roof) and positioned (in terms of location) to attract adult lobster (bearing in mind the zero tolerance approach of BMEA to the minimum size limit (see Appendix 10 Zero Tolerance Policy for processors)), so this would likely not apply here. (It is worth noting that one of the no-take areas – Andros west side – is thought to be an important nursery area for lobsters; Higgs, 2016b.)

Condos as artificial reefs: In relatively featureless environments such as seagrass beds, the role of any kind of feature (patch reefs, rocks, condos, wrecks, rubbish…) as a point of attraction for animals of all kinds is clear; indeed, this is presumably what mediates some of the predation-driven effects on juvenile lobsters discussed above, as well as the 'halo' around condos discussed above (Section 3.4.11 – habitats).

Condos as sources of debris: Condos reportedly last ~5 years, suggesting that ~200,000 condos reach the end of their life each year. At least some condo fishers remove broken condos, but some may be left to break up in the environment, creating a potentially significant source of marine debris. Much of this is probably broken up harmlessly or buried (given that much of The Bahamas banks is made up of mobile sand habitats) but some may cause damage to VMEs such as reefs.

3.4.15 Cumulative impacts of the fishery

There are no MSC-certified fisheries overlapping with this fishery (stock, geographical area, management authority); therefore there are no cumulative impacts to consider.

3.5 Principle Three: Management System Background

3.5.1 Jurisdiction

The fishery is under the single jurisdiction of the Government of The Bahamas.

3.5.2 Legal framework for fisheries management

Enacted in 2006, the Fisheries Resources (Jurisdiction and Conservation) Act makes provisions for the conservation and management of the fishery resources within the waters of Bahamian jurisdiction and is the relevant piece of legislation in relation to the commercial fishery. The Act defines the rules for Bahamian and foreign fishing vessels, the limits of the Exclusive Economic Zone (EEZ), fishery inspections, as well as import/export restrictions, offences and penalties for breaches under the Act.

Section 10 of the Act gives the government the authority to set optimum yields for fishery resources in Bahamian waters, and requires “the need to ensure, through proper conservation and management measures, the maintenance of the resources or restoration of populations of harvested species at levels which can produce maximum sustainable yield”.

The Act is currently undergoing revision, which was triggered by the need to incorporate port state measures, in response to the EU’s IUU Regulation. The draft act has been through all the required stages of consultation, and is awaiting review, discussion and approval by Cabinet. The revised Act will also include the requirement for DMR to develop a Fisheries Management Plan for each resource.

A series of Regulations (Fisheries Resources (Jurisdiction and Conservation) Regulations) based on the act are also in force – those applicable directly to the lobster fishery are summarised in Section 3.2.9. The regulations also protect ETP species (see Section 3.4.7).

The Bahamian legal framework for fisheries is designed with the rights of subsistence fishers at the fore. As has already been noted, there is not, legally speaking, any distinction for Bahamians between commercial and recreational fishers. This is not an oversight, but is a recognition of the historic and cultural right of Bahamians to fish and to sell their catch. This is an intrinsic part of the culture and way of life of The Bahamas, notably outside New Providence.

3.5.3 Regional co-operation for spiny lobster

There are multiple regional organisations that play a role in the fishery. Although there is nothing mandatory in place, co-operation within the region through research and data sharing is beneficial to the management of the fishery, by allowing the use of the most up-to-date scientific information and management.

Management and information sharing takes places in a number of ways, these include conferences that are predominantly scientific such as Gulf and Caribbean Fisheries Institute (GCFI) and the International Conference and Workshop on Lobster Biology and Management (ICWL). It also includes Conferences or meetings that are predominantly

management based that incorporate science such as WECAFC. Recent examples with typical discussions include:

- OSPESCA / SICA – A Latin American meeting, the most recent of which was held in February 2017. Discussions centred around the use of international lobster agreements for Latin American countries and other successful management techniques, for example HCRs, maximum size limits and co-operation between neighbouring countries to limit IUU fishing.
- WECAFC lobster meetings – These are attended by countries which have major landings of *P.argus*. Topics at recent meetings have included stock assessments, scientific evidence of the need for regional management, an evaluation of management measures that the region should consider and a regional management plan. Major regional organisations such as the Caribbean Regional Fishery Mechanism (CRFM), Central American Fisheries and Aquaculture Organisation (OSPESCA) and Caribbean Fishery Management Council (CFMC) are part of this.
- ICWL – A variety of topics related to management and science (including stock assessments), climate change and broader P2 type issues such marine debris have been discussed in recent years.
- CRFM meetings – These happen on an ad-hoc basis. Meetings focus on stock assessments and major management issues if they arise. Part of the CRFM is the Reef and Slope Fisheries Working Group (RSWG). One of the major contributions of the RSWG was a scientific review of the non-binding St. George's Declaration on Conservation, Management and Sustainable use of the Caribbean spiny lobster.
- GCFI – These have been attended by the DMR as well as environmental groups that influence management in The Bahamas such as The Bahamas National Trust (BNT) and The Nature Conservancy (TNC). A variety of scientific sessions on various aspects of marine research take place. There are often special side meetings as well. For example, a special side meeting on data-limited fisheries management took place in 2015.
- SPAW (Specially Protected Areas and Wildlife (in the Wider Caribbean Region)) Protocol COP (Contracting Parties) - The last meeting for which was held in March 2017. The Protocol acts as a vehicle to assist with regional implementation of the broader and more demanding global Convention on Biological Diversity (CBD) and Cartagena Convention. The focus of SPAW is biodiversity. *P.argus* is specifically listed under Annex III of the Protocol. Caribbean spiny lobsters have not featured prominently in the work plan but general issues such as illegal foreign trade have done. The current intent is to focus on tracing the products and proceeds of illegal trade. The Bahamas is very supportive of this and encourage such efforts.

3.5.4 Organisations involved and decision-making processes

The organisations involved in the management of the fishery are listed in Table 14.

Table 14. Organisations involved in fisheries management in The Bahamas

Organisation	Role and responsibilities
Department of Marine Resources (DMR)	Government department responsible for fisheries management and marine conservation.
Bahamas Spiny Lobster Working Group (BSLWG)	Formal stakeholder advisory group for the fishery (appointed by Cabinet to advise the government); currently 14 members including fishers, processors, DMR, BMEA, TNC,, Friends of the Environment, BNT, BEST Commission and persons knowledgeable about fishing from different islands. Meets at least 3 times a year.
Bahamas Marine Exporters Association (BMEA)	Association of licenced lobster exporters, with membership voluntary (members represent ~77% of exports currently). Member of BSLWG. Winner of a Seafood Champion award.
Royal Bahamas Defence Force	Bahamian military; active in at-sea enforcement including inspections of Bahamian fishing vessels and patrols for foreign IUU vessels, particularly from their base at Ragged Island in the remote southern area of the country.
The Nature Conservancy (TNC)	International NGO with office in The Bahamas. Supporter of the FIP. Member of BSLWG.
BREEF	Bahamian NGO with focus on marine conservation and education.
WWF	International NGO and support of the FIP.
Bahamas Commercial Fishers Alliance	National organisation of commercial fishers; represented on BSLWG
Bahamas National Trust	Bahamian NGO, which for historical reasons runs the Exuma Cays Land and Sea Park; the country's largest and oldest no-take area. (Other MPAs are the responsibility of DMR.)
BEST Commission	Responsible for the management of non-living marine resources; part of the Office of the Prime Minister (prior to this year, this was in the Ministry of Environment.

Management decisions with legal force (i.e. regulations, orders) are taken by Ministers; the process is broadly as follows:

- A proposal for a management change or measure may come from DMR or the BSLWG; in either case, BSLWG will review and discuss;
- There is a wider stakeholder consultation process conducted by DMR (meetings across The Bahamas, advertising, online);
- A proposal is put to Cabinet for approval, after review by the Attorney General.

As already noted, this is the process by which the export cap, which is key to the HCR, would be imposed, if required. Although it seems complex, it can actually be quite quick; for example, the publication of the new stock assessment, with a review of the HCR was in August 2017 (Medley, 2017), with the external peer review report provided in November 2017 (Muller and Cummings, 2017); the BSLWG requested a change to the HCR in January 2018 and the change was approved by Cabinet on 1 February 2018.

3.5.5 Consultation and stakeholder involvement

There are various mechanisms for stakeholder consultation:

- BSLWG brings together the main stakeholders in the lobster fishery, specifically to advise DMR and government about management. The membership of the BSLWG is listed in Table 14;
- DMR, along with other stakeholders (BMEA, NGOs) visit lobster fishing areas across the Family Islands (DMR visits all Family Islands) every summer during the closed season. The purpose of these meetings is to inform communities about changes in management and issues under consideration, and to give stakeholders the opportunity to raise issues with the authorities. These meetings are conducted as formal 'town hall meetings' (although they may be more informal in very small communities), and it is reported that turn-out is usually high. The meetings are arranged and advertised via the Island Administrators, Fishery Officers and in the press;
- Similar meetings to the above are conducted on an ad hoc basis to address particular issues, should they arise outside the usual schedule or if additional consultation is considered to be required. For example, BMEA held a series of such meetings to address the issue of undersized lobster;
- For raising awareness of particular issues, DMR, BMEA and NGOs have used local media such as radio talk shows, public service announcements as well as the internet[11].

It was emphasised during the site visit, that the management of the fishery aims to be as community-based as possible; DMR noted that if a proposal were put to Cabinet without sufficient evidence of stakeholder consultation and buy-in, it would certainly be sent back unapproved.

NGOs met during the site visit expressed a positive view of the work done to support and encourage stakeholders to participate in consultation (although they noted that their input is not always taken into account).

[11] Here is a wonderful example of this, although not related to the lobster fishery: https://www.youtube.com/watch?v=IYCsTSjc4N8

3.5.6 Objectives for the fishery

The objective of maximum sustainable yield for marine resources is enshrined in the Fisheries Act (see Section 3.5.2). There is also an objective to protect 20% of marine habitat in protected areas (see Section 3.4.3). DMR has a mission and vision statement as follows:

- Our mission has been the development of the fisheries sector through sustainable use and integrated management of the fishery resources, coastal zone, and marine environment for the well-being of Bahamians'
- Our vision has been to optimise sustainable utilisation of the fishery resources, in particular, for the maximum benefit of the Bahamian people.

There are also objectives set out in the 5-year sector plan:

- Sustainable resource use;
- Provide safe food for consumption (local & export);
- Meet treaty and international agreement responsibilities;
- Maximise employment of Bahamians while also recognising the need to match the number of commercial fishers and recreational guides to the available resources;
- Protect the marine environment (including mangroves) necessary for continued growth and development of the fisheries sector;
- Develop a sustainable aquaculture sector that does not negatively impact on habitat/environment.

In relation to fishery-specific objectives, the BSLWG has set itself some objectives, as follows:

- High quality local and international product;
- Maximise job availability now and in the long-term;
- Maximise commercial production currently and long-term;
- Create value added product;
- Ensure long-term sustainability;
- Minimise by-catch;
- Regulate condos;
- Improve fisheries enforcement.

The HCR has been designed such that the stock can be maintained at a target biomass of 40%SB_0, which can also be considered to be a stock-specific objective (Medley, 2017). This is the MSC default level for a stock management objective, and is likely to be very precautionary for a spiny lobster fishery.

3.5.7 Compliance and enforcement

Enforcement systems in The Bahamas

Fishery Officers have enforcement powers, along with the police, customs and RBDF officers, all of whom work closely together. There is not for the moment a system of administrative penalties for fisheries infringements, although this is coming in for some

recreational activities; all non-compliance relating to commercial fisheries is a criminal matter.

The Fisheries Regulations stipulate maximum fines (see Parts 14 and 15) but magistrates have discretion; the DMR or police prosecutor may make suggestions (which may or may not be followed). Overall, DMR staff noted that they would like stiffer fines to be imposed. Prosecutions and convictions are reported in their annual reports by DMR to Parliament.

The main enforcement mechanisms are i) visit to landing sites by Fishery Officers (also for the purpose of collecting catch/effort data; see above) and ii) at-sea inspections by the RBDF. DMR also conduct some enforcement activities at food shops and restaurants, generally relating to the same of undersized lobster; this is not systematic, but they will respond to a call.

Compliance in the Bahamian fishery
As already noted, because there are relatively few of the requirements on Bahamian fishers that are standard elsewhere (i.e. licencing, registration, catch reporting etc.), there is relatively little scope for non-compliance. The two key regulations for the day-to-day management of the fishery, however, aside from the export cap, are potentially a compliance issue – this is, the minimum size and the closed season.

Aside from perhaps some minor subsistence consumption (and foreign IUU – considered below), compliance with the closed season is not thought to be an issue; it is very well-known throughout The Bahamas and of long standing. Conversely, compliance with the minimum size has been more of a concern, and various activities have been put in place to address this.

BMEA have put in place a ‘zero-tolerance policy’ (see Appendix 10 Zero Tolerance Policy for processors) towards the purchase of undersized tails. The objective is to ensure that their total purchase of undersized tails is kept to <1%. Members grade very carefully, and where catch from fishers or vessels exceeds this threshold, they take action; initially talking to their supplier and potentially refusing further purchases until action is taken, as well as flagging the issue with other buyers. At the site visit, they noted that this has been very effective at ensuring that the main commercial fishers respect the size limit carefully.

FIP members have also been working on education and outreach, designed to discourage members of the public and local restaurants and hotels from purchasing undersized lobster; this has included a ‘Size Matters’ campaign, asking restaurants to sign pledges and attending meetings and seafood events.

Having said this, the Royal Bahamas Defence Force (RBDF) also boards and inspects Bahamian fishing vessels as part of its enforcement work, and the view of RBDF staff met at the site visit was that levels of non-compliance by Bahamian fishing vessels is low. They check the product on board, as well as permits and other issues.

Another compliance issue relates to the rule that hookah (compressors) should only be used between 30 and 60 feet, which is widely ignored (in relation to depth range <30 feet). It seems that the regulation has effectively gone into abeyance, and is not enforced, but it remains on the statute books.

Finally, the no-take rules of the Exuma Cays Land and Sea Park are enforced by RBDF personnel who are permanently stationed at the park HQ and patrol alongside the BNT warden.

Foreign IUU

Foreign poaching targeting lobster and other species (conch, fish) has always been a problem in the southern Bahamas, which is remote, unpopulated and far from Nassau. The main culprits are thought to be from the Dominican Republic, and The Bahamas Government has signed a formal MoU with the Dominican Government, which has pledged to help deal with the poaching issue, including fitting their fishing vessels with VMS. The DMR is, however, sceptical that they will see any concrete action from the Dominicans on this issue (although they note that they will continue to engage).

Conflicts with Cuba about fishing rights in the southern Bahamas have been serious in the past (and have led to the sinking of a Royal Bahamas Defence Force vessel, HMBS Flamingo by the Cuban air force, in Bahamian waters, with loss of life[12]). According to DMR, however, a maritime boundary has now been agreed between The Bahamas and Cuba, although the Cubans continue to push for recognition of historic fishing rights inside Bahamian waters, which the Bahamian Government does not accept. It is thought, however, the IUU by Cuban vessels in The Bahamas is not significant compared to the Dominican problem.

Tackling foreign IUU fishing in the southern Bahamas is a priority for the government and the RBDF, who use the vessels stationed at their base in Ragged Island to patrol this area. Two patrol vessels are present in the area on a two-week rotation, and in addition to that, they have assets in Inagua and Mayaguana, which can be called upon. A huge recent investment by the government in the RBDF (the 'Sandy Bottom Project') has seen the force provided with nine large new patrol vessels, as well as a concomitant increase in other resources, with IUU fishing as one of the two main target areas (the other being immigration). They also have small coastal patrol vessels, as do The Bahamas police, who can work in cooperation with the RBDF. There is also cooperation with the US Coast Guard and the Turks and Caicos Islands (three-way agreement on law enforcement in place since 1986). Most importantly, Bahamian fishers in the area provide eyes and ears for the RBDF patrols, since the area is also a favoured fishing spot for Bahamians. This makes enforcement harder during the closed season (because there are no Bahamian fishers around), and the RBDF note that they make addition efforts to be present during this period. The RBDF also have three aircraft, which operate around The Bahamas, which can spot poachers and call back coordinates to the vessels. In the future, they hope to be able to station aircraft in Inagua and Ragged Island, but for now they operate from New Providence.

In 2016, four fishing vessels from the Dominican Republic were arrested in the southern Bahamas, with a total of 110 crew. They had on board 70,000 lbs. of fisheries product, of which a good proportion was lobster (much of it undersized) as well as fish and conch. The process of prosecution is done by the DMR, with the RBDF as the key witnesses. The

[12] See http://rbdf.gov.bs/the-flamingo-incident/

product, vessels and equipment was confiscated and turned over to the Ministry of Finance, while crew were imprisoned pending payment of fines (at the time of the site visit in early 2017, they were still in prison). RBDF staff were of the view that this has had a good deterrent effect on would-be poachers, with a significant reduction in activity since the start of strengthened anti-poaching actions – this is also supported by fishers met at the site visit.

A final IUU challenge is posed by US recreational fishers, for whom The Bahamas is a popular spot for boating holidays. The Bahamas sets a catch limit (ten for vessel[13]) for foreign recreational fishers and requires them to obtain a permit at first point of entry into The Bahamas (giving the opportunity for the rules to be clearly explained), but Bahamian fishers believe that the bag limit is not always respected. (This is mainly an issue in areas close to Florida popular with tourists, such as the Abacos, rather than in the south.) The RBDF can inspect these vessels and they also cooperate with the US Coast Guard. (The US Lacey Act allows US citizens to be prosecuted for wildlife crimes which occur outside US jurisdiction if there is an element of commercial trade – i.e. US citizens poaching in Bahamian waters for sale in the US are breaching US as well as Bahamian law.)

3.5.8 Management evaluation

The fishery has been subject to fishery-specific management reviews in the past. The Food and Agriculture Organisation (FAO) completed a review of the fishery sector in 2016 (Moultrie et al.), which included the policy, regulatory and management frameworks in place. The Bahamas received funding from the EU ACP Fish II project to review its main legislation surrounding managing its fishery resources (Fisheries Resources (Jurisdiction and Conservation) Act, 1977) and to make improvements with regard to monitoring and management, including the need for a better vessel registration system and licences for Bahamian fishers to fish. Improvements highlighted further in the review included the need for additional efforts to implement the FAO Code of Conduct for Responsible Fishers (FAO, 1995) and the development and implementation of conservation plans for spiny lobster.

In addition, following an initial MSC pre-assessment in 2009, the fishery underwent a Fishery Improvement Project (FIP) that finished in 2016. This has served the fishery with an external review of the management system, evaluating the performance of the fishery's management system, and leading to positive changes precluding this full assessment. In relation to the management system, the FIP led to the implementation of a Government strategy to reduce and eliminate IUU fishing and on-going enforcement of existing management measures, such as minimum size limits and closed seasons.

[13] Section 48(1)(f)(iii) of Fisheries Resources Jurisdiction and Conservation Regulations

4 Evaluation Procedure

4.1 Harmonised Fishery Assessment

This fishery does not require harmonisation, as there are no other *Panulirus argus* fisheries either certified under the MSC Fisheries Standard, nor in assessment.

4.2 Previous assessments

This fishery has not undergone MSC certification before.

4.3 Assessment Methodologies

This full assessment was undertaken in accordance with the MSC Fisheries Certification Requirements (FCR) version 2.0 for assessment procedure and scoring. Adjustments to the Default Assessment Tree were not required.

The MSC Full Assessment Reporting Template v2.0 (8th October 2014) was used to produce the report.

The Risk-Based Framework (RBF) was not used in this assessment.

4.4 Evaluation Processes and Techniques

4.4.1 Site Visits

The site visit for this initial certification took place between the 14th and 17th February 2017 in Nassau, New Providence, in The Bahamas. The team attended the meeting (Jo Gascoigne, Thomas Matthews). Representatives from MSC and ASI were present on site to witness the site visit in an observational capacity.

The individuals met during the site visit and their roles in the fishery are listed in Table 15. The site visit took place on New Providence Island, with stakeholder representatives traveling to the below locations for the meetings. The majority of the site visit consisted of meetings with the below stakeholder groups to gain a better understanding of the fishery, this included a field trip to processing units.

Table 15. List of attendees at the on-site meetings.

Organisation	Position	Name	Meeting date and location[14]
CU Pesca	Assessment team leader	Jo Gascoigne	-
CU Pesca	Assessment team member	Tom Matthews	-
ASI	Witness assessor	Nick Pfeiffer	-

[14] If a representative was met with more than once, the date of the first meeting has been recorded in the list of attendees and the name identified with an asterisk.

Organisation	Position	Name	Meeting date and location[14]
ASI	Witness assessor	Sergio Cansado	-
The Nature Conservancy (TNC)	Stakeholder representative	Natalie Miaoulis*	14th February 2017 - BAIC Offices, Old Trail Road, Nassau, Bahamas
MRAG	FIP consultant	Robert Wakeford*	14th February 2017 - BAIC Offices, Old Trail Road, Nassau, Bahamas
WWF	Client group/stakeholder representative /FIP coordinator	Wendy Goyert*	14th February 2017 - BAIC Offices
MSC	Stakeholder representative	Marin Hawk*	14th February 2017 - BAIC Offices
Heritage Seafood - Owner	BMEA client group representative	Mia Isaacs*	14th February 2017 - BAIC Offices
Heritage Seafood	BMEA client group representative	Casey Curry	14th February 2017 - BAIC Offices
Heritage Seafood	BMEA client group representative	Tamnika Buth	14th February 2017 - BAIC Offices
Heritage Seafood	BMEA client group representative	Cassandra Taylor	14th February 2017 - BAIC Offices
Tropic Seafood - Owner	BMEA client group representative	Glenn Pritchard*	14th February 2017 - BAIC Offices
Tropic Seafood	BMEA client group representative	Karen Rahming	14th February 2017 - BAIC Offices
Tropic Seafood	BMEA client group representative	Gerald Wathen	14th February 2017 - BAIC Offices
Fisher	Fisher representative/stakeholder – Grand Bahama	Garnett Armbrister	14th February 2017 - BAIC Offices
Fisher	Fisher representative/stakeholder – Abaco	Romano Armbrister	14th February 2017 - BAIC Offices
Fisher	Fisher representative/stakeholder – Long Island	Jude Knowles	14th February 2017 - BAIC Offices
Fisher	Fisher representative/stakeholder –Spanish Wells	Robert Roberts	14th February 2017 - BAIC Offices

Organisation	Position	Name	Meeting date and location[14]
Fisher	Fisher representative/stakeholder - Nassau	Keith Carroll	14th February 2017 - BAIC Offices
Fisher	Fisher representative/stakeholder - Andros	Whitney Miller	14th February 2017 - BAIC Offices
Fisher	Fisher representative/stakeholder	Quentin Russell	14th February 2017 - BAIC Offices
Department of Marine Resources (DMR) – Acting Director	Stakeholder representative	Edison Deleveaux	16th February 2017 – DMR Office, East Bay Street, Nassau, Bahamas
Department of Marine Resources (DMR)	Stakeholder representative	Gilford Lloyd	16th February 2017 – DMR Office
Department of Marine Resources (DMR) – Science and Conservation Unit	Stakeholder representative	Lester Gittens	16th February 2017 – DMR Office
Royal Bahamas Defence Force	Lieutenant Commander/stakeholder	Whitfield Neely	16th February 2017 - RBDF Station Base, Coral Harbour
Royal Bahamas Defence Force	Lieutenant Commander/stakeholder	Clarence Dean	16th February 2017 - RBDF Station Base, Coral Harbour
Royal Bahamas Defence Force	Captain/stakeholder	Philip Clarke	16th February 2017 - RBDF Station Base, Coral Harbour
Bahamas Reef Environment Education Foundation (BREEF) - President	Stakeholder representative	Casuarina McKinney-Lambert	17th February 2017 - The Nature Conservancy Office, 6 Colonial Hill Plaza, Thompson Blvd, Nassau, Bahamas

4.4.2 Consultations

At key stages of the assessment process, stakeholders were contacted and provided with an opportunity to comment (for a full list of stakeholders, please see Appendix 12 Stakeholders).

Table 15 above lists all the stakeholders that were met and interviewed during the site visit. Stakeholders ranged from the fishers themselves, the BMEA, Government and NGOs,

including those instrumental in guiding the fishery through its FIP process. The MSC also attended the majority of the site visit.

Information obtained during the site visit included background to the operation of the fishery, gear specifics, areas of fishing, understanding of the export market for the client group, traceability and how the fishery is policed.

4.4.3 Evaluation Techniques

a) Media announcements: targeted a wide range of stakeholders within the sustainable seafood industry, ensuring that key stakeholders were notified of this fishery's announcement.

b) Methodology for information gathering: Review of data and documentation, interview of stakeholders.

c) Scoring process: Scoring was completed on the second day of the site visit, followed by additional email correspondence afterwards, mainly in relation to Principle 1.

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	FAIL	65	85
More than half	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 rule for reaching the final recommendation: The decision rule for MSC certification is as follows:

- No PIs scores below 60;
- 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.

e) Scoring elements: The set of scoring elements considered in the assessment are listed in Table 16.

Table 16. Scoring elements

Component	Scoring elements	Main/Not main	Data-deficient or not
Principle 1 (target species)	Bahamian spiny lobster	N/A	No
Primary species	None	Main / not main	N/A
Secondary species	None	Main	N/A
	Condos – none Traps – see Table 11 for species	Not main	N/A
ETP species	Turtles Dolphins Manatees	N/A	No
Habitats	Limestone sand and hard-bottom	Commonly-encountered	No
	Condos – seagrass, hard-bottom, reefs Traps – seagrass, hard-bottom, reefs	VMEs	No

5 Traceability

5.1 Eligibility Date

The Eligibility Date has been set as the date of certification, pending the successful outcome of this evaluation. The fishery operates for eight months of the year, and freezes product in large quantities for commercial export. There is therefore no reason to amend the eligibility date from the default, as there will be enough certified product to supply to the market the default. Product caught from lobster traps or condos by any Bahamian lobster fisherman[15] landing legal product and selling to the BMEA client group after the date of certification will be eligible to enter further chains of custody.

5.2 Traceability within the Fishery

The majority of fishers go out in small boats on day trips, collecting lobster during the daylight hours. The traps are lifted to allow non-target species to escape, and then the lobsters are collected by hand. If the lobster are associated with condos, they are hooked out from under the ledge and collected by hand. These hooks do not damage the lobster and ensures high quality of the marketable product.

Once aboard the dingy from either fishing gears, fishers may tail the lobster and discard the rest over the side of the dingy. Both tailed and whole lobster are landed on ice by fishers in designated locations and purchased by the BMEA. All fishers wanting to sell to the BMEA must register at the start of the fishing season, which requires the provision of boat registration and licences.

Alternatively, in addition to the smaller boats, there are also a number of larger boats, known as mother vessels, which operate up to three to four weeks, and support fishers on five or more vessels. Mother vessels also have the capacity to process and freeze the catch that the smaller boats bring. Here, each bag of frozen, processed product is labelled by the mother ship. Each dinghy supplying the mother ship has its own colour, and accompanying documentation, which are supplied to the Fisheries Department (these are discussed in more detail below).

