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Marine Stewardship Council fisheries assessments

SSMO Shetland inshore brown crab and scallop



Surveillance Report

Conformity Assessment Body (CAB)	LRQA
Assessment team	Rod Cappell and Julian Addison
Fishery client	The Shetland Shellfish Management Organisation
Assessment type	Third Surveillance Audit
Date	May 2022

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1 Assessment Data Sheet

CAB details

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2 Glossary

- ETP Endangered, Threatened and Protected (species) Generalised Additive Model GAM HCR Harvest Control Rule HPMA Highly Protected Marine Area Inshore Vessel Monitoring System i-VMS Landings Per Unit Effort LPUE LRP Limit Reference Point MPA Marine Protected Area NAFC North Atlantic Fisheries College PMF **Priority Marine Feature** Registration of Buyers and Sellers RBS REM Remote Electronic Monitoring SSB Spawning Stock Biomass SSMO Shetland Shellfish Management Organisation TRP **Target Reference Point**
- UHI University of the Highlands and Islands
- VMS Vessel Monitoring System
- VPA Virtual Population Analysis

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3 **Executive summary**

An off-site surveillance was conducted on 24th March 2022 for this year 3 surveillance audit. The assessment team consisted of Rod Cappell and Julian Addison who had conducted previous assessments and surveillance audits of this fishery. The team interviewed the client, SSMO, and their scientific advisors at University of Highlands & Islands Shetland (UHI Shetland, previously NAFC Marine Centre). Further interviews were conducted with Marine Scotland staff involved in the roll-out of Remote Electronic Monitoring (REM) systems for inshore fishing vessels and Marine Protected Area (MPA) network development.

There have been no significant changes to the management system reported over the past 12 months. There is no indication that fishing practices have changed. A new inshore coordinator is in post and an interim Chair of the SSMO continues as an independent chair is sought.

There was some disruption to fishing operations due to Covid and more significantly the transport/export issues resulting from Brexit as much of the brown crab is destined for Europe. Covid and staffing issues also caused some disruption to planned scientific survey activity.

A co-operation agreement and a shared policy agreement between the Scottish Government and Scottish Green Party (termed the 'Bute House Agreement') were published in November 2021¹. This commits the Scottish Government to introducing fisheries measures into MPAs by 2024 and making at least 10% of the MPA network Highly Protected Marine Areas (HPMAs) by 2026. Marine Scotland is in the process of defining the criteria to select HPMAs and the associated management measures. In Shetland the MPAs are in place and Marine Scotland consider the situation to be comparatively more advanced with progressive measures already adopted by the SSMO (M. McLeod, pers. comm.).

The main element of the stock assessment of the brown crab and scallop fisheries in Shetland is the assessment of stock status against biological reference points. Direct estimates of stock biomass are not available for brown crab and therefore the assessment uses reference points and harvest control rules (HCRs) based on stock indicators which are a proxy for biomass and exploitation rate. The key stock indicator used for assessing stock status against reference points (and around which the HCRs are based) for both the brown crab and scallop fisheries is landings per unit effort (LPUE) which is considered as an index of stock abundance. There have been no changes to the reference points and HCRs since the fishery was recertified in 2018.

At the surveillance audit, the Client and UHI Shetland, formerly NAFC Marine Centre, presented updated assessments of stock status of the brown crab and scallop fisheries in relation to reference points, which are summarised below. More detailed information of the stock assessments for brown crab and scallop can be found in Coleman and Mouat (2021). As stock indicators for the brown crab and scallop fisheries are around or above the target reference points, additional management measures have not been triggered since the recertification of the fishery.

In relation to the outstanding open condition under 1.2.4, the stock assessment document was sent out for peer review by two external experts. Both peer reviews have now been completed, and recommendations will be incorporated as appropriate via the SSMO Research and Development Plan. The Client confirmed that the peer review will be implemented on a regular basis going forward. The condition was closed at this assessment and the PI rescored to a score of 90.

The SSMO Shetland Inshore brown crab and scallop remains certified with the 4th year surveillance and reassessment commencing in 2023.

¹ https://www.gov.scot/publications/scottish-government-and-scottish-green-party-shared-policy-programme/



4 Report details

4.1 Surveillance information

Table 1. Surveillance information

1	Fishery name			
	SSMO Shetland inshore brown crab and scallop			
2	Unit(s) of Assessment (UoA)			
	UoA 1			
	Species:	Brown Crab (Cancer p	agurus)	
	Stock:	Shetland inshore brow	/n crab	
	Geographical area:	FAO Statistical Area 2 which is within 6nm of	7, in EU waters – ICES Area IVa Shetland	
	Harvest method:	Creels (pots)		
	Client Group:	The Shetland Shellfish	n Management Organisation (SSMO)	
	Other Eligible Fishers:	None		
	UoA 2			
	Species:	King Scallop (Pecten	maximus)	
	Stock:	Shetland inshore king	scallop	
	Geographical area:	FAO Statistical Area which is within 6nm of	27, in EU waters – ICES Area IVa f Shetland	
	Harvest method:	Scallop dredge (mobi	le gear)	
	Client Group:	The Shetland Shellfish	h ation (SSMO)	
	Other Eligible Eisbers:	None		
	other Engine Hanera.	NOTIC		
3	Date certified		Date of expiry	
	14 th March 2012 (re-certified	12 th July 2018)	11 th January 2024	
4	Surveillance level and type			
	Surveillance level 4- off-site surveillance audit			
5	Surveillance number			
	3rd Surveillance X			
6	Surveillance team leader			
	Rod Cappell (Team Leader	and principle 2 and 3	3 expert)	

