SEA EGGS AGAIN: AN ACCOUNT AND EVALUATION OF THE 2015 BARBADOS SEA EGG FISHING SEASON (1-31 OCTOBER 2015)

M. PENA, P. McCONNEY, R. FORDE, S. SEALY AND J. WOOD
ACKNOWLEDGEMENTS

We would like to thank the staff of the Barbados Fisheries Division, especially Christopher Parker (Fisheries Biologist), for sharing data and information on the 2015 sea egg season. The authors also appreciate the information and opinions that people engaged in the fishery readily shared with us. We thank colleagues in Grenada, St Lucia and Martinique who told us about their experiences in 2015.

Cover photo (clockwise): 1) Loading catch onboard boat at Skeetes Bay, photo credit Shelly-Ann Cox; 2) Harvesters pulling a net to shore, photo credit Ronald Kellman; 3) Harvesting at Rockfield, St. Lucy, photo credit Romel Forde, 4) First day of the open season at Bathsheba, photo credit Romel Forde.

Citation

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Acronymns

BARNUFO Barbados National Union of Fisherfolk Organisations
CERMES Centre for Resource Management and Environmental Studies
CZMU Coastal Zone Management Unit
FAO/SLC Food and Agricultural Organisation (FAO) Subregional Office for the Caribbean
FMP Fisheries Management Plan
IFREMER Institut Français de Rescherche pour l’Exploitation de la Mer
IRPM L’Institut Régional de Pêche et de Marine
MarGov Marine Resource Governance in the Eastern Caribbean
MCS Monitoring, Control, Surveillance
SEFMAC Sea Egg Fishery Management Advisory Council
SMC Sea egg Management Council
1 INTRODUCTION

This report provides an account of events related to the 2015 sea egg (sea urchin) fishing season supplemented by appendices. It documents the events, making a few observations, and provides recommendations for improving the management of the Barbados sea egg fishery. This report continues the programme of action research and information sharing outreach that the Centre for Resource Management and Environmental Studies (CERMES) at the University of the West Indies (UWI) Cave Hill Campus has historically undertaken in collaboration with the Fisheries Division of the Ministry of Agriculture, Food, Fisheries and Water Resource Management and the Barbados National Union of Fisherfolk Organisations (BARNUFO). For a general introduction to the resource and the fishery see McConney and Pena (2004, 2005) and Pena et al. (2010).

The following sections provide overviews of the monitoring conducted during the open season, CERMES research on the resource and fishery, and then focus on the events of the 2015 fishing season from preparation (management process) to post-evaluation. Concluding comments and recommendations suggest what steps may next be considered in the management of the fishery.

1.1 Synopsis of the management history of the sea egg fishery

Despite management and conservation efforts, white sea urchin (sea egg) population abundance has declined locally. Management tools have included closed seasons and complete closures (moratoria). A legally designated closed season to protect sea eggs during their peak reproductive period, implemented since the late 1800s, has been the primary management measure applied to the white sea urchin fishery in Barbados. Under the Fisheries Regulation Act (1904) an annual fishing closed season for the sea egg was mandated extending from 1 April to 31 August unless otherwise published in the Official Gazette. However, enforcement of this closure was never totally effective and poaching of the resource frequently occurred before the annual legal opening date of 1 September. During the mid-1970s and early 1980s there was a major decline in the sea egg population in Barbados, with the fishery deemed as having collapsed by 1986. High fishing pressure, poor recruitment, low abundance and poaching have plagued the fishery in recent years. As such the recent management history of sea egg fishery has included two moratoria (1987-1989 and 1998-2001), shortened fishing seasons (2002-2004) ranging between two weeks to two months, and no recommendations for opening the fishery since 2004 (Figure 1; Pena et al. 2010). Despite reportedly low stock abundance, the sea egg fishery was opened for the month of October 2015. For the first time, in the management history of the fishery, the Barbados Fisheries Division implemented a registration and licensing system for all persons harvesting sea eggs. See licence application in Appendix 1. Persons were required to register and be licensed by the start of the season. The licensing system required that all licencees submit data sheets of quantities of sea eggs harvested during the season as well as return their licences by 15 November 2015 to the Fisheries Division.
1.2 Monitoring efforts during the 2015 open season

CERMES previously monitored the 2003 and 2004 sea egg seasons. This research continues the process of documenting and analysing the sea egg fishery with observations and recommendations on events, management strategies and processes. The research builds on action research and information sharing outreach that CERMES undertakes in collaboration with the Barbados Fisheries Division and BARNUFO. A greater understanding of the socio-economic profile of the fishery and evaluation of the management process are critical to the rehabilitation and sustainable use of this resource in the future.

Following the announcement in the media on 23 September 2015 of the opening of the sea egg fishery for the month of October under a registration and licensing system, CERMES developed a research plan to track events and management activities during the harvesting season based on the following goal and objectives:

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<th>Goal</th>
<th>Objectives</th>
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<td>To make recommendations for improving the management of the Barbados sea egg fishery by documenting and evaluating the 2015 Barbados sea egg fishing season (1-31 October)</td>
<td>Evaluate the sea egg season management process undertaken prior to, during and subsequent to the opening of the fishery</td>
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<td></td>
<td>Document photographically socio-economic characteristics of the fishing season</td>
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<td></td>
<td>Collect and document all available print, audio and video reports provided by mass media and public reaction during the fishing season</td>
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<td>Monitor actions of all enforcement agencies and the justice system</td>
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The monitoring undertaken during the season involved:
• Documenting the management process for the 2015 sea egg season undertaken before, during and after the opening of the season.

• Conducting observations and photo documentation of activities at key (active) harvesting sites around the island at least three times per week during the open season. Even though monitoring focused on key harvesting sites, it was flexible enough to report on any trending pattern of activity across the island. As much photographic evidence as possible, was collected on harvesting practices, and persons engaged in harvesting, selling and buying the resource. Information was collected according to sex, age and location. A preliminary analysis of the sea egg value chain was conducted via observations and where necessary, informal interviews. Information collected included estimates of the amounts of sea eggs harvested and sold, determination of who the buyers are, and selling prices (revenue generated) for sea eggs.

• Tracking events, activities and public reaction during the fishing season via the collection and analysis of print and audio-visual reports provided by the mass media, as well as social media. The utilisation of the media by the Fisheries Division, either proactively or reactively, was also monitored. Media sources were also important in following the actions of enforcement agencies such as the Fisheries Division, Coast Guard and Royal Barbados Police Force, as well as the judicial system. Enforcement and judicial actions of particular interest included arrests and imposition of fines for harvesting without licences, illegal harvesting etc.

• Collecting official information (registration data) from the Fisheries Division to corroborate preliminary field data on sea egg harvesters.

• Post-season site visits to determine from harvesters their suggestions on what, if anything, (a) people in the fishery and (b) government, should do differently for the next sea egg season opening.

Two CERMES graduates, Shekira Sealy and Romel Forde were contracted to collect and compile relevant data and information.

1.3 Monitoring and research during the 10-year closure of the fishery

Stock abundance surveys were conducted locally by the Barbados Fisheries Division in collaboration with fishers annually during the 10-year closure of the sea egg fishery for comparison of sea egg densities at index sites around Barbados to inform management of the fishery.

CERMES maintained its research interest in sea egg fisheries, both locally and regionally, throughout the 10-year closure of the Barbados fishery primarily through project work. Research on governance issues and socio-ecological networks within sea egg fisheries in Barbados, St. Lucia and Grenada was undertaken by CERMES and the Natural Resources Institute, University of Manitoba, Canada, primarily through the Marine Resource Governance in the Eastern Caribbean (MarGov) project. Additionally, CERMES collaborated with the Food and Agricultural Organisation (FAO) Subregional Office for the Caribbean (FAO/SLC), the Institut Français de Rescherche pour l’Exploitation de la Mer (IFREMER) in Martinique and L’Institut Régional de Pêche et de Marine (IRPM), Guadeloupe, to address the white sea urchin (sea egg) fishery from a regional perspective through the collation and review of published and unpublished information on the white sea urchin and its fishery in the English-speaking eastern Caribbean. Both CERMES and the Barbados Fisheries Division continued to raise awareness about local
and regional sea egg fisheries via publications and presentations at conferences. This section provides a brief overview of the monitoring and research conducted on the sea egg fishery in Barbados and others in the region from 2004 to 2015.

1.3.1 Annual resource monitoring by the Barbados Fisheries Division

Annual stock abundance surveys and measurement of sea egg size by the Fisheries Division in collaboration with fishers at index sites on the north, south and east coasts continued during the period 2004 to 2015. Monitoring by transects and survey quadrats was conducted by approximately 10 sea egg divers. The divers are not volunteers but rather are paid a stipend to cover the costs of boat and equipment use and time. Total pre-survey assessment costs are in the region of BBD 10,000 (USD 5,000) and are funded from the Fisheries Division budget. During each monitoring event, survey data are submitted to the Fisheries Division for review. With each survey event, the Fisheries Division holds a post-survey meeting with the fishers to gain feedback on abundance levels, condition of harvest location and to gain consensus on whether the fishery should be opened or remain closed as well as the timing and duration of the open season. Since 2014, abundance levels had increased to such levels that it was thought there was sufficient resource to support a fishery. However, the decision was made by government to extend the closed season throughout 2014 (C. Parker pers comm.).

1.3.2 MarGov project

The Marine Resource Governance in the Eastern Caribbean (MarGov) Project implemented by CERMES from 2007 to 2012, undertook applied interdisciplinary research to address the critical need to build capacity and network connections for adaptation and resilience into current and planned marine resource governance initiatives in the eastern Caribbean. Within the MarGov project PhD research on the sea urchin fisheries in Barbados and St. Lucia has been undertaken and is currently under completion. In addition to the academic aspects of the MarGov research programme, small grants to support complementary, high quality applied research integral to the project were made available to project partners. Eight small grants were awarded and implemented by both governmental and non-governmental entities. Small grant research relevant to sea egg fisheries included fisheries management planning, governance arrangements and participatory decision-making mechanisms for the sea urchin fisheries in Grenada and St. Lucia; and improving governance through the analysis of institutional frameworks and capacity of the Barbados Fishery Advisory Committee (FAC) to form a Sea Egg Fishery Management Council (SEFMAC) (Pena et al. 2010; Pena and McConney 2012). Synopses of this research and highlighted publications are provided in Appendix 2. Another output of the project was a 24-min five-part documentary on The Decline of the Sea Egg Fishery in Barbados. The documentary may be viewed on YouTube at https://www.youtube.com/watch?v=BUkmFywMyMA. For detailed information on the MarGov Project and its outputs related to the sea egg fishery, contact Patrick McConney at patrick.mcconney@cavehill.uwi.edu.