The client group companies buy directly from the fishers at the landing site; there are no auctions in this fishery. The consignments are sent to Nassau on mail boats (if coming from different islands than New Providence). Upon landing, a Marine Resource landing form is completed, which is later returned the to the Fisheries Department. This lists the name of the vessel, trip dates, fishing area, estimated quantity being landed and also the fishing method (condos for example). This document allows traceability back further than just to the Unit of Assessment, to the exact fisher who has caught the lobster. At the same time, the BMEA

[15] For historical/cultural reasons, there is no requirement to have a fishing licence or permit to fish or to sell fish in the Bahamas, and only fishing vessels >20 feet are required to have a permit. There is therefore no such thing as an illegal Bahamian fisherman in the Bahamas (although it is illegal for non-Bahamians to fish in Bahamas waters without a permit). This is the reason that ‘other eligible fishers’ is worded in this way.

buyers complete a buyer's log, which include the above details as well as the landing dates if there are multiple consignments. Traceability from the point of landing forward is possible through the allocation of lot numbers to consignments, receiving form and catch information form, which are completed upon delivery at BMEA member processing facilities. The catch information form is effectively a duplicate of the landing form, and contains the same information. One 'lot' is usually one landing, but if the landing is small, two individual landings may be aggregated to form one. In these cases, this is recorded in the buyers log and catches information form.

Processors clean, de-vein and trim the tails, then to weighing station. The weight determines the grade of lobster by size. The lowest size class are checked individually with callipers to ensure that there are no undersized carapaces. They are then washed, bagged and frozen (if not already processed and frozen from the mother ships). The bag are tagged with the lot number and the name of the fisher (the name of the fisher allows to differentiation between fishing vessels if lot are made up of more than one landing. Following freezing, lobster product is boxed and labelled. The labels on the boxes carry the production code (date of processing), which allows tracing back to the lot number designated at landing. Additional documentation which is provided to the Fisheries Department mother ship forms (if relevant), annual boat registration, monthly catch information forms and buyers logs.

Based on the review of traceability conducted for this fishery, the documentation and overall system is sufficient and robust enough to allow tracing back to the Unit of Certification. Separation of product is maintained in order to distinguish catch by individual fishers, who are only catching certified product (as entire EEZ is certified), as long as they are sold to BMEA members.

Table 17. 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	The trap fishermen may fish using fish traps in the same trip as lobster traps. It is not legal to land lobster from fish traps since the only legal gear for fishing lobsters is a lobster trap, but this is not enforced in this context. The landings of lobster from fish traps are very, very minor compared to lobster trap and condo landings, but the risk is present. The Marine Resource landing form, which is completed when product is landed, and which is later returned the to the Fisheries Department lists the name of the vessel, trip dates, fishing area, estimated quantity being landed and also the fishing method (condos for example). This document allows traceability back further than just to the Unit of Assessment, to the exact fisher who has caught the lobster.
Potential for vessels from the UoC to fish outside the UoC or in different geographical areas (on the same	Fishing is entirely within the EEZ in the shallow waters on 'the banks'. The whole of the EEZ will be certified pending a successful certification process.

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)
trips or different trips)	
Potential for vessels outside of the UoC or client group fishing the same stock	All of the EEZ is included in the UoC. The nature of how the assessment is structured provides the control on how product enters the certified supply chain. Any Bahamian fisher may land the lobster (as long as it is from a lobster trap or condo), but only when the lobster is sold and purchased through members of the BMEA, can the product be called certified. Whilst IUU fishing is highlighted as an issue in the fishery, resulting in a condition of certification; IUU fishing in this case refers to foreign, unreported catches of spiny lobster. The principal offenders are vessels from the Dominican Republic. These vessels do not land in the Bahamas and are not authorised to sell to the client group. Those found to be illegally fishing are prosecuted by the DMR, supported by the RBDF. In 2016, four fishing vessels from the Dominican Republic were arrested in the southern Bahamas. They had on board 70,000 lbs. of fisheries product, of which a good proportion was lobster (much of it undersized). The product, vessels and equipment was confiscated and turned over to the Ministry of Finance, while crew were imprisoned pending payment of fines (at the time of the site visit in early 2017, they were still in prison). A risk to traceability is however not perceived. This is because companies from the client group buy directly from the fishers at the landing site; there are no auctions in this fishery. A Marine Resource landing form is completed when product is landed, which is later returned the to the Fisheries Department. This lists the name of the vessel, trip dates, fishing area, estimated quantity being landed and also the fishing method (condos for example). The Marine Resource landing form fulfils a crucial role, as part of the traceability process, as it is the key piece of documentation that allows tracing of product directly back to the Unit of Assessment and individual fisher. Lobster landed without the accompanying Marine Resource landing form will not be eligible to be labelled as MSC-certified. The team believe there is a system in place to ensure that lobster bought and subsequently sold as MSC-certified come from Bahamian fishers. In relation to IUU from the Bahamian fishery, the issue is the landing of undersized lobster. To address this issue, the BMEA have signed up to a declaration of zero tolerance in relation to undersized lobster. This is supported by a rigorous

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)
	grading system. Size grade data is also provided to the Fisheries Department.
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 product remains physically separated by fisher (either by small fishing boats landing product directly at landing sites or when processed by mother ships. As mentioned above, all lobster caught by lobster trap or condo are certified, as long as they are purchased by the client group. Even if mother ships were to unload to multiple companies in and outside of the client group, the product is physically separated in labelled bags, allowing tracing back to the fishing area. Auctions are not used in the fishery, there are specified landing sites and all lobster sold by the client group comes from inside The Bahamas EEZ and therefore UoC. It is the final destination rather than the source of the product within the fishery, which denotes is certified or non-certified status.
Risks of mixing between certified and non-certified catch during processing activities (at-sea and/or before subsequent Chain of Custody)	The risk is low here. Either unprocessed product is bought by the BMEA client group, meaning all product processed is automatically certified as they're owned by the client group at the point of processing or processed product is bought by the client group and then sold.
Risks of mixing between certified and non-certified catch during transhipment	No transhipment occurs in the fishery in the traditional sense. Small dinghies may take their catch to mother ships for on-board processing, but records are kept as to which vessels they came from and more importantly are separated by fishing boat/fisher. All lobster caught in The Bahamas EEZ are certified, as long as they are sold to the BMEA. Day-trip boats land directly at specified landing sites, where BMEA members, maintaining the supply chain, purchase them.
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 risks are perceived. Processing occurs prior to the product leaving the ownership of the client group. Traceability systems are sufficient to track individual lobsters back to fisher, date and fishing area.

5.3 Eligibility to Enter Further Chains of Custody

The assessment team have considered the risks of traceability in the fishery and have determined that legal lobster product landed by Bahamian fishers from lobster traps and condos and originating from within the Unit of Assessment covered by this assessment and sold to BMEA member companies (see Table 1 and Table 2) shall be eligible to enter into further chains of custody.

Product is eligible for landing at domestic landing sites, as long as they are purchased by a BMEA member company. There is no definitive list of landing sites.

Further chain of custody certification will be required for certified product at the first point of sale from a BMEA member company.

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

No IPI stocks were identified in this assessment.

6 Evaluation Results

6.1 Principle Level Scores

The final principle scores are provided in Table 18.

Table 18. Final Principle Scores

Final Principle Scores		
Principle	**UoA1 Score**	**UoC2 Score**
Principle 1 – Target Species	83.3	83.3
Principle 2 – Ecosystem	88.0	84.7
Principle 3 – Management System	82.7	82.7

6.2 Summary of PI Level Scores

Principle	Component	Wt.	Performance Indicator (PI)		Wt.	UoA 1 Score	UoA 2 Score
One	Outcome	0.333	1.1.1	Stock status	0.5	70	70
			1.1.2	Stock rebuilding	0.5	80	80
	Management	0.667	1.2.1	Harvest strategy	0.25	95	95
			1.2.2	Harvest control rules & tools	0.25	80	80
			1.2.3	Information & monitoring	0.25	75	75
			1.2.4	Assessment of stock status	0.25	100	100
Two	Primary species	0.2	2.1.1	Outcome	0.333	100	100
			2.1.2	Management strategy	0.333	100	100
			2.1.3	Information/Monitoring	0.333	100	100
	Secondary species	0.2	2.2.1	Outcome	0.333	100	90
			2.2.2	Management strategy	0.333	100	80
			2.2.3	Information/Monitoring	0.333	90	80
	ETP species	0.2	2.3.1	Outcome	0.333	90	80
			2.3.2	Management strategy	0.333	80	80
			2.3.3	Information strategy	0.333	80	80
	Habitats	0.2	2.4.1	Outcome	0.333	95	95
			2.4.2	Management strategy	0.333	80	80

Principle	Component	Wt.	Performance Indicator (PI)		Wt.	UoA 1 Score	UoA 2 Score
			2.4.3	Information	0.333	65	65
	Ecosystem	0.2	2.5.1	Outcome	0.333	80	80
			2.5.2	Management	0.333	85	85
			2.5.3	Information	0.333	75	75
Three	Governance and policy	0.5	3.1.1	Legal &/or customary framework	0.333	80	80
			3.1.2	Consultation, roles & responsibilities	0.333	85	85
			3.1.3	Long term objectives	0.333	80	80
	Fishery specific management system	0.5	3.2.1	Fishery specific objectives	0.25	90	90
			3.2.2	Decision making processes	0.25	80	80
			3.2.3	Compliance & enforcement	0.25	75	75
			3.2.4	Monitoring & management performance evaluation	0.25	90	90

6.3 Summary of Conditions

A summary of the conditions is shown below. Please see Appendix 1.2 for more detail.

Table 19. Summary of Conditions

Number	Condition	Performance Indicator
1	Information needs to be collected such that all fishery removals from the stock (=spiny lobster in The Bahamas) can be estimated.	1.2.3
2	For condos, information needs to be collected on the quantity deployed, location of deployment and eventual fate (removed vs. lost) sufficient to i) provide reliable information on timing and location of fishing; and ii) evaluate the on-going risk (if any) to habitats from condo deployment. For traps, information needs to be collected on the number of traps in use and the main areas of deployment of traps, as well as trap loss rates, for the same purpose.	2.4.3
3	Information needs to be collected on the quantity deployed, location of deployment and eventual fate (removed vs. lost) of condos, sufficient to evaluate the on-going risk (if any) to ecosystems from condo deployment.	2.5.3
4	The monitoring, control and surveillance system needs to be improved such that there is no evidence of systematic non-compliance (incursions by non-Bahamian vessels, landing of undersized lobster in the non-export fishery).	3.2.3

6.4 Recommendations

The team also raised recommendations for PI 2.2.1 and PI 2.5.1.

- PI 2.2.1: The team proposes a recommendation that conch fishing by commercial lobster fishermen should be quantified and if necessary management measures put in place to ensure that the lobster fishery is not indirectly depleting the stocks, particularly in remote areas.
- PI 2.5.1: The team commends The Bahamas for the 20% by 2020 initiative, and recommends that progress on designating MPAs and putting management in place be continued with this goal firmly in mind.

6.5 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 CU Pesca 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

Principle 1 scoring 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	It is highly likely that the stock is above the PRI with a low probability of recruitment overfishing, thus meeting SG60 and SG80. Two lines of evidence are: the outcome of the 2017 stock assessment, which includes sufficient information to provide insights for the level of fishing mortality and recent trends in fishing mortality (Medley 2017), and the biology and life-history of *P. argus*. These are described in turn: Stock status: The 2017 assessment model (Medley 2017) was able to estimate recruitment without relying on external productivity data (unlike in the 2012 assessment). Estimated recruitment was mostly at an average level over the time series, and recruitment was weakly related to SSB. Despite a marked difference in SSB between optimistic and pessimistic cases in the assessment, there was little difference in recruitment between the 2 cases aside from the transition period between the two CPUE time series – highlighting the weak relationship, even for the pessimistic model, which projected stock status to be <20% by 2026. Other evidence suggests that there is not a well-defined relationship between SSB and recruitment in the Bahamian and broader fishery (e.g. Lipcius et al 1997, Cruz et al 2001). The biomass target of 40% SSB is set at a highly precautionary level for this species; likewise 20% SSB as a proxy for the PRI is likely to be very conservative for a highly fecund crustacean species, even though these values are the MSC default values. Sensitivity analyses in the current stock assessment suggests that model results were robust to exclusion of data and		

		provides insight to the stock-recruitment relationship (Medley 2017). Life history: *P. argus* is a highly fecund and fast growing species, with a wide distribution range – also outside the Bahamian fishing grounds across the wider Caribbean and central Western Atlantic. *P. argus* larvae exhibit extensive planktonic stages of 6 or more months, suggesting high connectivity or larval exchange between different spawning areas, caused by prevailing current systems and larval behaviour (Lipcius et al. 1997; Butler et al. 2011). Both self-recruitment and recruitment from other sources in the wider Caribbean region is therefore likely (Kough et al. 2013). *P. argus* matures within 2 years of settling, and females can carry 200 000 to 1.3 million eggs per clutch, depending on their size (Bertelsen and Matthews 2001; Cruz and Bertelsen 2009). These life-history characteristics make populations more resilient in the face of exploitation. SG100: Some uncertainties remain in the assessment model and supporting data, which precludes scoring at SG100 ('high degree of certainty'). The uncertainty in the CPUE abundance index stems from the absence of a consistent method of data collection covering the period from initial exploitation to the present. In the treatment of the CPUE abundance index, it remains unclear how much of the recent increase in the index when using the "new hooks" is as a result of an increase of catchability, or, alternatively, higher recruitment (Figure 6). The relationship between the CPUE index and stock status is therefore difficult to interpret – this is scored in PI 1.2.4, There remains insufficient information on the amount of IUU fishing both in terms of foreign fleets (i.e. the Dominican Republic) and unreported landings from local consumption and sales by unregistered Bahamian fishermen. All interviews with DMR staff and fishermen acknowledge IUU catch by foreign fleets, but not at the 20% of total landings level suggested by Sullivan-Sealy (2011) or equal to total Dominican landings reported to FAO (FAO FishSTAT). The number of unregistered fishermen is unknown and landings recorded only if landed at inspected landings sites. However, landings by unregistered fishers have a long tradition and there is no reason for harvest by this group to have changed over time.		
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?		N	N
	Justification	MSY was not directly estimated in the 2017 assessment; instead, SSB is estimated relative to the unexploited state, with SSB = 0.4 (SSB40) set as target reference point. This is therefore taken was as a proxy for stock status at MSY. This is in		

		accordance with the MSC intent that "directly measurable (empirical) proxies for fishing mortality or biomass (such as catch rate or recruitment) and associated harvest strategies can be used where they perform consistent with MSY". Advice based upon SSB, with an appropriate reference point, is sufficient to ensure sustainability when recruits make a significant contribution to SSB (De Lara et al. 2007). This is the case in The Bahamas fishery, which largely targets recruits (Medley 2017). The stock is at a level consistent with MSY based on the optimistic model of stock status (SSB relative to unexploited), but below it based on the pessimistic model – and hence SG80 is not achieved. Recent export records indicate landings are below peak historic levels (FAO landings records, Harper 1995), but the stock assessment model suggests the fishery is at or near full exploitation and effort is high. The rapid decline in CPUE during the progression of the fishing season suggests a dependence on annual recruitment to the fishery. The lack of information on the annual variation in IUU fishing obscures estimates of potential productivity of the fishery. Harvest control rules cap exports of lobsters but not IUU fishing leaving a substantial risk to the stock. Inclusion of IUU fishing raised the apparent productivity of the stock and potential reductions in IUU fishing through better enforcement could be a component of increased legal catch (Medley 2017). Inclusion of IUU raised the apparent productivity of the stock, but did not affect stock status. Changes in IUU could have other effects such as increases in legal catch rates, which have been observed. There is no assessment of growth overfishing that is the harvest of lobsters at a small size relative to their potential size.
References		Medley, 2017; Muller and Cummings, 2017; Bertelsen and Matthews, 2001; Butler et al., 2009, Cruz and Bertelsen, 2009; Cruz et al., 2001; De Lara et al., 2007; Ehrhardt, 1996; Froese, 2004; Harper, 1995; Kough et al., 2013; Lipcius et al., 1997; Maxwell et al., 2009

Stock Status relative to Reference Points

	Type of reference point	Value of reference point	Current stock status relative to reference point
Reference point used in scoring stock relative to PRI (SIa)	Spawning stock biomass (SSB) relative to unexploited level	0.2 (SSB 20% of unexploited level)	Optimistic (linked q) model ~0.4 Pessimistic (separate q) model ~0.25 See Figure 9
Reference point used in scoring stock relative to MSY (SIb)	Spawning stock biomass (SSB) relative to unexploited level	0.4 (SSB 40% of unexploited level)	

OVERALL PERFORMANCE INDICATOR SCORE:	**70**
CONDITION NUMBER:	**See PI 1.1.2**

Evaluation Table for PI 1.1.2 – Stock rebuilding

PI 1.1.2		Where the stock is reduced, there is evidence of stock rebuilding within a specified timeframe		
Scoring Issue		SG 60	SG 80	SG 100
a	**Rebuilding timeframes**			
	Guidepost	A rebuilding timeframe is specified for the stock that is **the shorter of 20 years or 2 times its generation time**. For cases where 2 generations is less than 5 years, the rebuilding timeframe is up to 5 years.		The shortest practicable rebuilding timeframe is specified which does not exceed **one generation time** for the stock.
	Met?	Y		N
	Justification	PI 1.1.1 did not meet SG80, and therefore PI 1.1.2 is relevant. One generation time (the average age of a reproductive individual in an unexploited stock; MSC – MSCI Vocabulary) in *P. argus* is approximately 5 years, based on an age at maturity of approx. 2 years after settlement, and longevity of ~12 years (Maxwell et al. 2009, Butler et al. 2011). MSC provide a rule of thumb for estimating generation time of 1/M + (age at 50% maturity) (FCRG Box GSA4); taking M=0.35 (as used in the stock assessment), this estimates generation time at 4.9 years – hence 5 years seems an appropriate estimate by this method also. An appropriate rebuilding timeframe under SG60 is therefore 10 years (2 times generation time). This would allow for several reproductive age classes in the population, and given the variability in annual recruitment to the population, it would also increase the likelihood of strong recruitment years occurring within the rebuilding timeframe. There is no indication of reduced recruitment (Figure 6, see 1.1.1a). Stock assessment projections run for 10 years, and give a probability of rebuilding (i.e. 50% of trajectories have rebuilt to target biomass level) within 1-2 years for the linked q model, but for the separate q model, only ~25% of trajectories have reached the target level within the 10-year timeframe, although the median trajectory is also rebuilding. Quantitative projections (Table 8) for the separate q model suggest a 30% probability of SSB>SSB40 at the end of two generation times, while for the linked q model they suggest a 80% probability. Since we have no basis at present for choosing between the two models, a combination would give probability of >50% of SSB>SSB40 (50% probability of SSB>SSB40 is reached in 2019). Considering SSB35 (bearing in mind that SSB40 is probably an over-estimate of B_{MSY}; see Section 3.3.3), projections from both models show a >50% probability of rebuilding to SSB35 in two generation times (93% and 54%, respectively).		

		On this basis, SG60 is met. Based on the projections (Table 8), SG100 is not met.		
b	Rebuilding evaluation			
	Guidepost	Monitoring is in place to determine whether the rebuilding strategies are effective in rebuilding the stock within the specified timeframe.	There is evidence that the rebuilding strategies are rebuilding stocks, **or it is likely** based on simulation modelling, exploitation rates or previous performance that they will be able to rebuild the stock within the specified timeframe.	There is **strong** evidence that the rebuilding strategies are rebuilding stocks, **or it is highly likely** based on simulation modelling, exploitation rates or previous performance that they will be able to rebuild the stock within the specified timeframe.
	Met?	Y	Y	N
	Justification	Sufficient catch monitoring is in place in the export sector to estimate the CPUE target/trigger/limit values, and since exports are well monitored, the HCR can be applied. The stock assessment provides projections, which evaluate the likely success of the old and new HCR levels under the 'optimistic' (linked q)and 'pessimistic' (independent q) scenarios, which are considered to bracket the uncertainties (Medley, 2017). On this basis, SG60 and SG80 are met. Productivity of the resource has now been estimated, and for the current fishery, exports of around 5 million lbs has been confirmed as a sustainable long term catch for this stock. The adjusted HCR level (5 million lbs) was approved by the Cabinet on 1 February, 2018. The two base case model scenarios (optimistic and pessimistic) are considered to bracket the full range of uncertainty in the stock assessment, even taking unreported landings into account. They both show that the stock will rebuild under the 5 million lbs HCR level, with a high probability, as follows: SSB ratio remains at 45% over 10 years for the optimistic scenario; SSB ratio increases from 25% to 35% in the pessimistic scenario (Figure 9). We therefore consider it 'likely*' based on simulation modelling, that the strategy will enable the stock to rebuild over 10 years, and even in the case of the pessimistic scenario being true, SSB is likely to increase by 10%, to just below the (very conservative) SSB40 target reference point. The rebuilding projections depend on the assumptions made about the CPUE abundance series – but this uncertainty is taken into account in the optimistic and pessimistic model scenarios, which effectively model CPUE under different assumptions of catch rate (i.e. whether the available time series are linked, or independent from each-other). The fishery largely targets recruits, so low catches may indicate periods of low recruitment, which can be caused by many factors besides depletion, caused by fishing. Despite the simulation model projections, which largely show rebuilding within a 10 year timeframe, strong evidence is still required, and based on the pessimistic model projections, SG100 cannot be met at the level of 'highly likely**'.		

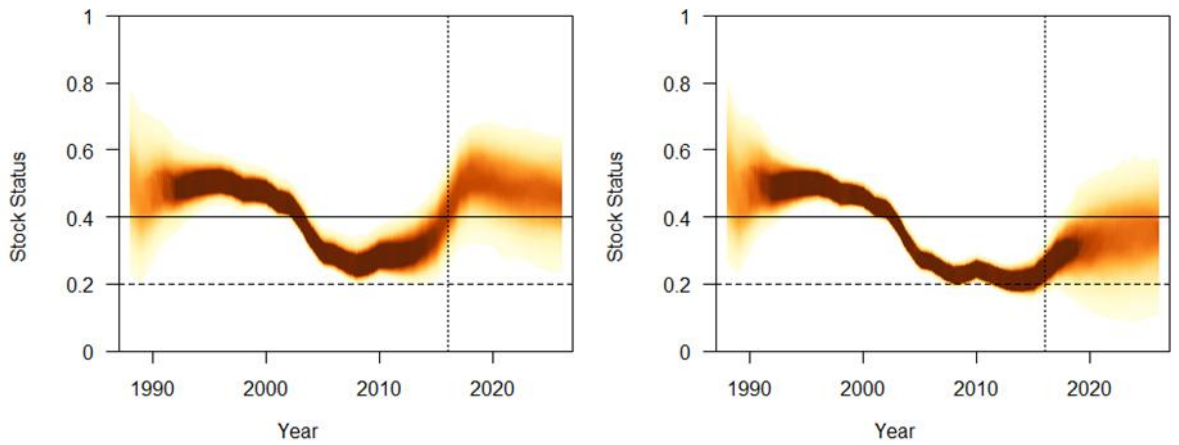


Figure 12. Spawner biomass projections as in Figure 7 but with the upper export limit fixed at 5 million lbs.; left: 'linked q' (optimistic); right: 'independent q' (pessimistic) (Medley, 2017)

*likely defined as ≥ 70% probability

**highly likely defined as ≥ 80% probability (see SA2.2 of MSc Fisheries Standard v2.0)

References	Medley, 2017; Butler et al., 2011; Maxwell et al., 2009
OVERALL PERFORMANCE INDICATOR SCORE:	**80**
CONDITION NUMBER:	**N/A**

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	Y
	Justification	The harvest strategy is defined by MSC as a combination of monitoring, stock assessment, HCR and management decision-making, sometimes supported by management strategy evaluation (MSE). The harvest strategy for this fishery is described in Section 3.3.5, and can be summarised as follows: • The fishery is monitored mainly via the processors but also via data collected by Fishery Officers (Section 3.3.7); • These data are used to evaluate aggregate catch rate for the dive (condo) fishery at the end of each season; • Export limits are applied if required according to the HCR level (see Section 3.3.5 and 1.2.2 below); • The stock status is monitored via periodic stock assessments, as well as projections to evaluate the likely effectiveness of the HCR; • External review of the stock assessment and HCR provides a measure of oversight and evaluation. The harvest strategy is based on the assumption that there is a relationship between stock status and the CPUE index, and that the stock status will increase or decrease in response to changes in exploitation rate (as is common in most fisheries). These relationships and assumptions are explored further in PI1.2.4. The harvest strategy was developed over a period of at least 8 years, during two rounds of Fisheries Improvement Projects (FIP) , supported through a partnership between the Fisheries Department, the industry, WWF-US and other stakeholders. The aim of the FIP process, which started in 2010 following a series of stakeholders workshops in 2009, was to maintain a viable lobster fishery that will meet the MSC standard. The FIPs supported a range of tasks within 4 major categories: Data collection; education and outreach; enforcement (monitoring, control and surveillance) and assessment and review (MRAG Americas Inc. 2010; MRAG 2015). These formed the basis of		

		the present harvest strategy. The harvest strategy is **expected** to achieve the stock management objectives, based on the data collection procedures, the stock assessment and projections in the stock assessment report (see Figure 9 above), and the implementation of the 'new' HCR (i.e. export cap set at 5 million lbs for CPUE above the trigger level; see Table 7) (SG60 met). The harvest strategy is responsive to the state of the stock. The assessment model was run to estimate the catch level corresponding to SSB40 (target) and the catch level corresponding to SSB20, and it was estimated at 5 million lb, under the current assessment data scenario. An empirical index that utilises catch rate from the dive (condo) fishery is used to link the 5-million lb level to a HCR target index (lb/man-day) and limit index (lb/man-day), which measures present stock condition (represented by CPUE) against the HCR index points. Changes in CPUE against the target / trigger / and limit index points are then used to adjust the HCR level according to set rules. Management decision-making was responsive to the stock assessment advice, and the HCR level was adjusted downwards from 7 to 5 million lbs in 2018. The example demonstrates that the harvest strategy is responsive to the state of the stock (as assessed), and that **elements work together** to achieve objectives (SG80 met). Note that the relationship between CPUE and stock status, per se, is scored in 1.2.4. The present harvest strategy was designed specifically for the Bahamas lobster fishery during the FIP process (see above). Over an 8-year period (2010-2018), projects and tasks were specifically undertaken (and monitored) to support the development of a harvest strategy that would conform to MSC Principles. Hence, the present harvest strategy is **designed** to collect data to be used in a stock assessment process to advise management, which in turn implements HCRs and enforces rules and regulations within a governance system (SG100 met).		
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	**Evidence exists** that the harvest strategy is achieving its objectives. Formal approval for the HCRs for the lobster fishery by the Bahamas government was given in spring 2015. The harvest strategy relies on a reduction of export levels to maintain stock status at SSB40. Based on data collected from processors and fishers, stock assessment in 2017 showed that the HCR level should be reduced from 7 to 5		

		million lb to achieve stock status objectives. The advice was accepted by the Bahamian government and the HCR maximum export level adjusted to 5 million tonnes in 2018, at which level it will be enforced. Projections over 10 years are that the stock will rebuild, or fluctuate around an MSY proxy, depending on the pessimistic or optimistic models (see 1.1.1 and 1.1.2). This provides good evidence that the strategy (i.e. different components working together) is achieving its objectives – interpreted as managing a fishery based on best scientific advice, and maintaining stocks at target levels (SG60 and SG80 met based on evidence from stock projections). The team considered that the stock assessment projections under the new HCR (Figure 9) constitute evidence that the strategy will achieve its objectives (i.e. rebuilding the stock to the target biomass level). However, there remain uncertainties; notably in the stock assessment (linked vs. independent q scenarios) which make it difficult to argue that the harvest strategy has been fully evaluated and is **clearly** able to maintain the stock at target levels (SG100 not met).		
c	Harvest strategy monitoring			
	Guidepost	Monitoring is in place that is expected to determine whether the harvest strategy is working.		
	Met?	Y		
	Justification	Monitoring is in place to determine whether the strategy is working (SG60 met). Monthly catch and effort information is obtained from processors where catches for export are offloaded, and lobster size composition is also monitored at several sites. Together with the export data, these information is used to determine whether the harvest strategy is working - through an empirical harvest control rule that is within the capacity of the management authority to implement without outside support. See 1.2.3 for further information.		
d	Harvest strategy review			
	Guidepost			The harvest strategy is periodically reviewed and improved as necessary.
	Met?			Y
	Justification	The harvest strategy is periodically reviewed, including data collection / monitoring and stock assessments. This has been done as part of a FIP since 2010 (5 review meetings between 2011 and 2015; MRAG 2015). Reviews have led to improvements, such as moving to an age-structured approach and incorporating size composition and additional catch and effort data. The improvements have led to a much more robust estimation of stock status since 2012 (Muller and Puga 2012). A recent external review of the stock assessment was		

		undertaken in 2017 - with some recommendations for future improvements (Muller and Cummings 2017). As part of the strategy, the HCR is relatively new (did not exist in 2009; MRAG Americas, Inc. 2009) – thus highlighting how recommendations from reviews have been taken up as improvements. The HCR has just been reviewed and revised based on the conclusions of the stock assessment; the revised version recommended by the stock assessment and projections was formally adopted in January 2018. On this basis, it is clear that the harvest strategy is reviewed and improved as necessary. SG100 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	Not scored. Sharks are not a target species.		
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 **biannual** 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	Spiny lobsters are collected by hand during diving, so unwanted specimens (too small) are not collected. Undersized lobster are mainly able to escape from traps due to the trap design (Lester Gittens, DMR, pers. comm. – see also Regulations). There is no unwanted catch and therefore SI f) was not scored.		
References		Medley, 2017; Muller and Cummings, 2017; Muller and Puga, 2012; BSLWG, 2015; MRAG Americas, 2010; MRAG 2015; Fisheries Regulations		
OVERALL PERFORMANCE INDICATOR SCORE:				**95**