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	Rod Cappell is Team Leader with responsibilities for Principle 3. He holds a degree in Marine Biology, a master's in marine resource development & Protection and a post-graduate qualification in Environmental Economics. He has been a director of the specialist fisheries consultancy, Poseidon, for over ten years providing fisheries management and policy research services after working for several years as an environmental consultant. Rod has been involved in more than twenty MSC full assessments and re-assessments throughout Europe, Iceland, Greenland & Chile as well as undertaking numerous surveillance audits and pre-assessments. These have included assessments of demersal, pelagic and shellfish species and complex multi-species and multi-gear assessments. In recent years Rod has supported Fishery Improvement Projects in the UK, China, and France.
	Rod has passed MSC training and has no Conflict of Interest in relation to this fishery. Full CV available upon request.
Team Leader Experience	Rod has completed a number of MSC assessment as TL and meets all Fishery TL Qualification and Competency Criteria under MSC FCP v2.2 Table PC1 and MSC GCR v2.4.1 Table 1.
7	Surveillance team members
	Julian Addison (Principle 1 Expert)
	Dr Julian Addison is an independent fisheries consultant with over 30 years' experience of stock assessment and provision of management advice on shellfish fisheries, and a background of scientific research on shellfish biology and population dynamics and inshore fisheries. Until December 2010 he worked at the Centre for Environment, Fisheries and Aquaculture Science (Cefas) in Lowestoft, England where he was Senior Shellfish Advisor to Government policy makers, which involved working closely with marine managers, legislators and stakeholders, Government Statutory Nature Conservation Organisations and environmental NGOs. He has also worked as a visiting scientist at DFO in Halifax, Nova Scotia and at NMFS in Woods Hole, Massachusetts where he experienced shellfish management approaches in North America. For four years he was a member of the Scientific Committee and the UK delegation to the International Whaling Commission providing scientific advice to the UK Commissioner. He has worked extensively with ICES and most recently was Chair of the Working Group on the Biology and Life History of Crabs, a member of the Working Group on Ecosystems Function.
	as a P2 team member and team leader. He has undertaken over 30 MSC full assessments of crustacean and mollusc fisheries worldwide which use a wide range of stock assessment methodologies and fishing gears. He has also undertaken MSC pre-assessments in Europe, North America, and Australia and over 60 annual surveillance audits and technical reviews. He is a member of the MSC Peer Review College and has carried out peer reviews of MSC assessments worldwide of a wide range of fish and shellfish fisheries. Other recent work includes a review of the stock assessment model for blue crabs in Chesapeake Bay, USA, and an assessment of three Alaskan crab fisheries under the FAO-based Responsible Fisheries Management scheme.
	Julian has passed MSC training and has no Conflict of Interest in relation to this fishery. Julian has completed the MSC RBF training in the past 5 years. Full CV available upon request.
Local Context	English is widely spoken in The Shetland Isles Both Rod and Julian have had assignments in the region in the last 10 years.
Traceability	Rod and Julian have completed the MSC traceability module in the last 5 years.
RBF	Julian has completed the RBF training.

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8	Audit/review time and location
	Remote off-site audit week commencing 21 st March 2022
9	Assessment and review activities
	All relevant data, progress on the Client Action Plan and progress on the 1 open condition.
10 5	Stakeholder opportunities
F N I N	Prior to the audit, stakeholders were informed that audit team members were available to meet remotely with stakeholders and that any stakeholders wishing to speak with the assessment team, should contact LRQA before the audit date so that LRQA could organise conference call facilities. Stakeholders wishing to submit comments for the team to review were requested to use the Stakeholder Input form and submit to fisheries-ca@lr.org
	Stakeholders were requested to provide comments before the site visit date (17.00 UTC on 20 th March 2022) or at least inform LRQA that they would be providing input so LR could plan accordingly. The MSC provide guidance and templates for stakeholder contribution which can be found here: https://www.msc.org/what-you-can-do/engage-with-a-fishery-assessment

4.2 Background

4.2.1 Changes in management system

The Shetland Islands Regulating Order², which establishes the management system for the Shetland Shellfish Management Organisation (SSMO) is up for review in 2028.

There have been no significant changes to the management system reported over the past 12 months. The same number of licenses were issued, with around 8 of these held back due to a delay in the vessels receiving the required Maritime & Coastguard Agency (MCA) certificates.

The following data on licensing was provided by the client in relation to the year 2020:

- Of the 39 boats landing brown crab, 15 were targeting crab (38%).
- There were 18 vessels targeting king scallop: and
- Out of 5,560 log sheets submitted to the SSMO, 1,749 log sheets were submitted electronically (31%).

There was some disruption to fishing operations due to Covid and more significantly the transport/export issues resulting from Brexit as much of the brown crab is destined for Europe. There is no indication that fishing practices have changed.

4.2.2 Changes in relevant regulations

A co-operation agreement and a shared policy agreement between the Scottish Government and Scottish Green Party (termed the 'Bute House Agreement') were published in November 2021³. The surveillance team met with Marine Scotland's Head of Marine Conservation Unit, Michael Mcleod, to learn more about the commitments under

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² The Shetland Islands Regulated Fishery (Scotland) Order 2012

⁽https://www.legislation.gov.uk/ssi/2012/348/article/3/made)

³ https://www.gov.scot/publications/scottish-government-and-scottish-green-party-shared-policy-programme/

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this agreement regarding the future development and management of Marine Protected Areas (MPAs) in Scotland and implications for the Shetland inshore fishery.

The Bute House Agreement is far-reaching and includes management of the marine environment, making the following commitments:

• deliver fisheries management measures for existing Marine Protected Areas (MPAs) where these are not already in place, as well as key coastal biodiversity locations outside of these sites, by March 2024 at the latest, directly following the conclusion of the required statutory consultation processes. These measures will give protection for MPA features, as well as those priority marine features identified as most at risk from bottom -contacting mobile fishing gear out with MPAs.

• add to the existing MPA network by designating a world-leading suite of Highly Protected Marine Areas (HPMAs) covering at least 10% of our seas that:

- includes designations in both offshore and inshore waters,

- exceeds the commitment to 'strict protection' by 2030 made in the EU biodiversity strategy by achieving this by 2026 for inshore waters (in respect of which Scottish Ministers have devolved powers) and, subject to the cooperation of the UK Government, by the same year for offshore waters (where the Scottish Parliament does not have legislative competence),

- will provide additional environmental protection over and above the existing MPA network (including when all management measures are applied in MPAs as outlined above), by establishing sites which will provide protection from all extractive, destructive or depositional activities including all fisheries, aquaculture and other infrastructure developments, while allowing other activities, such as tourism or recreational water activities, at non-damaging levels (making them equivalent to 'marine parks'), and

- in cases where these sites overlap with current MPAs, provide extra environmental protection additional to that afforded by existing MPAs. Our clear common purpose is to deliver a significant total increase in the level of environmental protection applicable to Scotland's seas, in support of achieving and maintaining good environmental status for our waters.

• take specific, evidence-based measures to protect the inshore seabed in areas out with MPAs and HPMAs. As an interim step, we will consult as soon as practicable on proposals to:

- apply a cap to fishing activity in inshore waters (up to three nautical miles) that will limit activity to current levels and set a ceiling from which activities that disrupt the seabed can be reduced in the light of evidence as it becomes available,

- keep that limit under review, pending fuller consideration and gathering of evidence to underpin any further actions required to protect inshore marine habitats. These could span a suite of options and could potentially include spatial management measures if suggested by the evidence,

- through this system, provide access only to vessels that hold a licence which has a historic track record of fishing activity in inshore waters over a recent reference period,

- in the first instance and in the interests of delivering this as soon as possible, bring this measure into effect by varying certain existing licence conditions pending the introduction of appropriate legislative measures, and

- also review the status of any unused 'latent' scallop fishing entitlements.

Where no investment has already been made to activate that entitlement, such as vessel conversion in cases where an owner has committed to changing fishing method, these entitlements would be revoked.

We will deliver the suite of HPMAs through a policy and selection framework that provides for:



• balanced representation of the ecology of Scotland's seas and their geographical spread from the coast to the deep sea, encompassing both inshore and offshore environments.