1.3.3 FAO Fisheries and Aquaculture Circular No. 1056

In response to a request from some eastern Caribbean countries to address the white sea urchin (sea egg) fishery from a regional perspective, CERMES was engaged by the FAO to produce a synthesis of published and unpublished information on the white sea urchin and its fishery in the eastern Caribbean. This synthesis incorporates information on the resource and fisheries in Barbados, Carriacou (Grenada),

1 Fisheries Biologist, Barbados Fisheries Division
Grenada, Martinique, Saint Lucia, and Saint Vincent and the Grenadines. The Circular consists of ten chapters. Chapters 1–6 synthesise information on the biology, ecology, population structure and aquaculture potential of the resource. Chapter 7 addresses the exploitation of the resource including the types of fishing equipment used, fishing areas and seasons. Chapter 8 examines the socio-economic importance of the white sea urchin fisheries in the eastern Caribbean. Chapter 9 focuses on the past and current management of the white sea urchin fisheries by country, and Chapter 10 identifies knowledge gaps for the sustainable management of white sea urchin fisheries and provides an overview of current research being conducted on white sea urchin fisheries in the region (Pena et al. 2009; Pena et al. 2010). The FAO Circular may be downloaded from http://www.fao.org/3/a-i1751e.pdf

1.4 Regional openings

The opening of the Barbados sea egg fishery followed and/or coincided with open seasons of other fisheries in the region notably those in Martinique, Grenada and St. Lucia, and was the longest in duration. Of all openings, the Grenada season started the earliest, in July, with an indefinite lifting of the ban on 31 August 2015. Martinique’s fishery was only opened for two days in August. The Barbados and St. Lucia openings coincided in October (Table 2).

In Grenada miscommunication in the media (The New Today) from an interview held with the Chief Fisheries Officer (CFO) lead to the public believing the season was to be opened in July. The CFO was quoted as saying, a study would be conducted in 2015 “to ensure that we can have limited re-entry of the reopening” of the hunting season for the sea urchin. “We are looking at July, August.” It was instead inferred by the public that the season would be open from July rather than the research referred to. This placed the Grenada Fisheries Division in a serious predicament. Originally, the plan was to have an August-September opening with a proper monitoring and data collection programme in place. To proceed to declare the season open ‘after the fact’ would appear incompetent so instead the Fisheries Division decided to lift the moratorium indefinitely until further notice. This was to take effect from 31 August and was issued by from the Ministry responsible for fisheries. No resources for monitoring and data collection by the Fisheries Division were available during the open season. The Grenada Fisheries Division was contemplating re-imposing the moratorium in November or December 2015 for management purposes (C. Isaac pers. comm2).

Grenada’s sea egg fishery still continues to be plagued by high incidences of illegal harvesting especially around Carnival time in August. This is compounded by a lack of capacity in the Fisheries Division to conduct Monitoring, Control and Surveillance (MCS) (C. Isaac. pers. comm.).

The Martinique fishery was opened for two days, 20-21 August. Before opening the season, the administration gave authorisation to six fishers to conduct pre-assessment surveys. Landings were reportedly good (L. Reynal pers. comm3).

The St. Lucia sea egg fishery opened for one week in October to coincide with Creole Day celebrations on 25 October. The Department of Fisheries opened the fishery to anyone interested in harvesting the resource. St. Lucia had previously implemented a permit system but due to resulting assaults on

2 Fisheries Officer, Grenada Fisheries Division
3 L’Institut Français de Recherche pour l’Exploitation de la Mer (IFREMER), Martinique
fisheries officers, the strategy implemented is one of a shorter period with access given to all (T. Nelson pers. comm).

Table 2 Regional sea egg fisheries open seasons

<table>
<thead>
<tr>
<th>Country</th>
<th>July</th>
<th>August</th>
<th>October</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grenada</td>
<td>1 Jul to indefinite</td>
<td>31 Aug moratorium lifted indefinitely until further notice</td>
<td>-</td>
</tr>
<tr>
<td>Martinique</td>
<td>-</td>
<td>20-21</td>
<td>-</td>
</tr>
<tr>
<td>St. Lucia</td>
<td>-</td>
<td>-</td>
<td>19-25</td>
</tr>
<tr>
<td>Barbados</td>
<td>-</td>
<td>-</td>
<td>1-31</td>
</tr>
</tbody>
</table>

In terms of recent management history within the 21st century of these countries, Barbados has experienced the longest ban (10 years) on sea egg harvesting up until its present opening. From a closure in 2008, St. Lucia re-opened the fishery the year after from 29 September to 1 Oct, after which it remained closed up until this year’s season, whereas Grenada re-opened its fishery briefly from 1-31 August 2013 after closure in 1995.

2 MANAGEMENT PROCESS

During the 10-year closure of the sea egg fishery, the Barbados Fisheries Division continued to conduct annual pre-season assessments usually between August and September every year. This was done in collaboration with professional sea egg fishers at a number of index sites in the north, south and east of the island. Post-survey meetings was the normal practice employed in which the Fisheries Division would gain feedback and input from the surveyors on whether to open the fishery (consultative co-management).

The rationale for opening the season in 2015 was based on reasonable levels of abundance that were thought to be sufficient enough to support a fishery and allowing the wider Barbadian public to get sea eggs before adult sea eggs naturally died off and poachers continued to benefit from the stock. For the first time in the management history of the sea egg fishery, a registration and licensing system of all sea egg divers and breakers was implemented with an accompanying reporting requirement of numbers of sea eggs harvested. Registration and licensing was open to anyone interested in harvesting and selling sea eggs, i.e. no restrictions were imposed under this system. The reasoning behind this registration and licensing system was that it would assist the Fisheries Division in updating its sea egg fishery database, particularly with socio-economic, and catch and effort data and information.

During the decade long closure of the fishery, the Fisheries Division did not conduct any independent research. However during the extended ban, efforts were made towards developing institutional arrangements for management of the fishery. Subsequent to the 2003 sea egg season, the Barbados Fisheries Division as part of the post-evaluation of the season hosted a Sea Egg Fishery Management Small Group Meeting at the Fisheries Division in November of that year. Participants included non-affiliated fishers, representatives from BARNUFO, the Coastal Zone Management Unit (CZMU) and CERMES. An important aspect of the meeting was the introduction of a proposal for establishing a Sea

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4 Deputy Chief Fisheries officer, Department of Fisheries, St. Lucia
egg Management Council (SMC) or advisory group within the coming three years (2004-2006) as a means of facilitating co-management. The proposed council would comprise representatives of relevant government agencies including enforcement agencies, BARNUFO, an independent fisheries biologist and representatives of major sea egg fishing communities. More than half the council’s membership would be fishers. Community representatives would be responsible for advising members of their communities on relevant issues and reporting the concerns and opinions of whom they represent to the council meetings. The council would coordinate stock assessments, formulate management policies providing advice and recommendations to the Minister responsible for fisheries, and develop ways of enforcing any management regulations. It was suggested that no more than 15 people would sit on the council. The fishers accepted the proposal in principle, and as a result, the recommendation was included in the 2004-2006 Fisheries Management Plan (FMP) and again in the draft 2008-2011 FMP (Barbados Fisheries Division 2004; McConney and Pena 2004; Parker and Pena 2006).

In 2006, Parker and Pena posited that a number of barriers would have to be overcome in developing the council, for example the mechanism(s) by which communities would elect their council representatives. They did propose however that given the urgency to establish the council, representatives could be initially appointed with election from among communities occurring after formation and functioning. It was also thought that financing of the council could be a possible issue, as it was unlikely that participants would be willing to devote their time and effort to make the council work in the longer term for free. While donor agencies and government would be willing to finance the initial set up stages, the council would have to eventually find ways to at least partially finance its work.

Since its proposal, the SMC or Sea Egg Fishery Management Advisory Council (SEFMAC) as it was more recently called, was formed as an administrative act of the Chief Fisheries Officer and met in 2009 but has not functioned well since then. Apparently one sticking point remains disagreement among fishery officials on the need for incentives (financial) to offset costs of involvement (C. Parker pers. comm.). The Fisheries Division has continued without the SEFMAC by reverting to convening the survey divers to share their views on sea egg abundance and distribution. This reflects an erosion of co-management.

The urgency to rehabilitate and sustainably manage the local sea egg fishery prompted the drafting of the first individual sea egg fishery management plan for Barbados in April 2015. The draft sea egg fishery management plan has been recently further revised as of this year and is once again under internal review (C. Parker pers. comm.), still unavailable for public guidance.

A timeline of the management process showing the actors and actions with reasoning, undertaken by the Barbados Fisheries Division before, during and after the opening is shown below in Figure 2. What is apparent is that within the management process no actions such as public information and stakeholder preparation for co-management were focused on reducing illegal fishing apart from sporadic enforcement of the Fisheries (Management) Regulations by the Coast Guard and Police.