CONDITION NUMBER:	**N/A**

Evaluation Table for PI 1.2.2 – Harvest control rules and tools

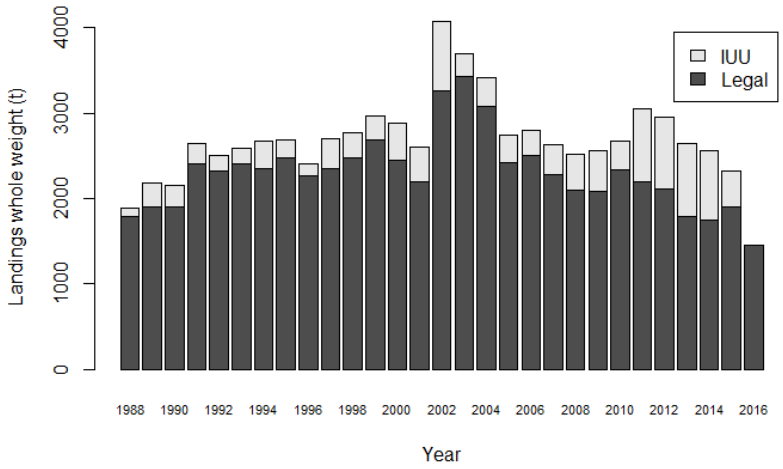
PI 1.2.2		There are well defined and effective harvest control rules (HCRs) in place		
Scoring Issue		SG 60	SG 80	SG 100
a	HCRs design and application			
	Guidepost	**Generally understood** HCRs are in place **or available** that are **expected** to reduce the exploitation rate as the point of recruitment 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	Y	N
	Justification	HCRs are a clearly specified set of rules that decreases the exploitation rate as the PRI (Point of Recruitment Impairment – stock level below which recruitment may be impaired) is approached, The PRI is estimated from stock assessment runs (taken to be equivalent to SSB20), as is the target level (equivalent to SSB40). The recent stock assessment estimated that an export quantity of 5 million lbs (the HCR level) would be expected to keep the stock fluctuating around target level (SSB40; optimistic model) or recover the stock over 10 years (pessimistic model). The HCR rules are then based on an empirical index of catch rate of the dive (condo) fishery which links them (target index (lb/man-day) trigger index (lb/man-day) and limit index lb/man-day) to the accepted HCR level. The HCR rules and how catch is reduced as the PRI is approached is defined as per Table 7. The HCR sets the export cap (equivalent to >90% of the catch according to Fishery Department estimates) to a monotonically declining function between 50 million lbs at the Trigger Reference Point to zero at the LRP – i.e. it is clear that it will reduce the exploitation rate very substantially as the stock approaches the LRP. On this basis, we consider that **well-defined HCRs are in place** that ensure that exploitation rate is reduced as the PRI is approached (SG60 fully met and SG80 partly met); this is described in PI 1.1.2 and Section 3.3.5. The 2nd part of SG80 (the stock **fluctuating around** a target level consistent with (or above) MSY is met with high probability for the optimistic (linked q) model. For the pessimistic (separate q) model, the projections estimate a stock recovery from 25% of pristine SSB at present to 35% of SSB over the next 10 years – hence a recovery to nearly SSB40 (Medley 2017, Figure 9) – this recovery scenario was scored in PI1.1.2. The overall probability of recovery to the biomass TRP is >50% (see 1.1.2) Hence SG80 is met when the export quantity is limited to 5 million lbs per year (as in the newly adopted, revised HCR – see Table 7).		

		Although it is likely that the HCR will maintain the stock above the target biomass level, based on model projections, there is not yet empirical evidence, and the HCR rules do not take ecological the ecological role of the stock into account explicitly. SG100 not met.		
b	HCRs robustness to uncertainty			
	Guidepost		The HCRs are likely to be robust to the main uncertainties.	The HCRs take account of a **wide** range of uncertainties including the ecological role of the stock, and there is **evidence** that the HCRs are robust to the main uncertainties.
	Met?		Y	N
	Justification	The HCR reduces exploitation rate on a sliding scale as the PRI is approached, and effectively stops exports once the index (measured as lb/man-day) is at or below the limit index. The upper export limit for the fishery (also called HCR level) is presently set at 5 million lbs based on the recent stock assessment projections. The recent reduction in the maximum export limit in the HCR (from 7 to 5 million lbs) has made the HCR more robust to (1) uncertainties in the stock status related to the assessment model, and (2) uncertainty related to using the CPUE abundance index to evaluate the stock against target, trigger and limit reference points (in lb/man-day). *(1)* The main modelling uncertainty relates to the use of the CPUE index, which is based on 3 separate catch rate series (spears, hooks and ne-hooks) over the 1988-2016 period. This is to a large extent take into account in using both optimistic (linked-q, i.e. catch rates linked) and pessimistic (independent q, i.e. catch rates treated independently) models to bracket a broad range of uncertainty. (2) The main catch rate (lb/man-day) uncertainty is that catch rates are unresponsive to variability in stock abundance (see Fig. 5), and that it is very 'noisy'. However, much of the variability (noise) is within-year, because the standardised CPUE is provided as a Year-Month index, in order to use the information provided by the within-season decline in catch rates (Medley, 2017). Hence within-year variability related to recruitment pulses, or low catchability as a result of moulting behaviour are all reflected – and suggest that CPUE is indeed responsive to abundance fluctuations, or catchability. Based on the above, we consider SG80 met. Although the stock assessment takes into account a wide range of uncertainties, including unreported landings (in sensitivity analyses), uncertainties remain; e.g. the year-month CPUE indices are certainly still noisy indices of stock biomass; and the two stock assessment catchability scenarios give some different results as to rebuilding probabilities and timeframes. SG100 is not met.		
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	Y	N
	Justification	The 1st tool used to implement the HCR is an export cap, as described in Section 3.3.5. The available evidence for the revised 2018 HCR level (5 million lbs) is that it is effective in achieving an appropriate biomass; this evidence is from projections from the stock assessment (Figure 9) which show that the stock can be maintained / rebuilt to the target biomass under both the optimistic and pessimistic scenarios, which are considered to bracket the uncertainty in stock status (Medley, 2017; Muller and Cummings, 2017). When the stock assessment suggested that the original HCR was not able to maintain the stock at target level under all scenarios, the HCR was revised (in early 2018); demonstrating that it is responsive to stock status and stock assessment output. SG60 and SG80 are met. The 2nd tool is an empirical index that utilises catch rate under different lobster population abundances to control exploitation. The tool has a solid theoretical basis. There is a clear effect on limiting export of lobsters should the trigger or limit indices be reached, and it is unlikely other compensatory activities in the fishery would increase harvest to supply local markets. Available evidence (i.e. existing long-term data) analysed within an appropriate stock assessment framework to provide projections indicates that the tools in use are appropriate and effective in achieving the exploitation levels required under an HCR level of 5 million lbs. The effectiveness of the Harvest Control Rule (HCR) was examined with ten-year projections, including random effects. This allowed for a wide range of uncertainties to be simulated – mainly related to **stock status**. (SG80 met). Uncertainties such as the ecological role of the stock, and its importance in maintaining trophic dynamics of ecosystems around The Bahamas have not been explicitly addressed, and SG100 is therefore not met.		
References		Medley, 2017 and references therein; Muller and Cummings, 2017		
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	Sufficient relevant information related to stock structure, stock productivity, fleet composition, stock abundance and UoA removals is available to support the harvest strategy, because the conclusions of the stock assessment, although uncertain, are robust when it comes to the HCR (both SG60 and 80 met). The data available is summarised below (see also Section 3.3.2). Parameters for growth have to rely on studies made in the region; total UoA removals are unclear because of unreported landings from subsistence fishing; there remains some IUU; and catch and effort data are not considered to provide a very good abundance index. Therefore data cannot be seen as comprehensive, and SG100 is not met. **Stock structure**: *P. argus* from the Caribbean Sea is genetically distinct from those in the SW Atlantic, off Brazil (Tourinho et al. 2012). Within the Caribbean (incl. Bahamas), high levels of gene flow have been shown for *P. argus*, concordant with an extended drifting larval phase and prevailing currents (Silberman et al. 1994). From a genetic stock structure perspective, *P. argus* in the Caribbean is considered a single stock. Larvae that recruit to Bahamas may therefore originate elsewhere in the Caribbean, although some self-recruitment is expected to occur. See analysis in Section 3.3.2. **Stock productivity**: Recruitment appears not to have varied much across the time series from 1988 to 2017, and is predicted to remain similar up to 2026. Consistent per recruit calculations suggested around 600,000 eggs and 0.6 kg spawning biomass produced per recruit (Figure 6). Growth rates are broadly known for the Caribbean region – although not specifically for The Bahamas. Appendix B in Medley (2017) provides a summary of 52 individual estimates of K, Linf and T0 across sites in the Caribbean.. **Fleet composition**: About 9000 part- and full-time fishers target lobster over a 45,000 square mile area, with landing at some 20 islands		

		(MRAG 2009). The numbers of boats and fishers are recorded by interviews conducted by Fishery Officers or obtained from processors. **Stock abundance**: Stock abundance is tracked by three catch/effort time series (see Figure 5). They are problematic as indices of abundance; resulting in two stock status scenarios (optimistic vs. pessimistic) from which a most likely base case cannot be chosen. nevertheless, the analysis with two base cases is robust in terms of the qualitative effectiveness of the HCR. **Removals from the stock**: Unrecorded landings for local use, and IUU landings by foreign vessels (mainly Dominican) may be significant. These were accounted for by adding Dominican Republic landings as reported to the FAO (see figure below from Medley 2017). A sensitivity run was developed which accounted for IUU catch.  Figure above: Bahamas landings with the estimate of IUU used in each year for the "Lobster_Aug3q2sd_DRland" sensitivity run (Medley, 2017, figure 2). **Size data**: Biological sampling of landings since 2000, including size composition; commercial size grading by individual weight measurements of tails.		
b	Monitoring			
	Guidepost	Stock abundance and UoA removals are monitored and at least one indicator is available and	Stock abundance and UoA removals are **regularly monitored at a level of accuracy and coverage consistent with the harvest**	**All information** required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good

		monitored with sufficient frequency to support the harvest control rule.	**control rule**, and one or more indicators are available and monitored with sufficient frequency to support the harvest control rule.	understanding of inherent **uncertainties** in the information [data] and the robustness of assessment and management to this uncertainty.
	Met?	Y	Y	N
	Justification	All UoA removals are monitored at the processing level with a high degree of accuracy and coverage consistent with the HCR, and indicators (catch and effort trends, export quantities) are available and suitable for stock assessment and the HCR, thus meeting SG60 and SG80. Not **all information** required by the harvest control rule is monitored with high frequency – there remains unreported catch by recreational fishery, and IUU catches by other fleets in the region. These still contribute inherent uncertainties in the information. SG100 not met.		
c	Comprehensiveness of information			
	Guidepost		There is good information on all other fishery removals from the stock.	
	Met?		N	
	Justification	Regarding the definition of the 'stock' – see Section 3.3.2 on lobster (meta)population structure. The conclusion of this analysis is that the definition of a 'stock' for this species is unclear, but that The Bahamas is a rationale management unit. On this basis, we take the 'stock' to be defined as the population in The Bahamas. There are many potential fishermen providing lobsters for subsistence / to local markets that are unreported. Furthermore, foreign IUU is a problem, as noted above and estimated increases in Dominican landings in 2011 that were suspected of originating from The Bahamas would prevent effective implementation of the new 5 million lb. HCR. SG80 is not met.		
References	Medley, 2017; Silberman et al., 1994; Tourinho et al., 2012			
OVERALL PERFORMANCE INDICATOR SCORE:				**75**
CONDITION NUMBER:				**1**

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 considers the major features relevant to the biology of the species and the nature of the UoA.
	Met?		Y	Y
	Justification	The assessment is based on a statistical catch-at-age model, which incorporates landings, effort in vessel-days, and the size structure of the landings. It estimates the numbers of lobsters as well as biomass. A Bayesian approach is used, with priors on all parameters used (Assessment Report Table 8; Medley 2017). The assessment configuration in the Stan language (Stan 2016) using Markov Chain Monte Carlo (MCMC) simulations allowed exploration of uncertainty in the parameters. The precision of the parameter estimates (observation error) was estimated by the parameters' posterior distributions developed from four chains of MCMC simulations with 600 iterations (400 were considered burn-in and 200 per chain were retained) per run. Linkage of HCR to stock status provided by stock assessment: The HCR rules are a clearly specified set of rules that decreases the exploitation rate as the PRI (Point of Recruitment Impairment – stock level below which recruitment may be impaired) is approached, The PRI is estimated from stock assessment runs (equivalent to SSB20), as is the target level (equivalent to SSB40) that will allow for maintaining the stock near an MSY proxy. . The recent stock assessment estimated that an export quantity of 5 million lbs (the HCR level) would be expected to keep the stock near SSB40 (optimistic model) or recover the stock over 10 years (pessimistic model). The HCR rules are then based on an empirical index of catch rate of the dive (condo) fishery which links them (target index (lb/man-day) trigger index (lb/man-day) and limit index lb/man-day) to the accepted HCR level. The HCR level can be adjusted based on stock assessment results. In other words, rather than acting as a direct input into the HCR on an annual basis, the HCR is based on an empirical index which is easier to calculate on a short-term basis; while the stock assessment (based on the same data as the index and hence clearly linked) is carried out less frequently and acts as a check on whether the HCR is working. The effectiveness of the Harvest Control Rule (HCR) was examined with ten-year projections. The assessment is appropriate for the stock and harvest control rule (SG80 met) and takes into account the major features relevant to the biology of the species (growth rate, size and age structure, length-weight relationships, recruitment, reproductive mode and seasonality)		

		and the nature of the UoA (SG100 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	Required stock assessment metrics on fishing mortality, abundance, and SSB are estimated, and thus SG60 and SG80 are met. There is some doubt as to the appropriate level of SSB reference points for Caribbean spiny lobster fisheries, but a 20 % limit and 40% target is likely robust for a highly fecund broadcast spawner.		
c	Uncertainty in the assessment			
	Guidepost	The assessment **identifies major sources** of uncertainty.	The assessment takes uncertainty into account.	The assessment considers uncertainty and is evaluating stock status relative to reference points in a **probabilistic** way.
	Met?	Y	Y	Y
	Justification	The assessment identifies major sources of uncertainty (such as lack of overlap of hook and hook new catch rate data; IUU removals; conversion errors) (SG60 met), and it also takes them into account in a series of sensitivity analyses (SG80 met). Stock status is then evaluated relative to reference points in a probabilistic way, using a Bayesian framework for the assessment, and through probabilistic outputs of SSB vs. unexploited stock over time (1988-2016) for optimistic and pessimistic scenarios. SG100 is met. In all 10 sensitivity analyses were conducted addressing: assumptions on the prior on the error on q, data inputs (IUU), impact of specific data components (random sampling size data, early time series (i.e., years before 2000, and using only the August catch rate data to estimate stock status, and assumption of changing q) (described in Table 18 of the stock assessment report; Medley 2017). These results suggested for the most part the model results were robust to assumptions of removing data (i.e., years before 2000; removal of the noisy 2008/2009 size data; removal of the random sampling data), to inclusion of the IUU test trial, and the assumptions on the catchability prior (Table 18 stock assessment report).		

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?			Y
	Justification	The stock assessment has been fitted to the available data, and diagnostics indicate that the current fit is sufficiently good to provide advice to management. Alternative hypotheses and assessment approaches have been rigorously explored. SG100 is met. Sensitivity analyses (see above) suggested for the most part the model results were robust to assumptions of removing data (i.e., years before 2000 or removal, removal of the noisy 2008/2009 size data, or to removal of the random sampling data), to inclusion of the IUU test trial,) and to assumptions on the catchability prior (Table 18 stock assessment report). Alternative hypotheses, such as linked vs. independent catchability (the optimistic vs. pessimistic scenarios) were tested. An older assessment approach was used in 2012 in which a modified DeLury model was used. The updated assessment included advancements in data (size, use of commercial pack categories, and adding a "hook-new" catch and effort time series). The new assessment also included several modelling advancements, including moving to a population model (numbers of lobsters), an age-based assessment including observations of size, statistical catch at age model and sensitivity analyses to examine impacts of assumptions. The new model was able to estimate annual recruitment, without relying on external information of productivity. The rigorous exploration, combined with major improvements made since the 2012 assessment justify a SG100 score.		
e	Peer review of assessment			
	Guidepost		The assessment of stock status is subject to peer review.	The assessment has been **internally and externally** peer reviewed.
	Met?		Y	Y
	Justification	Peer review of the 2017 stock assessment was completed. Internal reviewers participated in previous stock assessments that identified data gaps that were addressed and incorporated into the 2017 assessment. The assessment has been externally reviewed in 2017 (Muller and Cummings 2017), and both SG80 and 100 are therefore met.		
References		Medley, 2017; Muller and Cummings, 2017		

OVERALL PERFORMANCE INDICATOR SCORE:	**100**
CONDITION NUMBER:	**N/A**

Principle 2 scoring rationale

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 - both UoAs	Y - both UoAs	Y - both UoAs
	Justification	The FCR v2.0 defines 'primary' bycatch species as those where management tools and measures are in place that aim to regulate fishing in relation to some biologically-based limit and/or target reference levels. Lobster is the only species in The Bahamas to which this applies. Hence there are no primary bycatch species for either gear type. SG100 is met by default.		
b	Minor primary species stock status			
	Guidepost			For minor species that are below the PRI, there is evidence that the UoA does not hinder the recovery and rebuilding of minor primary species

	Met?			Y - both UoAs
	Justification	There are no minor primary species, therefore SG100 is met by default.		
References		N/a		
OVERALL PERFORMANCE INDICATOR SCORE:				**100 - both UoAs**
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.
	Met?	Y - both UoAs	Y - both UoAs	Y - both UoAs
	Justification	There are no main or minor primary species, therefore 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 - both UoAs	Y - both UoAs	Y – both UoAs
	Justification	There are no main or minor primary species, therefore SG100 is met by default.		
c	Management strategy implementation			
	Guidepost		There is **some evidence** that the	There is clear evidence that the partial

			measures/partial strategy is being **implemented successfully**.	strategy/strategy is being implemented successfully and is achieving its overall objective as set out in scoring issue (a).
	Met?		Y - both UoAs	Y – both UoA
	Justification	There are no main or minor primary species, therefore 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
	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	There is no unwanted catch of primary species.		
References		N/a		
OVERALL PERFORMANCE INDICATOR SCORE:				**100 – both UoAs**
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 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 - both UoAs	Y - both UoAs	Y - both UoAs
	Justification	Because the lobster is the only fishery species in The Bahamas which meets the criteria for 'primary species, there is a high degree of certainty that neither gear type has any bycatch of primary species. Further to this, there is sufficient monitoring and regulation (trap size etc.) in place to prevent new gear being used that might change bycatch levels. SG100 is met.		
b	Information adequacy for assessment of impact on minor species			
	Guidepost			Some quantitative information is adequate to estimate the impact of the UoA on minor primary species with respect to status.
	Met?			Y - both UoAs

	Justification	Met by default (see scoring issue a)..		
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?	Y - both UoAs	Y - both UoAs	Y - both UoAs
	Justification	Met by default (see scoring issue a).		
References		N/a		
OVERALL PERFORMANCE INDICATOR SCORE:				**100 - both UoAs**
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 biological 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 If below biologically based limits, there are measures in place expected to ensure that the UoA does not hinder recovery and rebuilding.	Main secondary species are **highly likely** to be above biologically based limits OR 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.	There is a **high degree of certainty** that main secondary species are within biologically based limits.
	Met?	Y – Condos Y – Traps	Y – Condos Y – Traps	Y – Condos Y – Traps
	Justification	Secondary bycatch species: Condos – no direct bycatch so no secondary species (see Section 3.4.4) Traps – no 'main' secondary species (see Section 3.4.5; defined as those consistent >5% of the total catch, or >2% if potentially vulnerable, or those out of scope); a variety of 'minor' secondary species (see Section 3.4.6). Because neither gear type has any 'main' secondary species, this scoring issue is met by default.		
b	**Minor secondary species stock status**			

	Guidepost			For minor species that are below biologically based limits', there is evidence that the UoA does not hinder the recovery and rebuilding of secondary species
	Met?			Y – Condos N – Traps
	Justification	Condos: No secondary species so met by default. Traps: The trap fishery has a range of minor secondary species, and the stock status not known with any confidence for any of them. Not met. Indirect bycatch: The team considered the issue of 'indirect bycatch' (taken in a separate fishing activity but alongside the lobster fishery – e.g. recreational fishing for conch) but it was concluded that it is not appropriate to consider this catch as bycatch of the lobster fishery (see Section 3.4.6). There are, however, some concerns in relation to vulnerable species, i.e. Nassau grouper and queen conch. For Nassau grouper there is management in place (minimum size, closed season during spawning); for conch there is also some management (the shells must have a well-formed lip), but there is not good evidence that it is working; stocks appear to be depleted and declining (Banks et al., 2014; the species is listed on CITES Appendix 2). The team therefore proposes a recommendation that conch fishing by commercial lobster fishermen should be quantified and if necessary management measures put in place to ensure that the lobster fishery is not indirectly depleting the stocks, particularly in remote areas.		
References		TNC, 2015a,b; Butler and Matthews, 2015; Matthews and Donahue, 1997; Banks et al., 2014; CITES Appendices: https://cites.org/eng/app/appendices.php		
OVERALL PERFORMANCE INDICATOR SCORE:				**UoA 1 - Condos 100** **UoA 2 – Traps 90**
CONDITION NUMBER:				**Recommendation 1**

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 – Condos Y – Traps	Y – Condos Y – Traps	Y – Condos N – Traps
	Justification	Condos: No secondary species – SG100 met by default. Traps: No main secondary species – SG80 met by default. Minor species not subject to a strategy, 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 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?	Y – Condos Y – Traps	Y – Condos Y – Traps	Y – Condos N – Traps

	Justification	Condos: No secondary species (main or minor) – SG100 met by default. Traps: No main secondary species – SG80 met by default. For condos, there is high confidence that there is no bycatch, based on the fishing method; SG100 is met. For traps, although the available information does not identify any 'main' bycatch species, it is limited (see Section 3.4.5), and the team does not have 'high confidence' that a partial strategy or strategy is not required, therefore SG100 is not met.		
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 set out in scoring issue (a).
	Met?		Y – Condos Y – Traps	Y – Condos N – Traps
	Justification	Condos: No secondary species (main or minor) – SG100 met by default. Traps: No main secondary species – SG80 met by default. For condos, the 'strategy' is the fishing technique – the team can have high confidence that there is no bycatch, and hence the objectives of scoring issue a are being achieved. SG100 is met. For traps, however, there is not 'clear evidence' on the quantity and species composition of bycatch (although there is some evidence – see Section 3.4.5), and therefore there is not high confidence that the objectives of scoring issue a are being achieved – not met.		
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
	Justification	No shark bycatch identified for either gear type in any data sources (see Section 3.4.7).		
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?	N/A – Condos Y – Traps	N/A – Condos Y – Traps	N/A – Condos N – Traps
	Guidepost	Condos are a highly selective gear (selection of catch directly by hand), so there is no unwanted catch; this scoring issue is therefore not scored. For traps, since there are no 'main' secondary species, SG80 is met. SG100 not met because there is bycatch and it is not clear how much, if any, is 'unwanted'.		
References		TNC, 2015a,b; Butler and Matthews, 2015; Matthews and Donahue, 1997		
OVERALL PERFORMANCE INDICATOR SCORE:				**UoA 1 - Condos 100** **UoA 2 – Traps 80**
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 – Condos Y – Traps	Y – Condos Y – Traps	Y – Condos N – Traps
	Justification	Condos have no main secondary species; SG100 is met by default. Traps: There is 'some quantitative information' available to evaluate bycatch of secondary species (see Section 3.4.5); this information suggests that there are no 'main' secondary species. SG80 is met. Generally, in cases where there are no main secondary species, SG100 is met by default. However, despite continuous monitoring and regulation of gear used, the team noted that the information available to evaluate 'main' secondary species is not particularly good; the quantitative data from the fishery directly is limited, and while there is excellent information available from Florida, it is not certain that the bycatch spectrum is the same in the two fisheries. The team considered that there is not a high degree of certainty that there are no main secondary species in this fishery, therefore SG100 should not be met.		
b	**Information adequacy for assessment of impacts on minor secondary species**			