• the recovery of priority marine features, which mostly lie within inshore waters, as a core purpose of the designation criteria.

• ecosystem recovery and biodiversity enhancement, including protection of blue carbon and critical fish habitats.

• account to be taken of socio-economic factors affecting the resilience and viability of marine industries and the coastal communities which depend on them.

• public engagement and consultation at all key stages of policy development, site selection and assessment, and designation.

In summary the above commits the Scottish Government to introducing fisheries measures into MPAs by 2024 and making at least 10% of the MPA network Highly Protected Marine Areas (HPMAs) by 2026. Marine Scotland is in the process of defining the criteria to select HPMAs and the associated management measures. Discussions with stakeholders continue over the fishery management measures, with those for offshore sites likely to be implemented first. There is also an intention to introduce measures to manage vulnerable benthic Priority Marine Features (PMFs) outside of the MPA network as measures may be required at a different scale to MPAs. In Shetland the MPAs are in place and Marine Scotland consider the situation to be comparatively more advanced with progressive measures already adopted by the SSMO (M. McLeod, pers. comm.).

4.2.3 Changes to personnel involved in science, management, or industry

New staff members in post this year include:

- A new SSMO Inshore Coordinator, John Robertson, started in January following the retirement of Carole Laignel. The surveillance team sends our best wishes to Carole in her retirement.
- Interim chair of the SSMO is continuing until May, with the post of chair being re-advertised in the local press. It has been a challenge to find suitably independent and willing chairs, exacerbated by Covid restrictions leading to all meetings being held remotely.
- Shellfish scientists to assist with stock assessments at UHI Shetland, have had to be recruited a few times
 with staff leaving. This, along with covid disruptions to work, has caused difficulties in maintaining research
 and survey plans.

4.2.4 Changes to scientific base of information, including stock assessments

Fisheries-dependent data for both the brown crab and scallop fisheries are available from SSMO log sheets. Approximately 30% of the vessels are making electronic returns of their log sheets. For the brown crab creel fishery, fishing area (5x5 nm SSMO square), soak time, the type of gear used, the species targeted, the number of creels hauled, and the numbers or weight of landed catch must be recorded. In addition, the numbers discarded and the reasons for discarding (e.g. undersized, soft-shelled etc.) and interactions with ETP species must also be recorded. The requirement to record the target species allows the calculation of landings per unit effort (LPUE) to be based only for those creels targeted at each individual species, i.e. to ensure that bycatch of the species from creels targeted at other species are not included in the calculation of LPUE.

For the scallop dredge fishery, the fishing area (5x5 nm SSMO square), hours towed, number of dredges, the species targeted (both king scallops, *Pecten maximus*, and queen scallops, *Aequipecten opercularis* are targeted in this fishery), and the numbers or weight of landed catch must be recorded. In addition, the numbers discarded and the reasons for discarding (e.g. undersized, diseased, or damaged etc.) and interactions with ETP species must also be recorded. A separate line on the log sheet must be completed for each fishing area (SSMO square). In 2020 there were 18 vessels targeting scallops.



In addition to SSMO log sheets, vessels over 10m length are required under Scottish legislation to complete EU logbooks and vessels under 10m are required to complete F1 forms. All commercially registered vessels are covered by the Registration of Buyers and Sellers (RBS) legislation, and so buyers must submit sales notes for all catches.

The main element of the stock assessment of the brown crab and scallop fisheries in Shetland is the assessment of stock status against biological reference points. Direct estimates of stock biomass are not available for brown crab and therefore the assessment uses reference points and harvest control rules (HCRs) based on stock indicators which are a proxy for biomass and exploitation rate. The key stock indicator used for assessing stock status against reference points (and around which the HCRs are based) for both the brown crab and scallop fisheries is landings per unit effort (LPUE) which is considered as an index of stock abundance. There have been no changes to the reference points and HCRs since the fishery was recertified in 2018.

At the surveillance audit, the Client and UHI Shetland, formerly NAFC Marine Centre, presented updated assessments of stock status of the brown crab and scallop fisheries in relation to reference points, which are summarised below. More detailed information of the stock assessments for brown crab and scallop can be found in Coleman and Mouat (2021).

Brown Crab

Recorded landings of brown crabs from all licence holders have fluctuated since 2000 with no obvious trend. Peak landings of 600 tonnes were observed in 2014, but landings then declined and since 2016 have fluctuated around 300 tonnes annually (Figure 1). Landings per unit effort (LPUE), which provide a better indicator of stock status than landings *per se*, fluctuated without any clear trend from 2000 to 2010, but then declined in 2012, being at the lowest point in the time series (Figure 1), resulting in management actions (the introduction of creel limits). LPUE increased continuously from 2013 onwards, and although landings declined in 2016 and 2017 and were at a similar level in 2018, fishing effort was lower in 2018, with further increases in LPUE seen in 2018, maintaining the overall increasing trend in LPUE observed since 2013 (Figure 1). Whilst landings of brown crabs were similar in 2019 to 2018, fishing effort increased significantly in 2019 with a resulting substantial decline in LPUE. Landings declined substantially in 2020, but fishing effort also declined so that LPUE in 2020 was similar to that observed in 2019 (Figure 1).

The latest UHI Shetland stock assessment document (Coleman and Mouat, 2021) presents the results of an analysis of LPUE within a generalised additive model (GAM) framework considering area fished, month, year, and vessel as variables. All four variables contributed significantly to the model for brown crabs and the fitted GAM model showed an increasing trend in LPUE until 2018 and then declined in 2019 and 2020 (Figure 2), which is similar to the trend exhibited by the unstandardised data in Figure 1. It should be noted that the LPUE data in Figure 1 and Figure 2 cover the whole fleet, and there was a clear distinction between those vessels which frequently target brown crab as opposed to those which are catching them predominantly as bycatch. In 2020, of the 39 boats landing brown crabs, 15 were targeting brown crabs (Leander Harlow, UHI Shetland, pers. comm.).

In contrast to the data for the whole fleet presented in Figure 1 and Figure 2, the information used to define the reference points and evaluate stock status against those reference points is based on vessels which land 100% brown crabs and no velvet crabs for a particular day. It is not restricted to vessels which only target brown crabs as this would eliminate a large proportion of the available data. There are two reference points for brown crabs based on LPUE and the mean size of the catch (including sub-legal crabs). Mean LPUE in the brown crab fishery showed a steady increasing trend from 2012 to 2018 when it was well above the target reference point (TRP), but in 2019 LPUE dropped substantially and was just below the TRP before recovering again in 2020 to a level above the TRP (Figure 3). The LPUE trend described in Figure 3 differs slightly from that described in Figure 1 because, as noted above, Figure 1 includes landings and fishing effort data from the whole fleet, including those vessels which on certain days may not be targeting brown crab, whereas Figure 3 uses only data from days on which the vessels were targeting brown crabs. The LPUE calculated in Figure 3 is therefore considered to be a better index of stock abundance and is the value used subsequently to compare with the reference point. The audit team noted that the current reference points are not based on standardised LPUE and at the last recertification recommended that the reference points should be standardised for season, fishing area and vessel effects to allow more consistent comparison with standardised stock indicators. The mean size of brown crabs caught in the Shetland fishery has been increasing in recent years and remains well above the target reference point (Figure 4). As both stock indicators for the brown crab fishery are around or above the target reference points, additional management measures have not been triggered since the recertification of the fishery.

