

Western Australian Abalone Fishery

Surveillance Report

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Fishery client	Abalone Industry Association of Western Australia Inc.
Assessment Type	Second Surveillance

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1 Glossary

AIAWA	Abalone Industry Association of Western Australia
HCR	Harvest Control Rule
hr	hour
kg	kilogram
LRP	limit reference point
mm	millimeter
MSC	Marine Stewardship Council
PI	Performance Indicator
PRI	Point of Recruitment Impairment
SSB	Spawning Stock Biomass
sCPUE	Standardised Catch Per Unit Effort
SHL	Sustainable Harvest Limit
t and mt	metric ton
TAC	Total Allowable Catch
TRP	target reference point

2 Executive summary

This report summarizes the findings from the 2019 second surveillance audit of the Western Australian abalone fishery. The fishery was first certified to the MSC requirements in 2017 using the default assessment tree MSC Fisheries Certification Requirements and Guidance v 2.0 (October, 2014).

The second annual surveillance audit focused on changes since the first surveillance audit and monitoring continued compliance with the MSC Principles and Criteria. The fishery originally received three conditions in the full assessment, all pertained to Principle 1 requirements and related to 1.1.1 (both Greenlip and Brownlip abalone) and 1.2.1 for Brownlip abalone only. The first audit added an additional condition related to 1.1.1 for Greenlip abalone.

The status of Greenlip abalone has continued to decline and has fallen below the limit reference point in Area 3. Consequently, the team concluded that several scoring issues for PI 1.1.2, 1.2.1 and 1.2.2 required rescoring. This resulted in a reduction of the score to 60 for PIs 1.1.2 and 1.2.1 and a score of 65 for 1.2.2. The overall score for Principle 1 for Greenlip abalone met the required level of 80, however the rescoring required the introduction of three new conditions.

Brownlip abalone stocks have continued to rebuild towards target levels demonstrating that catches are being appropriately constrained and that the HCR is operating as intended. Conditions 2 and 3 are therefore considered to be on target.

Roe's abalone continues to meet all the requirements for certification.

It is bio.inspecta's view that the Western Australian abalone fishery continues to meet the standards of the MSC and complies with the 'Requirements for Continued Certification'. Bio.inspecta recommends the continued use of the MSC certificate through to the next surveillance audit in 2020.

3 Report details

3.1 Surveillance information

Table 1 – Surveillance information		
1	Fishery name	
	Western Australian Abalone Fishery	
2	Surveillance level and type	
	Surveillance level 5, 3 annual on-site surveillance audits, 1 off-site audit. Onsite for second surveillance audit.	
3	Surveillance number	
	1st Surveillance	
	2nd Surveillance	X
	3rd Surveillance	
	4th Surveillance	
	Other (expedited etc)	
4	Team leader	
	<p>Dr. Sabine Daume (Lead auditor and Principle 2 expert)</p> <p>Dr. Daume was the lead auditor during the full re-assessment of the fishery and meets the competency criteria in Annex PC for team leader as follows:</p> <ul style="list-style-type: none"> • She has an appropriate university degree and more than five years' experience in fisheries research of invertebrate species; • She has passed the MSC team leader training; • She has the required competencies described in Table PC1, section 2; • She has undertaken more than two fishery assessments as a team member in the last five years, and • She has experience in applying different types of interviewing and facilitation techniques and can effectively communicate with clients and other stakeholders. In addition, she has the appropriate skills and experience required to serve as a Principle 2 assessor as described in FCR Annex PC table PC3. 	