	Guidepost			Some quantitative information is adequate to estimate the impact of the UoA on minor secondary species with respect to status.
	Met?			Y – Condos N – Traps
	Justification	Condos: Met by default as there are no secondary species, either main or minor. Traps: Some (limited) quantitative information is available on bycatch for minor secondary species, but there is no information on stock status. Not met.		
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 – Condos Y – Traps	Y – Condos Y – Traps	Y – Condos N – Traps
	Justification	Condos: No secondary species and additionally there is continuous monitoring and regulation of gear used – SG100 met by default. Traps: No main secondary species – SG80 met by default. There is no 'high degree of certainty' relating to trap bycatch, however, so SG100 is not met.		
References		TNC, 2015a,b; Butler and Matthews, 2015; Matthews and Donahue, 1997		
OVERALL PERFORMANCE INDICATOR SCORE:				**UoA 1 - Condos 100** **UoA 2 – Traps 80**
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?	N/A	N/A	N/A
	Justification	MSC's intention in relation to 'limits' is levels of bycatch or interaction that would trigger management action; there are no such limits in this fishery. Not relevant.		
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?	Condos & Traps **Y** – Turtles, bottlenose dolphins, manatees	Condos & Traps **Y** – Turtles, bottlenose dolphins, manatees	Condos **Y** – Turtles, bottlenose dolphins, manatees Traps N - Turtles, bottlenose dolphins, manatees
	Justification	ETP species in The Bahamas have been defined as follows (under the Fisheries Regulations; see section 3.4.7): • Turtles (green and loggerhead);		

		• Bottlenose dolphins; • Manatees. Condos: There is no mechanism for mortality or injury from interaction of these species with condos; some may use them to forage (e.g. loggerheads) but likely with positive results in terms of the population (see section 3.4.7). There is no evidence of any interactions with the fishery (e.g. structured interviews with fishermen in Callwood (2016); DMR pers. comm.). Observations in Florida also provide no evidence of any negative interactions of these species with condos (Higgs, 2016a). SG100 is met. Traps: Turtles: There are no 'known direct effects' from The Bahamas (Higgs, 2016a), but data are limited. Information from Florida suggests that impacts on turtles are possible (see Section 3.4.7), but likely due to entanglement with vertical ropes (e.g. surface buoys on traps), which are not used in The Bahamas fishery at all (in comparison, there are estimated to be 2 million vertical ropes in Florida waters; Adimay et al., 2014). Densities of turtles are also higher in Florida than in The Bahamas; the Florida Keys are a globally significant nesting area for loggerhead turtles. The most important point is that the lack of vertical trap-surface ropes in the Bahamian fishery removes the mechanism for negative interactions with turtles. SG80 is met. In the absence of vertical ropes (known to be the main source of mortality in Florida for ETP species in traps), the team could see no mechanism for significant impacts on ETP species via lobster traps in The Bahamas. However, the lack of direct information (reporting of interactions) means that there is not a 'high degree of confidence' so SG100 is not met. Dolphins: The Bahamian population of bottlenose dolphins is reportedly large and genetically diverse (Higgs, 2016a), and as for turtles there are no 'known direct effects' – but again, data are limited. As for turtles, the lack of vertical ropes removes the mechanism for entanglement, and it is hard to envisage a bottlenose dolphin getting stuck in a lobster trap. Conclusions are the same as for turtles. Manatees: There are very few manatees in The Bahamas (estimate ~15); it is not likely to be a core population area because manatees require some freshwater, which is hardly available in The Bahamas. No interactions have been recorded; vessel collisions are the main concern. As for turtles and dolphins, the lack of vertical ropes means that there is no clear mechanism for them to become entangled in lobster traps, even if they were to interact with them (which also seems unlikely). SG80 is met but SG100 is not met, as for turtles and dolphins.		
c	Indirect effects			
	Guidepost		Indirect effects have been considered and are thought to be **highly likely** to not create unacceptable impacts.	There is a high degree of confidence that there are no significant detrimental indirect effects of the fishery on ETP species.

	Met?		Condos & Traps **Y** – Turtles, bottlenose dolphins, manatees	Condos & Traps **N** – Turtles, bottlenose dolphins, manatees
	Justification	Possible indirect effects have been considered as follows: ***1.*** Change in foraging patterns for species attracted to condos (loggerheads, dolphins); ***2.*** Using condos as shelters (turtles); ***3.*** Disturbance by fishing vessels (manatees, dolphins); ***4.*** Collisions with fishing vessels (manatees, turtles); ***5.*** Reduction in seagrass area due to condos for species that forage on seagrass (green turtles, manatees). Interactions 1 and 2 are not likely to be detrimental, since there is no mechanism for the animals to become trapped. In relation to 3 and 4, lobster fishing vessels are a small proportion of vessel traffic in The Bahamas, which also includes recreational / subsistence fishing vessels owned by Bahamians, recreational fishing vessels from the US and other tourist vessels and commercial shipping in some areas. Dolphin populations are healthy and manatees are rare (probably vagrant from Florida) and there is no evidence of any negative interactions. Interaction 5 is not likely to be significant because condos impact <<1% of total seagrass area (see Section 3.4.9 and PIs 2.4.1-3 below). SG80 is met. There is, however, not a 'high degree of confidence' regarding indirect effects of the fishery (there rarely is), so SG100 is not met.		
References		Adimay et al., 2014; Higgs, 2016a; Callwood, 2016; Fisheries Regulations Manatee information: https://rollingharbour.com/2015/10/05/manatees-in-the-bahamas-a-short-history-1904-2015/		
Turtles			**UoA 1 Condos 90**	**UoA 2 Traps 80**
Bottlenose dolphins			**UoA 1 Condos 90**	**UoA 2 Traps 80**
Manatees			**UoA 1 Condos 90**	**UoA 2 Traps 80**
OVERALL PERFORMANCE INDICATOR SCORE:			**UoA 1 Condos 90**	**UoA 2 Traps 80**
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:** • **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?	N/A	N/A	N/A
	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]. As noted in 2.3.1a, there are no such limits, so this is scored 'not relevant'.		
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?	Condos and Traps **Y** – Turtles, bottlenose dolphins, manatees	Condos and Traps **Y** – Turtles, bottlenose dolphins, manatees	Condos and Traps **N** – Turtles, bottlenose dolphins, manatees

	Justification	MSC's definition of a strategy is given below: *A "**strategy**" represents a cohesive and strategic arrangement which may comprise one or more measures, an understanding of how it/they work to achieve an outcome and which should be designed to manage impact on that component specifically. A strategy needs to be appropriate to the scale, intensity and cultural context of the fishery and should contain mechanisms for the modification of fishing practices in the light of the identification of unacceptable impacts*. There are measures in place for all the ETP species (listed above); it is forbidden to kill or molest or harass them, to take or disturb eggs or nests etc. (see Fisheries Regulations paragraphs. 29-41). Given that interaction rates are low to negligible, and there are no real mechanisms by which injury could occur (see 2.3.1), this is sufficient as a strategy'; SG80 is met.		
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?	Condos and Traps **Y** – Turtles, bottlenose dolphins, manatees	Condos and Traps – Turtles, bottlenose dolphins, manatees	Condos and Traps **N** – Turtles, bottlenose dolphins, manatees
	Justification	The analysis regarding interactions with ETP species is based to some extent on plausible argument (e.g. comparison with Florida), but also on information directly about the fishery (i.e. the fishing gear and operation) as well as on the species and populations involved (see details given in Section 3.4.7). Although direct information on the interactions between the gear and the ETP species is limited, there is information about the fishery and the species involved, which is sufficient to give confidence that the fishery is not having a negative impact on these species. On this basis, SG80 is 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 objective as set out in scoring issue (a) or (b).
	Met?		Condos and Traps **Y** – Turtles, bottlenose	Condos and Traps **N** – Turtles, bottlenose

			dolphins, manatees	dolphins, manatees
	Justification	The Bahamas Defense Force inspects vessels at sea (Bahamian and IUU), including relation to the regulations on ETP species. They do not report that breach of these regulations is a significant problem (Commander Bethel, Captain Sturrup, Captain Neeley, Bahamas Defense Force, pers. comm.). SG80 is met. Since there is not a strategy, SG100 cannot be met.		
e	Review of alternative measures to minimise 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 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 from either traps or condos at present, this is scored as not applicable – see FCR paragraph SA3.5.3.		
References		Fisheries Resources (Jurisdiction and Conservation) Regulations		

Turtles	**UoA 1 Condos 80**	**UoA 2 Traps 80**
Bottlenose dolphins	**UoA 1 Condos 80**	**UoA 2 Traps 80**
Manatees	**UoA 1 Condos 80**	**UoA 2 Traps 80**
OVERALL PERFORMANCE INDICATOR SCORE:	**UoA 1 Condos 80**	**UoA 2 Traps 80**
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:** • **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.**		
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?	Condos & Traps **Y** – Turtles, bottlenose dolphins, manatees	Condos & Traps **Y** – Turtles, bottlenose dolphins, manatees	Condos & Traps **N** – Turtles, bottlenose dolphins, manatees
	Justification	Qualitative information and some quantitative information is available which attempts to estimate the impacts of the fishery on various ETP species (e.g. Higgs, 2016a); taking this information and by plausible argument it is very likely that impacts are low (e.g. comparison with Florida, noting significant differences in the gear configuration – described above). On this basis, SG80 is met. There is insufficient quantitative data for SG100 to be 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, minimise mortality and injury of ETP species, and evaluate with a **high degree of certainty** whether a strategy is achieving its objectives.
	Met?	Condos & Traps **Y** – Turtles, bottlenose dolphins, manatees	Condos & Traps **Y** – Turtles, bottlenose dolphins, manatees	Condos & Traps **N** – Turtles, bottlenose dolphins, manatees
	Justification	General measures are in place in the fisheries regulations; these are not required to be supported by much information (see 2.3.2 above) and are sufficient to constitute a strategy in this context. SG80 is met. There is not a comprehensive strategy for managing fishery impacts on ETP species; it does not appear that such a strategy is required but this is not certain. SG100 not met.		
References		Higgs, 2016a; Fisheries Regulations See also references under 2.3.1		

Turtles	**UoA 1 Condos 80**	**UoA 2 Traps 80**
Bottlenose dolphins	**UoA 1 Condos 80**	**UoA 2 Traps 80**
Manatees	**UoA 1 Condos 80**	**UoA 2 Traps 80**
OVERALL PERFORMANCE INDICATOR SCORE:	**UoA 1 Condos 80**	**UoA 2 Traps 80**
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(s) covered by the governance body(s) responsible for fisheries management.		
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	Y
	Justification	Commonly encountered habitats have been defined as: sand (both gear types). Other commonly encountered habitats (seagrass and hard-bottom) are evaluated under VMEs for reasons given in main report (Section 3.4.10; Higgs, 2016b). Sand habitats are, generally speaking, not particularly vulnerable to disturbance from fishing gear. Condos and traps have a small spatial footprint and although condos certainly do change the habitat underneath the condo over the time period they are in situ (~5 years), it is likely that when they are removed the habitat will return to the un-impacted state relatively fast (e.g. regrow epibenthic algae). Likewise, impacts from traps (e.g. dragging) are likely to be minor / short-lived. Marine debris (e.g. from broken condos) will also probably have a limited impact and be quickly buried. The assessment team have also tried to complete MSC's semi-quantitative analysis of likely impacts on commonly-encountered habitats (Table GSA7):		

UoA / habitat characteristics		Sand
A	% Completely protected in closed areas	0%
B	Area of habitat subject to fishing	100%
C	Level of gear impact	<1%

		D	Current status of habitats in fished area (% of un-impacted level)	99%	
		E	Current overall status of habitat (A + (B x D))	99%	
		F	Habitat recovery rate	Fast	
		G	Expected future status in fished areas in 20 years if fishing ceases	100%	
		H	Expected future overall status of habitat in 20 years, compared to un-impacted level (A + (B x G))	100%	
		1	Likelihood that the UoA is causing serious or irreversible harm (H<80%)	very low	
		J	MSC score	100	
b	VME habitat status				
	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?	Y – Seagrass, hard-bottom, reefs	Y – Seagrass, hard-bottom, reefs	Y - Seagrass N – Hard-bottom, reefs	
	Justification	VMEs have been defined as: seagrass, hard-bottom, reefs; see Section 3.4.10. Definition: In the case of VMEs the team shall interpret “serious or irreversible harm” as reductions in habitat structure and function below 80% of the un-impacted level. Seagrass: The main issue for seagrass is likely to be shading from condos; however, the total impact is estimated to cover <<1% of the total seagrass area (see estimates given in Section 3.4.11). Seagrass can also regrow relatively quickly from rhizomes so the team considered that ‘serious or irreversible harm’ is not at all likely; SG80 is met. For traps, impacts are short-lived so shading not an issue; seagrass is not particularly fragile so it is not likely to be impacted by traps except where there has been dragging or scraping. Based on the relative levels of effort, however, the team considered that the impact of traps on seagrass would be considerably lower than that of condos; there are ~50,000 traps in use in the fishery compared to ~1 million condos. There is also a seagrass-associated flora / fauna			

		(algae, hydroids, queen conch etc.) which the team considered was also likely to be robust to the main impacts of the fishery (from condos), given the spatial footprint. (Note: patch reefs in seagrass are considered under 'reefs' below.) In relation to SG100, there has been research on the impact of shading as well as grazing on seagrass (e.g. Peterson et al., 2002; Czerny, 1995; see also references cited in Higgs (2016b)). Callwood (2016) also provides evidence as to the number of condos and their location which allows an estimate of the total spatial footprint (see Section 3.4.10). On this basis, the team considered that SG100 is met for seagrass.Hard-bottom: Hard-bottom substrata (limestone / consolidated sand) can support species such as gorgonians and sponges which are vulnerable to fisheries impacts (e.g. see habitat 'gorgonian plain'; see 3.4.10). Damage from setting traps or positioning condos is possible to individual organisms, but Higgs (2016b) notes that the density of sessile invertebrates in this habitat type is actually quite low; with algae more likely to be the dominant macrobenthos than gorgonians or sponges (Higgs, 2016b). On this basis, and noting the small footprint of the fishery (see above), the team concluded that the fishery is highly unlikely to cause serious or irreversible harm (damage to >20% of this habitat type); SG80 is met. SG100 requires 'evidence', which is tricky as the impact of an individual trap or condo depends on the details of the species present, and their density. It was also noted that these habitats commonly include significant amounts of coral rubble, which can increase the probability of condos or traps being mobilised during storms – this would increase their footprint. For these reasons, the team concluded that SG100 is not met Reefs: Condos are not set on reefs, but may impact reefs via debris. The Bahamas reportedly has about 1 million condos in the fishery; they last ~5 years according to fishermen – this would make 200,000 condos / year reaching the end of their lifespan. Many are removed and/or repaired, but some certainly end up as debris, which tends to accumulate on reefs (T. Matthews, pers. obs.). Traps are also reportedly not deliberately deployed on reefs (Lewis et al., 2009; Dahlgren, pers. comm.), so any impact would be accidental or from lost traps. In Florida, lost traps are reportedly a big issue, but different gear configuration (shot lines between traps; lack of surface buoy-lines) make trap loss in The Bahamas much less likely. There are also ~10X more traps in Florida than in The Bahamas for a similar or larger area of reef in The Bahamas. While some damage is certainly possible on reefs close to the main fishing areas (e.g. Ragged Island / Jumentos Cays), the team considered that taking condos and traps together it is not likely to approach anything close to 20% of the cover of sensitive organisms, even in these areas. On this basis, SG80 is met. For SG100, the problem is that data are lacking on the impact of condo debris particularly – not met.	
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 – Seagrass, hard-bottom, reefs	
	Justification	Possible minor habitats are mangroves and shore lines. Although debris may periodically wash up in these habitats after storms, the team considered that serious or irreversible harm is extremely unlikely from this source. The quantity of fishery-related debris relative to the area of these habitats in The Bahamas could be quantitatively evaluated to provide direct evidence. Met.			
References		Higgs, 2016b and references therein; Peterson et al., 2002; Czerny, 1995; Callwood, 2016; Lewis et al., 2009			
Seagrass				**UoA 1 100**	**UoA 2 100**
Hard-bottom				**UoA 1 90**	**UoA 2 90**
Reefs				**UoA 1 90**	**UoA 2 90**
OVERALL PERFORMANCE INDICATOR SCORE:				**UoA 1 95**	**UoA 2 95**
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	N
	Justification	MSC definition of a 'partial strategy': A "**partial strategy**" represents a cohesive arrangement that may comprise one or more measures, an understanding of how it/they work to achieve an outcome and an awareness of the need to change the measures should they cease to be effective. It may not have been designed to manage the impact on that component specifically. The fishing techniques can be considered as part of a (partial) strategy for habitat protection – e.g. using condos and traps which have lower habitat impacts than nets or towed gear; the small footprint of the fishery relative to the amount of habitat (see Section 3.4.10 and 2.4.1). But there is also a more active management strategy for habitats in The Bahamas; a declared intention to protect 20% of marine habitats by 2020. Currently 10% of bank habitat is part of a MPA, although as yet most have no management in place. Work to develop management measures is on-going; e.g. rapid assessment surveys which will inform ecological risk assessments for each area (Craig Dahlgren, pers. comm.). Some no-take areas are, however, already in place, such as the Exuma Cays Land and Sea Park and the Andros West Side MPA (which according to Higgs (2016b) is likely to be an important lobster nursery area). Given that habitat impacts are relatively benign and the footprint of the fishery very small (see 2.4.1), the team concluded that this constitutes a sufficient partial strategy. A 'strategy' (SG100), on the other hand, requires are more explicit link with the fishery, and a clear process for on-going evaluation of habitat impacts from the fishery; this 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 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 analysis in 2.4.1 demonstrates that habitat impacts are very unlikely; i.e. the partial strategy is working. Information is available on the habitats involved (see Section 3.4.10 and references therein). The impacts of the fishing techniques can be inferred with reasonable confidence (see e.g. Higgs, 2016b; Dahlgren 2012). SG80 is met. SG100 requires 'testing' and 'high confidence'. There has been quite a lot of testing of different possible habitat impacts in the Florida fishery (see analysis in Section 3.4.11 and 3.4.12), but trap configuration is different in Florida and condos are not used at all. There are significant unknowns remaining, such as the amount of debris derived from condos. SG100 is not met.		
c	Management strategy implementation			
	Guidepost		There is **some quantitative evidence** that the measures/partial strategy is being implemented successfully.	There is **clear quantitative evidence** that the partial strategy/strategy is being implemented successfully and is achieving its objective, as outlined in scoring issue (a).
	Met?		Y	N
	Justification	Part of the partial strategy is the fishing technique which is low impact; other more damaging methods of catching lobster (e.g. using tangle nets or chemicals) are not allowed. Condos are not restricted but available quantitative evidence suggests that they nevertheless have a small footprint on habitats (Callwood, 2016; see 2.4.1 and Section 3.4.11). The design of traps is constrained by the regulations to minimise persistence in the environment in the event of trap loss, and the configuration of traps in any case minimises the probability of trap loss (i.e. deployment in lines). Two no-take zones are also in place and progress being made towards other MPAs (see above). In relation to 'quantitative evidence'; it is possible to quantify roughly the number of traps and condos in use (e.g. see Callwood, 2016; Section 3.4.12) and to estimate their footprint (see Section 3.4.10); this shows that the probability of a significant habitat impact from this fishery is small (see 2.4.1). On this basis, the team concluded that SG80 is met. SG100 requires 'clear quantitative evidence'; this is not met because, for example, the number of condos and traps is only roughly		

		quantified and nothing is known about the quantity and fate of debris from condos; 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	There are no management requirements to protect VMEs specifically, either from this fishery or other MSC UoA (none applicable) or non-MSC fisheries. Not relevant.			
References		Callwood, 2016; Higgs, 2016b; Dahlgren, 2012			
OVERALL PERFORMANCE INDICATOR SCORE:				**UoA 1 80**	**UoA 2 80**
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	The types and distribution of the main habitats are **broadly understood**. OR If CSA is used to score PI 2.4.1 for the UoA: Qualitative information is adequate to estimate the types and distribution of the main habitats.	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. OR If CSA is used to score PI 2.4.1 for the UoA: Some quantitative information is available and is adequate to estimate the types and distribution of the main habitats.	The distribution of all habitats is known over their range, with particular attention to the occurrence of vulnerable habitats.
	Met?	Y	Y	Y
	Justification	An analysis of habitat types and locations is provided in Section 3.4.10 (Table 13). Habitat types, distribution and vulnerability to the fishery are known or can be inferred with reasonable confidence (see PI 2.4.1). SG80 is met. In relation to SG100, habitats are well-mapped, and reef and fish surveys have taken place and are underway all over The Bahamas (e.g. to find appropriate MPA sites; Craig Dahlgren, pers. comm.). Although the emphasis is on reefs, seagrass and other habitats are also mapped (see Higgs 2016b); because The Bahamas has very oligotrophic, clear water, this can largely be done using remote sensing. On this basis, the team concluded that SG100 is also met. It is important to bear in mind that this fishery takes place in a very atypical fisheries environment of very shallow, very clear water, making habitat mapping an order of magnitude easier than in most fisheries.		
b	Information adequacy for assessment of impacts			
	Guidepost	Information is adequate to broadly	Information is adequate to allow for identification of the	The physical impacts of the gear

		understand the nature of the main impacts of gear use on the main habitats, including spatial overlap of habitat with fishing gear. OR **If CSA is used to score PI 2.4.1 for the UoA:** Qualitative information is adequate to estimate the consequence and spatial attributes of the main habitats.	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. OR **If CSA is used to score PI 2.4.1 for the UoA:** Some quantitative information is available and is adequate to estimate the consequence and spatial attributes of the main habitats.	on all habitats have been quantified fully.
	Met?	Y	N	N
	Justification	As set out in 2.4.1 and Section 3.4.10, it is possible to evaluate the spatial overlap of the gear with different habitats and hence to evaluate the impact. On this basis, SG60 is met. In relation to SG80 the first part is met as set out in 2.4.1 (see also Higgs, 2016b), but it is clear we do not have '*reliable information on the spatial extent of interaction and on the timing and location of use of the fishing gear*', either for traps or condos (taking condos for this purpose to constitute fishing gear, although technically they are not). On this basis, SG80 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?		N	N
	Justification	Although the risk to habitats from this fishery at present is small (see 2.4.1), the information being collected at present is not adequate to detect changes in this risk. Specifically there is no evidence that the number of condos will not continue to increase, and there is also no information about how many are removed when broken vs. allowed to break up in the environment, creating debris. Although the risk to habitats is not likely to increase significantly in the near future, we do not have the information to make any on-going quantitative evaluation of changes in risk from condos. Not met for condos. For traps, the number of traps is much smaller than condos, and is stable or decreasing, on this basis there is not likely to be any increase in risk from traps; however, information is also not gathered on the number of traps. Not met for traps.		
References	Callwood, 2016; see references in 3.4.9			

	ReefCheck – see http://www.reefcheck.org/reef-news/bahamas-expands-reef-check-in-national-monitoring-program		
OVERALL PERFORMANCE INDICATOR SCORE:		**UoA 1 65**	**UoA 2 65**
CONDITION NUMBER:		**2**	

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	N
	Justification	Definition: Serious or irreversible harm to the ecosystem … additionally includes trophic cascade, depletion of top predators and key prey species in 'wasp-waisted' food webs, severely truncated size composition of the ecological community to the extent that recovery would be very slow due to the increased predation of intermediate-sized predators, permanent changes in the species diversity of the ecological community caused by direct or indirect effects of fishing, and change in genetic diversity of species caused by selective fishing and resulting in genetically determined change in demographic parameters. See Section 3.4.13 Potential ecosystem issues from this fishery have been identified as: i) removal of lobster biomass from the ecosystem; ii) impacts on bycatch species, ETP species and habitats; and iii) ecological impacts of condos as alternative shelters or 'ecological traps' and iv) debris from abandoned condos. In relation to lobster biomass: the stock assessment estimates spawner biomass at 25-40% of B_0 (depending on the model – see PI 1.1.1). Since lobster predators in this system (triggerfish, nurse sharks, eagle rays, octopus) are generalists, this level of biomass reduction is not likely to result in a trophic cascade. According to Callwood (2017), fishermen believe that lobsters 'clean' the reef, and they attribute some of the changes on Bahamian reefs in the last few decades to the removal of lobsters from the reef to condos. Spiny lobsters are indeed generalist predators / detritivores, but there are multiple drivers of degradation of reefs in The Bahamas (as elsewhere in the Caribbean), including coral bleaching and disease, the *Diadema* sea urchin die-off, fishing pressure and eutrophication in some areas as a result of tourism development. There are some examples of trophic cascades involving rock lobsters; e.g. lobsters/ urchins/ kelp in southern California and New Zealand (Boudreau and Worm, 2012); but the mechanisms do not apply in (sub)tropical ecosystems.		