700000 1.6 ■Landings (kg) andings (kg) or Effort (creels). Effort (creels) 1.4 600000 PUE (kg/creel) Mean LPUE (kg/creel 1.2 500000 1 400000 0.8 300000 0.6 200000 0.4 100000 0.2 0 0 2006 2008 000 2010 2013 2014 2015 2016 2018 2019 2020 2003 2004 2005 2012 2017 2000 2002 2007 2011 2001

Figure 1. Total brown crab landings (kg), total number of creels catching brown crab, and mean LPUE obtained from SSMO logbooks data with 95% confidence intervals shown. (Source: Coleman and Mouat, 2021).



Figure 2. Fitted GAM showing long term trends in brown crab (whole fleet data) LPUE data for the period 2000 to 2020. (Source: Coleman and Mouat, 2021)

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Figure 3. Time trend of LPUE in kg/creel for the brown crab fishery in Shetland from 2001 to 2020. The green line denotes the upper or target reference point (TRP) and the red line represents the limit reference point (LRP). (Source: Coleman and Mouat, 2021)

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Figure 4. Time trend of mean size in mm carapace width for the brown crab fishery in Shetland from 2001 to 2020. The green line denotes the upper or target reference point (TRP) and the red line represents the limit reference point (LRP). (Source: Coleman and Mouat, 2021)

Scallops

There are two reference points for scallops based on LPUE from the fishery and spawning stock biomass (SSB) calculated from the Virtual Population Analysis (VPA). Landings of scallops from the Shetland fishery have increased steadily since 2000, although landings in 2019 and 2020 were slightly lower than landings in 2018 (Figure 5). Fishing effort has changed little since 2010, and so there is a general increasing trend of LPUE in recent years (**Error! Reference source not found.**). The observed continuous increasing trend in LPUE ensures that the LPUE stock indicator remains well above the target reference point (Figure 6). The latest UHI Shetland stock assessment document (Coleman and Mouat, 2021) presents the results of an analysis of scallop LPUE within a generalised additive model (GAM) framework. All variables contributed significantly to the model for scallop and the fitted GAM model showed an increasing trend (Figure 7), which is similar to the trend exhibited by the unstandardised data in Figure 6. Due to the spatial spread of the fishery, Coleman and Mouat (2021) recommended that further GAM analysis should be undertaken to better understand regional variation in LPUE.

The Client and UHI Shetland reported that due to Covid restrictions it was not possible to undertake sufficient sampling in 2020 to undertake a VPA. However as noted in last year's surveillance audit report (Cappell and Addison, 2021), there are major uncertainties underlying the estimates of SSB using this methodology and therefore such

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estimates of SSB should not be used currently for management purposes. Mouat *et al.* (2020) considered that the most recent VPA assessment should not be considered reliable. Historical trends may change when the model is re-run with another year's data which makes it difficult to develop management measures around these estimates of SSB in relation to reference points.

In addition to the fisheries-dependent data, eight fishery-independent scallop stock surveys have been carried out by UHI Shetland (then NAFC Marine Centre) during 2007, 2010, 2011, 2012, 2013, 2015, 2017 and 2019. Due to staffing issues, UHI Shetland were not able to undertake the scallop stock survey in 2021 as planned and the survey will now take place in 2022. Now that a time series of data is available from the stock surveys, UHI Shetland will be reviewing the data and investigating whether any recommendations can be made for the inclusion of outputs in management. In addition a comprehensive review of the sampling data, including linking samples to spatial data from log sheets will be carried out to determine if the sampling protocol is providing representative data for use in the VPA, and the review should also consider observer sampling at sea.

The LPUE stock indicator for the scallop fishery continues to be above the target reference point and so additional management measures have not been triggered since the recertification of the fishery. The audit team recommended at the first surveillance audit that the Client should focus on developing the spawning stock biomass reference point, either through resolving the uncertainties underlying the VPA approach, or through developing a new reference point based upon the time series of stock surveys.



Figure 5. Landings of scallops (displayed in numbers), fishing effort (dredge hours) and mean LPUE (landings per dredge hours) obtained from SSMO log sheets. (Source: Coleman and Mouat, 2021)



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Figure 6. Time trend of LPUE for the scallop fishery in Shetland from 2001 to 2020. The green line denotes the upper or target reference point (TRP) and the red line represents the limit reference point (LRP). (Source: Coleman and Mouat, 2021).



Figure 7. GAM showing long term trends in scallop LPUE data for the period 2000 to 2020. Dashed green and red lines denote the target and limit reference points respectively. (Source: Coleman and Mouat, 2021)

Velvet Crab

The velvet crab fishery is no longer included within the certificate and is not reported upon in this surveillance audit report. Nevertheless, the Client and UHI Shetland continue to collect fishery information, undertake stock assessments, and manage the velvet crab fishery in relation to biological reference points (Coleman and Mouat, 2021). Management measures in place for the velvet crab stock appear to be rebuilding the stock. In addition, UHI Shetland have recently carried out a review of velvet crab biological reference points and proposed an approach for revising reference points and their use in fisheries management to the SSMO board.

As noted above, UHI Shetland have produced full documentation of the annual stock assessments for both brown crabs and scallops and the reports also cover the fisheries for velvet crabs, green crabs, lobsters, whelks and queen scallops (Mouat *et al.*, 2020; Coleman and Mouat, 2021). In relation to the outstanding condition, the stock assessment document was sent out for peer review by two external experts. Both peer reviews have now been completed, and recommendations will be incorporated as appropriate via the SSMO Research and Development Plan. The Client confirmed that the peer review will be implemented on a regular basis going forward (peer review is included in the management plan under section 3.9 of the implementation plan) with the next review scheduled for May 2023. UHI Shetland provided copies of the peer reviews to the audit team at the site visit. Highlights from the two peer reviews are included on the UHI Shetland website, and the full peer review reports are available on request.