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5 Fisheries Biologist, Barbados Fisheries Division
6 The former amalgamated Fishery Management Plan format has been recently abandoned by the Fisheries Division. Instead there is a general Fisheries Policy document that has been already approved by Cabinet. Part of the policy includes the development of detailed Individual Fishery Management Plans, the first of which is the sea egg management plan (C. Parker pers. comm.)
Figure 2 Timeline of the management process for the sea egg fishery
*although appreciable recovery in abundance was observed in 2014 and was thought to be sufficient to support an open season, consensus dictated the fishery remain closed (C. Parker pers. comm.)
3 OBSERVATIONS AND INTERVIEWS IN THE 2015 SEASON

In addition to making site visits for observational purposes and to photographically document the open season, Romel Forde, interviewed harvesters at popular sea egg landing sites to obtain a basic socio-economic perspective on persons engaged in the fishery, including harvesting, preparation and marketing practices, abundance estimates, and attitudes towards to the newly imposed licensing system. In the 2015 sea egg season Forde conducted 12 unstructured interviews with a convenience sample of 19 persons, which is 3% of the people registered in 2015 (625) and 6% of the number of people previously estimated to be actively involved fishers (300)\(^7\) – 15 were individual interviews, three were interviews with two persons each and one was with a group of four individuals. For purposes of reporting on basic data analysis, responses for group interviews were counted according to the number of people in each group, hence total sample size used was 19 and not 12. Harvesters at five of the most popular harvesting sites were targeted for the interviews – Bathsheba, St. Joseph (n=5), Consett Bay, St. John (n=3), Rockfield, St. Lucy (n=7), Silver Sands, Christ Church (n=3) and Tent Bay, St. John (n=1).

3.1 Demographics

All individuals interviewed were male with the majority, being 41-60 years (53%) (Figure 3). This is therefore a sampling bias in this preliminary analysis unintentionally introduced by the interviewer who formally interviewed harvesters but casually conversed with breakers.

![Figure 3 Age distribution of sea egg harvesters (n = 17)](image)

\(^7\)A total of 625 persons registered to participate in the 2015 sea egg season of which approximately 300 were considered to be actively involved in the fishery. It should be noted that the latter estimate is conservative being based on the number of returned data sheets (332) and submission by only 286 of these on their role in the fishery. Reasons proposed for low return rate of data sheets are lack of interest in the fishery after being registered or indifference to the conditions set for obtaining the license Source: C. Parker, Fisheries Biologist, Barbados Fisheries Division.
The majority of sea egg harvesters interviewed were fishermen by profession (64%). The remaining 36% of persons were of varied occupations - emergency services, security, tradesmen and government staff (Figure 5).

3.2 Harvesting history

There is a long history of harvesting sea eggs among those interviewed. Sixty-eight percent have been involved in the fishery for between 20 to 48 years. It was noted to be the first, second or third time for 6.2% each of persons interviewed. Two harvesters (12.5%) were unable to give an estimate in the number of years in the fishery but noted that they had been engaged for a number of seasons.

3.3 Harvesting location vs. residence

Among those interviewed, people were found to harvest sea eggs at locations close to their residences. In general, harvesters that harvested sea eggs at Silver Sands, Consett Bay and Rockfield resided in the areas. Those harvesting at Bathsheba tended to come from outside St. Joseph, albeit from neighbouring parishes of St. John and St. Philip. See matrix showing location by residence (Table 3). It should be noted however, that this trend is not indicative of the entire population of harvesters since it is known based on random conversations with harvesters and breakers throughout the season that persons travelled.
from distant parts of the island to harvesting areas. For example, one group of breakers at Bathsheba (east coast) originated from Christ Church (south coast). Similarly, boats from Silver Sands on the south coast travelled to the east coast to dive for sea eggs.

Table 3 Location of sea egg harvesters versus their residence (n = 12)

<table>
<thead>
<tr>
<th>Location</th>
<th>Residence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Christ Church</td>
</tr>
<tr>
<td>Silver Sands</td>
<td>100%</td>
</tr>
<tr>
<td>Consett Bay</td>
<td>-</td>
</tr>
<tr>
<td>Bathsheba</td>
<td>-</td>
</tr>
<tr>
<td>Tent Bay</td>
<td>-</td>
</tr>
<tr>
<td>Rockfield</td>
<td>-</td>
</tr>
</tbody>
</table>

3.4 Resource abundance and perceptions of roe quality

As early as 5 October, some of the sea egg harvesters interviewed indicated high abundance of sea eggs nearshore (Silver Sands) but noted that due to the large numbers of divers in the area only a few sea eggs remained scattered on the reefs. Generally sea egg harvesters described sea eggs to be low in abundance with small roe on the south coast (Silver Sands) compared to the east (Bathsheba, Consett Bay) and north coasts (Rockfield) where quantities were described as plentiful with good sized roe. Four people interviewed noted that in addition to many adult sea eggs, “alot of juvenile urchins were spotted in the area” (specifically referring to Bathsheba and Consett Bay). Due to rough seas encountered at Consett Bay during the first week of the open season, Bathsheba was a better option for harvesting.

Figure 6 Roe quality and harvest size of sea eggs. Photo credit: R. Forde.

At Rockfield, St. Lucy in the north, by the middle of the season (15 October) at least two persons interviewed noted a decline in the sea egg population as a result of many of the divers in the east moving to the north to fish in the area. One person even believed that at that time (mid-season) due to the heavy fishing pressure being exerted on the resource, by the third week of the season all of the sea eggs in the north (Rockfield) would be fished out.
Additionally, one person from Rockfield complained that too many persons were harvesting with boats and tanks which put them at an unfair advantage to other harvesters. It was thought that the boats were endangering the lives of the divers in the area, as some were coming too close without any consideration for others. The individual believed boats should be banned from the fishery. It should be noted that since 1998, harvesting sea eggs with SCUBA gear is illegal and only free diving is legally allowed in the fishery (Parker 2010).

Almost one-third (32%) of those interviewed thought the season started too late with many sea eggs observed to be “milking” or spawning or already spawned resulting in lower quality roe. Typically urchin roe produce the highest yield and best quality for consumption at the peak of nutrient accumulation in the gonad tissue. This happens after spawning when the gonads enter a phase of nutrient accumulation, increasing in both size and firmness as maximum nutrient accumulation is achieved. This is the peak condition for consumption and typically occurs between October and November each year before gametogenesis resumes (Hickey 1982). Therefore sea eggs harvested during the open season should have been of good quality for consumption. The observation of spawning occurring during the open season is probable since the species is capable of spawning year-round (McPherson 1965; Smith and Berkes 1991; Daniel 2003) although it is typically reported to be seasonal (Lewis 1958).

Most of the interviewees said the season should have been opened in September to also coincide with calmer sea conditions.

3.5 Fishing operations

3.5.1 Preferred harvesting sites

Based on the results of the interviews, Bathsheba and Consett Bay were the most popular harvesting locations for sea eggs. However, it should be noted that information on preferred locations was not asked to the majority of persons interviewed. Large numbers of harvesters and breakers were also observed at Rockfield in St. Lucy. During the first week of the open season when the sea was particularly rough on the east coast, many divers mentioned they were going to head to St. Lucy (Rockfield) to harvest since conditions were too dangerous on the east coast (Bathsheba, Consett Bay, Tent Bay). These preferred harvesting sites are in keeping with the historical occurrence of the greatest densities of sea eggs on the north and east coasts (Vermeer, Hunte and Oxenford 2005; Parker 2010).

From the start of the season, conversations with harvesters revealed that traditional sea egg sites such as Sam Lord’s and the Crane had no sea eggs (as well as locations such as Proverbs and Shark Hole). Other information indicated sea eggs were available from Ragged Point to Cove Bay while Silver Sands was reported to have none due to continuous poaching throughout the year. It should be noted however that sea eggs were present at Silver Sands, although low in abundance, during the earlier part of the open season.

3.5.2 Harvesting practices and gear

Harvesting practices have not changed in the 10 years since the last open season. The tendency is for harvesting and breaking to be done in groups typically comprising 4-6 persons (see Mahon et al. 2003). Typical gear used continues to be the traditional snorkel gear (mask, snorkel and fins) with a net and pole. In some cases, divers use smaller nets to harvest batches of sea eggs. Once full, the catch is transferred to a larger net attached to a pole. One harvester reported using two large fishing nets
estimated to hold as many as 5,000 sea eggs. One group noted that water depth determines whether a large or small net is used for harvesting.

Figure 7 L: Typical net and pole used for harvesting sea eggs; R: Use of onion bags as nets. Photo credit: R. Forde.

Figure 8 A selection of photos showing the traditional practice of harvesting and breaking sea eggs in groups. Photo credit: R. Forde.

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8 Suspected to be an overestimate, based on other estimates.
Two of the harvesters interviewed who were fishing for sea eggs from Silver Sands were observed using onion bags unlike the traditional sea egg nets used by the majority of fishers.

One harvester expressed concern about the lack of people on the island knowledgeable or capable of making the nets. He stated the importance of the older harvesters teaching the younger ones how to make nets in an effort to reduce the amount of money spent on buying them from stores.

When diving from shore, once the net is filled a group of divers brings them back to shore to the awaiting breakers before the divers head back out to sea. All members of the group usually work together to break, clean and package the sea eggs. Empty shells are buried in the sand. When harvesting by boat, once the capacity of the boat is reached, the divers head into shore to offload the sea eggs onto the jetty (e.g. Consett Bay) or offload at an easily accessible location onshore (e.g. Tent Bay) before returning to the harvest site. A number of locals from the area or family members of the divers assist with the breaking. The empty shells are thrown into the water and the jetty is then washed down with buckets of seawater. Throughout the season offshore sea eggs were harvested by divers operating from small boats (“moses”) and launches (“day boats”).

Figure 9 Harvesting sea eggs by boat. Photo credit: S. Cox (left) and R. Forde (right).

Sea egg harvesting and preparation of roe for sale tends usually to be a family affair usually carried out by groups of family members (see Pena et al. 2010) but not necessarily from the same household. Persons interviewed noted that there was a family history of sea egg harvesting. In 2015, mothers, sisters, nieces etc. assisted with breaking and packaging of roe for sale while sons, brothers and uncles etc. carried out the harvesting. Observations indicate that breakers however were predominantly male. Many groups carried out all aspects of sea egg harvesting and processing in order to maximise their profits instead of dividing labour among sub-groups.

3.6 Fishing effort, preparation and marketing of roe

The normal period for harvesting sea eggs was between 5am and 5pm daily. Generally harvesting began early in the morning between 5-7am and ended between 3 and 5pm. One person noted that the

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9 Out of 286 persons who indicated their role in the 2015 season, 136 persons identified themselves as divers only (63%), 74 as breakers only (26%) and 76 (27%) as both divers and breakers (Fisheries Division data).
duration of one trip was typically from 5am to noon at which time the sea eggs were brought to shore. Afternoon dives were all second trips by the same harvesters.