		Higgs (2016b) notes the possibility that a reduction in the number of larger size classes (an effect of fishing) might have an impact on deeper reef habitats which are not directly fished, since lobsters migrate to these areas ontogenetically and also seasonally (for spawning); there is no evidence for or against this effect, but if present it would be mitigated by the fact that the stock status is reasonably good; it is also difficult to think of a mechanism to drive such impacts, given that lobsters and lobster predators are generalists, and (unlike clawed lobsters) spiny lobsters are not aggressive or agonistic except when threatened. Impacts on bycatch, ETP species and habitats from the fishery are not considered to be significant (see 2.2.1, 2.3.1 and 2.4.1 above). The literature on the ecological role of condos is reviewed in Section 3.4.14. Impacts on juveniles through increased predation are possible at certain sites, if condos are scaled to attracted smaller lobsters (Eggleston et al., 1992; Gutzler et al., 2015). The condos in this fishery are, however, scaled to attract lobsters (since undersize lobster are not saleable – see Section 3.4.14), so this would not apply here. As noted above, fishermen believe that lobsters are attracted away from reefs to condos, with deleterious impacts on the reefs; however, there is no good evidence for this in practice – particularly given that spiny lobster are very mobile, moving significant distances while foraging during the night as well as for spawning (Bertelsen, 2013). Condos in The Bahamas are generally made of wood and tin sheet – wood degrades quickly but metal sheeting less so. ~200,000 condos per year come to the end of their life; some are removed but some may not be. Some (reversible) damage to sensitive habitats such as reefs is possible from condo debris, given that the quantity of debris generated from condos is unknown. Overall, the team could find no information or mechanism suggesting serious or irreversible harm to the ecosystem from this fishery. SG80 is met. SG100 overall is not met; while there is evidence in some areas as set out above, the ecological and debris-related impact of such a large number of condos remains to be quantified. It is clear that MPAs can play a major role in protecting marine ecosystems, as well as enhancing fisheries and reducing impacts on habitats. The team commends The Bahamas for the 20% by 2020 initiative, and recommends that progress on designating MPAs and putting management in place be continued with this goal firmly in mind.
References		Boudreau and Worm, 2012; Higgs, 2016b; Callwood, 2016; Eggleston et al., 1992; Gutzler et al., 2015; Bertelsen, 2013 http://www.globalcoral.org/bahamian-coral-reef-dying-because-of-golf-course/ http://www.agrra.org/wp-content/uploads/2016/05/Bahamas-2016-Coral-Reef-Report-Card.pdf
OVERALL PERFORMANCE INDICATOR SCORE:		**80**
CONDITION NUMBER:		**N/A**

Evaluation Table for PI 2.5.2 – Ecosystem management strategy

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	There are a range of measures in place which taken together control the ecosystem impacts of the fishery, including the harvest strategy, the overall footprint of the fishery in relation to the ecosystem, the requirement to use only static gear, regulations to minimise impacts on protected species, the designation of two large no-take zones and the overall action plan to extend the number and management of protected areas (see Section 3.4.3). This qualifies as a 'partial strategy' which is restraining the ecosystem impacts of the fishery to a low level (see 2.5.1). SG80 is met. Since there is no formal 'plan' in relation to the management of the ecosystem, 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	The analysis in Section 3.4.13 and 2.5.1 provides a basis for confidence that the partial strategy will work, based on a review of literature, lobster ecology, the stock assessment, the nature of the fishery and ecosystem etc. For most of the possible ecosystem impacts, SG80 is met. The team noted that (despite the analysis in Callwood, 2016) there is no systematic attempt to quantify the number of condos in the		

		system, nor the year-on-year increase in condos, nor the rate of recycling vs. break-up into the ecosystem, nor the fate and break-down rate of this debris in the environment. The team did not think that this was resulting in unacceptable impacts (see 2.5.1), because the footprint of the condos is small in terms of their presence on the seabed as well as the potential quantity of debris generated in relation to the total area of vulnerable habitat. This provides an objective basis for confidence that this issue will not cause significant ecosystem impacts, hence SG80 is met. The question of information on condos / condo loss is considered further under 2.5.3 below.		
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 set out in scoring issue (a).
	Met?		Y	Y
	Justification	The partial strategy is being implemented – see details under scoring issue a. SG80 is met. The analysis in 2.5.1 provides a range of evidence on (the lack of) ecosystem impacts, some direct and some indirect, and shows that the fishery is achieving its objective (i.e. achieving 2.5.1 SG80). SG100 is therefore met.		
References		Master plan for The Bahamas National Protected Area System (2014); Fisheries Regulations; Callwood, 2016 See references under 2.5.1		
OVERALL PERFORMANCE INDICATOR SCORE:				**85**
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	The structure and function of the main ecosystems (reefs, seagrass, flats) is quite well-studied, both in The Bahamas and in relation to similar ecosystems elsewhere (particularly the Florida Keys) and the ecology of lobster and its role in the ecosystem is well known. SG80 is met.		
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	Main impacts of the fishery on ecosystem can be inferred (see Section 3.4.14 and 2.5.1). Some have been investigated in detail; e.g. condos as 'ecological traps' (Eggleston et al, 1992; Gutzler et al., 2015), impact of gear on habitats (Dahlgren, 2012; Higgs 2016b); but some has not, e.g. fate of debris from condos, bycatch of traps (see 2.2.1-3 above). SG80 is met but SG 100 is not met.		
c	Understanding of component functions			
	Guidepost		The main functions of the components (i.e., P1 target species, primary, secondary and	The impacts of the UoA on P1 target species, primary, secondary and ETP species and

			ETP species and Habitats) in the ecosystem are **known**.	Habitats are identified and the main functions of these components in the ecosystem are **understood**.
	Met?		Y	N
	Justification	Components: lobster, ETP species (turtles, dolphins), habitats (seagrass, sand, hard-bottom and reef) habitats; no main primary or secondary species The function of all these components in the ecosystem is known; i.e. for the animals (lobster, turtles, dolphin) their prey, predators, habitat use is known (see Section 3.4.2 and Section 3.4.9). For habitats, the main component species and the type of ecosystem they support are known (see Section 3.4.10, Table 13). SG80 is met. In relation to SG100, the impact of the UoA on the target species is understood (see Principle 1; Medley, 2017), and the impact of the UoA on primary and secondary species and ETP species can be inferred with reasonable confidence (see PIs 2.1.1, 2.2.1, 2.3.1). The impact of the UoA on habitats is likewise fairly clear (see PI 2.4.1). However, there is a lack of knowledge in certain areas; e.g. the number of condos, their behaviour during storms, the fate of debris, which precludes SG100 being fully met.		
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	Despite the lack of information in some areas (see above) the consequences of the fishery in terms of their impact on the components of the ecosystem (i.e. primary species, habitats etc.) can be inferred – see Section 3.4.13 and PI2.5.1. SG100 requires that this is the case for individual elements (i.e. individual bycatch species, individual species in the habitat 'reef' etc.). Since in this case this is a very long list of species, SG100 is not met.		
e	Monitoring			

	Guidepost		Adequate data continue to be collected to detect any increase in risk level.	Information is adequate to support the development of strategies to manage ecosystem impacts.
	Met?		N	N
	Justification	In general terms, this is mainly met (see above). The team noted, however, that (despite the analysis in Callwood, 2016) there is no systematic attempt to quantify the number of condos in the system, nor the year-on-year increase in condos, nor the rate of recycling vs. break-up into the ecosystem, nor the fate and break-down rate of this debris in the environment. The team did not think that this was likely to result in unacceptable impacts (see 2.5.1), but an on-going uncontrolled expansion in the use of condos will result in incremental increase in ecological risk, and this is not quantified in this fishery at all. On this basis, SG80 is not met.		
References		Boudreau and Worm, 2012; Higgs, 2016b; Callwood, 2016; Eggleston et al., 1992; Gutzler et al., 2015; Bertelsen, 2013; Higgs, 2016a,b; Dahlgren, 2012; TNC, 2015a,b; Chiappone et al., 2000; Ward-Paige, 2010; Medley, 2017		
OVERALL PERFORMANCE INDICATOR SCORE:				**75**
CONDITION NUMBER:				**3**

Principle 3 scoring rationale

Evaluation Table for PI 3.1.1 – Legal and/or customary framework

PI 3.1.1		**The management system exists within an appropriate legal and/or customary framework which ensures that it:** • **Is capable of delivering sustainability in the UoA(s); 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	Compatibility of laws or standards with effective management			
	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	N
	Justification	The fisheries sector development in The Bahamas has historically been hampered by the lack of a proper legal, policy and planning framework; a matter which has been addressed by the Fisheries Act (recently re-drafted and updated) and the draft National Policy and the Strategic Plan for Fisheries and Aquaculture Development and Management in The Bahamas 2017-2022 (Moultrie et al. 2016). There is now an effective national legal system (Fisheries Act, currently in revision) and a framework for cooperation – thus SG60 is met. The Ministry of Agriculture, Marine Resources (MAMR) is the national authority responsible for fisheries. The Department of Marine Resources (DMR) is responsible for developing the fisheries sector, through sustainable use and integrated management of the fishery resources, coastal zone, and marine environment for the well-being of Bahamians. The national legal system includes organised and effective co-operation with other parties at the national level. At the national level, a legal framework was implemented to provide a mechanism for fishermen and environmental organisations to participate in management of the fishery (previously the Fisheries Management Council, now the BSLWG for this fishery). At the regional level The Bahamas participates with international fisheries bodies, as part of delivering management outcomes consistent with MSC principles, meeting SG80 requirements. The Bahamas is an active member of the Western Central Atlantic Fishery Commission		

		(WECAFC), which provides a regional forum and technical advisory body regarding the management of shared fisheries stocks the Wider Caribbean Region. WECAFC provisions closely follow the Code of Conduct for Responsible Fisheries and its related instruments. Moreover, WECAFC facilitates fisheries scientific and management collaboration between The Bahamas and neighbouring countries, through its active participation in the Caribbean Regional Fisheries Mechanism (CRFM). The Bahamas has access to a mechanism for joint fisheries research projects and is able to exchange best practices across the region. Both WECAFC and CRFM enhance regional harmonisation of fisheries management, collaboration and cooperation in fisheries research, and promotion of best practices, but also enhance trade and fisheries development and thus strengthen regional integration (Moultrie et al. 2016). The Bahamas is a party to the 1982 United Nations Convention on the Law of the Sea since July 1983 and to the 1995 UN Fish Stocks Agreement since January 1997. The Bahamas also is party to a range of conventions and international instruments, such as the Convention on Biological Diversity, Convention on Climate Change, the Climate Change-Kyoto Protocol, Desertification, Endangered Species, Hazardous Wastes, Ozone Layer Protection, Ship Pollution, Wetlands. Whereas The Bahamas has neither accessed nor ratified the 1993 FAO Compliance Agreement, it actively supported a resolution to strengthen the implementation of international fisheries instruments in the region. Recently, on 21 September 2016, The Bahamas acceded to the 2009 FAO Agreement on Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing (PSMA) (Moultrie et al. 2016); one of the reasons why the Fisheries Act is currently in revision. Because Bahamas has not ratified all of these agreements – which together deliver MSC outcomes, SG100 is not fully met.		
b	Resolution of disputes			
	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 UoA.	The management system incorporates or is 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	N
	Justification	The current management system has a mechanism (albeit not subject to law) for the resolution of legal disputes and is expected to be able to demonstrate through case studies that the system is considered to be effective. The regulatory system moved violations from criminal to civil court to standardise the fine structure and create a more transparent and consistent resolution of disputes defined in Regulation 68. There remains inconsistent enforcement (LG pers. Comm.) and officer discretion is consistently applied in as much as 80%		

		of legal disputes, although not the most serious such as IUU fishing (L. Gittens, DMR, pers. comm.). Magistrates also have fine level discretion, 2nd and 3rd offences double and triple fines respectively. The management system includes a mechanism to review rules. The BSLWG was consulted in the development of HCR and it was implemented without dispute. This included consultation at every stage, including meetings in islands which take place annually before the start of the season, as well as on a case-by-case basis for specific issues. SG 80 is met. However, the BSLWG does not have a mechanism or binding legal procedures for resolution of disputes. SG100 is not met.		
c	Respect for rights			
	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	The national legal system formally recognises traditional fishing rights and provides for the declaration of protected marine areas and regulation of the fishing industry. The Fisheries Act ensures that traditional fishing rights are protected. The fishery is culturally important and provides both fishing opportunity as primary employment and supplemental livelihood for artisanal fishermen. Access to licences in the fishery is open to all Bahamians and does not limit the number of participants. Certification for compressed air diving is required. These access rights are acknowledged in both National rules, the Fisheries Act and international agreements, St Georges Declaration. Hence the management system has a mechanism to observe legal rights, and SG80 is met. The protection of the rights of Bahamians to have access to traditional fisheries is a recognized priority of fishery management. However, the lack of formal procedures to ensure that access, may allow non-traditional fishermen currently involved in IUU fishing, that is fishermen from other countries, to access the fishery through marriages of convenience (pers. comm. BSLWG). The potential lack of protection of exclusive access by traditional Bahamian fisheries may effectively erode access rights. SG100 is not met.		
References		Fisheries Resources (Jurisdiction and Conservation) Act, 2006 Fisheries Resources (Jurisdiction and Conservation Act; draft 2017 Moultrie et al., 2016 FAO. 1995. Code of Conduct for Responsible Fisheries		

	St Georges Declaration. 2007 UNCLOS. 1982 UN. 1995. Fish Stock Agreement FAO. 2009. Port State Measures Agreement
OVERALL PERFORMANCE INDICATOR SCORE:	**80**
CONDITION NUMBER:	**N/A**

Evaluation Table for PI 3.1.2 – Consultation, roles and responsibilities

PI 3.1.2		**The management system has effective consultation processes that are open to interested and affected parties.** **The roles and responsibilities of organisations and individuals who are involved in the management process are clear and understood by all relevant parties**		
Scoring Issue		SG 60	SG 80	SG 100
a	Roles and responsibilities			
	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	Two areas are useful for evaluating the roles and responsibilities for organisations and individuals in the management process: rule-making and enforcement. A multi-agency approach is used to manage the fisheries sector (e.g. DMR, Defence Force, Police Force etc.), and organisations and individuals involved in the process have been identified together with their functions, roles and responsibilities (see Table 13) SG60 is thus met. Furthermore, the management system includes a consultation process through The Bahamas Spiny Lobster Working Group (BSLWG). The BSLWG incorporates key stakeholders: fishers, NGOs (TNC), DMR, BMEA, and processors and meets at least three times a year. The BSLWG as the primary stakeholder consultation body for the fishery is an improvement on the previous Fisheries Advisory Committee (Lester GIttens, DMR, pers. comm.) The HCR was developed following stock assessment, stakeholder consultation and approval by the BSLWG and were subsequently approved by Cabinet in 2014 after further consultation with key communities (it has subsequently been updated). Thus, SG80 is met for the rulemaking process. Enforcement of fishery regulations includes explicitly defined roles for police and judges, as well as the DMR (Fishery Officers) and the Defence Force. Thus SG80 is met for enforcement, and is met overall. The performance review suggests that the roles and responsibilities for enforcement and prosecution overlap. Specifically, the prosecutor is also the police officer or in concert with, other members of DMR so the entirety of the evidence and presentation of a case can be in the control of one person or agency. While this process ensures appropriate chain of custody of evidence and access to technical expertise		

		and dependent upon their experience and knowledge. Similarly, magistrates may not understand the value of the resource to the extent of that by technical personnel (DMR, pers. comm.). Much of the responsibility for enforcement can be in the control of the police officer or other DMR personnel. The dual roles of enforcement and prosecution within one agency creates the potential for conflicts in areas of responsibility for the legal system. SG100 is not met since all areas of responsibility are not well understood for all stakeholders.		
b	Consultation processes			
	Guidepost	The management system includes consultation processes that **obtain relevant information** from the main affected parties, including local knowledge, to inform the management system.	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.	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**.
	Met?	Y	Y	N
	Justification	The key consultation for the management system is through The Bahamas Spiny Lobster Working Group (BSLWG) as described above. The BSLWG provides information on a dedicated website and publishes minutes of each meeting (or at minimum a summary of outcomes). In addition, there is a government-mandated process of consultation whenever changes to the management framework are proposed or implemented. This includes advertising and a series of 'town meetings' across the Family Islands, during which proposals are explained to stakeholders and their views are sought. This applies to both fishery-related issues (e.g. the HCR) and wider marine management issues (e.g. designation of MPAs and development of management plans). There are also regular meetings with stakeholders across The Bahamas – for example at the start of the lobster season, regardless of whether any changes are proposed. The management system accepts and uses as well as seeks information; an example is the process for designation and management of MPAs, which has involved mapping of fishing use as well as biological features. Acceptance of the HCR after the consultation process was complete, indicates that the consultative process was clear and understood by all parties. SG80 is met. There remains a lack of reporting in the "town meetings" and BSLWG process. Meeting details are captured in detailed notes. These meeting notes are retained for internal use to encourage participation of BSLWG members. Meeting minutes available to the public indicate what topics were on the agenda, but do not provide sufficient detail to evaluate the issues associated with each topic.. There is limited information available in the public meeting notes to allow non-attendants to evaluate what issues were discussed on each topic. It is noted that not all stakeholders from The Bahamas archipelago may have representation within the BSLWG. Additional effort to		

		provide access to stakeholders concerning meeting information would improve access to local knowledge and participation in the consultation process. Additional engagement by stakeholders by developing and maintaining a website could provide a portal to inform stakeholders. SG100 is not met.		
c	Participation			
	Guidepost		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	Y
	Justification	There is a consultative process in place, described above and in Section 3.5.5. There are significant hurdles to individual involvement in the consultative processes given the wide distribution of interested parties. DMR provide advertising to inform and meet stakeholders across The Bahamas through regular town hall meetings across the Family Islands as well as providing information on TV and radio to provide opportunity and encouragement for public involvement. BSLWG meeting minutes are posted online. SG100 is met.		
References		Moultrie et al., 2016 BNT. 2014. MPA plan Harvest Control Rules – see Appendix		
OVERALL PERFORMANCE INDICATOR SCORE:				**85**
CONDITION NUMBER:				**N/A**

Evaluation Table for PI 3.1.3 – Long term objectives

PI 3.1.3		**The management policy has clear long-term objectives to guide decision-making that are consistent with MSC fisheries standard, and incorporates the precautionary approach.**		
Scoring Issue		SG 60	SG 80	SG 100
a	Objectives			
	Guidepost	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	N
	Justification	Current fisheries policy has general long-term objectives outlined within the Fisheries Act, which includes achieving maximum sustainable yields while ensuring the conservation of the resources, and reserving 100% of the fishing rights within Bahamian waters for local people. The Bahamas has a five-year development plan, which includes as one of the key activities to achieve MSC certification. The management policy includes a harvest control rule with defines the main objective of the harvest strategy is to achieve levels of escapement from the fishery so that the spawning stock is not depleted. It will depend upon a measure of the recruitment each year, and export quota (or other appropriate catch limit). The long-term objectives are explicitly defined in the HCR passed in spring 2015. The DMR also has a mission and vision statement as follows: "*Our mission has been the development of the fisheries sector through sustainable use and integrated management of the fishery resources, coastal zone, and marine environment for the well-being of Bahamians*." "*Our vision has been to optimize sustainable utilization of the fishery resources, in particular, for the maximum benefit of the Bahamian people*." Thus, SG80 is met – long-term objectives are explicit. The fishery management policy requires action in the export fishery to limit harvest when necessary but the management policy does not appear to require clear long-terms objectives per se– thus SG100 not met.		
References		Fisheries Act Bahamas Lobster Fishery Harvest Strategy. 2015.		

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

Evaluation Table for PI 3.2.1 Fishery-specific objectives

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	Objectives			
	Guidepost	**Objectives**, which are broadly consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are **implicit** within the fishery-specific 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-specific 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-specific management system.
	Met?	Y	Y	P
	Justification	The management system has explicit, clear, specific objectives to achieve MSC Principles 1 and 2. The harvest strategy has 8 objectives for the lobster fishery: The Bahamas Spiny Lobster Working Group (BSLWG) has reviewed these objectives and thus far has identified a number of fishery-specific objectives which includes, but is not limited to: a. High quality local and international product; b. Maximise job availability now and in the long-term; c. Maximise commercial production currently and long-term; d. Create value added product; e. Ensure long-term sustainability; f. Minimise by-catch; g. Regulate condos; h. Improve fisheries enforcement. The Fisheries Resources and Jurisdiction and Conservation Act (2006) provides the authority of the Governor-General to set optimum yields for fishery resources to produce maximum sustainable yield. Therefore, SG80 is met for both P1 regarding sustainability of the		

		lobster fishery and for P2 regarding by-catch reduction. The HCR has an explicit target reference point expressed in terms of CPUE index, which is consistent with MSY as identified by the recent stock assessment, and which can be measured (Medley 2017). Therefore, attaining MSY is a well-defined and measurable objective. Defined methods are not in place to measure P2 objectives, however. SG100 is partially met.
References		Fisheries Resources (Jurisdiction and Conservation) Act Bahamas Lobster Fishery Harvest Strategy HCR Medley, 2017
OVERALL PERFORMANCE INDICATOR SCORE:		**90**
CONDITION NUMBER:		**N/A**

Evaluation Table for PI 3.2.2 – Decision-making processes

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.**		
Scoring Issue		SG 60	SG 80	SG 100
a	Decision-making processes			
	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	There are established decision-making processes in place. These have enabled fishery-specific management measures to be used within the fishery, such as a closed season, minimum size limits, and the HCRs. The established decision making process was demonstrated as effective when the new stock assessment suggests that the HCR was not precautionary leading to a request from the BSLWG to the DMR to review the HCR, and a subsequent revision of the HCR, which was then approved by Cabinet. SG80 is met.		
b	Responsiveness of decision-making processes			
	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 decisions.	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 implications of decisions.	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.
	Met?	Y	Y	N
	Justification	Response to the serious issues was demonstrated during the development and approval of the HCR, as well as the changes made as a		

		response to the new stock assessment from August 2017; the analysis showed that the HCR was not as precautionary as thought and a change (following the recommendation of the stock assessment scientist) was accordingly implemented on 1st February 2018. The management system has also responded to the issue of illegal fishing by significantly boosting resources for at-sea inspection (see 3.2.3). This provides evidence that decision-making processes respond to important issues; SG80 is met. Some other issues have not been taken into account in decision-making however; notably the role of artisanal/subsistence fishers as well as management of condos. Analyses suggest that these are not currently serious issues for the management of the fishery and ecosystem, but this may change in the future – SG100 is not met.		
c	Use of precautionary approach			
	Guidepost		Decision-making processes use the precautionary approach and are based on best available information.	
	Met?		Y	
	Justification	Decision-making processes are based on the best available information. In addition, due to limited resources in both capacity and skills, it has been necessary to use a simple precautionary approach. The Terms of Reference of the BSLWG have been defined in terms of the FAO precautionary approach to fisheries management. The use of a high spawning biomass ratio to determine the overfishing limit is an important precautionary principle. Use of MPAs or at least planned use of MPAs is also a viable fishery management tool utilising an albeit difficult to measure precautionary approach.		
d	Accountability and transparency of management system and decision-making process			
	Guidepost	Some information on the fishery's performance and management action is generally available on request to stakeholders.	**Information on the fishery's 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 the fishery's 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	The DMR provides substantial information on their website including sector review, management performance review, harvest strategy, information on environmental impacts of the fishery, information about the FIP, and regulations DMR outreach to stakeholders at town hall meetings at the start of each season provide information and a forum by which DMR can explain to stakeholders why decisions have been taken or not taken. This combination of online and in person information exchange is likely a more effective way to communicate with stakeholders in this fishery, since many members of fishing communities are not likely to read the department's annual report. SG80 is met. Summaries are published of BSLWG meetings are online, but the minutes of the meeting are not widely available to all stakeholders. Although the BSLWG provides a forum to discuss and disseminate information to stakeholders, there lacks full explanations for their decisions. There is very limited record of discussion at BSLWG meetings and no record of the process used to come to consensus. There remain impediments to broad access to review activities of the BSLWG. It is recommended that a summary of feedback be reported in a formal manner on the management actions taken (BSLWG meeting notes, website announcements etc.). Currently, landings data is online, the BSLWG meets annually in accordance with established law, online publication of meeting notes approaches the level of providing comprehensive information, but meeting notes are inadequate to provide transparency and provide for a record of the deliberations during the consultative process. SG100 is not met.		
e	Approach to disputes			
	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	N
	Justification	The fishery is able to comply in a timely fashion to judicial decisions arising from any legal challenges and there are no on-going court challenges to date. However, it is not clear if or how the fishery acts in a proactive manner to avoid legal disputes or rapidly implements judicial decisions arising from legal challenges. The current management system has a mechanism (albeit not subject to law) for the resolution of legal disputes, and is expected to be able to demonstrate through case studies that the system is considered to be effective. For example, the Nassau grouper management		

		underwent just such a challenge and was resolved to avoid further legal dispute. The resolution of disputes in other fisheries indicates that SG80 is met. However, a possible emerging legal dispute to current fisheries policy reserving the 100% of the fishing rights within Bahamian waters to local people is occurring through the re-licensing of fishing boats from the Dominican Republic as Bahamian. It is unclear how rule development will proceed if no clear regulatory alternative is provided by the DMR. The lack of a proactive approach to the issue of relicensing of DR fishing boats as Bahamian fishing boats may put at risk a basic tenet of policy; i.e. Bahamian sole access to fishery resources. SG100 is not met.
References		Bahamian Fisheries Resources (Jurisdiction and Conservation) Act, DMR website: http://www.bahamas.gov.bs/marineresources Information on the new HCR: see Appendix 7 Medley, 2017 BSLWG meetings summaries
OVERALL PERFORMANCE INDICATOR SCORE:		**80**
CONDITION NUMBER:		**N/A**

Evaluation Table for PI 3.2.3 – Compliance and enforcement

PI 3.2.3		**Monitoring, control and surveillance mechanisms ensure the management measures in the fishery are enforced and complied with.**		
Scoring Issue		SG 60	SG 80	SG 100
a	MCS implementation			
	Guidepost	Monitoring, control and surveillance **mechanisms** exist, and are implemented in the fishery and there is a reasonable expectation that they are effective.	A monitoring, control and surveillance **system** has been implemented in the fishery 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 and has demonstrated a consistent ability to enforce relevant management measures, strategies and/or rules.
	Met?	Y	Y	N
	Justification	In relation to the UoC: The DMR has established an MCS system that collects information about the fishery and enforces fisheries regulations (Fishery Officers in each island). The Defense Force and DMR officers inspect Bahamian vessels at sea. BMEA has a 'zero tolerance' approach to undersize lobster which is contributing to good enforcement of this regulation in the export markets. There is therefore confidence in the MCS system for the commercial / export-led fishery (the UoC). SG100 is met for the UoC. In relation to other Bahamian fishers: Since there are no catch or effort limits or reporting requirements for non-export fisheries, the key regulation for lobster in terms of enforcement is the size limit. Effort is made to enforce the size limit, by Fishery Officers, as well as via enforcement actions in outlets (hotels, restaurants) (DMR, pers. comm.). BMEA and the FIP have also worked on a public information campaign ('Size Matters') and asked outlets to sign up to pledges to avoid buying undersize lobster. On this basis, there is a reasonable expectation that the size limit is respected. However, it is not clear that the system has a consistent ability to enforce it across the whole sector. For the Bahamian fishery outside the UoC, SG80 is met but SG100 is not met. In relation to foreign IUU fishing: In relation to IUU fishing in The Bahamas EEZ, The Bahamas government signed a Basic Agreement on Technical Cooperation Between the Governments of the Commonwealth of The Bahamas, Cuba, Turks and Caicos, and the Dominican Republic (DMR, pers. comm.).		