4.2.5 Updates on ecosystem issues

As noted in last year' surveillance audit report (Cappell and Addison, 2021), a scallop bycatch survey was completed in 2018. Initial results showed that there were differences in bycatch composition between the survey data and commercial samples which required further investigation. There are bycatch data available also from the regular scallop stock surveys, but the stock surveys use modified gear to allow capture of a wider range of size classes than commercial gear, and therefore bycatch composition data from the surveys are not directly comparable with bycatch in the commercial fishery. The Client recognised that the fishery will be due to begin the recertification process next year **YOUR FUTURE. OUR FOCUS.**

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During the site visit, the audit team spoke with Ellen Huis of Marine Scotland who updated the team on the roll-out of Remote Electronic Monitoring (REM) systems on Shetland scallop vessels. The system is similar to the VMS system required on vessels of 12m and over, and to inshore VMS systems (iVMS) in terms of monitoring fishing position, but the REM system also has a sensor on the winch which permits discrimination between fishing activity and steaming between fishing grounds, and the use of camera systems on board. In addition, the REM system provides recording of fishing position (pings) every 10 seconds which is much more frequent than conventionally used in VMS or iVMS systems. The REM system therefore provides information on fishing activity patterns to back up other information on fishing effort, but also provides a highly effective tool in monitoring fishing in relation to Marine Protected Areas (MPAs), and the camera system can ensure compliance with any restrictions on the number of dredges. Following trials on 22 vessels in 2017, the REM system is currently voluntary on scallop vessels in Shetland with mainly the larger vessels participating, but a consultation process to make the systems mandatory on all vessel irrespective of size and target species is currently underway Ensuring Long Term Sustainability from Scotland's Marine Resources - Remote Electronic Monitoring (REM): Consultation (www.gov.scot).

4.2.6 Any developments or changes within the fishery which impact traceability or the ability to segregate between fish from the Unit of Certification (UoC) and fish from outside the UoC (non-certified fish)

The client raised a query regarding the landing of small amounts of king scallop by-catch in the queen scallop fishery. This generally amounts to no more than 5 individual king scallops in a 25kg bag.

The surveillance team clarified that as the four vessels licensed to fish for 'queenies' use different gear and fish in different areas, this king scallop by-catch would not be included in the certificate and must be clearly segregated from MSC certified king scallop.

The four-queen scallop licensed vessels have not been active in the queenie fishery as there is no current market due to freight costs. However, they and processors have been reminded that should the queenie fishery restart, any king scallop by-catch (if landed) must be kept separate to MSC-certified scallop.

4.3 Version details

Table 2. Fisheries program documents versions

Document	Version number
MSC Fisheries Certification Process	Version 2.2
MSC Fisheries Standard	Version 2.01*
MSC General Certification Requirements	Version 2.4.1
MSC Surveillance Reporting Template	Version 2.1

* default assessment tree



5 Results

5.1 Surveillance results overview

5.1.1 Summary of conditions

Table 3. Summary of conditions

Condition number	Condition	Performance Indicator (PI)	Status	PI original score	PI revised score
1	The assessment of stock status is subject to peer review.	PI 1.2.4	Closed	75	90

5.1.2 Total Allowable Catch (TAC) and catch data

Table 4. Total Allowable Catch (TAC) and catch data – UoA 1 Brown crab

TAC	Year	2021	Amount	No TAC is set
UoA share of TAC	Year	2021	Amount	NA
UoA share of total TAC	Year	2021	Amount	NA
Total green weight catch by UoC	Year (most recent)	2020	Amount	242.8 tonnes
Total green weight catch by UoC	Year (second most recent)	2019	Amount	358.3 tonnes

Table 5. Total Allowable Catch (TAC) and catch data – UoA 2 King scallop

TAC	Year	2021	Amount	No TAC is set
UoA share of TAC	Year	2021	Amount	NA
UoA share of total TAC	Year	2021	Amount	NA
Total green weight catch by UoC	Year (most recent)	2020	Amount	4,232,541 individuals
Total green weight catch by UoC	Year (second most recent)	2019	Amount	4,202,524 individuals

5.1.3 Recommendations



1. PI 1.1.2 The reference points should be standardised for season, fishing area and vessel effects to allow more consistent comparison with standardised stock indicators.

Update at SA1: The Client and UHI Shetland reported that there had been no progress in relation to this recommendation. European funding had been secured for employment of a stock assessment scientist (18-month contract). However, no suitable candidate was identified, and the funds had to be returned. UHI Shetland is not currently in a position to undertake the work, but staff restructuring may enable this to be done in the coming year.

Update for SA2: After some delay in appointment, a permanent shellfish scientist is now in post to progress this work.

Update for SA3: The Client and UHI Shetland reported that Generalised Additive Models are used in the stock assessment process, taking into consideration season, fishing area and vessel effects. LPUE reference points can be set within this context and will be outlined in the stock assessment report for 2021 data, which at the time of this audit was not yet complete.

2. PI 1.2.4. Uncertainty around annual stock indicator values should be evaluated using either standard statistical methods or through computer-intensive methods such as boot-strapping.

Update at SA1: At the site visit the Client and UHI Shetland reported that there had been no progress in relation to this recommendation. As for recommendation 1, European funding had been secured for employment of a stock assessment scientist (18-month contract). However, no suitable candidate was identified, and the funds had to be returned. UHI Shetland is not currently in a position to undertake the work, but staff restructuring may enable this to be done in the coming year.

Update for SA2: After some delay in appointment, a permanent shellfish scientist is now in post to progress this work.

Update for SA3: At the site visit the Client and UHI Shetland reported that this work has been delayed due to staffing issues and Covid impacts. As the Client and UHI Shetland review the reference points and work to incorporate the recommendations of the peer review process, this recommendation will be undertaken.

3. PI 1.1.2. The spawning stock biomass reference point for the scallop fishery should be revised, either through resolving the uncertainties underlying the VPA approach, or through developing a new reference point based upon the time series of stock surveys.

Update for SA2: After some delay in appointment, a permanent shellfish scientist is now in post. This recommendation is also to form part of the remit.

Update for SA3: At the site visit the Client and UHI Shetland reported that this work has been delayed due to staffing issues and Covid impacts – it is planned for 2022/23.

4. PI 1.1.2 (Velvets). The fishing effort reference points for the velvet crab fishery should be reviewed as soon as possible.

Update at SA1: The velvet crab fishery was not re-certified. Outline conditions were provided for the fishery, which are non-binding. It is noted that the SSMO board has decided not to pursue re-assessment for the velvet crab fishery. Nevertheless, the recommendations in relation to reference points are being progressed and the Advisory Group intend to review these before the next velvet crab stock assessment.

Update for SA2: As above.

Update for SA3: As noted above, the velvet crab fishery was not re-certified, and this condition is not therefore binding. Nevertheless, UHI Shetland have made significant progress in reviewing the reference points for velvet crabs and have provided a report to the SSMO board on proposed revision of the reference points and and their use in fisheries management.



Following the closure of Condition 1 on PI 1.2.4 for both UoA 2 (brown crab) and UoA 2 (scallop), the scoring rationales for PI 1.2.4 were revised as set out in Table 9 and Table 10. The revised table of PI scores is now shown below in Table 6, and the revised Principle level scores in Table 7.

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Table 6. Performance Indicator (PI) scores for UoAs 1 & 2 following closure of the outstanding condition.