Estimates of net capacity varied from 100 to 200 sea eggs. One person specified the capacity of a small net to hold 200 sea eggs. This is on par with the majority of estimates provided from those interviewed which ranged between 100-150 sea eggs. Harvesters noted that the time taken to fill nets averaged between 10-20 minutes on a good day (good sea conditions and abundant sea eggs). Larger nets were estimated to take between 40 minutes to one hour to fill.

Daily catch estimates ranged from 200 to 2,500 sea eggs (largely per group although a few persons harvested alone). Two persons provided ranges of 500-600 and 200-700 sea eggs per day; while one individual noted harvesting 1,000 to 2,500 per day. Generally persons made 1-2 trips per day to harvest sea eggs. Harvesters noted the frequency of harvesting was dependent of sea conditions. At least four days were lost due to poor sea conditions mostly affecting harvesters in Bathsheba who were unable to cope with large waves in the surf.

The preparation and marketing was as per previous seasons (see Pena et al. 2010) in half litre Styrofoam Figure 10). No customers were observed bringing their own containers for sea egg purchase. With respect to food safety and handling, two points of potential interest include (1) the observation of some breakers eating roes while using the same spoon for continuous breaking of sea eggs and (2) direct handling of sea egg roes by breakers (sanitation).

Two estimates on numbers of sea eggs required to fill a container (half litre) were given: 25 and a range of 20-40. Using these estimates and the sales price of the half-litre container, the 2015 unit price for sea eggs ranged between USD 0.75-1.50/shell (BBD 1.50 to 3.00/shell).

![Figure 10 Preparation and packaging of roe for sale in half-litre Styrofoam containers. Photo credit: R. Forde.](image)

It was estimated that an average of 20-40 containers were produced from the harvest by harvesting group per day. Field observations indicated harvesting groups tended to be larger for those harvesting without boats comprising 4-6 persons, while those using boats comprised 2-3 individuals. Mahon et al. estimated harvesting group size to be on average five persons.

Differences in the number of containers produced per day would have been dependent on fishing effort and abundance of sea eggs throughout the season. It should be noted that one harvester mentioned the
demand for sea eggs was so high that for most days, all of the containers were sold before he even left the jetty. Crude catch ranges per day are shown in Table 4 based on the two estimates of 25 and 20-40 urchins said to be required to fill a container. Differences in the number of sea eggs required to fill a half-litre container would be attributed to natural variation in urchin roe size. Based on these estimates, daily crude catch rate for the 2015 sea egg season ranged between 400 to 1,600 sea eggs per harvesting group similar to what some harvesters suggested.

Table 4 Crude estimate of catch per day based on varying container production rate estimates and estimates of numbers of sea eggs required per container

<table>
<thead>
<tr>
<th>No. of sea eggs to fill container</th>
<th>Container production/day/group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>20 containers = 10 litres</td>
</tr>
<tr>
<td>20</td>
<td>400 sea eggs/day</td>
</tr>
<tr>
<td>25</td>
<td>500 sea eggs/day</td>
</tr>
<tr>
<td>40</td>
<td>800 sea eggs/day</td>
</tr>
</tbody>
</table>

Table 5 shows crude daily catch estimates extrapolated to weekly and monthly harvest rates. Monthly harvest rates per group for the 2015 season ranged from 11,200 to 44,800 sea eggs per harvesting group.

Table 5 Crude weekly and monthly catch rates for 2015 sea egg season

<table>
<thead>
<tr>
<th>No. of sea eggs to fill container</th>
<th>Catch rates (no. of sea eggs/per week or month)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Per week</td>
</tr>
<tr>
<td>20</td>
<td>2,800 – 5,600</td>
</tr>
<tr>
<td>25</td>
<td>3,500 – 7,000</td>
</tr>
<tr>
<td>40</td>
<td>5,600 – 11,200</td>
</tr>
</tbody>
</table>

3.7 Economic value

In 2015, sea eggs were sold for USD 30 (BBD 60) per half-litre container twice the sales price of a one-litre container in 2004 (McConney and Pena 2005). One harvester quoted the sales price of a one-litre container to be USD 60 (BBD 120) but such containers were not commonly seen at landing sites perhaps due to their unpopularity with the Barbadian public due to steep cost.

Revenue from the sea egg fishery in Barbados is an important part of some fishers’ income (McConney, Mahon and Parker 2003). While researchers differ on their estimates of mean income per fisher from the harvest largely attributable to differences in estimates of effort, there is little doubt that when abundant, sea eggs in Barbados are the basis of a very valuable fishery (Fishery Division 2003). Extrapolating from the estimated 20-40 container production per day per group at USD 30 per container, a crude estimate of monthly revenue per group can be calculated, the range of which is between USD 16,800 – 33,600 (BBD 33,600-67,200). These estimates do not take into consideration differing shares according to whether persons in the group are divers versus breakers and other costs for gear and vessels. The Fisheries Division estimates the total value of the 2015 sea egg season at USD 0.6 million (BBD 1.2 million) based on estimates of mean catch, quantity of roe product and price.
3.8 Attitudes towards the licensing system

Views on the licensing system were mixed among those interviewed with almost similar proportions having no issue with the management measure and generally being supportive of it (42%) and a large proportion believing it to be unnecessary (37%). Sixteen percent believed the system was unfair and 5% thought it was not efficient (Figure 11). Those who were supportive of the issuance of licences, having no issues with it, felt this way since the licences were free and believed it would be good for the fishery. Those who found the system to be unnecessary took issue with the requirement of breakers to be licensed. It was virtually unanimous that licensing for breakers was unnecessary and a deterrent for many who were willing to help.

The common comment among those who felt the new licensing system was unfair was the belief that the fishery should have only been opened to people who fish as a profession. This belief was strongly voiced via the Consett Bay Fisherfolk and Fish Market Facebook page prior to the start of the season with the group posting, "Do you believe the Fisheries Division really know[s] what their are  [they are] doing? For a fisherman to obtain his fisheries pass, he have [has] to present a passport and with his boat owner. Now the sea egg banned [ban] have [has] been lifted anybody can obtain a fisheries pass to obtain a sea egg license. How could someone that have [has] no knowledge about fishing be consider[ed] as a fisherman[?] . No offence how can a fisherman turn up at the airport an[d] obtain a license as a pilot when he has no idea about flying an aeroplane. Fishing is a fisherman['s] profession don't taken [take] it away from him..."(Posted 29 Sept 2015).

![Figure 11 Harvesters attitudes towards licensing for the 2015 sea egg season (n = 19)](image)

One harvester provided very valid points pertaining to the management measure imposed on the fishery, mainly that there had been a lack of enforcement and regulation, and this would likely lead to many fishermen diving for sea eggs in the future without obtaining the licence.

There was also mention of boat fishermen who have the advantage of harvesting, and have a tendency to clean out the areas they visit when they should be leaving back a few urchins to repopulate the area.

Interviewees went on to say that the Fisheries Division should be conducting surveys of the urchin population at least once a week to determine when an area has been overfished and thus prevent further harvesting from these defined areas for the remainder of the season. He also stated that some
of the harvesters (those who lack true fishing experience) do not have experience with [harvesting] sea eggs and thus do not know the ideal ones to harvest. He thought that a solution to this would be to perform a briefing to every licence holder, informing them of proper harvesting techniques and ideal sizes of urchins to harvest [prior to the start of the season]. Many fishermen were reportedly clearing out entire areas of sea eggs, and this was believed to be detrimental to the long-term sustainability of the crop. Traditionally, instead of harvesting all mature sea eggs in sight, a few are left behind in each area to replenish the stock for the following year. Those interviewed believed that information such as this as well as that on general sustainable harvesting practices should be the responsibility of the Fisheries Division.

4 SEA EGGS IN THE MEDIA

Throughout the open season, Shekira Sealy collected and documented all available print reports provided by mass and social media and public reaction. Whatever was not available electronically was scanned and archived. A summary of the coverage is provided in Appendices 3 and 4. Coverage of the 2015 season was greater than that of the 2004 season with sea eggs and the fishery featuring in news reports (print, electronic and audio-visual) 21 times prior to and during the season. This could be attributed to greater length of the 2015 season compared to that of the 2004 season (two weeks) and the fact that the fishery had been closed for a decade. The Nation News and its regular Daily Nation, Weekend Nation and Sunday Sun publications provided the overwhelming majority of coverage of the open season. This is in direct contrast to the island’s other leading newspaper, The Barbados Advocate, in which coverage was notably lacking. News on the season occupied prominent pages such as the front, centre and back pages and was very pictorial. Newspaper reports were lucid and succinct and focused on the newly implemented licensing system for harvesting and its accompanying rules, the duration of the open season and fishers’ reaction to this, diver opinion of stock abundance throughout the season, and marketing of sea egg roe. The Fisheries Division made regular use of newspaper articles to provide information about the 2015 season and the fishery, good harvesting practices, the newly introduced licensing system, among other things, throughout the open season. Newspaper articles suggested Fisheries Division personnel engagement in providing comments and raising awareness about the fishery throughout the season. The authority repeatedly pleaded with sea egg divers to: practice responsible harvesting in terms of harvesting only adults and leaving juveniles to repopulate the stock; avoid breaking sea eggs on sea egg grounds; and refrain from the illegal practice of using SCUBA to fish for sea eggs. The Fisheries Division also reminded consumers that it was an offence to purchase sea eggs from unlicenced divers. It should be noted that commentary by the Barbados National Union of Fisherfolk Organisations (BARNUFO) was notably absent. A selection of some of the more impactful newspaper headlines is shown in Figure 12.

Reaction in the media to the licensing system was divided with some saying that licensing should have been restricted to fisherfolk only (this was a similar result to CERMES face-to-face interviews conducted during the season). Some of the most ‘vocal’ criticism of the approach to licensing came from Consett Bay fisherfolk via their Consett Bay Fisherfolk and Fish Market Facebook page (Appendix 4).