		This was to pave the way for a more detailed agreement to address IUU fishing issues. No further agreements have yet been reached. More recently, further efforts have been made to ensure the government of the Dominican Republic adheres to their agreement to reduce and eliminate IUU fishing within Bahamian waters. Whilst inter-governmental cooperation remains on-going, the Bahamian government has invested significantly in resources for the Royal Bahamas Defence Force (RBDF) and in 2016 had a successful year in relation to fisheries enforcement (see Section 3.5.7 for details). There is therefore a system for addressing IUU fishing, and although this is extremely challenging given the size of The Bahamas, the system appears to be improving, with commercial fishermen of the view that IUU has declined dramatically in recent years. On this basis, SG80 is met, but since some level of IUU is likely on-going, SG100 is not met.		
b	Sanctions			
	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	N
	Justification	Sanctions exist to deal with non-compliance, for both Bahamians and non-Bahamians, via the criminal courts. For example, recent arrests and convictions of many fishers from the Dominican Republic fishing illegally within Bahamian waters demonstrated that sanctions are available and were consistently applied. It seems likely that the level of sanctions for illegal vessels (i.e. fines, confiscation of vessels, imprisonment of crew) is providing an effective deterrent although sanctions are currently under review. Some concerns were expressed by the DMR as to the effectiveness of deterrence for fines levied on Bahamians; e.g. for landings below the minimum size; deterrence for this issue is more focused on raising awareness, as described in SIa. In relation to the new HCR, because the export limit is lower and likely to be imposed in more years, There are likely to be more conflicts among exporters concerning each exporter's share of the allowed exports and between exporters and regulatory authorities. The latter includes potential attempts to illegally export lobsters, without DMR knowledge or approval. However, a system of inspection, certification and sanctions for non-compliance exists for this and is clearly set out in the Fisheries Regulations (paragraph 68); sanctions are a fine of $3000 or up to a year in prison. The US Lacey Act also provides an additional layer of enforcement and sanction for illegal imports into the US. Sanctions for non-Bahamian IUU are applied and clearly provide deterrence. Sanctions for illegal exports have not so far been required, but a system is in place which is likely to provide effective deterrence. For violations of small-scale fishers, deterrence has focused more on awareness raising than sanctions (although there is also enforcement and sanctions), and overall the system seems to be working,		

		albeit not with 100% compliance (which is extremely difficult to achieve in a country as large as The Bahamas). The team concluded that SG80 is met, but SG100 is not met.		
c	Compliance			
	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	N
	Justification	Demonstrable evidence of compliance is available from processors. For example, monitoring of average tail size at processors has shown a significant decline in the capture of undersized lobster to a minimal level. It is noted that a limited volume of undersized lobsters may be distributed elsewhere but the quantity is not thought to put the fishery at risk. Education and outreach have supported enforcement regarding this issue (see SIa). There are minimal discards at processing plants and vessel intercepts at docking locations leave little room for lack of compliance. There is a high degree of confidence that commercial fishermen comply with regulations, but less confidence about other Bahamian fishers. SG80 is met but SG100 is not met.		
d	Systematic non-compliance			
	Guidepost		There is no evidence of systematic non-compliance.	
	Met?		N	
	Justification	There are no large-scale outlets of illegal fishery products. However, open access to the fishery by all Bahamians and limited resources to assess their compliance with the size limit demonstrates some potential for systematic non-compliance. Under-sized lobsters are commonly seen when day boats return to port and are for sale to locals and tourists. Whilst this is outside the scope of the assessment (only legally sized and caught lobsters are sold through the BMEA), there are still illegal removals from the Bahamas lobster fishery overall. Although IUU has been much reduced since new resources were provided to the Defence Force, and is not considered to pose a threat to		

		the stock (Medley, 2017), there are still likely to be systematic incursions into the waters of the southern Bahamas by IUU vessels. There are also some more minor elements where the regulations and the practice do not align; notably in theory the use of compressors for diving is only permitted deeper than 30 feet, while in practice this is not enforced, for safety reasons. Not met.
References		Medley, 2017; Fisheries Regulations
OVERALL PERFORMANCE INDICATOR SCORE:		**75**
CONDITION NUMBER:		**4**

Evaluation Table for PI 3.2.4 – Monitoring and management performance evaluation

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	Evaluation coverage			
	Guidepost	There are mechanisms in place to evaluate **some** parts of the fishery-specific management system.	There are mechanisms in place to evaluate **key** parts of the fishery-specific management system	There are mechanisms in place to evaluate **all** parts of the fishery-specific management system.
	Met?	Y	Y	N
	Justification	There are mechanisms in place to evaluate key parts of the fishery-specific management system. The five-year sector plan reviews were conducted in 2010 and in 2016 demonstrating consistent review of the management system. There has been no evidence of impacts on other natural resources by the fishery but mechanisms exist through participation of non-fishery organisations (e.g. NGOs) in the BSLWG to report any occurrences. The stock assessment was externally reviewed. SG80 is therefore met. Since there is no mechanism to evaluate the impact of the artisanal fishery, SG100 is not met.		
b	Internal and/or external review			
	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	Y
	Justification	The DMR has responsibility for internal review of the fishery, and BSLWG is tasked to carry out oversight of the fishery. The five-year sector plan reviews were conducted in 2010 and in 2016. The FIP provided for external review of the fishery as did the stock assessments, the most recent completed in 2017 and externally reviewed, meeting the requirement for 'regular external review' for the fishery. A regular review of management performance by stakeholders is provided through annual preseason stakeholder meetings. A		

		professional fishery management staff exists and regularly assess landings data. Occasional stock assessments are conducted by external assessors and externally peer review by two reviewers. SG100 is met with the regular internal review from stakeholders and the BSLWG, and regular external review via sector reviews and from the stock assessment review, as well as the FIP.
References		Bahamas Lobster Fishery Harvest Strategy Moultrie et al., 2016 Medley, 2017 Muller and Cummings, 2017 BSLWG meeting summaries MRAG. 2015. Review of Bahamas Lobster FIP.
OVERALL PERFORMANCE INDICATOR SCORE:		**90**
CONDITION NUMBER:		**N/A**

Appendix 1.2 Conditions

The fishery is provisionally proposed to be certified with four conditions, as follows:

Table 20. Condition 1

Performance Indicator	1.2.3: Relevant information is collected to support the harvest strategy
Score	75
Rationale	1.2.3c: There is good information on all other fishery removals from the stock. There are many potential fishermen providing lobsters for subsistence / to local markets that are unreported. Furthermore, foreign IUU is a problem, as noted above and estimated increases in Dominican landings in 2011 that were suspected of originating from The Bahamas would prevent effective implementation of the new 5 million lb. HCR. SG80 is not met.
Condition	Information needs to be collected such that there is good information on all other fishery removals from the stock (unreported local and foreign IUU catch of spiny lobster in The Bahamas).
Milestones	By the Year 1 audit, a research process would have been developed that is capable of estimating removals from foreign IUU and from unreported Bahamian fishing within the fishery. Score: 75 By the Year 2 audit, the process will have been initiated, with data collection in process. Score: 75 At the Year 3 audit, the initial results will be presented to demonstrate progress. Score: 75 or higher By the Year 4 audit, the data collected will have been analysed and best estimates of removal from the fishery presented. There should be good information on these “other fishery removals on the stock” by this audit. Score: 80
Client action plan	**Year 1:** Department of Marine Resources (DMR) to evaluate all current sources of information concerning IUU fishing amounts in The Bahamas including the recent DMR arrest reports, independent research projects recently conducted and consumption surveys (to target local market landings and subsistence fishing information). DMR to then design research projects aimed at filling gaps in information related to the various components of IUU fishing. DMR and Bahamas Marine Exporters Association (BMEA) will budget for or otherwise seek funding in preparation for conducting the research. At the annual surveillance audit, DMR and BMEA to share current information collected and the research plan design with the CAB. **Year 2:** DMR and BMEA to start research aimed at filling gaps in information related to the different components of IUU fishing. Towards

	the end of year 2, DMR, BMEA and Bahamas Spiny Lobster Working Group (BSLWG) to evaluate preliminary results of research conducted with the assistance of key stakeholders, and revise project as necessary. At the annual surveillance audit, DMR and/ or BMEA to present preliminary results of research to CAB. **Year 3:** Continue research. At the annual surveillance audit, DMR and / or BMEA to present research results to date to CAB. **Year 4:** DMR and BMEA to complete the research, and complete analyses of data collected. DMR to present results to relevant enforcement agencies and other relevant stakeholders such as the BSLWG, as well as to the CAB at the annual surveillance audit.
Consultation on condition	Consultation with DMR. See Appendix 8 Support Letter from Department of Marine Resources (DMR)

Table 21. Condition 2

Performance Indicator	**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**
Score	65
Rationale	SIb: … there is reliable information on the spatial extent of interaction and on the timing and location of use of the fishing gear. SIc: Adequate information continues to be collected to detect any increase in risk to the main habitats. In relation to SG80 … it is clear we do not have '*reliable information on the spatial extent of interaction and on the timing and location of use of the fishing gear*', either for traps or condos (taking condos for this purpose to constitute fishing gear, although technically they are not). On this basis, SG80 is not met. Although the risk to habitats from this fishery at present is small (see 2.4.1), the information being collected at present is not adequate to detect changes in this risk. Specifically there is no evidence that the number of condos will not continue to increase, and there is also no information about how many are removed when broken vs. allowed to break up in the environment, creating debris. Although the risk to habitats is not likely to increase significantly in the near future, we do not have the information to make any on-going quantitative evaluation of changes in risk from condos. Not met for condos. For traps, the number of traps is much smaller than condos, and is stable or decreasing, on this basis there is not likely to be any increase in risk from traps; however, information is also not gathered on the number of traps. Not met for traps.
Condition	For condos, information needs to be collected on the quantity deployed, location of deployment and eventual fate (removed vs. lost) sufficient to i) provide reliable information on the spatial extent of interaction, the timing and location of use of the fishing gear; and ii) to detect any increase in risk to the main habitats (if any) from condo deployment.

	For traps, information needs to be collected on the number of traps in use and the main areas of deployment of traps, as well as trap loss rates, for the same purpose.
Milestones	By the Year 1 audit, a research process would have been developed that is capable of estimating spatial extent of the interaction between gears (condos and traps), timing and location of gear use within the fishery. Score: 65 By the Year 2 audit, the process will have been initiated, with data collection in process to demonstrate information gathering on extent of interactions. Score: 75 At the Year 3 audit, the initial results will be presented to demonstrate progress. Score: 75 or higher By the Year 4 audit, the data collected will have been analysed to give estimate of spatial extent, as well as numbers in use/deployed/lost. There should be adequate information to allow detection of any increase in risks to main habitats in the fishery. Score: 80
Client action plan	**Year 1:** DMR to develop a research plan for estimating condo and trap deployments while ensuring an appropriate system for data confidentiality. Research will be centred around garnering the needed information as part of the current application process for fishers. This includes applications for compressors and traps. Develop a research plan to conduct a survey with fishers through the processors and/or DMR fisheries officers to collect information about condo number and distribution. At the annual surveillance audit, DMR to share the research plan with the CAB. **Year 2:** DMR to start the research, and towards the end of the year, evaluate the initial data received and revise data acquisition strategies. At the annual surveillance audit, DMR to present preliminary results of research to CAB. **Year 3:** DMR to continue research. At the annual surveillance audit, DMR to present research results to date to CAB. **Year 4:** DMR to complete the data analyses and report numbers of each gear type in use, general locations of deployment, and rates of loss to the CAB at the annual surveillance audit.
Consultation on condition	Consultation with DMR. See Appendix 8 Support Letter from Department of Marine Resources (DMR)

Table 22. Condition 3

Performance Indicator	PI 2.5.3. There is adequate knowledge of the impacts of the UoA on the ecosystem.
Score	75
Rationale	SIe. Adequate data continue to be collected to detect any increase in risk level. … The team noted, however, that (despite the analysis in Callwood, 2016) there is no systematic attempt to quantify the number of condos in the system, nor the year-on-year increase in condos, nor the rate of recycling vs. break-up into the ecosystem, nor the fate and break-down rate of this debris in the environment. The team did not think that this was likely to result in unacceptable impacts (see 2.5.1), but an on-going uncontrolled expansion in the use of condos will result in incremental increase in ecological risk, and this is not quantified in this fishery at all. On this basis, SG80 is not met.
Condition	Information needs to be collected on the quantity deployed, location of deployment and eventual fate (removed vs. lost) of condos, sufficient to evaluate the on-going risk and detect any increase in risk level (if any) to ecosystems from condo deployment.
Milestones	By the Year 1 audit, a research process would have been developed that is capable of estimating risk to the fishery ecosystem from condo deployment, use and removal. Score: 75 By the Year 2 audit, the process will have been initiated, with data collection in process to demonstrate information gathering on condo deployment and use in the fishery Score: 75 At the Year 3 audit, the initial results will be presented to demonstrate progress. Score: 75 or higher By the Year 4 audit, the data collected will have been analysed to give estimate numbers of condos in use/deployed/lost/recycled. There should be adequate information to allow detection of any increase in ecological risks in the fishery. Score: 80
Client action plan	**Years 1 - 4:** The same as above, though traps are excluded in this Condition, so only condo-focused research will be included here.
Consultation on condition	Consultation with DMR. See Appendix 8 Support Letter from Department of Marine Resources (DMR)

Table 23. Condition 4

Performance Indicator	3.2.3 Monitoring, control and surveillance mechanisms ensure the management measures in the fishery are enforced and complied with
Score	75
Rationale	There are not large-scale outlets of illegal fishery products. However, open access to the fishery by all Bahamians and limited resources to assess their compliance with the size limit demonstrates some potential for systematic non-compliance. Under-sized lobsters are commonly seen when day boats return to port and are for sale to locals and tourists. Whilst this is outside the scope of the assessment (only legally sized and caught lobsters are sold through the BMEA), there are still illegal removals from the Bahamas lobster fishery overall. Although IUU has been much reduced since new resources were provided to the Defence Force, and is not considered to pose a threat to the stock (Medley, 2017), there are still likely to be systematic incursions into the waters of the southern Bahamas by IUU vessels. There are also some more minor elements where the regulations and the practice do not align; notably in theory the use of compressors for diving is only permitted deeper than 30 feet, while in practice this is not fully enforced, for safety reasons.
Condition	The monitoring, control and surveillance system needs to be improved such that there is no evidence of systematic non-compliance (systematic, wide-scale IUU; and other non-compliance / non-enforcement issues).
Milestones	Year 1: Engagement with other organisations (police, judiciary) on the issue of enforcement and sanctions for landing of undersized lobster. On-going at-sea enforcement efforts against IUU. Review of regulation and practices which are not currently aligned in the fishery. Score 75. Year 2: Agreement on appropriate enforcement and sanctions for non-compliance with lobster management regulations. On-going at-sea enforcement efforts against IUU. Consultation process to investigate and discuss options for alignment of regulations and practice (for example in relation to use of compressors by depth). Score 75. Year 3: Evidence that agreed sanctions are being implemented. On-going at-sea enforcement efforts against IUU. IUU risk assessment underway. On-going consultation to discuss options for alignment of regulations and practice (for example in relation to use of compressors by depth). Score 75 . Year 4: IUU risk assessment shows improvement compared to baseline data established. Agreement on changes to regulations and/or practice to avoid systematic non-compliance by the UoA (e.g. in relation to use of compressors

	by depth). Score 80.
Client action plan	**Year 1**: Continue to improve dialogue and collaboration between enforcement agencies concerning IUU detection and sanction options, including consideration of systematic non-compliance risks, and timelines to implement sanctions. This includes consideration of alignment of regulations and enforcement practices, such as issues surrounding the use of compressors outside of lawful depth limits. Continue to collaborate concerning independent and joint enforcement operations on the seas and at landing sites. Continue efforts to have the revised Fisheries Act finalised which includes measures to increase fines for various aspects of poaching including foreign poaching, fishing during closed seasons and employment of Bahamians who are non-Bahamian. Agreements made and progress with enforcement will be presented to the CAB at the annual surveillance audit. DMR to plan IUU risk assessment study in consultation with RBDF, BSLWG and BMEA.. The development of indicators of fishing activity and IUU indicators as part of IUU risk assessment will also be explored. Develop and/ or revise education and awareness programme for local fishers related to lobster catches, in particular problems related to undersized, berried lobsters and the use of air compressors. **Year 2:** Continue to improve dialogue and collaboration between enforcement agencies concerning IUU detection and sanction options already in place. Continue to collaborate concerning joint enforcement operations on the seas and at landing sites. Collation of fishing activity, enforcement and IUU indicators. Status of on-going enforcement efforts and improvements achieved will be presented to the CAB at the annual surveillance audit. **Year 3:** Conduct IUU risk assessment study. Continue to improve dialogue and collaboration between enforcement agencies concerning IUU detection and sanction options already in place. Continue to collaborate concerning joint enforcement operations on the seas and at landing sites. Collation and review of fishing activity, enforcement and IUU indicators (as part of IUU Risk assessment study). Current status of enforcement efforts will be presented to the CAB at the annual surveillance audit. **Year 4:** Evaluate results and implications of IUU risk assessment, including three years' of indicator data to show progress. Continue to improve dialogue and collaboration between enforcement agencies concerning IUU sanction options already in place. Continue to collaborate concerning joint enforcement operations on the seas and at landing sites. Results of IUU risk assessment, improvements in enforcement, and implications for reducing IUU will be presented to the CAB during the annual surveillance audit.
Consultation on condition	Consultation with DMR and the RBDF. See Appendix 8 Support Letter from Department of Marine Resources (DMR) and Appendix 9 Support Letter from the Royal Bahamas Defence Force (RBDF).

Appendix 2 Peer Review Reports

Peer Reviewer 1

Summary of Peer Reviewer Opinion

Has the assessment team arrived at an appropriate conclusion based on the evidence presented in the assessment report?	**No**	**CAB Response**
Justification: Scores are considered to be higher than can be justified on the evidence provided for one or more scoring issues in PIs 1.1.2, 1.2.1, 1.2.2, 1.2.4, 3.1.1, and 3.2.3. Detailed comments are provided below (for P3) and in the attached pages (for P1).		P1 comments have been pasted in to the table below. See response to detailed comments.

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]	**No**	**CAB Response**
Justification: The wording of conditions does not always reflect that used in the relevant scoring issues and, following 7.11.1.2, should be revised to do so. See comments on specific conditions below.		Condition 1 has been amended to exactly match the scoring issue and refers to the local unreported subsistence and foreign IUU fishing. Clarification on the client action plan was made in consultation with the client group.

If included:

Do you think the client action plan is sufficient to close the conditions raised? **[Reference FCR 7.11.2 - 7.11.3 and sub-clauses]**	**No**	**CAB Response**
Justification: For PI 1.2.3, the action plan makes no reference to obtaining information on catches of lobsters for subsistence / to local markets that are unreported. These catches are part of the reason that SG80 is not met. In addition, I believe that information on catches from other countries is also relevant to this PI and condition (see comments on PI 1.2.2c – attached).		Regarding catch from other countries, see discussion in Section 3.2.2 on (meta)population structure and appropriate management units. Re Bahamian subsistence fishing; it was intended to be included (e.g. via the consumption surveys); the wording

	has been adjusted to make this clear.

Table 24 For reports using one of the default assessment trees:

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/N/A)	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	N/A	Scoring issue a: The rationale uses two lines of evidence: the stock assessment's estimate of stock status and the biological and life history characteristics of the species. Comments on the stock assessment are provided below under 1.2.4 but for this PI its findings are accepted as indicating that the stock is highly likely to be above the PRI. It is also argued that the life history is such that the stock is above the PRI but it is not clear what biological	(a) We note that the reviewer agrees with the score in his comments. We have revised the text to split the stock status and life history evidence clearly. A truncated size frequency is very common in lobster fisheries, because largest size classes are removed first by fishing and somatic growth slows down naturally when lobsters become larger. Hence, the largest size classes remain truncated in a fishery where there are no regulations to specifically protect them – i.e. a maximum size limit, which is scarce in fisheries

				attribute could or does guarantee that this stock remains in such safe territory. There is mention that "20% SSB as a proxy for the PRI is likely to be very conservative for a highly fecund crustacean species" but this is a separate issue to current stock status. Furthermore, the last sentence of the rationale indicates that an observed truncated size frequency (data not included in the report) is a 'potential risk to PRI'. But it's not clear whether this size-fecundity relationship and the shift in size frequency have been factored into the stock assessment and therefore whether this 'potential risk' does not preclude the finding that the stock is still highly likely to be above the PRI. The sentence "Making it unlikely that this largely unreported harvest and 50% of *P. argus* females reach maturity at 81 mm carapace length (CL), as measured from egg-bearing (Ehrhardt, 1996)" contains two seemingly unrelated ideas and should be revised. Scoring issue b: Agree with the	management. Size frequency was included in the stock assessment, both from pack-categories and from size composition measurements. Note that it is an age-based assessment which implicitly incorporates observations of size, which are converted to age-classes. The discussion of whether or not 20%SSB is a good estimate of PRI is relevant here, because the team needs some definite point against which to score the SI – i.e. the basis for the scoring starts with an evaluation of how the PRI might be estimated and what are the uncertainties and biases in this estimate. Lacking a SR relationship, the team took the MSC default (which is also the formal LRP) as a proxy for the PRI, but it is relevant to note that this is a conservative estimate for this stock, based on the life history of the species, the nature of the stock (high connectivity) and the lack of any direct evidence for a SR relationship. The issue of potential risks to recruitment was discussed in the context of SG100 – i.e. why we do not

				proposed score.	consider that 'a high degree of certainty' is met, despite the nature of the species and stock described above, which make a SR relationship unlikely. The rationale, however, was a little disorganised, so this was confusing. The discussion in relation to SG100 is now grouped at the end and our thought processes should be clearer. The sentence of "two unrelated ideas" that the reviewer points out was seemingly an editing error – our apologies; it has been fixed. (b) No change
1.1.2	No	No	N/A	Scoring issue a: This issue requires that a rebuilding timeframe be specified for the stock but there is no indication in the report that a rebuilding timeframe has been specified for this fishery, or that a specific rebuilding strategy has been developed. The rationale and score seem to be based on the view that the new HCR is an implicit rebuilding strategy and that the expected	First of all, a functioning HCR should act automatically as a rebuilding strategy – the whole purpose of the HCR is to maintain the stock at the target level, which includes rebuilding it to the target level if it drops below (e.g. due to some external shock – hurricane, run of bad recruitments etc.). So the team does not accept the distinction that the reviewer makes between a rebuilding startegy and a

				duration of recovery is an implicit rebuilding timeframe. It seems overly generous to consider such implicit measures as complying with the intent of this PI for which timeframes are expected to be specified. Without further evidence of there being a specified timeframe, I find it hard to justify a pass even at SG60. Scoring issue b: The rebuilding projections (Figure 9) depend on the assumptions made about the linkage of the CPUE series, and which HCR is applied. Even under the new HCR, rebuilding to the target does not seem to be achieved within 10 years under the independent-q (pessimistic) model. So, even accepting the presence of an implicit rebuilding strategy with an implicit timeframe, the simulation modelling does not indicate that these would be likely to achieved under one of the plausible scenarios that has been modelled. A condition should be required for scoring issue b.	HCR. A stock would only need an explicit rebuilding strategy if it does not have a proper HCR (or if that HCR is not working). Otherwise the HCR is the rebuilding strategy, by definition, and it is not 'implicit', except by virtue of the title at the top of the document. The rebuilding timeframe is likewise not 'implicit' – it is explicitly estimated via stochastic projections for both HCRs and both stock assessment scenarios (see Figure 7 and Figure 9 in the background section). However, we requested some additional quantitative projections from the author of the stock assessment – these are provided in the new Table 7. The Fisheries Dept. and the industry have signed up to the HCR which gives an overall >50% probability of rebuilding within the stipulated timeframe, so SG60a is met. We have nevertheless made significant changes to the rationale for SIa, which could have been clearer. The rationale has now been revised to address only the issue of a rebuilding time-frame, as specified in the MSC

					Fisheries Standard v 2.0 (SA2.3). (b) The rationale has now been revised to provide more detail. At a 5 million pound export limit, the SSB ratio remains at 45% over 10 years for the optimistic scenario, and increases from 25% to 35% in the pessimistic scenario (Figure 9). The new projections provide quantitative estimates of rebuilding probabilities over time for the two different assessment scenarios, and show a probability >50% of rebuilding to SSB35 for both scenarios, as well as rebuilding to above SSB40 for the two scenarios combined, although not for the pessimistic scenario individual; it does, however, show that the median trajectory is for rebuilding overall. it therefore seems that application of the new HCR is a reasonable rebuilding strategy, and we consider it 'likely', based on simulation modelling, that the strategy will enable the stock to rebuild over 10 years. Even in the case of the pessimistic scenario being true, SSB is likely to increase by 10%, to just below the (very conservative) 40% target reference point. In addition, there is no uncertainty

					about which HCR will be applied, since the 'new' version has been formally applied. This was not completely clear in the rationale, which was originally drafted which this was not the case. It has been revised to make this more clear. Uncertainty in the CPUE index is accounted for in the optimistic and pessimistic model simulations. Given the PI 1.1.2 overall score of 80, no condition is required
1.2.1	No	No	NA	Scoring issue a: It is not clear to me how the HCR, which is based on catch rates, is designed to achieve the specific target biomass objectives that are given in PI 1.1.1. The HCR acts to change the allowed export tonnage, but there seems to be no explicit linkage to SSB level as estimated by the assessment. In fact there is a statement under PI 1.2.3b that "The CPUE index remains noisy and a poor indicator of stock size" which would seem to undermine any claim that a HCR based on CPUE could achieve a biomass objective. Also, CPUE (Figure 5) is at a similar	a) The rationale has been revised to focus narrowly on the harvest strategy: whether it is **expected** to achieve stock management objectives; whether **elements work together**; and whether the strategy was **designed** to be responsive and to achieve objectives. Individual elements (such as HCR linkage to stock status) are evaluated in PI 1.2.3. (The statement in 1.2.3b regarding the CPUE as an index of stock status was perhaps poorly expressed; it was intended as part of the rationale as to why SG100 is not met. This wording has been adjusted.)

				level in the 1990s, when the stock was estimated to be above target, and the early 2000s when it was estimated to have declined substantially. So, the responsiveness to stock status is unclear, as is how these elements of the Harvest Strategy (monitoring which produces the CPUE, the HCR and the stock assessment) work together. Compliance with the SG80 requirements is therefore also unclear and, unless further evidence is provided, a condition would be warranted. The rationale suggests that the external review of the stock assessment and HCR provides "a measure of MSE". This is a form of review but is not what is normally considered to be a form of MSE. The rationale also states that there is a clear linkage between the stock	The major uncertainty in the stock assessment relates to the old and new hook time series (as is clear from Figures 5, 6, 7 and 9); it is therefore not really appropriate to compare historical with more recent levels of CPUE. The stock assessment model deals with this via two different scenarios (linked vs independent q between the two series), both of which are taken into account in scoring 1.1.1 and 1.1.2, as well as in the decision on the HCR. b) The harvest strategy was formally approved in 2015, and the 2018 reduction in the export level (adjustment of HCR from 7 to 5 million lb as an integral part of the strategy) provides evidence that the harvest strategy (various components working together) is working, even if not fully tested. Projections are acceptable as evidence that it will achieve its objectives (see 1.1.2). d) No change.

				assessment evaluation of the HCR (rebuilding projections) and the adaptation of the HCR and that therefore the HCR has been designed to achieve stock management objectives. This is evidence of the HS been revised but that is not necessarily evidence that it is designed to meet the objectives. The absence of clear linkage between the HCR and stock status mentioned above, and the results of projections that indicate that stocks may not rebuild under the independent-q model, suggest that the harvest strategy is still deficient in this regard despite the revisions. A pass at SG80 does not seem to be warranted. Also, this PI is about the HS as a whole but the rationale focusses on the HCR, which is only one part of the HS. For example “On this basis, it is clear that the HCR has been designed to achieve stock management objectives. SG100 is met”.	