Component	PI No.	Performance Indicator (PI)	UoC1 (brown crab)	UoC2 (scallop)
Outcome	1.1.1	Stock status	90	90
	1.1.2	Reference points	80	80
	1.1.3	Stock rebuilding		
Management	1.2.1	Harvest strategy	95	95
	1.2.2	Harvest control rules & tools	90	80
	1.2.3	Information & monitoring	80	80
	1.2.4	Assessment of stock status	90	90
Retained	2.1.1	Outcome	80	80
species	2.1.2	Management	80	80
	2.1.3	Information	85	80
Bycatch	2.2.1	Outcome	80	80
species	2.2.2	Management	80	80
	2.2.3	Information	80	80
ETP species	2.3.1	Outcome	100	85
	2.3.2	Management	95	90
2.3		Information	80	80
Habitats	2.4.1	Outcome	90	80
	2.4.2	Management	80	95
	2.4.3	Information	95	95
Ecosystem	2.5.1	Outcome	90	80
	2.5.2	Management	90	95
	2.5.3	Information	90	90
Governance	3.1.1	Legal & customary framework	95	95
and policy	3.1.2	Consultation, roles & responsibilities	100	100
	3.1.3	Long term objectives	90	90
	3.1.4	Incentives for sustainable fishing	80	80
Fishery	3.2.1	Fishery specific objectives	90	90
specific management system	3.2.2	Decision making processes	85	85
	3.2.3	Compliance & enforcement	100	100
	3.2.4	Research plan	80	80
	3.2.5	Management performance evaluation	90	90

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Table 7. Principle level scores

Principle	UoA 1 Brown crab	UoA 2 Scallop
Principle 1 – Target species	86.9	85.6
Principle 2 – Ecosystem impacts	88.9	86.7
Principle 3 – Management system	90.1	90.1

5.3 Conditions

5.3.1 Closed Conditions

The outstanding condition – Condition 1 on PI 1.2.4 – was closed for both UoAs at this surveillance audit as described below in Table 8.

Table 8. Condition 1 - Closed

Performance Indicator	PI 1.2.4. There is an adequate assessment of the stock status Scoring issue (e). The assessment of stock status is subject to peer review.		
Score	75		
Justification	Whilst elements of the assessment approach, such as the definition of reference points and HCRs may be discussed at the Advisory Group prior to submission to the SSMO Board, it is not clear that the annual assessments of stock status of brown crabs, velvet crabs and scallops are subject to peer review. Previously an annual stock assessment report was produced and one such annual report underwent an external peer review. However, the annual stock assessment report has not been produced in recent years. The output of the brown crab and velvet crab stock assessments have been presented at the ICES Crab Working Group, but no formal peer review of the assessments takes place at the Working Group. In conclusion the assessment team considered that the assessments of stock status are not subject to sufficient internal or external peer review. The SG80 is not met.		
Condition	A peer review of the stock assessments of the brown crab, velvet crab and scallop fishery should be undertaken by the 2 nd annual surveillance audit, and a process whereby the stock assessments are regularly peer-reviewed should be put in place by the 3 rd annual surveillance audit.		
Condition start	July 2018		
Condition deadline	July 2021 extended to January 2022 under Covid-19 derogation.		
Milestones	 Annual surveillance 1: Show written evidence of an agreement to carry out a peer review (preferably external) of the stock assessments for the brown crab, velvet crab and scallop fisheries. This milestone is an incremental step toward fulfilling the condition. Its successful completion will not result in a change of score to this PI. Expected interim score: 75 Annual surveillance 2: Completion and publication of a peer review of the stock assessments for the brown crab, velvet crab and scallop fisheries. 		

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	This milestone is an incremental step toward fulfilling the condition. Its successful completion will not result in a change of score to this PI. Expected interim score: 75 Annual surveillance 3: Show written evidence of a commitment to carry out regular peer reviews of the stock assessments for the brown crab, velvet crab and scallop fisheries.		
	Expected score: 80		
	Year 1	At the Year 1 surveillance audit, the Client and UHI Shetland provided written evidence of an agreement with two appropriately qualified experts to carry out a peer review of the stock assessments for the brown crab and scallop fisheries. (As the velvet crab fishery is no longer part of the certificate, there is no requirement for the velvet crab fishery to be included within the peer review.) The Client and NAFC Marine Centre confirmed that a detailed stock assessment document will be compiled and sent to the agreed peer reviewers during the second year of the certificate. The audit team concluded that the Year 1 milestone had been met and the condition was therefore on target.	
Progress on Condition (Year 3, 2022)	Year 2	The Client reported that a written stock assessment document produced by UHI Shetland (Mouat <i>et al.</i> , 2020) covering all commercially exploited shellfish species in Shetland waters, including brown crab and scallop, had been sent to two suitably qualified external peer reviewers. A peer review had been received from one of the two peer reviewers, a copy of which was provided to the audit team, but at the time of the audit, the second peer review had not yet been received. UHI Shetland is awaiting receipt of the second peer review before publication of the findings of the two peer reviews and subsequent proposals for improvement of future stock assessments will be incorporated via the SSMO Research and Development Plan as appropriate. The Client confirmed that the peer review will be implemented on a regular basis going forward (likely to be every three years). The completion of one peer review by an external expert has therefore been completed, which meets the first part of the Year 2 milestone. However, UHI Shetland is awaiting receipt of the second peer reviews, and the therefore the second part of the milestone has not yet been achieved. The audit team concluded that the condition was 'Behind target' at this Year 2 surveillance audit, but on receipt of the second external peer review, the audit team expects the Client and UHI Shetland to complete all action required to close this	

Following the closure of Condition 1 on PI 1.2.4 for both the brown crab (UoA 1) and scallop (UoA 2) fisheries, it is necessary to rescore PI 1.2.4 for the two UoAs. Table 9 and Table 10 below describe the original scoring rationales for PI 1.2.4 for the two UoAs and the revised rationales following closure of the condition. (Original text has been crossed out and revised scoring text is now shown in blue highlight.)