Throughout the season newspaper articles, radio and television news reports all described better abundance on the east and north coasts than on the south. Poor abundance on the south resulted in divers from the area moving to the east coast to continue harvesting. Many divers reported dwindling catches by mid-season and expressed doubts the season would last for the entire month. Demand for sea egg roe was high and consumers were paying BBD 60.00 (USD 30.00) per container. The timing of the season was a continuous complaint among divers and breakers particularly due to the quality of the
roe and the poor weather conditions at this time. Illegal harvesting was blamed for declining abundance at traditional harvest locations (Silver Sands). Two arrests of divers suspected of harvesting sea eggs with SCUBA were made during the season but the Coast Guard was viewed more as a nuisance since no evidence was found to prosecute the individuals. As a result no judicial actions could be taken.
Figure 12 A selection of newspaper headlines for the 2015 sea egg season (Source: Nation Publishing Co. Ltd)
5 SITE VISITS

CERMES made three site visits on 30 October to Conssett Bay, Tent Bay and Silver Sands in an attempt to gain feedback from divers and breakers on the following question: For the next sea egg season opening what, if anything, should (a) people in the fishery and (b) government do differently? It was hoped that the question would focus attention on what was good and poor related to management, rather than just share stories. Although people were willing to talk, they were preoccupied with harvesting activities and feedback was limited but included:

- Young first time harvesters need to be educated by more seasoned sea egg fishermen about responsible harvesting practices.
- Divided reaction to the licensing system. Some feel licences should have been restricted to fisherfolk, others said everyone should have the chance to fish the resource.
- The requirement for reporting on numbers harvested was viewed as unrealistic. Although it was possible to fill out the data sheets, people were not doing so or not accurately doing it. Reporting was further compounded by the fact that sea egg harvests were pooled so if each harvester provided an estimate and each breaker provided theirs, then the overestimation would be high.
- The Fisheries Division needs to be more visible throughout the open season.
- One diver noted that with the season having opened this year, maybe the Sea Egg Fishery Management Advisory Committee (SEFMAC) would be taken seriously to put things in place for next year.

Coming out of these site visits, CERMES circulated a discussion document (Appendix 5) on the sea egg open season via its Facebook page and mass emailing to determine whether a critical and learning oriented analysis of the season and management was likely. No responses were received. Perhaps these media are not the most appropriate for discussion and feedback on a topic such as this. A focus group or meeting should be tried for critical learning.

6 POST-EVALUATION OF THE 2015 SEASON

A collaborative post-evaluation of the 2015 season is being planned by the Fisheries Division with fishers in 2016. It was hoped that this meeting would have been held shortly after the close of the season but due to delays in data entry from the required submission of harvester data sheets, the Fisheries Division felt that it was necessary to postpone the evaluation (C. Parker, pers comm). Submitted data required interpretation since landings were provided both by group and individuals.

A collaborative post-evaluation could have provided an opportunity for information exchange to flag differences of opinion or fact, develop a shared view of the season, highlight ‘hot spots’ for urchins and depleted areas, determine the degree of compliance with the closed season, air enforcement issues, note views on the licensing system and examine possible management approaches to be implemented in the coming year. It is critical that the Fisheries Division holds this collaborative post-evaluation since there were mixed attitudes towards the registration and licensing system for the 2015 season. To not provide an opportunity for free and frank discussion of the fishery is to further stifle co-management. Regarding the type of co-management, it appears that consultative rather than collaborative is the aim.
7 CONCLUSIONS

The 2015 sea egg season was similar to that of past harvesting seasons in terms of high participation in harvesting and processing activities, harvesting methods employed and demand for the resource, with the exception of the inaugural implementation by the Fisheries Division of a non-restrictive licensing system primarily as a measure for data collection rather than harvesting control. The licensing system introduced for the first time in the management history of sea eggs in Barbados received mixed reviews from sea egg harvesters and breakers. The Fisheries Division needs to pay attention to this during its post-evaluation of the season. In 2003 fishers who were present at the post-evaluation meeting for the season did not favour a restrictive licensing tool. Access to the sea egg resources was seen as an inherent right rather than a privilege of the State to license (McConney and Pena 2004). It is therefore interesting to note the many comments related to the open registration implemented by the Fisheries Division and its perceived unfairness in allowing people other than fisherfolk to be licensed to harvest the resource.

Licensing provided the Fisheries Division with the opportunity to update and expand its database on persons involved in the sea egg fishery (harvesters, breakers etc.). Contextual socio-economic information on occupation, age, educational level and role in the fishery (whether as harvester or breaker) was obtainable from previous and new registrations. However, the license application or registration process did not allow for the collection of information on type of harvesting operation (part of a group or individually). This contextual information is critical to developing an accurate socio-economic profile of the fishery for monitoring trends in changes over time.

Additionally, the Fisheries Division must significantly improve its monitoring, control and surveillance (MCS) systems especially with respect to this vulnerable fishery. The Fisheries Division was not as visible as it should have been throughout the open season. It undertook some monitoring of activities on the first day of the season and on a few days throughout the season (C. Parker pers. comm.) but lacked capacity to thoroughly and effectively monitor activities and collect data and information critical to management. Harvesters and breakers who spoke with CERMES researchers identified the absence of the management authority as an issue. This issue continues to plague not only the Barbados Fisheries Division but other authorities within the region. Innovative ways of improving institutional capacity for MCS must be found perhaps through engagement of BARNUFO, The University of the West Indies, and others. The SEFMAC could be critical to MCS. Having no MCS, or only limited MCS, will undermine future (co-)management interventions with respect to the fishery. Data collection to corroborate information submitted officially by harvesters should be undertaken throughout open seasons by the Fisheries Division. This is crucial to improving and adapting the management of this traditionally and culturally important fishery.

There was a total of 625 registrants and a return of 332 data sheets for the 2015 season. The level of initial interest was surprising, but the return rate was not, as it reflected expected attrition (C. Parker pers. comm.).

There was indifference towards reporting catch and effort data when CERMES researchers asked harvesters and breakers about the requirement for reporting. As a result Fisheries Division catch and effort data collected for the 2015 open season is inadequate and limited based on this low return rate and inaccuracy in reporting since persons reported harvest numbers by group and not on an individual basis. There is a high probability that many of the quantities reported were fabricated, and no means of
data validation was instituted. The Fisheries Division must improve its monitoring capacity and process if management information is to be credible.

It is also interesting to note that mid-way through the season, due to declining abundance at traditional sea egg sites (such as Silver Sands), sea egg fishermen from these areas moved to the east to continue harvesting. Bathsheba seemed to have experienced a high level of ‘outsiders’ harvesting in the area, which was corroborated by observation and newspaper accounts. Attitudes towards licensing should be reviewed to determine people’s attitudes towards restriction by profession and area.

Demand was high for the product which had been banned for a decade and the Barbadian public was willing to pay the reasonably high price to sample the delicacy once again. Although the season was one in which it was reported that a number of young people (recent school-leavers looking for jobs in a difficult economic time), had entered the fishery, there was little evidence of this at harvesting locations where more seasoned harvesters and breakers who had been involved in the fishery for years were common. Perhaps the younger demographic entered the fishery early on in the season hoping to earn quick and good cash but the poor sea conditions during this time, and the labour involved in harvesting and preparing the sea eggs for sale may soon have deterred most. Recruitment into the fishery requires further investigation.

The Fisheries Division again did not demonstrate a well-planned approach to co-management. Efforts have however been made towards improving governance of the fishery with the proactive drafting of the first separate sea egg management plan in April 2015 and its revision this year. Based on an evaluation of the season, the plan must be revised and updated accordingly. The SEFMAC is non-functioning and needs to be re-established and strengthened as a mechanism for effective stakeholder consultation and engagement in the management of the sea egg fishery as stated in the draft sea egg management plan. The Fisheries Division and BARNUFO should collaborate on this initiative. All activities pertaining to the re-establishment and strengthening of the council should be in time for the 2016 pre-season sea egg assessment. The duties, composition and procedures of the council have already been developed and included in the draft sea egg management plan. Sea egg fishers demonstrated concern over declining abundance of sea eggs during the 2015 season and repeatedly promoted the need for responsible harvesting practices. With this in mind, re-establishment of the council should proceed immediately with ethical incentives to serve on the advisory body. The Fisheries Division and BARNUFO could appeal to fishers’ notions of stewardship for the resource and fishery by requesting volunteer service to the council in the initial stages of re-establishment. Means will have to be sought soon after to provide other incentives.

The sea egg season featured prominently in numerous newspaper articles, and on the radio and CBC TV. The media was also utilised quite effectively by the Fisheries Division throughout the season and the authority responded to queries by journalists effectively. There was strong emphasis on promoting the licensing system and compliance with the system, and regulations of the fishery.

Low abundance and small roe were reported at sites in the south of the island compared to the east and north coasts. This could indicate continued illegal harvesting on the south and might indicate the need to protect certain sites from harvesting through the establishment of no-take reserves at key spawning and recruitment sites as proposed in the draft sea egg management plan. With an improved MCS throughout open seasons, the Fisheries Division would be able to explore closing overfished areas during the open season. Such a recommendation was made by one of the fishermen interviewed.
More public education should be undertaken to inform people in Barbados about the consequences of illegal sea egg harvesting both for the sustainability of the resource, and for them if successfully prosecuted. Harvesting during the closed season, and hence illegal purchases by consumers, have become customary. Some of these consumers are alleged to be individuals in positions of authority. It has been said that illegal fishers therefore feel encouraged to break the law. Information on the conservation regulations needs to reach a wide cross-section of the public, across all ages. The increased awareness among children may assist in changing the behaviour of adults (McConney and Pena 2005). A series of Public Service Announcements (PSA) should be televised prior to and during all open seasons for added impact.

CERMES was unable to conduct a preliminary livelihoods analysis on sea egg fishers based on the official information collected by the Fisheries Division. Future data collection during registration of persons should include appropriate socio-economic information. This information is essential to understanding the level of dependence on the sea egg fishery by people of varying backgrounds and will help to inform future management actions. A greater understanding of the socio-economic profile of the fishery and evaluation of the management process are critical to the rehabilitation and sustainable use of this resource in the future.