				This statement about SG100 being met is then contradicted by the next sentence and the subsequent text which details additional requirements and issues with the HS, so there is some ambiguity as to whether the authors do consider SG100 to be met. <u>Scoring issue b</u>: This is passed at the SG80 level which requires that there be "evidence exists that it is achieving its objectives". Given that the new HCR was only adopted in February 2018, there cannot yet be such evidence and SG80 cannot be met. The projections cited are evidence that it could achieve objectives (depending on model assumptions) but not that it is currently doing so. Evidence should accumulate over successive annual applications but for now SG60 is met but not SG80. Scoring issue d: Should not be	

				scored as other issues do not reach the SG80 level.	
1.2.2	No	No	N/A	Scoring issue a: Additional evidence is needed to support the statement that the HCR (based on CPUE) would act to reduce exploitation as the PRI is approached (which is measured by the depletion estimated by the assessment). As noted above, the HCR does not necessarily respond to a change to stock status as estimated by the assessment. The HCRs are scored as being well defined but there are confusing aspects in the current version of the report. Table 6 provides the settings of the 'initial harvest control rule' with a target CPUE of 50 tail/boat/day (setting a of TAE 7 million lb), a trigger of 40 (TAE 4 million lb) and a limit of 20 (zero TAE). This was then said to have been modified to produce the 'new HCR' "whereby the upper target CPUE level and export limit of 7 million lbs. is removed; i.e. the trigger CPUE level	(a) The rationale has been revised to explain the HCRs in more detail, and Section 3.3.5 in the report has also been improved – mainly in Table 6 to reflect the situation at 5 million lbs instead of at the 'original' 7 million lbs. We trust this will be easier to understand. In the pessimistic model, stock status improves from 25% to 35% of SSB40 over 10 years. This was scored in PI 1.1.2. We do not expect a recovering stock (based on a pessimistic model estimate) to fluctuate around MSY from the onset. It is also worth noting that the HCR sets the export cap (>90% of the catch) at a monotonically declining function from 50 million lbs at the Trigger Ref. Point to 0 at the LRP – so regardless of your opinion of the stock assessment, it is clear that overall catch is reduced very dramatically as the LRP is approached. This has been added to the rationale.

				becomes the target/upper reference point, with 5 million lbs. the maximum permitted level of exports." This would suggest that the previous CPUE trigger of 40 is the new TRP. But the report then says that the assessment author "also recommends that the trigger/new target CPUE level be increased to 60 lbs. tail/boat/day". This is above the previous TRP so it is unclear why this would have been suggested or indeed what the settings are for the new HCR. The implication is that the new HCR is based on a different CPUE series to the old one, with different TRP and LRP as well as different TAEs but this is not made clear in the report. Even if well-defined HCRs are in place, their responsiveness to stock status is not clearly demonstrated. The rationale also states that "Capping the export quantity at 5 million lbs. results in the TRP of 40% of SSB_0 being exceeded for the optimistic model, and met for the pessimistic model in projections over	(b) We now only refer to the new HCR level (5 million lbs) and explain the uncertainties related to (1) stock assessment and (2) responsiveness of the CPUE index used in the HCR rules. (c) **Available evidence** (in the form of existing long-term datasets and their use in assessment models and projections) indicate that that the tools in use are appropriate and effective. Contradictory arguments re-phrased. As noted above, the new HCR was changed after the rationales had already been drafted, and the team was not always successful in removing all references to the old situation from the rationales. This has, we appreciate, led to some confusion, and we apologise. NB: TAE is 'total allowable exports'; we do not actually use the phrase ourselves because (as the reviewer points out) it is a bit confusing, since it usually refers to effort. We have prefered the term 'export limit' or

				the next 10 years". As noted above, however, Figure 9 shows a cloud of potential outcomes that seem to mostly fall below the TRP even after 10 years, so the basis for this claim is uncertain at best. Including a table of estimates and confidence intervals, rather than just the figure, would help clarify the projection results. Scoring issue b: The rationale states that "the abundance index used in the 2017 assessment (3 separate catch rate series, i.e. spears, hooks and new hooks) was different from the index used to determine the HCRs [note plural], which used the older method of interviews with fishers, instead of obtaining catch and effort data directly from the processors. This is the main uncertainty in the stock assessment, and is taken into account in the new HCR". This is ambiguous, as to whether both old and new HCRs are being referred to as being different from the 2017 assessment. If so, how the new HCR has taken the difference into account. Not only are three	'export cap'. However, it is in the report courtesy of a direct quote from the stock assessment report. It has been added to the glossary.

				CPUE series used in the assessment but (from Figure 5) these would seem to have been input to the model as several points per year, whereas both the old and new HCRs are based on annual average values. So how the new HCR takes this difference into account is unclear. One of the main uncertainties with the assessment is how to address the inclusion of a new CPUE series with different levels and trends. If the new HCR only uses only one CPUE series (it only works on a two-year moving average) this is not a problem that it has to deal with. So the rationale seems to confuse assessment uncertainty with HCR uncertainty. Note: in Section 3.3.5 of the report TAE seems to be used as an abbreviation for Total Allowable Export but then is also listed as "(TAE in days at sea per vessel)" which implies it is an effort indicator. Clarification is needed and the abbreviation and correct expansion	

				should be added to the Glossary. Scoring issue c: The rationale contains contradictory arguments and does not support a pass at SG80. For example, there is a comment that “The available evidence for the new HCR (maximum export limit of 5 million lbs.) is that it is effective in achieving an appropriate biomass;” but later on is the statement that “These limits have not been applied in the fishery so there is no available evidence that the tool would be effective at population control. On the contrary available evidence indicates the target harvest is too high and does not trigger responsive measures.” I would side with the latter comment on the basis that it is not clear that the proposed TAE would act to constrain exploitation rates appropriately for three reasons: it has only just been introduced; it’s unclear that it is set at a level that would constrain fishing activity; and there are several other sources of mortality that are not affected by the	

				TAE. These other sources of mortality include local landings and IUU fishing, noting the comment under PI 1.2.3 that "estimated increases in Dominican landings in 2011 that were suspected of originating from The Bahamas would prevent effective implementation of the new 5 million lb. HCR". The other sources of mortality also include legal removals from the same stock in other jurisdictions. The definition of the stock boundary is not clear although I agree with the authors that The Bahamas appears to be a rational stock management unit for spiny lobster. Nevertheless, this is not the same as saying that The Bahamas on their own have sufficient control over the exploitation of this stock such that unilateral actions by them could ensure that the stock is maintained at desired levels. The larval dispersion modelling that has been done indicates that the lobster population exploited in The Bahamas has a level of dependency on recruitment from other areas, particularly the Turks and Caicos, Haiti and the Dominican Republic	

				(Figure 4 in Kough et al. 2013). More information on the fisheries in these areas is needed to assess whether they pose a risk to the sustainability of The Bahama's fishery. The need for coherent regional management seems to be a common theme in publications including those cited in the report (FAO 2001 – which is missing from the list of references; Kough et al. 2013). At the SG80 level, this scoring issue requires evidence that tools are effective, not that effective tools are available (SG60) or that modelling or plausible arguments indicate that they would be effective.	

1.2.3	No	Yes	No	Scoring issue b: The rationale should reference UoA catches not the UoC. Scoring issue c: The stock extends beyond The Bahamas so information on catches in other countries should also be included in as part of the rationale for this scoring issue (see comments on 1.2.2c – attached). I agree that a condition is needed, but, unless this information can be added to the revised report, the Action Plan should be extended to include it.	b) corrected c) See Section 3.3.2 on (meta)population structure and management units. This has been referenced in the rationale. The Action Plan has not been changed.
1.2.4	Yes	Yes	N/A	Scoring issue a: The stock assessment is appropriate for the stock but has no obvious linkage to the HCR which does not use the estimates of stock status that it provides. The lack of linkage could be said to be a HCR issue and not an assessment issue but, until this is resolved, it could not be said that the stock assessment is appropriate for the HCR and SG80 requirements do not seem to be met.	(a) The linkage between the HCR and stock status (via the assessment) is explained. This is not an uncommon way of developing a harvest strategy for small-scale fisheries; rather than acting as a direct input into the HCR on an annual basis, the HCR is based on a empirical index which is easier to calculate; while the stock assessment (based on the same data as the index and hence clearly linked) is

				Other comments: The conclusions of the assessment and other proposed scores are accepted, particularly as it has been subject to external review, but there are aspects that are not well explained in the report. The assessment relies on three separate CPUE series as indices of abundance but the report does not give sufficient information about how these have been calculated or standardised, and values for the CPUE index as used in the HCR (annual average) are not provided. The fishery mainly relies on capture of animals from small aggregations under 'condos' so there would seem to be the potential for hyperstability in CPUE. Figure 5 suggests this has been the case for many years prior to 2010 when the CPUE series changed. Conversely, since 2010 the new CPUE series shows substantial short-term fluctuations which are not discussed but are of a scale that would seem hard to reconcile as indicators of change in the underlying biomass. The changes include jumps from above target to close to or below limit levels	carried out less frequently and acts as a check on whether the HCR is working. In the team's view, it is appropriate for the stock. The section describing the CPUE indices has been improved. (b) No change (c) No change (d) No change (e) No change In relation to 'other comments', we double checked these points with the author of the stock assessment, to ensure that our response is correct. Trap CPUE is not used. The separate CPUE series are the result of changes in data collection and data recording rather than different gears. Data collection has undergone significant improvements, and the most recent data are considered to be reliable. We recognise, however, that overall the CPUE series has some

				in one or two time steps, and vice versa. Some discussion of these issues is warranted. Furthermore, none of these CPUE series seem to reflect the estimated trends in biomass estimated by the stock assessment (e.g. Figure 7) and in particular they don't seem to forecast the modelled decline in biomass from above the target level in the 1990s to close to or below the limit around 2008. There are three years of catches above 3000 t around 2003-05 (Figure 8) which may be responsible for the biomass decline (but, if so, the proposed upper catch limit is probably too high). Alternatively, the information may be in the size composition data, which the review apparently recommended be included more fully in the assessment, but which are not presented. The estimated recruitment series is also relatively flat. Some explanation of the biomass trends shown would be helpful. Other comments – The above would help understand the stock assessment but do not address the	significant problems, but it is the only index available for this fishery; the problems mainly relate to historical issues, and the most recent part of the time series is much improved. The fishery is predominantly focused on new recruits, so the CPUE index is most closely aligned to a recruitment index, which would explain fluctuations. This was demonstrated by the available size information, which is dominated by the 5 oz tails. There is therefore no direct biomass index; the biomass and SSB is effectively inferred from the catch and recruit information.

				other important issue that the outputs of the stock assessment do not seem to be used in the HCR.	
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		
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	Yes		
2.5.1	Yes	Yes	N/A		
2.5.2	Yes	Yes	N/A		
2.5.3	Yes	Yes	Yes		

3.1.1	No	No	N/A	Given the cross-jurisdictional distribution of the stock, complementary regional management measures would seem to be required for this fishery. Although there is a level of cooperation among countries, evidence is not provided that this cooperation is sufficiently coherent at a management level "to deliver management outcomes consistent with MSC Principles 1 and 2" as required at the SG80 level. As noted in comments for Principle 1, fisheries outside The Bahamas have the potential to undermine the good intentions of this fishery's managers.	See Section 3.3.2 for an extensive review of this question and the most appropriate geographical boundaries of the 'stock' for the purposes of this assessment.
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	No	Yes	Scoring issue a: It is questionable as to whether there is a demonstratably effective system for addressing IUU fishing, particularly given the comment under PI 1.2.2 about estimated increases in Dominican landings in 2011 that were suspected of originating from The Bahamas. Also, the 2015 Revised Action Plan for the FIP stated that a number of the proposed Monitoring and Enforcement activities have been removed from the Action Plan, not because they were no longer needed, but because of "the large spatial scale of the Bahamas archipelago and limited resources and human capacity available at this time". These factors would suggest a limited ability to enforce regulations across the fishery with the potential for this to undermine achievment of objectives.	The strengthened enforcement system in the southern Bahamas is quite new, and the situation is now much improved from what pertained in 2011 and before. It is clear that enforcement is a very big challenge, for the reasons identified by the reviewer, but the team took the review that the new system appeared to be working. This was a difficult judgement call, and perhaps there is an element of 'benefit of the doubt' in this scoring, but in any case, the issue is addressed by the condition under SId.
3.2.4	Yes	Yes	N/A		

Table 25 For reports assessing enhanced fisheries:

Does the report clearly evaluate any additional impacts that might arise from enhancement activities? Note: Justification to support your answers is only required where answers given are 'No'.	**Yes**	**CAB Response:**
Justification:		

Peer Reviewer 2

Summary of Peer Reviewer Opinion

Has the assessment team arrived at an appropriate conclusion based on the evidence presented in the assessment report?	**Yes**	**CAB Response**
Justification: The overall determination that this fishery should be certified according to the MSC principles and criteria is appropriate, and correctly based on the findings of this assessment. The remarks below aim to help clarify and complement the report but do not concern substantial points of scoring.		

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**	**CAB Response**
Justification: There are four conditions listed below, which are clearly written in relation to the scoring issues. All conditions concern the collection and analysis of information and knowledge and involve key stakeholders who have confirmed their support. Condition #1: 1.2.3c: Information needs to be collected such that all fishery removals from the stock (=spiny lobster in The Bahamas) can be estimated. Condition #2: PI 2.4.3b and c: For condos, information needs to be collected on the quantity deployed, location of deployment and eventual fate (removed vs. lost) sufficient to i) provide reliable information on the spatial extent of interaction, the timing and location of use of the fishing gear; and ii) to detect any increase in risk to the main habitats (if		

any) from condo deployment. For traps, information needs to be collected on the number of traps in use and the main areas of deployment of traps, as well as trap loss rates, for the same purpose. Condition #3: PI 2.5.3e: Information needs to be collected on the quantity deployed, location of deployment and eventual fate (removed vs. lost) of condos, sufficient to evaluate the on-going risk (if any) to ecosystems from condo deployment. Condition #4: PI 3.2.3d: The monitoring, control and surveillance system needs to be improved such that there is no evidence of systematic non-compliance (systematic, wide-scale IUU).	

If included:

Do you think the client action plan is sufficient to close the conditions raised? ***[Reference FCR 7.11.2-7.11.3 and sub-clauses]***	**Yes**	**CAB Response**
Justification: Yes, the Action Plans are clear for all 4 conditions		*Great!*

Table 26 For reports using one of the default assessment trees:

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/N/A)	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	Yes	Yes	No	The certifier gave a score of 70 for this PI, and triggered the scoring of PI 1.1.2. Given the current differences between "optimistic" and "pessimistic" model projections and that the certifier determined that the stock assessment needs to be updated "at a minimum every 3-4 years" (section 3.3.5), I suggest a condition could be raised to this effect.	We are not required to raise a condition when this PI is scored with the default tree; instead, any conditions are applied to 1.1.2, depending on its scoring outcome.
1.1.2	Yes	Yes	N/A		

1.2.1	Yes	No	N/A	Some of the text in PI 1.2.1a is contradictory regarding SG100. I would agree that "On this basis, it is clear that the HCR has been **designed** to achieve stock management objectives. SG100 is met." (my emphasis), with the other aspects mentioned being scored elsewhere including this PI SIc	It has been considerably clarified (see response to other peer reviewer for details). Hopefully it is now clear. The scoring is as the reviewer suggests.
1.2.2	Yes	Yes	N/A		
1.2.3	Yes	Yes	Yes		
1.2.4	Yes	Yes	N/A		
2.1.1	Yes	Yes	N/A		
2.1.2	Yes	Yes	NA/		
2.1.3	Yes	Yes	N/A		
2.2.1	Yes	Yes	N/A	The recommendation is useful.	

2.2.2	Yes	Yes	N/A		
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	Yes		
2.5.1	Yes	Yes	N/A		
2.5.2	Yes	Yes	N/A		

2.5.3	Yes	Yes	Yes		
3.1.1	Yes	Yes	N/A		
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/No	Yes	The scoring at SG80 for SIa is clearly justified, some elements of the rationale explaining why that SG100 is not met are confusing The condition (#4), milestones and Action Plan are all clearly set out.	This has now been clarified in the rationale. Hopefully it is clear now.
3.2.4	Yes	Yes	N/A		

Appendix 3 Stakeholder submissions

No written stakeholder submissions were received prior to the publication of the Public Comment Draft Report. Verbal submissions received during the site visit focused on the provision of information and no concerns were raised about the fishery under assessment.

Following publication of the PCDR, a stakeholder submission was received from BREEF, The Bahamas Reef Environment Education Foundation. MSC also provided Technical Oversight (TO). These submissions, together with the team's response, are shown below.

The Bahamas Reef Environment Educational Foundation (BREEF)

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25th June, 2018

Dear Sir or Madam,

Thank you for the considerable amount of work that has gone into preparing the Bahamas MSC proposal.

I do have some concerns as follows:

There is still evidence of systematic non-compliance regarding IUU fishing that needs to be addressed. There is consistent poaching from the Dominican Republic to the south and the United States to the north. While there have been strides made in addressing this, it remains a major problem. Dr. Kathleen Sullivan Sealy has done quite a bit of work estimating the magnitude of IUU fishing. The prospect of MSC certification should have helped move enforcement efforts forward, and would also help build fishermen buy-in for something that they care deeply about in the broader context of the need for fisheries conservation and management.

Team response: Firstly, the team would like to thank BREEF for their submission. The team too have noted the fishery's issues with IUU fishing and felt that the fishery could not meet the Scoring Guidepost (SG) of 80 for the Performance Indicator (PI) 'Compliance and Enforcement', specifically for the Scoring Issue (SI) of 'Systematic non-compliance'. As a result, a condition was raised (Condition 4; see **Table 23**) for the fishery to address this issue over the life of the fishery certificate. Specific milestones for the client to meet in order for the condition to be fulfilled are also included in **Table 23**. In the event that the CAB determines that the progress of the condition is not back 'on target' within 12 months of falling 'behind target', the CAB is required to consider progress as 'inadequate' and apply suspension or withdrawal procedures. The condition serves to encourage the fishery forward with making positive changes to combat the issue of IUU fishing and systematic non-compliance.

In relation to estimating the magnitude of IUU fishing, Dr Sullivan Sealy's evaluation was discussed at the site visit. Stakeholders (including in particular the DMR, but generally across the spectrum) made it clear that they did not have confidence in her estimates, and for this reason, the estimates of IUU in her report are not cited here. PI 1.2.3 (information on the stock) requires at the SG80 level that there be robust estimates of all removals from the stock – this is clearly not the case, so SG80 is not met for this PI. A condition has been raised to develop better estimates of IUU fishing (Condition 1; **Table 20**). Meanwhile, the stock assessment considers the assumption that 100% of landings of spiny lobster in the DR come from the Bahamas (one of the sensitivity analyses) which the team considered dealt appropriately with the question of uncertainty in stock status driven by IUU removals.

> Major knowledge gaps pertaining to key issues such as the number of condos and traps deployed (there is no current mechanism for documenting this information), the amount of local legal fishing (that is of significant importance to recreational, artisinal and subsistence fishers and provides value to the Bahamian economy), CUPE, and the amount of illegal fishing.

Team Response: With regard to the uncertainty surrounding the number of condos and traps in operation in the fishery, the team have also highlighted this as an issue in the fishery and scored the relevant PIs in Principle 2 (PIs 2.4.3 and 2.5.4 – information pertaining to the impact of the fishery on habitats and ecosystems) accordingly below the 80 level (see Conditions 2 and 3; **Table 21** and **Table 22**). Whilst the team did not feel that this issue precludes the fishery from MSC certification, it does acknowledge the need for the amount of gear used in the fishery to be quantified, moreover within the next five years. The conditions raised require a mechanism to be put in place to quantify fishing gear, including the rate of gear loss, particularly in relation to condos, to better manage the impacts of the fishery on the habitats and ecosystem. As mentioned above with regard to the condition relating to IUU fishing, failing to meet the conditions' milestones could lead to suspension of the fishery from MSC certification.

In relation to local legal fishing, this is also included in Condition 1, alongside foreign IUU.

In relation to CPUE, the stock assessment is based on various CPUE time series (see Section 3.3.8 and **Figure 5** – we hope that this has been adequately explained. It is not necessary to have a CPUE index for all fisheries on the stock, as long as there are one/a few which can act as a reasonably robust abundance indicator (or in this case, recruitment indicator).

In relation to illegal fishing – see above.

> There is a consistent violation of the Bahamian fisheries regulations stating that compressors are only permitted to be used between 30 and 60 feet of water depth. The majority of the spiny lobster fishery takes place using compressors in water shallower than 30 feet.
>
> The report recognizes this but states that " this regulation is more honoured in the breach than the observance." This response to a consistent violation of the fisheries regulations would appear to be completely inadequate. This depth requirement was instated when hookah fishing was first introduced to mitigate the seriously damaging implications of hookah as a fishing tool and this regulation should not be ignored.

Team response: Yes, we made a mistake here. The issue is mentioned in the rationale for 3.2.3, SId, under which we have raised a condition relating to IUU (Condition 4 – see above). This part of the rationale went missing in translation to **Table 23**, hence it was not included in the condition. It has now been included in the condition, milestones and Client Action Plan.

The team decided that the requirement was not to ensure that fishing using compressors in <30 feet didn't happen, but rather to start a process to align regulations and practice, taking whichever path stakeholders deemed appropriate. This is because the team did not feel that such a requirement would be essential for the future sustainability of the fishery, particularly not given possible safety issue associated with extensive free-diving – you may not agree with this interpretation, but we hope that during the process of review, stakeholders will be able to have their say.

> Through the Caribbean Challenge, The Bahamas government has committed to designating 20% of the marine habitat of the country to be included within a network of marine protected areas by 2020. This is a major initiative intended to protect the environment and fish stocks for the future. Given that the spiny lobster fishery is by far the most valuable component of the fishing industry, and as this assessment has shown, there is a need to rebuild the spiny lobster stocks, attention needs to be given to MPAs. Replenishment zones within our network of marine protected areas are only given a cursory discussion in this report, but we believe that they should be a required component of stock rebuilding and maintenance under the MSC framework. This would help engage a key sector of Bahamian stakeholders who have traditionally been resistant to MPAs.

Team response: Unfortunately, an MSC assessment team is allowed to specify what needs to be improved (following the rubric of the SG80 scoring guideposts) but we are forbidden from specifying how improvements should be made. We have, however, added a recommendation to the effect that progress be continued with designation and management of MPAs based on 20% by 2020 goal. Although this has no force in terms of auditing and the status of the certificate, recommendations are brought up and discussed at each audit, so it may contributed in some way to the objective of keeping up pressure on this question.

Our P2 expert is slightly upset at the description of Section 3.4.3 as 'cursory' – she prefers 'concise' …

> The Bahamas has committed to a precautionary approach when it comes to fisheries management, but the recommended harvest control rule would not seem to reflect that. Given the information that we do have about the current stock status compared to historical status and to comparative spiny lobster fishery-independent densities inside and outside the only effective Bahamian marine reserve (the Exuma Cays Land and Sea Park), the stock status is below the threshold necessary to be considered eligible.

Team response: The HCR was changed in early 2018, so that the export cap is now set at 5 million lbs instead of 7 million lbs, which is more commensurate with the actual magnitude of exports and thus more likely to control fishing effort. According to the stock assessment model, a cap set at this level can rebuild the stock to the target level (40% of B0 – the unfished biomass) under different stock assessment assumptions – this is (hopefully) explained in the rationale for PI 1.1.1 and 1.1.2.

In terms of stock status requirement to be eligible, depleted stocks (in the sense of below MSY or their target level) are eligible for MSC certification, with the requirement that a structure for rebuilding the stock within a suitable timeframe is in place – see PIs 1.1.1 and 1.1.2. Stocks are ineligible if they fall below the 'point of recruitment impairment'; which can be considered 20% of B0 or the limit reference point – not the case here.

Noting that the biomass target is 40% of the unfished biomass, and the stock is currently estimated to be somewhat below this level, it is not surprising that there would be clear visual differences between density in fished and unfished areas – the more so since the ECLSP has extensive good lobster habitat. A 60% biomass depletion seems like a lot, but 40% of B0 is considered a suitable precautionary target across a wide range of different types of fishery, and should maximise stock productivity.

Also, two corrections:

1, It is only foreign sport fishers who have a bag limit for spiny lobster – so long as fishing is under the 250lb/ day limit, this is considered recreational fishermen. For foreign sportfishers, there is a vessel bag limit of 10/day, not an individual bag limit of 6/day.

2, BREEF was initially a member of the SLWG, but was replaced with an additional member from the commercial fishing sector.

Team response: The team have made the correction that only foreign recreational fishers are subject to catch limits of 10 lobster per vessel as per Section 48(1)(f)(iii) of Fisheries Resources Jurisdiction and Conservation Regulations (see page 34, 59 of this report).

Reference to BREEF being part of the BSLWG has been removed from the report.

In conclusion, although a lot of work has been done so far, I think that there are still some core issues that need to be addressed before the fishery can be certified under the Marine Stewardship Council. I would be happy to address any questions that you may have.

Sincerely,

Casuarina McKinney-Lambert
Executive Director, BREEF

Team response: Thank you for taking the time to provide us with your input. We hope the team have satisfactorily addressed your concerns. The team are still recommending the fishery for MSC certification, as it has been evaluated to meet the MSC Fisheries Standard overall. Some changes have been made to the fishery assessment because of this submission.

MSC Technical Oversight

CERTIFIED SUSTAINABLE SEAFOOD

Date 28/06/2018

SUBJECT: MSC Technical Oversight for The Bahamas Spiny Lobster Fishery - Public Comment Draft Report

Dear Jo Gascoigne (ME Certification Limited (MEC))

Please find below the results of our Technical Oversight review. This was completed by both the Fisheries Standards Team and Supply Chain Standards Team.

Ref	Type	Page	Requirement	Reference	Details	PI
28820	Minor	87	FCR-7.10.6 v.2.0	To contribute to the scoring of any PI, the team shall verify that each scoring issue is fully and unambiguously met.	PI 1.2.1 SI b. It is shown that SG60 is met but there is no rationale provided to support this before moving on to why SG80 is met.	1.2.1,

Team response: For this SI, if SG80 is met (requiring 'evidence') then SG60 (requiring 'plausible argument') is met by definition. However, the rationale has been slightly re-phrased to make this more clear.

28821	Major	93	FCR-7.10.6 v.2.0	To contribute to the scoring of any PI, the team shall verify that each scoring issue is fully and unambiguously met.	PI 1.2.2 SI C. Given that PI 1.1.1 scored less than 80, the HCR was enacted in 2015, there are two different model projections (optimistic and pessimistic) for the stock, and that the data collected for use in the stock assessment changed in 2010, it is not clear what evidence supports the SG80 determination. Please refer to SA2.5.6 and associated guidance for futher information on what constitutes evidence for scoring.	1.2.2,

Team response: Although the HCR was initially put in place in 2015, it was revised in 2018 based on the results of the stock assessment, such that according to projections the stock would rebuild under both optimistic and pessimistic scenarios (see PI 1.1.2). The stock assessment report suggests that both fluctuations in recruitment and improvements in data collection have resulted in changes to the perception of stock status – and the management system has reacted accordingly. This is clearly described in the P1 background section. The stock assessment does not attempt to measure F, so the scoring cannot respond directly to SA2.5.6, but since projections under both scenarios suggest that under the existing (new) HCR, the stock can rebuild to SSB40, presumably F is below F_{SSB40} (i.e. below F_{MSY}) under both scenarios. The rationale has been slightly amended to make this more clear.