	<ul style="list-style-type: none"> Bio.inspecta Pty Ltd. confirms that Dr. Daume has no conflicts of interest in relation to the fishery under assessment.
5	Team members
	<p>Dr. Klaas Hartmann, Principle 1 expert.</p> <p>Bio.inspecta Pty. Ltd. confirms that Dr. Hartmann meets the competency criteria in Annex PC for team members as follows:</p> <ul style="list-style-type: none"> He has an appropriate university degree and more than five years' experience in applying relevant stock assessment techniques being used by the fishery; He has primary authorship of at least two peer-reviewed stock assessments of a type used in the fishery; He has passed the MSC team member training and the MSC Traceability training module; He has the appropriate skills and experience required to serve as a Principle 1 assessor as described in FCP Annex PC table PC3. Dr. Hartmann has no conflicts of interest in relation to the fishery. <p>Together the team meets all competency requirements laid out in Table PC3.</p>
6	Audit/review time and location
	The audit was conducted on the 8th August 2019 in Perth, Western Australia
7	Assessment and review activities
	The annual audit has taken into account recent developments and monitor progress on the conditions placed on the fishery for continued certification. The annual review will include participants such as the fishery managers and scientists to gain a full understanding of the current state of the fishery.

3.2 Background

3.2.1 Updates on Scientific base of information including stock assessment

a. Stock indicators used in the fishery

The primary stock indicator is the 3-year moving average of standardised CPUE (sCPUE). This is compared against target, threshold and limit reference points that have been determined on a species and management area specific level.

A marine heatwave in 2011 had a substantial negative impact on all abalone species and management areas. Substantial TAC reductions were put in place to address this, nevertheless the impact of the heat wave is still evident in most areas.

Greenlip Abalone

sCPUE has been declining in both Greenlip abalone areas (2 and 3) for a number of years. In 2018 the annual and 3 year running mean of sCPUE fell to record lows in both areas (Figure 1 and Figure 2).

In response to declining sCPUE the TAC in Area 2 has been reduced progressively from 28.8t in 2014 to 9t in 2018. The stock seems to be responding with an indication that the sCPUE decline is slowing. Whilst sCPUE is below the threshold it remains above the limit.

In Area 3 the TAC has been reduced progressively from 35t in 2013 to 8t in 2018 and the worst sub-area – Augusta – has been closed to commercial fishing in 2019. Nevertheless, sCPUE decline has continued to a record low with the 3 year running mean of sCPUE falling below the limit for the first time.

After an extended period of decrease, mean meat weight has increased in all four sub-areas providing an indication that exploitation rates have effectively been reduced.

The continued decline in the primary indicator which has fallen below the limit in one area further supports the concern raised in the first audit that it is no longer highly likely that the stock is above the Point of Recruitment Impairment. Furthermore, the lack of stock response to the catch reductions under the harvest strategy provides new evidence that necessitates the re-scoring of PIs 1.1.2, 1.2.1 and 1.2.2.

This resulted in the addition of three new conditions that necessitate a revision of the harvest strategy and the development of a rebuilding strategy.

Brownlip Abalone

After an extended period of sCPUE declines, both Brownlip abalone areas (Areas 2 and 3; Figure 3 and Figure 4) showed an increase in the 3 year running mean in 2018. Area 2 remains just below the threshold and Area 3 is well above the target. This provides clear evidence that the harvest strategy is constraining catches appropriately to rebuild Area 2 and maintain Area 3 at or above the target level.

Roe's Abalone

sCPUE has been well above the target level in all four areas (2, 5, 6 and 7). In Areas 2 and 5 there has been a long term declining trend in sCPUE (Figure 5 and Figure 6) which combined with a TAC undercatch motivated TAC reductions in both areas in 2018. The TAC remained unchanged in Areas 6 and 7 where sCPUE has increased in recent years (Figure 7 and Figure 8).

This provides clear evidence that the harvest strategy is constraining catches to maintaining sCPUE above the target reference points.