The future of sea egg fishery management appears to be as uncertain as the annual abundance of the animals. Decisions are required on the approach to management as there is currently a confusing mix of consultative co-management alternating with conventional command-and-control minus the critical element of consistent enforcement. It is difficult to detect a coherent fisheries policy for the fishery.

8 REFERENCES


APPENDICES

Appendix 1: Application form for sea egg licence

APPLICATION FOR A LICENCE TO HARVEST SEA EGG

CONTACT INFORMATION

Applicant name: ____________________________________________

Last name: ____________________________________________

Middle name(s): _________________________________________

First name: ____________________________________________

Nicknames: _____________________________________________

Gender: _______________________________________________

Mailing address: _________________________________________

Tel: (H): ________________ (W): ________________ (C): ________________ (F): ________________

NATIONAL REGISTRATION CARD OR PASSPORT INFORMATION

Passport No.: ___________________________________________

Passport origin: ______________________________ Date issued: ______________________________

Place issued: ______________________________ Date expires: ______________________________

National Registration Number: ____________________________

EMERGENCY CONTACT

Name: ______________________________

Address: ____________________________

Relation: ______________________________

Tel: (H): ________________ (W): ________________ (C): ________________

WORK EXPERIENCE

Number of years experience: _____________________________

Harvest site(s): (1) ______________________________ (2) ______________________________ (3) ______________________________

Vessel(s) applicant is working on or associated with:

<table>
<thead>
<tr>
<th>Hull No.</th>
<th>Reg. No.</th>
<th>Vessel Name</th>
<th>Role on Vessel</th>
</tr>
</thead>
</table>

I hereby submit this application for a licence to harvest sea eggs in accordance with the notice published in the Official Gazette. I also declare that all of the information provided above is true.

Signature of Applicant: ____________________________ Date ____________ Year Month Day
<table>
<thead>
<tr>
<th>Reissue Reason</th>
<th>Date</th>
<th>Officer</th>
</tr>
</thead>
</table>

**Received by:** ______________________ Date ______________________

**Application for Sea Egg Licence:** Approved ☐ Not approved ☐

**Chief Fisheries Officer:** ______________________ Date ______________________

**Computer Updated by:** ______________________ Date ______________________

**Valid For the period 1st October 2015 to 31 October 2015**
Appendix 2: CERMES research on sea egg fisheries (local and regional)

- **Determination of the formal and informal processes and conditions for establishing and sustaining adaptive co-management of sea urchin fisheries in Barbados and Saint Lucia (PhD research – CERMES, University of the West Indies, Barbados)**
  
  In Barbados and Saint Lucia the management of the white sea urchin (*Tripneustes ventricosus*) fishery has proved problematic for many years. Both countries place a high cultural and economic value on this fishery. This fact, in addition to the sedentary nature of these organisms and their habitat preference in the near shore, has made the white sea urchins vulnerable to overexploitation. Many management strategies, including co-management arrangements have been attempted in the past but important attributes favouring the success of these initiatives are absent. A new approach to governance called adaptive co-management has emerged that moves beyond the limits of co-management with characteristics that highlight the importance of adaptation and learning. This approach to governance may be the solution to the problem of managing the sea urchin fisheries in Barbados and Saint Lucia. This research seeks to determine the formal and informal processes and conditions for establishing and sustaining adaptive co-management of the sea urchin fisheries in Barbados and Saint Lucia.

  **Accompanying publications**
  

- **Development of a draft fisheries management plan and governance arrangements for the Grenada sea urchin fishery, using ecosystem-based and sustainable livelihood approaches to fisheries management (MarGov project small grant, Grenada Fisheries Division)**
  
  The purpose of this project was to develop a draft fisheries management plan and governance arrangements for the Grenada sea urchin fishery using ecosystem-based and sustainable livelihood approaches to fisheries management. Outputs include: ecological, socio-economic and governance situation analyses for the sea urchin fishery; public consultations on options for managing and governing the sea urchin fishery leading to improved and shared understanding of the fishery and how it can be better managed; draft fisheries management plan for the Grenada sea urchin fishery; and a report of lessons learned and recommendations.

  **Accompanying publications**
  

- **The sea urchin fishery in Grenada: a case study of social ecological networks (MSc research, University of Manitoba, Canada)**
  
  This research examined the white sea urchin (*Tripneustes ventricosus*) or the “sea egg” fishery in Grenada prior to its closure in 1995. A case study was developed to examine the social-ecological networks of the fishery, to identify the participants and their networks with
consideration for the multitude of challenges and issues facing small-scale fisheries and their management. Improving governance and using social network analysis to understand social structure and features may improve the likelihood that an alternative to the prevailing centrally-controlled management strategies can be found and be more effective.

Accompanying publications

- Strengthening the role of the Barbados Fisheries Advisory Committee (FAC) in sustainable governance of fisheries resources in Barbados: Examination of the FAC’s ability in formation of a Sea Egg Management Council
- One of the case studies of this research is to determine the resilience of the Barbados Fisheries Advisory Committee (FAC) in the governance of the fishing industry in Barbados. The FAC was awarded a grant of US$8 750 in July 2008 to strengthen its role in the sustainable governance of fisheries resources in Barbados. One of the governance tests in this project is the formation of a white sea urchin management council.

Adapted from Pena et al. (2010)
## Appendix 3: Media reports made prior to and during the 2015 sea egg season

<table>
<thead>
<tr>
<th>Date</th>
<th>Summary of reports and observations</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 Sept 2015</td>
<td>First announcement of the opening of the sea egg season from 1 – 31 October, 2015, for the first time in 11 years. The new closed season is due to begin on 1 November. It was reported that a full open season was not possible due to constant illegal harvesting throughout the 11 year ban. During the ban, there had been several “calls and recommendations by fisheries officials to have some form of sea egg seasons.”</td>
<td>“Open season on sea eggs” Barbados Nation. <a href="http://www.cbc.bb/index.php/en/news/barbados-news/item/2523-open-season-on-sea-eggs">http://www.cbc.bb/index.php/en/news/barbados-news/item/2523-open-season-on-sea-eggs</a></td>
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<td>26 Sept 2015</td>
<td>In the Comment page of the Saturday Sun, one of the “Eff I wuz…” comments referred to the sea egg fishery, particularly consumers, stating, “EFF I WUZ...A SEA EGG LOVER I would beg the poachers to give the sea urchins time and space to multiply.”</td>
<td>“Eff I wuz…”, Saturday Sun, page 9.</td>
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<td>30 Sept 2015</td>
<td>Prior to the start of the open season reportedly greater than 200 people, both men and women, had already applied for harvest licenses. The report noted however that some fisherfolk were not in agreement with the process in which there was no priority given to fishermen to harvest sea eggs. Additional information provided in the news report regarded the penalty for harvesting sea eggs without a licence – up to BBD 50,000 – and similar liability for those caught buying sea eggs from unlicensed harvesters. The Chief Fisheries Officer appealed to harvesters to avoid the practice of breaking sea eggs on sea egg fishing grounds.</td>
<td>“200 sign up for sea egg harvest” Barbados Nation. <a href="http://www.cbc.bb/index.php/en/news/barbados-news/item/2581-200-sign-up-for-sea-egg-harvest">http://www.cbc.bb/index.php/en/news/barbados-news/item/2581-200-sign-up-for-sea-egg-harvest</a></td>
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<td>1 Oct 2015</td>
<td>Morning news extract was as follows, “Registered Barbadian divers are heading to harvest sea eggs. People wishing to harvest sea eggs must be registered and licensed by the Chief Fisheries Officer.” The story was not mentioned in the headlines.</td>
<td>7:30am Morning News, Q 100.7 FM</td>
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<td>1 Oct 2015</td>
<td>Night news headline story – “Sea eggs aplenty as the season gets underway.” It was reported that “divers wasted no time in harvesting sea eggs. Estimates suggest that there are thousands but sea egg diver Jack Waldron says there are not enough people to break.” One</td>
<td>7:00pm CBC Night News</td>
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<td>1 Oct 2015</td>
<td>breaker who was interviewed said the row was not firm enough and the season should have been opened earlier. In the CBC Night News Poll, the opinion poll question posed was “Should there have been an earlier start to the sea egg season?” The responses were as follows: Yes – 80% No – 20%</td>
<td>“Sea eggs at last!” Barbados Today (Evening edition) – cover page</td>
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| 1 Oct 2015 | Short interviews with three fishers and a breaker at Skeetes Bay, St. Philip, about the first day of the season. All fishers mentioned the rough seas characteristic of October and the impact it would have on harvest yield and the sales price of roe. The article referenced the extended ban on fishing sea eggs noting approximately 400 licenced divers were involved in this year’s season. Demand for sea eggs was high as one fisher noted that, “his catch already had takers even before he left to fight the waves.” 