Table 9. Rescoring of PI 1.2.4 for UoA 1 – brown crab

PI 1.	2.4	UoC 1 Brown Crab: There is an adequate assessment of the stock status		
Scori Issue	ng	SG 60	SG 80	SG 100
а	Guidepost		The assessment is appropriate for the stock and for the harvest control rule.	The assessment is appropriate for the stock and for the harvest control rule and takes into account the major features relevant to the biology of the species and the nature of the fishery.
	Met?		Y	Y

PI 1.	1.2.4 UoC 1 Brown Crab: There is an adequate assessment of the stock sta			sessment of the stock status
	Justification	As with all fisheries for brown crab, there are no direct estimates of biomass of brown crabs in Shetland, and therefore a multiple stock indicator approach to stock assessment is highly appropriate given the nature of the fishery and the biology of the target species. Length Cohort Analysis (LCA) has been used to assess fishing mortality in the brown crab fishery, but the output of the model has not been directly used for management purposes due to the limitations of this method. An indicator approach to stock assessment is the standard approach used in other creel/pot fisheries when no analytical assessment is available. Assessing absolute stock abundance of brown crab directly from fisheries data is very difficult as catch per unit effort from creel fisheries may not necessarily be directly related to stock abundance because of gear selectivity and behavioral interactions between animals around pots. It is highly appropriate therefore that the assessment uses a second indicator (mean size of crabs in catch) to provide a fuller description of stock status, and additional stock information (such as output from LCA) may be used with the two stock indicators when considering management actions within the harvest control rules. The SG100 is met therefore.		
b	Guidepos t	The assessment estimates stock status relative to reference points.		
	Met?	Y		
	Justification	The stock assessmer annual update of the tw in relation to pre-defin therefore.	nt evaluates stock statu vo stock indicators of LP ed limit and target refer	is of brown crab through the UE and mean size of the catch ence points. The SG60 is met
С	Guidepost	The assessment identifies major sources of uncertainty.	The assessment takes uncertainty into account.	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a probabilistic way.
	Met?	Y	Y	Ν

PI 1.	.2.4	UoC 1 Brown Crab: T	here is an adequate as	sessment of the stock status
	Justification	The assessment uses stock abundance and The assessment team to the assessment of The harvest control rul LPUE and mean size valuable additional inf the type of management either the limit or target As recommended un standardised for seas assessment team re- indicator values should or through computer-in The assessment does in a probabilistic way s	two stock indicators w of exploitation rate to a concluded that the use of stock status implicitly ta les are based primarily of of crab, but also recognis ormation on stock status ent action that is implenent et reference points. The st ider PI 1.1.2, the LPU son, fishing area and verse ecommends that uncer to be evaluated using eith intensive methods such a so the SG100 is <u>not</u> methods	hich provide both an index of assess the status of the stock. of a multiple indicator approach akes uncertainty into account. on these two stock indicators of se that other data may provide s and may therefore influence nented if the stock falls below SG80 is met. IE stock indicator should be essel effects. In addition, the rtainty around annual stock er standard statistical methods as boot-strapping. us relative to reference points
d	Guidepost			The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.
	Met?			Ν
	Justification	The assessment approach using stock indicators of LPUE and mean size the catch has not been fully tested and shown to be robust throug Management Strategy Evaluation (MSE) or similar approach. We alternative assessment methods such as Length Cohort Analysis (LCA) been trialled, it cannot be concluded that alternative hypotheses assessment approaches have been rigorously explored. The SG100 is met, therefore.		ors of LPUE and mean size of nown to be robust through a or similar approach. Whilst th Cohort Analysis (LCA) have alternative hypotheses and y explored. The SG100 is <u>not</u>
e	Guidepos t		The assessment of stock status is subject to peer review.	The assessment has been internally and externally peer reviewed.
	Met?		NY	N Y

PI 1.2.4 UoC 1 Brown Crab: There is an adequate assessment of the s		status	
		Whilst elements of the assessment approach, such as the defir reference points and HCRs may be discussed at the Advisory Group submission to the SSMO Board, it is not clear that the annual assess stock status of brown crab is subject to peer review. Previously an stock assessment report was produced and one such annual underwent an external peer review. However, the annual stock asses report has not been produced in recent years. The output of th assessment has been presented at the ICES Crab Working Group formal peer review of the assessments take place at the Working Gr conclusion the assessment team considered that the assessment is not subject to sufficient internal or external peer review. Th is not met.	ition of prior to ment of annual report essment estock but no oup. In of stock eSG80
	UHI Shetland publishes an annual stock assessment report for the brind crab fishery which includes an evaluation of stock status in relation reference points. The stock assessment is reviewed internally within Shetland and by the SSMO board. A peer review of the 2020 states assessment report was conducted by two independent external review and recommendations from these peer reviews will be incorporated appropriate via the SSMO Research and Development Plan. The C confirmed that the peer review will be implemented on a regular basis g forward (peer review is included in the management plan under section of the implementation plan) with the next review scheduled for May 2023.		e brown ation to hin UHI 0 stock viewers, ated as e Client is going tion 3.9 023.
Refer	References UHI Shetland stock assessments SSMO Reference Points and Harvest Control Rules Marine Scotland Science. (2017). Fish and Shellfish Stocks. 2017 edition. Jones, R. 1984. Assessing the effects in changes in exploitation patter using length composition data. FAO Fish. Tech. Pap. 256: 118 pp.		
OVER		RFORMANCE INDICATOR SCORE:	75 90
CONE	CONDITION NUMBER (if relevant): 4 NA		4 <mark>NA</mark>

Table 10. Rescoring of PI 1.2.4 for UoA 2 – scallop

PI 1.	2.4	UoC 3 Scallop: There is an adequate assessment of the stock status		
Scori Issue	ng	SG 60	SG 80	SG 100
а	Guidepost		The assessment is appropriate for the stock and for the harvest control rule.	The assessment is appropriate for the stock and for the harvest control rule and takes into account the major features relevant to the biology of the species and the nature of the fishery.

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PI 1	.2.4	UoC 3 Scallop: There	e is an adequate asses	sment of the stock status
	Met?		Y	Ν
	Justification	There are currently no and therefore a multi highly appropriate give species. An indicator a used in other fisheries It is highly appropriate stock biomass (LPUE fuller description of sto of stock biomass from as geographical variat stock indicators when control rules. The SG The development of a has not been fully deve account the known ge addition, VPA may no scallop, so spatial mod is not met therefore.	b direct estimates of bio ple stock indicator appr en the nature of the fishe approach to stock assess when no analytical ass therefore that the asse and spawning stock bio ock status and is current the stock surveys. Add ion in the LPUE indicato considering managem 80 is met, therefore. direct estimate of stock eloped, and the assess ographical variation in s to be fully appropriate to delling approaches would	mass of scallops in Shetland, roach to stock assessment is ry and the biology of the target ment is the standard approach essment of Bmsy is available. ssment uses two indicators of omass from VPA) to provide a ly developing a direct estimate litional stock information (such ors) may be used with the two ent actions within the harvest biomass from the stock survey nent does not directly take into stock dynamics of scallops. In a sedentary species such as d be more appropriate. SG100
b	Guidepost	The assessment estimates stock status relative to reference points.		
	Met?	Y		
	Justification	The stock assessmen update of the two sto (SSB) in relation to pr is met therefore.	t evaluates stock status ock indicators of LPUE e-defined limit and targe	of scallop through the annual and spawning stock biomass at reference points. The SG60
C	Guidepost	The assessment identifies major sources of uncertainty.	The assessment takes uncertainty into account.	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a probabilistic way.
	Met?	Y	Y	N