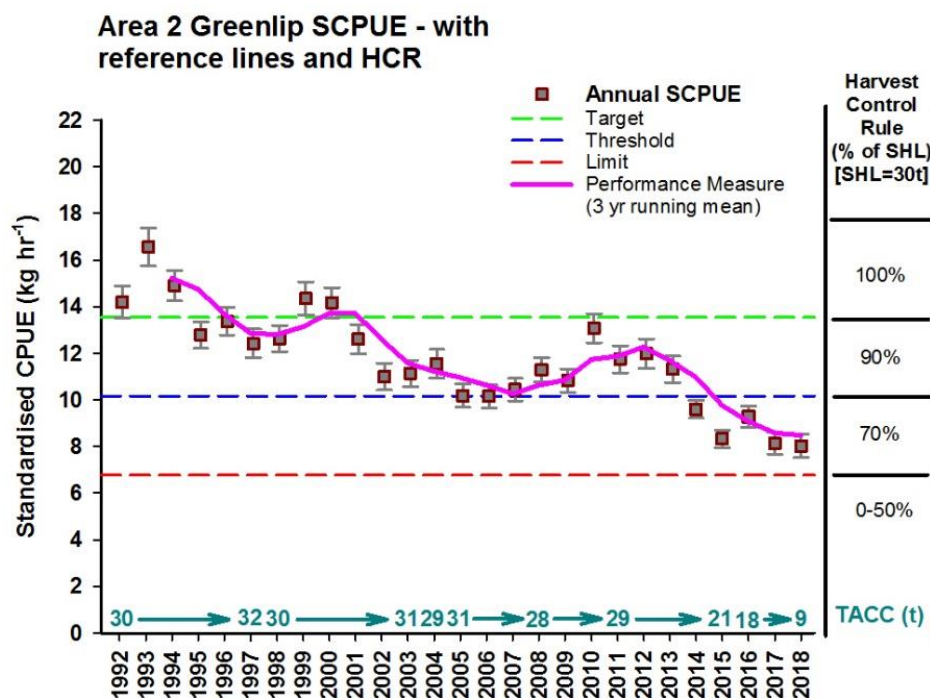


Figure 1: The annual standardised CPUE (kg.hr⁻¹) for Greenlip abalone with the performance indicator (3 year running mean), reference levels (target, threshold and limit) and harvest control rule in Management Area 2.

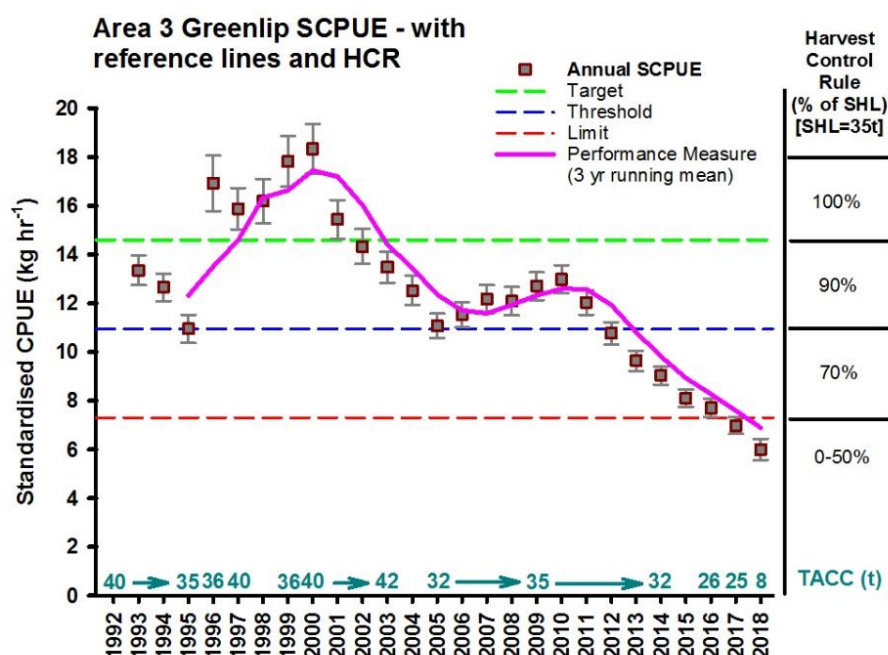


Figure 2: The annual standardised CPUE (kg.hr^{-1}) for Greenlip abalone with the performance indicator (3 year running mean), reference levels (target, threshold and limit) and harvest control rule in Management Area 3.