*It should be noted that the duration of the ban on sea egg harvesting was incorrectly quoted twice throughout the article as being five years long. The fishery was closed since 2004. Additionally, misinformation on the resource consumed was provided – “Using spoons, the women along with the men expertly cracked the sea eggs, took out the urchins, cleaned them and placed them in buckets.” The roe (gonads) of the urchin are what are removed and consumed.* |  |
<p>| 1 Oct 2015 | Sea egg harvesters were out diving for sea eggs from dawn on the first day of the open season. The article reported many vendors cleaning sea eggs at Silver Sands with customers around awaiting word on the sales price. Rough sea conditions on the east coast (Martin’s Bay and Consett Bay) hindered harvest by divers. | R.A. “Sea egg season opens” Barbados Nation <a href="http://www.nationnews.com/nationnews/news/72871/sea-egg-season#sthash.ud3iTwF3.dpuf">www.nationnews.com/nationnews/news/72871/sea-egg-season#sthash.ud3iTwF3.dpuf</a> |
| 1 Oct 2015 | There was an overwhelming response to registering for the 2015 sea egg season with over 400 divers reported to have been granted licences by the 1 October start date. Fisheries officials noted this would provide “an opportunity to expand our database and make it easier to manage.” The authorities issued an appeal to divers to harvest the resource responsibly. The article also   | Slinger, T. “Sea egg nod: 400 divers get the OK to harvest as season opens”; “Next year in divers’ hands” Daily Nation, front page and p4. |</p>
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<th>Summary of reports and observations</th>
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<td>2 Oct 2015</td>
<td>Large photo on the front page of the Weekend Nation of a diver with net laden with sea eggs. The article, divided into three sections, provided an account of activities on the first day of the open season inclusive of photos of divers and breakers at Consett Bay and Silver Sands. Divers reported that the majority of sea eggs were on the east and north east coast from Ragged Point Lighthouse in St. Philip to Cove Bay in St. Lucy. Some sea eggs were present at Silver Sands with roe in good condition. Better diving conditions were experienced on the south that on the east. One diver noted there weren’t as many sea eggs as there had been in the past. He also voiced his disagreement with having to document the number of sea eggs harvested daily—“That is madness, it was never required before so why now. Men trying to hustle a dollar and don’t really have time for that.” Harvesting was limited on the east coast at Martin’s Bay and Consett Bay due to rough seas. One of the first divers to be arrested on the first day of the open season was interviewed. The diver had been suspected of using SCUBA to harvest sea eggs but was released when no evidence was found. The article provided a description of SCUBA and Fisheries Division official’s perspective on the use of the gear for harvesting sea eggs which was described as being unfair to other divers. It was noted that divers believe the rule is unfair and should be revisited.</td>
<td>Agard, R. “Sea eggs galore”; “Long wait over”; “First arrest of sea egg season.” Weekend Nation, front page and pages 32 and 33.</td>
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<td>3 Oct 2015</td>
<td>In the Comment page of the Saturday Sun, one of the “Eff I wuz...” comments referred to the sea egg fishery, specifically targeting sea egg fishermen and the sustainable harvesting of the resource and was as follows: “EFF I WUZ...A SEA EGG diver, I would let common sense prevail and leave enough adults behind to bolster next year’s season.”</td>
<td>“Eff I wuz...”, Saturday Sun, page 9.</td>
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<td>4 Oct 2015</td>
<td>Interview with fisherman Charles Inniss about the sea egg fishery. A fisherman for over 30 years, he is part of the per-season sea egg assessment team. Inniss provided an overview of the annual assessment method which uses quadrats to determine sea egg abundance. Decisions regarding the opening of the</td>
<td>Agard, R. “Sea egg harvest a ’25-year setback’” Sunday Sun, page 24A</td>
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<td>11 Oct 2015</td>
<td>The process is a consultative one in which the assessment team and Fisheries Division discuss abundance and status of the sea egg stock. In Inniss’ opinion the 2015 crop of sea eggs was not all ripe or plentiful. In the article Inniss stated that the authorities hold regular discussions about sea eggs but participation is low and as a result harvesting practices are not well informed. He stressed that, “by harvesting wrong they are only killing the crop”. The licensing system was criticised and described as “ludicrous”. The authorities should have consulted with divers before implementing licencing. Perceived flaws in the system were the need for recording daily catch, requirement for breakers to be licenced too, late registration notice and the BBD 50,000 fine for illegal harvesting described as, “that is madness.”</td>
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<td>Half page photo of breakers on the Consett Bay jetty breaking sea eggs. The accompanying caption mentioned the high harvesting activity in the St. John fishing village and reminded readers that sea egg harvesting had been banned for the past 11 years and the current open season would close on 1 November.</td>
<td>Agard, R. Sea eggs, sea eggs! Sunday Sun, front page.</td>
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<td>Almost mid-way into the season, the article reported that the sea egg population appeared to “have taken such a hit” that levels on the south and southeast coasts had declined. The Fisheries Division was reported to have been conducting independent research into the decline in abundance. Several sea egg fishermen and divers claimed low abundance of mature sea eggs and were doubtful the season would last past the third week. Fisheries Division officials noted an overwhelming response to the open season with over 400 licenses awarded to divers and breakers. One Fisheries Division official warned that if harvesters did not fish responsibly, the authority might be forced to enforce the ban again next year.</td>
<td>Agard, R. “Fisheries officials probing sea egg drop.” Sunday Sun, page 3A.</td>
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<td>Communities in St. John in the east and Christ Church in the south were busy with harvesting activity. Poor seas had hampered divers at Silver Sands in Christ Church from harvesting sea eggs on that day. Divers mentioned steady depletion of the sea egg crop in the area. Due to scarcity of the resource on the south, divers there were determining alternative harvesting sites. Divers said “they were happy that the season had opened to allow...”</td>
<td>Agard, R. “Fishermen say sea eggs on decline.” Sunday Sun, page 34A.</td>
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<td>19 Oct 2015</td>
<td>Fisherfolk claimed to be unable to satisfy the demand for sea eggs due to declining abundance of sea eggs along the south coast in areas such as Silver Sands, Long Beach and Foul Bay. It was reported that by mid-season sea eggs were plentiful only the east coast. Lack of policing during the official ban was posited for the low abundance of sea eggs on the south coast by one fisher. Another fisher noted sea eggs in the south were vulnerable to poaching due to the calm seas of the area. The severity of illegal harvesting was reinforced with his claim that, “off season, more sea eggs were taken from the sea that what is taken now.” Harvester complained that some divers were not practicing selective harvesting but instead were in the season only for the money. It was noted that these persons were taking up sea eggs that should be left to breed. Harvester again complained about the timing of the open season with respect to poor product quality referred to as “sandy and drippy”, as well as the rough seas which posed safety problems to divers.</td>
<td>K.K. “Sea egg season a let down” Barbados Today</td>
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<td>22 Oct 2015</td>
<td>Two divers who were arrested on the suspicion of harvesting sea eggs with SCUBA gear believed they were harassed by the Barbados Coast Guard. Both men and their vessels were taken to Coast Guard headquarters but were later released as nothing illegal was found.</td>
<td>Agard, R. “Divers cry foul” Daily Nation, p 3.</td>
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<td>23 Oct 2015</td>
<td>In the CBC Night News Poll, the opinion poll question posed was “Should there be another sea egg season next year?” The responses were as follows: Yes – 24% No – 76%</td>
<td>7:00pm CBC Night News</td>
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<td>30 Oct 2015</td>
<td>The writer notes that some sea egg harvesters were disappointed in the sea egg open season with some in Bathsheba complaining that by the middle of the season there were no more sea eggs to be harvested. In his opinion it was unfair to local divers (those in Bathsheba) that divers from St. John, St. Philip and Christ Church moved from their traditional harvest locations (Foul Bay and Silver Sands) to harvest off Bathsheba. This lead to increased harvest pressure at Bathsheba. The write questioned why divers needed to move to other harvest</td>
<td>Massiah, E. Rev. “Seems ban didn’t help sea eggs.” In: Outside the pulpit. Weekend Nation, page 27.</td>
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<td>31 Oct 2015</td>
<td>The reporter spoke to seven divers to get their feedback on the open season. Four divers on the east coast at Consett Bay evaluated the season as “okay”, “wasn’t bad”, and “it wasn’t the best and it wasn’t the worst.” On the south coast at Silver Sands, three divers reported a poor and not bountiful season. Divers on the east noted that urgent measures need to be taken to restore sea egg beds with one suggesting re-stocking from sea eggs in St. Vincent. Another diver commented on the licensing system noting that in his opinion the licenses should have only been granted to fisherfolk and not accessible to everyone. One diver on the south said he had observed “a lot of young sea eggs” and they should be left to “hatch”. Another diver commented on the duration on the open season stating that it started too late resulting in “plenty days at sea was missed” [due to rough sea conditions].</td>
<td>Agard, R. “Mixed fishing reaction to one-month sea egg season.” Saturday Sun, page 4.</td>
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<td>8 Nov 2015</td>
<td>Article based on interviews with vendors at the Berinda Cox Fish Market, Oistins. Vendors reminisced on past sea eggs seasons. In the 1970s sea eggs were plentiful. Historic sales prices were 4 to 12 cents per shell. People were happy to have harvested sea eggs during the season after the extended ban. One diver wanted the authorities to allow the use of SCUBA gear for sea egg harvesting. He refuted the firmly held belief among many that the use of SCUBA would destroy the sea eggs or would give SCUBA divers an unfair advantage over free divers. He noted that, “sea eggs are a thing that you can only catch a quota per day” because of the significant time needed to break them after harvest. Sea eggs were most plentiful from Ragged Point on the east coast to St. Lucy on the north with “a lot” in Bathsheba, Bath and Tent Bay. Plentiful areas on the south coast were reported as extending from the South Coast Lighthouse to Silver Sands hotel. It was thought that the ban should remain in place until next year. The presence</td>
<td>M.R. “Looking back on days of plenty.” Sunday Sun, 34A.</td>
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<td>of a large amount of juveniles was a good sign for next year’s crop. People believed the Fisheries Division should have extended the season (to 3 months with an extra week) due to bad weather conditions experienced on some days of the season.</td>
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Appendix 4: Social media comments on the 2015 sea egg season

Consett Bay Fisherfolk and Fish Market
September 29 at 8:29pm · Edited ·

Do you believe the Fisheries Division really know what their are doing? For a fisherman to obtain his fisheries pass he have to present a passport and with his boat owner. Now the sea egg banned have been lifted anybody can obtain a fisheries pass to obtain a sea egg licence. How could someone that have no knowledge about fishing be consider as a fisherman. No offence how can a fisherman turn up at the airport and obtain a license as a pilot when he has no idea about flying an aeroplane. Fishing is a fisherman profession don’t taken it away from him. To be a fisherman it cause for skill and knowledge. A man don’t just step on board a fishing vessels and become a fisherman.

To enter the Bridgetown Fishing Complex you had to had a fisheries pass to go on the dock to purchase fish from the vessel now the any and everybody had a fisheries pass (as the old times saying goes the cats , the dogs and everybody have a pass ) who is you to say you are not a fisherfolk ( boat owners , fisherman , fish vendor or processor. How can you give someone that have no knowledge about the fishing industry a title as a fisherman.