28822	Guidance	64	FCR_7.4.8.3 v.2.0	FCR_7.4.8.3	Please provide a list of all vessels registered to sell certified product to the client group.	

Team response: This is not practicable unfortunately, as any Bahamian lobster fisher can legally land product and therefore sell to the client group. There are hundreds of vessels. For historical/cultural reasons, there is no requirement to have a fishing licence or permit to fish or to sell fish in The Bahamas, and only fishing vessels >20 feet or vessels that catch ≥250 lbs are required to have a permit. There is therefore no such thing as an illegal Bahamian fisher in The Bahamas (although it is illegal for non-Bahamians to fish in Bahamas waters without a permit). Only a spiny lobster product passing through a client group company can make MSC-certified claims. This is explained in the description of the UoC at the start of the report. No change has been made to the report.

28823	Minor	65	FCR-7.4.11.a v.2.0	The possibility of non-certified gears being used within the UoC.	Table 17 identifies the risk of non-certified fish traps used by lobster fishers on the same trip as fishers catch certified product with lobster traps, as well as lack of government enforcement. However, there is no description of how the risk is mitigated. Please describe how the systems are sufficient to ensure this non-certified lobster does not enter certified supply chains.	

Team response: The Marine Resource landing form, which is completed when product is landed, and which is later returned the to the Fisheries Department lists the name of the vessel, trip dates, fishing area, estimated quantity being landed and also the fishing method (condos for example). This document allows traceability back further than just to the Unit of Assessment, to the exact fisher who has caught the lobster. This has been added to **Table 17**.

28824	Minor	65	FCR_7.12.1.3 v.2.0	7.12.1 The CAB shall determine if the systems of tracking and tracing in the UoA are sufficient to ensure all fish and fish products identified and sold as certified by the UoA originate from the appropriate Unit of Certification (UoC). 7.12.1.3 The CAB shall document the risk factors outlined in the "MSC Full Assessment Reporting Template", identifying any areas of risk for the integrity of certified products and how they are managed and mitigated.	IUU fishing has been identified as a risk on pages 5,6, 17, and 32 of the report, however, it does not feature in Table 17 on page 65. Please specify these risks with regards to traceability, and how they are mitigated.	

Team response: The IUU fishing refers to foreign, unreported fishing in the Bahamas EEZ. The client group only buys from local Bahamian fishers. As mentioned above and in the Units of Assessment, all spiny lobster landed by Bahamian fishers are legal and eligible to be purchased and sold through the client group as MSC-certified. The client group companies buy directly from the fishers at the landing site; there are no auctions in this fishery. The Marine Resource landing form is completed when product is landed, which is later returned the to the Fisheries Department. This lists the name of the vessel, trip dates, fishing area, estimated quantity being landed and also the fishing method (condos for example). This document allows the product's path to be tracked back further than just to the Unit of Assessment, but to the exact fisher who has caught the lobster, thus traceability is maintained. This has been added to **Table 17**.

28825	Minor	65	FCR_7.12.1.4 v.2.0	For each risk factor, there shall be a description of the risk present and details for the mitigation or management of risk	In Table 17, the response to the risk of vessels outside the UoC fishing on the same stock does not include a description of any non-Bahamian vessels fishing spiny lobster. Please further detail potential risks and mitigation measures in place associated with these fishers and whether licensed non-Bahamian vessels are eligible to sell to the client group.	

Team response: An explanation has been added to **Table 17** expanding the description of IUU fishing in the fishery. The Marine Resource landing form is a vital as part of the traceability process, as it is the key piece of documentation that allows tracing of product directly back to the individual fisher. Lobster landed without this form are not eligible to be sold as MSC-certified.

28826	Minor	141	FCR-7.10.6.1 v.2.0	A rationale shall be presented to support the team's conclusion.	PI 3.1.1 SI.b. The rationale states that officer discretion is applied in 80% of legal disputes. The transparency of the decision making and factors considered by the officer is not clear to support the SG80.	3.1.1,

Team response: The issue raised by the TO is considered under PI 3.2.3 (Compliance and Enforcement). In relation to scoring this SI, we are considering more the general framework for dispute resolution, rather than the detailed mechanics of applying sanctions. The system is transparent in as much as it is clearly understood by all parties, and stakeholders are able to find out what penalties have been applied. No change has been made.

28833	Guidance	123	FCR-7.10.7 v.2.0	7.10.7 In Principle 1 or 2, the team shall score PIs comprised of differeing scoring elements (species or habitats) that comprise part of a component affected by the UoA.	PI 2.4.1 SI a. The provided rationale outlines the scoring for sand habitats yet the 'Met?' boxes for the different scoring guideposts pertain to the habitats identified as VMEs i.e. seagrass, hard bottoms, reefs.	2.4.1,

Team response: Sorry – typo. Fixed.

Appendix 4 Surveillance Frequency

The surveillance frequency for this fishery has been sat as default (Level 6), requiring four on-site surveillance audits.

Deviations from the standard surveillance schedule (i.e. annually, by the anniversary date of the certificate) are currently not foreseen.

The fishery surveillance programme is shown below.

Fishery Surveillance Programme

Surveillance Level	Year 1	Year 2	Year 3	Year 4
Level 6	On-site surveillance audit	On-site surveillance audit	On-site surveillance audit	On-site surveillance audit & re-certification site visit

Appendix 5 Letter of Support for Responsible Fishing from Bahamas Lobster Exporters

LETTER of SUPPORT for RESPONSIBLE FISHING
Bahamas Lobster Exporters

January 23rd, 2018

Minister Renward Wells, M. P.
Ministry of Agriculture and Marine Resources
Out Island Traders Building
East Bay Street
New Providence, The Bahamas

Re: BAHAMAS LOBSTER EXPORTERS LETTER OF SUPPORT FOR LOBSTER HCR REVISION

Dear Sir,

This letter serves as confirmation that we, the Bahamian licensed spiny lobster (crawfish) exporters, pledge our commitment and support for responsible fishing of the Bahamas lobster fishery. In an effort to ensure a continued healthy stock and long-term sustainability, we wish to advise the government and public at large that we fully agree with the November 2017 peer reviewers recommendation of the spiny lobster stock assessment, to limit the Harvest Control Rule, HCR to 5 million lbs. of exports per season.

We fully understand the significance and importance of this fishery to our country and wish to do our part.

We pledge our commitment to the following:

Harvest Control Rule (HCR) for the Crawfish/ Spiny Lobster Fishery

Commencing 1st August, at the start of the 2018/2019 spiny lobster / crawfish season, a new Harvest Control Rule (HCR) for The Bahamas will take effect. The export quota for spiny lobster / crawfish tails (or its equivalent weight in whole weight or live lobster) will be set at 5 million pounds. Exports will be monitored by the Department of Marine Resources and, after adequate notice is given, commercial exports will cease when the limit of 5 million pounds has been reached. If 5 million pounds is not exceeded, the fishery will close on March 31st, as usual. This export quota will be enacted on a seasonal basis. If the export limit is reached during one season, subject to normal authorizations, exports will again be allowed beginning August 1st of the subsequent season. Revisions of the export quota amount, and its implementation, will take place as needed. This HCR does not negate applicable laws pertaining to fisheries or exports.

Time is of the essence, we are requesting the Ministry of Agriculture and Marine Resources to urgently update and adopt the Bahamas spiny lobster HCR to 5 million pounds of exports per season to help enable the vitality and longevity of the Bahamas spiny lobster fishery.

Letter of Support for Responsible Fishing from Bahamian Lobster Exporters. Page 1 of 3

We welcome you to the Ministry and look forward to working together with you.

Sincerely,

Zellamae Bayer
Bayer Seafood, PP-30

Kirk Neely
Boardwalk Seafood Distributors, PP-13

Wendell Saunders
China Hill Seafood, PP-05

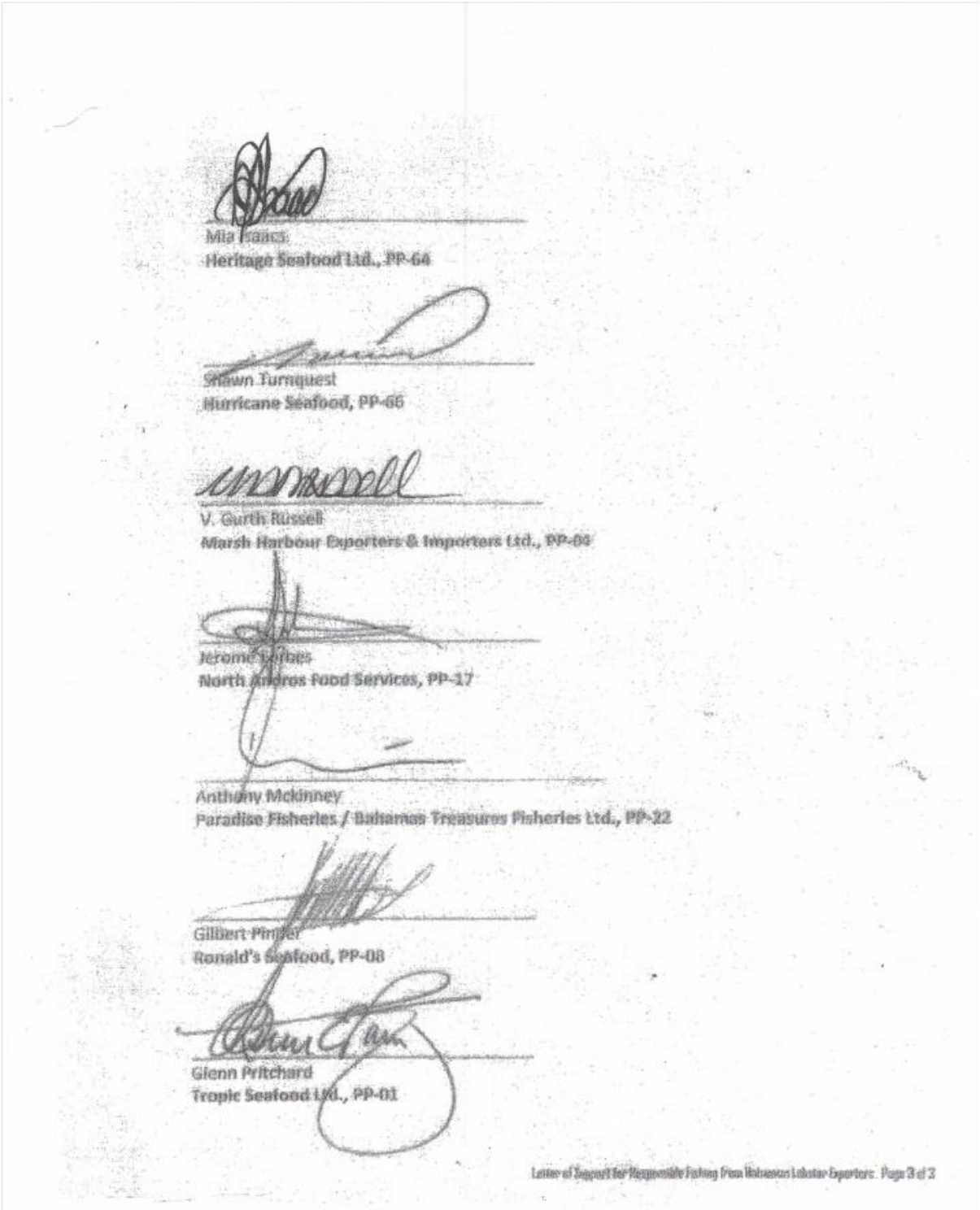
Fermon Newbold
Friendliest Catch, PP-11

Kenneth Lewis
G & L Seafood Ltd., PP-90

Percy Roberts
Geneva Brass Seafoods, PP-50

Cleveland Wells
Gulfstream Food Co. Ltd., PP-27

Letter of Support for Responsible Fishing from Bahamian Lobster Exporters. Page 2 of 3



Mia Isaacs
Heritage Seafood Ltd., PP-64

Shawn Turnquest
Hurricane Seafood, PP-66

V. Gurth Russell
Marsh Harbour Exporters & Importers Ltd., PP-03

Jerome Forbes
North Andros Food Services, PP-17

Anthony Mckinney
Paradise Fisheries / Bahamas Treasures Fisheries Ltd., PP-22

Gilbert Pinder
Ronald's Seafood, PP-08

Glenn Pritchard
Tropic Seafood Ltd., PP-01

Letter of Support for Responsible Fishing From Bahamian Lobster Exporters Page 3 of 3

Appendix 6 BSLWG Support Letter for Lobster HCR

January 16th, 2018

Minister Renward Wells, M. P.
Ministry of Agriculture and Marine Resources
Out Island Traders Building
East Bay Street
New Providence, The Bahamas

Re: Bahamas Spiny Lobster Group Support for Spiny Lobster HCR

Based on the latest stock assessment and peer review of Bahamian Spiny Lobster, The Bahamas Spiny Lobster Working Group pledges our commitment to the following:

Harvest Control Rule (HCR) for the Crawfish/ Spiny Lobster Fishery

Commencing 1st August, at the start of the 2018/2019 spiny lobster / crawfish season, a new Harvest Control Rule (HCR) for The Bahamas will take effect. The export quota for spiny lobster / crawfish tails (or its equivalent weight in whole weight or live lobster) will be set at 5 million pounds. Exports will be monitored by the Department of Marine Resources and, after adequate notice is given, commercial exports will cease when the limit of 5 million pounds has been reached. If 5 million pounds is not exceeded, the fishery will close on March 31st, as usual. This export quota will be enacted on a seasonal basis. If the export limit is reached during one season, subject to normal authorizations, exports will again be allowed beginning August 1st of the subsequent season. Revisions of the export quota amount, and its implementation, will take place as needed. This HCR does not negate applicable laws pertaining to fisheries or exports.

The Bahamas Spiny Lobster Working Group urges the Ministry of Agriculture and Marine Resources to update the Harvest Control Rule to 5 million pounds of tail immediately in order to enable a continued healthy stock and comply with the Marine Stewardship Council Sustainability assessment requirements.

Sincerely,

Bahamas Spiny Lobster Working Group. Page 1 of 4

Adrian Laroda
Bahamas Commercial Fisheries Alliance - President

Agnessa Lundy
Bahamas National Trust – Marine Science Officer

Douglas Saunders
Andros Fishermen Representative

Douglas Saunders

Edison Deleveaux
Acting Director Department of Marine Resources

Glenn Pritchard
Bahamas Marine Exporters Association - VP; Tropic Seafood- President

Jacklyn Chisolm –
College of The Bahamas – Lecturer

Jacklyn Chisholm - Lighttowne

Jude Knowles
Long Island Fishermen Representative

Jude A Knowles.

Dr. Lester Gittens
Department of Marine Resources- Fisheries Officer

Lester Gittens

Mia Isaacs
Bahamas Marine Exporters Association - President; Heritage Seafood- Managing Director

Natalie Miaoulis
The Nature Conservancy- Conservation Practitioner

Natalie Miaoulis

Olivia Patterson
Friends of the Environment- Program Coordinator

Robert Roberts
Spanish Wells Fishermen Representative

Robert Roberts

Romano Armbrister
Abaco Fishermen Representative

Sharease Rolle
Grand Bahama Fishermen Representative

Stacy Lubin
Bahamas Environment, Science and Technology (BEST) Commission
Senior Environmental Officer

Appendix 7 Confirmation of approved HCR from DMR

Official approval of Harvest Control Rules for the lobster fishery.

Department of MARINE RESOURCES
Ministry of Agriculture & Marine Resources
P. O. Box N 3028
Nassau, Bahamas

fisheries@bahamas.gov.bs

MA&MR/FIS/4

February 28, 2018

Ms. Kat Collinson
MSC Fisheries Assessment Manager
ME Certification Ltd
56 High Street, Lymington
Hampshire SO41 9AH
United Kingdom

RE: Harvest Control Rule for the Spiny Lobster (*Panulirus argus*) Fishery of The Bahamas

Dear Ms. Collinson,

Please be advised that, based on the advice of The Department of Marine Resources, the Bahamas Spiny Lobster Work Group, commercial lobster exporters in The Bahamas, a lobster stock assessment and a peer review of the stock assessment, the Cabinet of The Bahamas, during a meeting held on January 30th 2018, has agreed to the adoption of a Harvest Control Rule that limits exports to five million pounds of lobster tails (or its equivalent) per season for the spiny lobster fishery. This limit will take effect from August 1st 2018, the beginning of the next lobster season.

Exports will be monitored by the Department of Marine Resources and, after adequate notice is given, commercial exports will cease when the limit of 5 million pounds has been reached. Further details can be provided if needed. Revisions of the export quota amount, and its implementation, will take place as needed and with the advice of the Bahamas Spiny Lobster Working Group, Bahamas Marine Exporters Association and other stakeholders where necessary.

Yours sincerely

Lester Gittens
for/ Director of Marine Resources

DEPARTMENT OF MARINE RESOURCES
28 FEB 2018
NASSAU, BAHAMAS

Appendix 8 Support Letter from Department of Marine Resources (DMR)

Department of MARINE RESOURCES
Ministry of Agriculture & Marine Resources
P. O. Box N 3028
Nassau, Bahamas

fisheries@bahamas.gov.bs

MA&MR/FIS/4

March 6, 2018

Ms. Kat Collinson
MSC Fisheries Assessment Manager
ME Certification Ltd
56 High Street, Lymington
Hampshire SO41 9AH
United Kingdom

RE: Client Draft Report Conditions – Bahamian Spiny Fishery

Dear Ms. Collinson,

Please be advised that the Department of Marine Resources (DMR) has reviewed the Draft Action Plan submitted by the Client (Bahamas Marine Exporters Association). The DMR believes the actions described are realistic in scope and that they represent appreciable improvements in the management of the lobster fishery. The Department of Marine Resources will continue to work with the client group and other key stakeholders as appropriate to achieve the actions described.

Yours sincerely

DEPARTMENT OF MARINE RESOURCES
07 MAR 2018
NASSAU, BAHAMAS

for/ Director of Marine Resources

Appendix 9 Support Letter from the Royal Bahamas Defence Force (RBDF)

ROYAL BAHAMAS DEFENCE FORCE
P.O. Box N-3733
Telephone: (242) 362-2116/7/9
Fax: (242) 362-2544
HMBS Coral Harbour
Nassau, Bahamas

OUR REFERENCE: RBDF/507/4

13 March 2018

Ms. Kat Collinson
MSC Fisheries Assessment Manager
ME Certification Ltd
56 High Street, Lymington
Hampshire SO41 9AH
United Kingdom

Dear Ms. Collinson,

RE: Client Draft Report Conditions – Bahamian Spiny Fishery

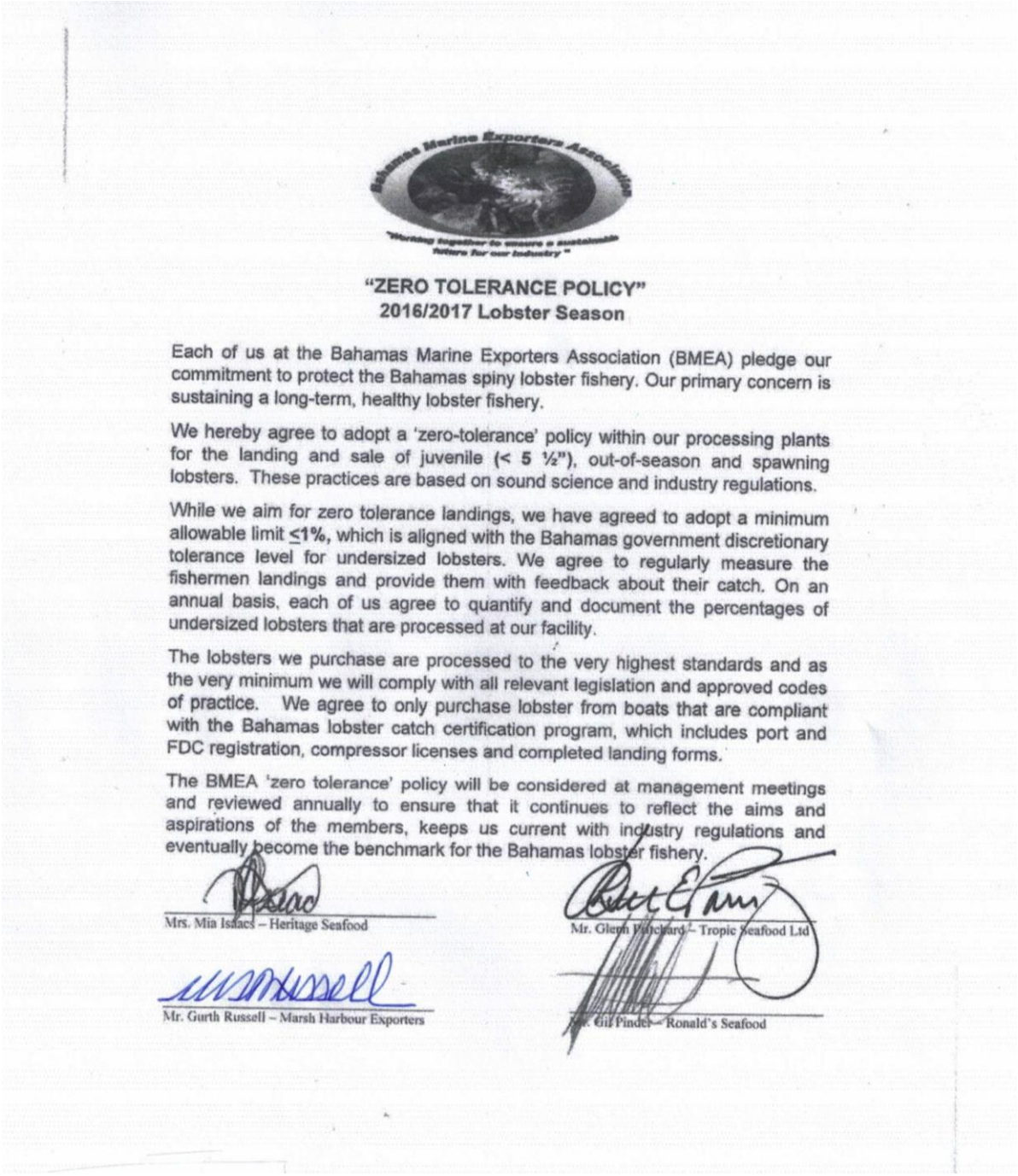
Please be advised that the Royal Bahamas Defence Force (RBDF) has consulted with the Department of Marine Resources (DMR), the primary fisheries management authority, concerning the Draft Action Plan submitted by the Client (Bahamas Marine Exporters Association). The actions described in the action plan appear realistic in scope.

Further, The Royal Bahamas Defence Force will continue to work with the DMR, the client group and other key stakeholders to undertake the described actions geared towards addressing illegal unreported and unregulated fishing.

Grateful.

TELLIS A. BETHEL
Commodore, **RBDF**
COMMANDER DEFENCE FORCE

Appendix 10 Zero Tolerance Policy for processors



"ZERO TOLERANCE POLICY"
2016/2017 Lobster Season

Each of us at the Bahamas Marine Exporters Association (BMEA) pledge our commitment to protect the Bahamas spiny lobster fishery. Our primary concern is sustaining a long-term, healthy lobster fishery.

We hereby agree to adopt a 'zero-tolerance' policy within our processing plants for the landing and sale of juvenile (< 5 ½"), out-of-season and spawning lobsters. These practices are based on sound science and industry regulations.

While we aim for zero tolerance landings, we have agreed to adopt a minimum allowable limit ≤1%, which is aligned with the Bahamas government discretionary tolerance level for undersized lobsters. We agree to regularly measure the fishermen landings and provide them with feedback about their catch. On an annual basis, each of us agree to quantify and document the percentages of undersized lobsters that are processed at our facility.

The lobsters we purchase are processed to the very highest standards and as the very minimum we will comply with all relevant legislation and approved codes of practice. We agree to only purchase lobster from boats that are compliant with the Bahamas lobster catch certification program, which includes port and FDC registration, compressor licenses and completed landing forms.

The BMEA 'zero tolerance' policy will be considered at management meetings and reviewed annually to ensure that it continues to reflect the aims and aspirations of the members, keeps us current with industry regulations and eventually become the benchmark for the Bahamas lobster fishery.

Mrs. Mia Isaacs – Heritage Seafood

Mr. Glenn Pritchard – Tropic Seafood Ltd

Mr. Gurth Russell – Marsh Harbour Exporters

Mr. Gil Pinder – Ronald's Seafood

Appendix 11 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 12 Stakeholders

Organisation	Name
The Nature Conservancy (TNC)	Natalie Miaoulis
The Nature Conservancy (TNC)	Felicity Burrows
MRAG	Robert Wakeford
WWF	Wendy Goyert
MSC	Marin Hawk
Heritage Seafood - Owner	Mia Isaacs
Heritage Seafood	Casey Curry
Heritage Seafood	Tamnika Buth
Heritage Seafood	Cassandra Taylor
Tropic Seafood - Owner	Glenn Pritchard
Tropic Seafood	Karen Rahming
Tropic Seafood	Gerald Wathen
Fisher	Garnett Armbrister
Fisher	Romano Armbrister
Fisher	Jude Knowles
Fisher	Robert Roberts
Fisher	Keith Carroll
Fisher	Whitney Miller
Fisher	Quentin Russell
Department of Marine Resources (DMR) – Acting Director	Edison Deleveaux
Department of Marine Resources (DMR)	Gilford Lloyd
Department of Marine Resources (DMR) – Science and Conservation Unit	Lester Gittens
Royal Bahamas Defence Force	Whitfield Neely
Royal Bahamas Defence Force	Clarence Dean
Royal Bahamas Defence Force	Philip Clarke
Bahamas Reef Environment Education Foundation (BREEF) - President	Casuarina McKinney-Lambert
Ministry of Agriculture, Marine Resources and Local Government	-

Cape Eleuthera Institute	Andy Gill
Paradise Fisheries Ltd	Anthony McKinney
Bahamas Agricultural and Industrial Corporation	-
Bahamas Customs Department	-
Gulf and Caribbean Fisheries Institute	Bob Glazier
Caribbean Regional Fisheries Mechanism (CRFM)	Elizabeth Mohammed
Caribbean Regional Fisheries Mechanism (CRFM)	Milton Haughton
Caribbean Regional Fisheries Mechanism (CRFM)	Peter Murray
Forfar Field Station	-
University of Miami	Karlisa Callwood
Western Central Atlantic Fishery Commission (WEAFC)	Raymon van Anrooy
Royal Bahamas Police Force	-
Caribbean Confederation of Credit Unions (Bahamas)	Stephanie Missick-Jones
The Bahamas Development Bank	-
The Bahamas National Trust	-