PI 1.	.2.4	UoC 3 Scallop: There	is an adequate asses	sment of the stock status
	Justification	The assessment uses the stock and is deviassessment team condi- the assessment team condi- the assessment of stoch depletion is a concerni- variation in scallop about HCRs through the trig drop below the LRP eva- and by the potential indicators falls below the on the two stock indicates also recognise that other stock status and may the stock status and may the is implemented if the points. For example, changes in the stock information can be take As recommended und standardised for sease assessment team re- indicator values should or through computer-in The assessment does in a probabilistic way s	two stock biomass indi eloping a third index to cluded that the use of a k status implicitly takes up of or sedentary molluso undance and catch rate gering of management ven though the overall L to implement spatial con- tors of LPUE and spaw er data may provide valu- herefore influence the ty stock falls below either the regular scallop sur- k such as evidence of en into account in the He der PI 1.1.2, the LPU on, fishing area and ver- commends that unce be evaluated using either tensive methods such a not evaluate stock stat o the SG100 is not met.	cators to assess the status of from the stock surveys. The multiple indicator approach to uncertainty into account. Local cs such as scallops. Spatial es is taken into account in the action if the stock indicators .PUE remains above the TRP, losures if either of the stock ontrol rules are based primarily ning stock biomass (SSB), but uable additional information on vpe of management action that r the limit or target reference rveys may identify significant of local depletion, and such CRs. The SG80 is met. E stock indicator should be essel effects. In addition, the rtainty around annual stock er standard statistical methods as boot-strapping. us relative to reference points
d	Guidepost			The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.
	Met?			N N
	Justification	The assessment uses stock biomass indicators of LPUE from commerce data and spawning stock biomass (SSB) from the quarterly VPA, and in future will have a third biomass estimate from the stock survey. However, the assessment approach has not been fully tested and shown to be robut through a Management Strategy Evaluation (MSE) or similar approact Whilst alternative assessment methods have been trialled, there is evidence that, for example, a spatial modelling approach has been tested and it cannot be concluded that alternative hypotheses and assessment approaches have been rigorously explored. The SG100 is not met, therefore		brs of LPUE from commercial he quarterly VPA, and in future stock survey. However, the sted and shown to be robust (MSE) or similar approach. We been trialled, there is no ng approach has been tested, hypotheses and assessment e SG100 is not met, therefore.
е	Guidepos t		The assessment of stock status is subject to peer review.	The assessment has been internally and externally peer reviewed.

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PI 1.2.4		UoC 3 Scallop: There is an adequate asses	sment of the stock st	atus
I	Met?	N Y	N Y	
		 Whilst elements of the assessment approach, such as the definition of reference points and HCRs may be discussed at the Advisory Group prior to submission to the SSMO Board, it is not clear that the annual assessment of stock status of scallops is subject to peer review. Previously an annual stock assessment report was produced and one such annual report underwent an external peer review. However, the annual stock assessment report has not been produced in recent years. In conclusion the assessment team considered that the assessment of stock status is not subject to sufficient internal or external peer review. The SG80 is not met. UHI Shetland publishes an annual stock assessment report for the scallop fishery which includes an evaluation of stock status in relation to reference points. The stock assessment is reviewed internally within UHI Shetland and by the SSMO board. A peer review of the 2020 stock assessment report was conducted by two independent external reviewers, and recommendations from these peer reviews will be incorporated as appropriate via the SSMO 		
	Justification	Research and Development Plan. The Client will be implemented on a regular basis going for in the management plan under section 3.9 of the next review scheduled for May 2023. The SG80 and SG100 are met.	confirmed that the peer rward (peer review is in the implementation pla	r review ncluded an) with
		UHI Shetland stock assessments		
Poforo	2005	SSMO Reference Points and Harvest Control Marine Scotland Science. 2014. Fish and She	Rules Ilfish Stocks. 2014 edi	tion.
Referen	lices	Shelmerdine, R. L. and Mouat, B. (in press). Big inshore scallop fishery, 2015. NAFC Marine Shellfish Management Organisation Pp. 21.	omass survey for the S Centre report for the S	hetland Shetland
OVERA	ALL PEI	RFORMANCE INDICATOR SCORE:		75 90
CONDI		UMBER (if relevant):		4 <mark>NA</mark>

5.3.2 Progress against conditions

The only outstanding condition – Condition 1 on peer review of the stock assessment - has now been closed (see Table 8) above.

5.4 Client Action Plan

With the closure of the outstanding condition, there is no further requirement for a Client Action Plan.





Cappell, R. and Addison, J. 2021. SSMO Shetland Inshore Brown crab and Scallop Fishery. 2nd MSC Annual Surveillance Audit Report. Pp 27.

Coleman, M. and Mouat, B. 2021. Shetland Shellfish Stock Assessments. A report prepared for the Shetland Shellfish Management Organisation (SSMO). NAFC Marine Centre UHI report. Pp. 49.

Jones, R. 1984. Assessing the effects in changes in exploitation pattern using length composition data. FAO Fish. Tech. Pap. 256: 118 pp.

Marine Scotland Science. 2014. Fish and Shellfish Stocks. 2014 edition.

Marine Scotland Science. (2017). Fish and Shellfish Stocks. 2017 edition.

Mouat, B., Angus, C., Bublitz, R., Fraser, S., Shelmerdine, R. L. 2020. Shetland Shellfish Stock Assessments. A report prepared for the Shetland Shellfish Management Organisation (SSMO). NAFC Marine Centre UHI report. Pp. 48.

Scottish Government and Scottish Green Party: draft shared policy programme (2021) https://www.gov.scot/publications/scottish-government-and-scottish-green-party-shared-policy-programme/

Shelmerdine, R. L. and Mouat, B. (in press). Biomass survey for the Shetland inshore scallop fishery, 2015. NAFC Marine Centre report for the Shetland Shellfish Management Organisation Pp. 21.

The Shetland Islands Regulated Fishery (Scotland) Order 2012 (https://www.legislation.gov.uk/ssi/2012/348/article/3/made)



7 Appendices

7.1 Evaluation processes and techniques

7.1.1 Site visits

A site visit was conducted remotely on 24th March involving meetings with the client, their scientific advisors and two further separate meetings on 24th and 28th March with Marine Scotland.

7.1.2 Stakeholder participation

The following parties participated in the surveillance audit:

- John Robertson, SSMO Inshore Co-ordinator
- Beth Mouat, Chief Scientist, UHI Shetland and scientific advisor to SSMO
- Leander Harlow, Shellfish Scientist, UHI Shetland
- Katie Keay, MSC UK outreach (Observer)
- Ellen Huis, Marine Scotland re. vessel REM system roll-out
- Michael McLeod, Marine Scotland Head of Marine Conservation Unit re. MPA network development.

7.2 Stakeholder input

No written stakeholder inputs were received.

8 Template information and copyright

This document was drafted using the 'MSC Surveillance Reporting Template v2.1'.

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2.0	17 December 2018	Release alongside Fisheries Certification Process v2.1
2.01	28 March 2019	Minor document change for usability
2.1	25 March 2020	Minor document change for usability

A controlled document list of MSC program documents is available on the MSC website (msc.org).

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