The sea is God creation open the season as it was in years gone by and whosoever believe their can dive sea eggs feel free to dive them. Issuing of a license is waste of taxpayers money that can be kept in the treasury to help the country out of the recession.
Fisherfolk let’s join together and stand up for the right of the fisherfolk.
Consett Bay Fisherfolk and Fish Market I do believe a man should have the freedom to dive seaeggs freely without having to obtain a license. A man may not have the time to obtain a seaegg license or afford a container of seaeggs but he can dive two for his house holds to eat, Let him feel free to dive them and enjoy them. Why should only the rich eat allow the poor man to get a taste now. The man that could afford them during the porching season eat enough.

Like · Reply · September 30 at 2:55am · Edited

Consett Bay Fisherfolk and Fish Market I cannot see no sense in what the Fisheries is trying to do A man dive his seaeggs and you're his friends and you turn up on his landing sites and decided to help him break out two of his seaegg why should i have to have a license to help him the theme of the fishing industry is you scratch my back and i scratch your when a fisherman and sea in difficulty he have to call on another fishing vessel for help. Not the Fisheries Division and the Coast Guard is a waste of time by the the coast Guard finishing sorting his navigation documents the fishing vessel in China. Fisherfolk stick together like bee stick to honey. Be your brother keeper.

Like · Reply · September 30 at 2:18am · Edited

Consett Bay Fisherfolk and Fish Market How will the Fisheries Division gong to manage policing the landing of the seaeggs. There are landing sites that the poucher was landing seaeggs during the close season and their could get it police. How would you police it now the season open? To the Coast Guard and the Police Force dont risk you life to policing seaegg you life worth more that two seaeggs rows.

Like · Reply · September 30 at 2:32am

Consett Bay Fisherfolk and Fish Market

October 2 ·

Now that the sea eggs season is legal it has more police patrol than when their were stealing them.
The Barbados Coast need to get their fact in order, Today a fishing vessel was touring the bar for King fish and Barracuda and was approach by the Barbados Coast Guard who took the boat into tour to the base because their found scuba gear and sea-egg prickle on board the fishing vessel. Don't you think this is total madness at a very high level. Where were the coast guard when the sea-egg season was close and the sea-egg were harvest illegally.
Why does the Barbados Coast Guard taking upon themselves to exploit and threatening fisherman. It time fisherman speak out about their encounter with the member of the Coast Guard. We all are citizen of Barbados and have right too. Do unto other as you would have them do unto you Remember a man sow what he reap so when you treat people unfairly accept your when your term come.

I heard fisherman say at night their coming home from from their trip after many days at sea and the coast guard vessel at sea with no light on and when the vessel near to approach their turn on the light and pass across the men boat bow. No this is not right why try to endanger a fishing vessel and crew or even your own life.

Their also know by law you cannot just decide to jump aboard a man fishing vessel, the right way is the right way you have to ask permission to board a man fishing vessel.

Why display to be stupid you escort a man to port because he had sea egg prickly and scuba gear on board his vessel and saying he had intention to dive sea egg as long as you ain't see him dive or have sea egg you cannot assume you must have proof.

Their also approach a fishing vessel on Tuesday off the Animal Flower Cave and escort it to base again when their approach the vessel their were told their were told three men was still over board in the water diving and their still insisted to take the vessel to the coast guard base their have no care for the diver do their believe these men life have no value. One diver on board had to insist that the vessel will not leave until all the divers is safe on board. Their saw the men boarded the fishing vessel with pot fish and lobsters. The Coast guard had the right to search the vessel on the stop but their did not their took the vessel to the base because their believe the vessel had on sea egg in the icebox. When their got to base carry out the check to find their had nothing again the crew. Do you know how much time wasted. diesel expense and a stopping the men from selling their catch. The two fishing vessel had to spend the night at the fishing complex then to burn diesel to go back to there original port someone should have pay the diesel bill.

Why are the Coast Guard targeting fishing vessel from Consett Bay. This is the third time that the Coast Guard and the Sea Coast Police had harass these men. Three time there escorted the fishing vessel or divers to the Coast Guard base or the Police station and brought no charges again them. It time to speak out and stand up for your right.

Lord about just let the sea egg season come to a safe close and let the fishing industry progress.

The Barbados Fisheries is also the cause of these harassment during the sea egg season.

Your job is to serve and protect not harass and threaten the society.

Source: https://www.facebook.com/NationBarbados/?nr, 4 October 2015.
Appendix 5: Sea egg discussion document

Barbados Sea Egg Fishery
Open Season October 2015
Public Discussion Document

Introduction
The Barbados sea egg fishery was opened under law from 1 to 31 October 2015. The previous legal opening was in 2004. However, during the decade of the sea egg fishery closure there were:
- High levels of illegal harvest, sale and consumption of sea eggs that most people knew about
- Low levels of enforcement of prohibited practices and of the closed season by authorities
- Low levels of social pressure to comply with the law put on those engaged in illegal practices
- Few attempts by either the fishing industry or the fisheries authorities to manage the fishery

The Centre for Resource Management and Environmental Studies (CERMES) at the Cave Hill Campus of the University of the West Indies has considerable interest in the sea egg fisheries of the Caribbean. We have done research, assisted management, recommended policy and legal measures. We have documented previous Barbados sea egg fishery openings, and did so for the 2015 season. We expect the Fisheries Division of the Ministry of Agriculture and/or the Barbados National Union of Fisherfolk Organisations to hold one or more public meetings after the close of the 2015 season to review what lessons were learned, and how to improve for the next season.

This Public Discussion Document is provided to aid any review process by setting out questions and comments that we encountered during the month-long opening. It does not cover everything. It is intended to stimulate discussion that can lead to learning so that the sea egg fishery can once again become sustainable. We will produce a report on the sea egg open season following the public discussion. Visit our web site, like us on Facebook, and follow us on Twitter to keep in touch.

For discussion
The following questions and comments are set out in no particular order except to roughly go from sea to land, and to cover the areas of sea egg nature, harvest, post-harvest and management.

1. God is who controls sea eggs, and you can never fish out sea eggs. Despite evidence from all around the world that only managed fisheries do well, some people do not believe it. Why?
2. It is pollution that is causing the sea eggs to decline, not fishing. People say this despite the likely low levels of pollution in heavily fished areas where there have been declines. Why?
3. Every year fishermen and the Fisheries Division survey the sea egg grounds to get an idea of how many sea eggs are out there, their sizes and conditions, etc. Learning anything new?
4. Harvesting sea eggs using SCUBA gear (air tanks) is illegal because this is more likely to lead to overfishing than free-diving (holding breath). Can SCUBA divers be trusted to not overfish?
5. Given the high levels of law-breaking at all points along the sea egg fishery are there new or innovative means of monitoring and surveillance to make enforcement easy and affordable?
6. There are traditional ways of “cutting the edge” and testing to see if sea egg patches should be harvested. Is it true that these good practices are being lost or ignored by the younger divers?
7. This was the first time the Fisheries Division issued licences. How well did the licensing work? What could be done better next time? Will people accurately fill out and return the data sheets?
8. Licences were available for free to anyone. With so much money to be made from sea eggs should there have been a fee to pay? How much? Should the fees be different or all the same?

9. Some people say there should be no licensing since everyone should be allowed to pick sea eggs. Others say that preference should be for people who depend on the sea. Which is fair?

10. It was said that many people engaged in the 2015 season were not licensed. If there was a cost to getting a licence would the licensed harvesters dissuade those who were unlicensed?

11. People complained that the season should have opened in September, not October. But if there is a lot of illegal harvest going on, does it make a difference when the season is open?

12. It was said that most of the unlicensed divers did not use boats, and that the Coast Guard did not check on the non-boat divers in the water. Do we need different methods of enforcement?

13. There has been little information on the postharvest side of the fishery. Do people in Barbados know that it is also against the law to sell and to consume sea eggs during the closed season?

14. Since rich and powerful (untouchable) people are said to be the main law breaking consumers of sea eggs out of season, thus driving illegal harvest, are only the poor and weak punished?

15. The Fisheries Act says fisheries management plans are necessary. Does the fisheries minister or the Chief Fisheries Officer have a sea egg fisheries management plan? If not, why not?

16. If there is no sea egg management plan, as required by law, what is the fishing industry doing about it? Do people care? Why not use fisherfolk organisations to represent their interests?

17. People said that they did not see fisheries officers monitoring the progress and problems of the open season. Why was this? What, if anything, constrains the field work of fisheries officers?

18. It was said that the Fisheries Division should ask fishing people about how to manage the open season. Why should the Fisheries Division bother when these people are breaking the law?

19. People said it would be better to have no laws and let the sea eggs get wiped out or come back without management rather than have laws that are not enforced or complied with. Is this so?

20. Years ago the Fisheries Division formed a Sea Egg Fisheries Management Advisory Council with fishermen, enforcement agencies and researchers but it became dormant. Start it again?

21. It seems that people in Barbados accept that there will be illegal harvesting of sea eggs, just like illegal dumping of garbage and littering perhaps. Are we low on environmental ethics?

22. Some people who were engaged in the open season said they have little confidence in the Fisheries Division to manage the fishery. If so, what should be done differently? By whom?

23. Despite easily available facts to the contrary there is misinformation about the sea egg (like the notion that they declined with the black sea egg or “clobber” in the 1980s). Why is this?

24. If it is possible for many people to legally make good money from the sea egg fishery every year why does society condone a few people benefitting illegally and crippling the fishery?
Join the Discussion!!

The Barbados sea egg fishery was opened under law from 1 to 31 October 2015. The previous legal opening was in 2004. However, during the decade of the sea egg fishery closure there were:

• High levels of illegal harvest, sale and consumption of sea eggs that most people knew about... See More

God is who controls sea eggs, and you can never fish out sea eggs.

Despite evidence from all around the world that only managed fisheries do well, some people do not believe it.

2. Pollution that is killing the sea eggs to line, not fishing.

3. Of late fishermen and fisheries Division of the sea egg products have an idea of how many sea eggs are there, their sizes and conditions, etc. Why?

Source: https://www.facebook.com/ceriesuwii/