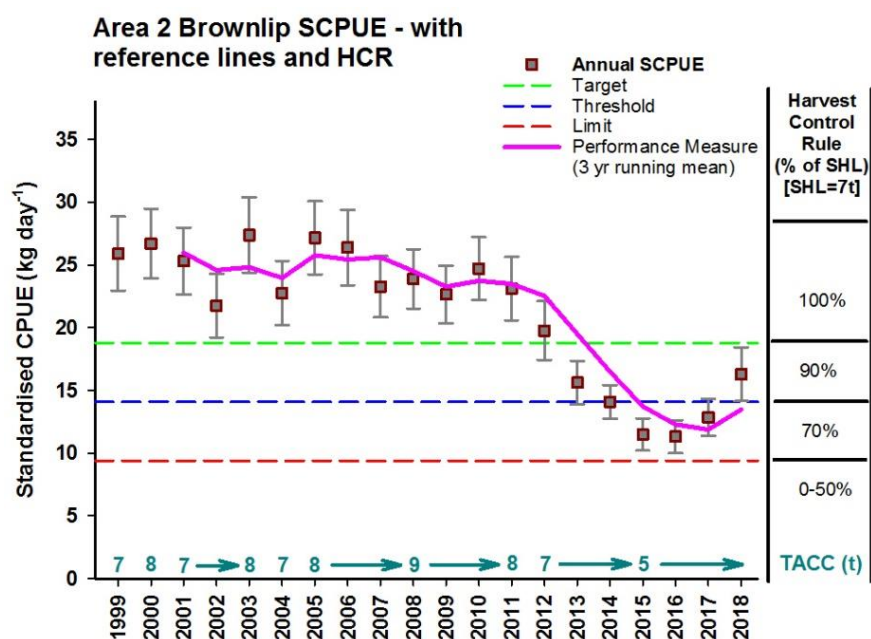


Figure 3: The annual standardised CPUE (kg.day^{-1}) for Brownlip abalone with the performance indicator (3 year running mean), reference levels (target, threshold and limit) and harvest control rule in Management Area 2.

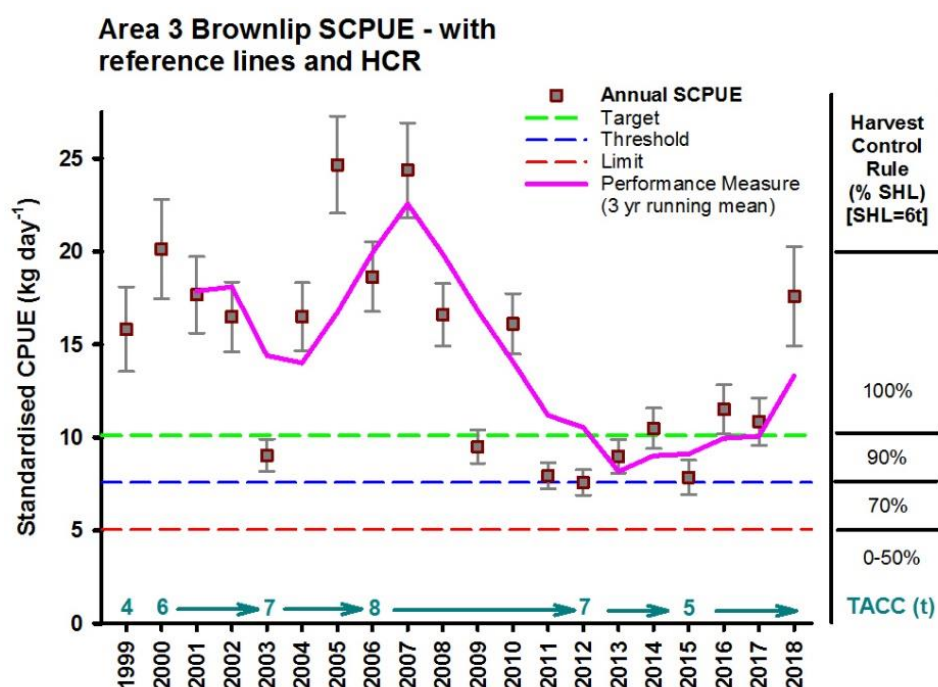


Figure 4: The annual standardised CPUE ($\text{kg} \cdot \text{day}^{-1}$) for Brownlip abalone with the performance indicator (3 year running mean), reference levels (target, threshold and limit) and harvest control rule in Management Area 3.

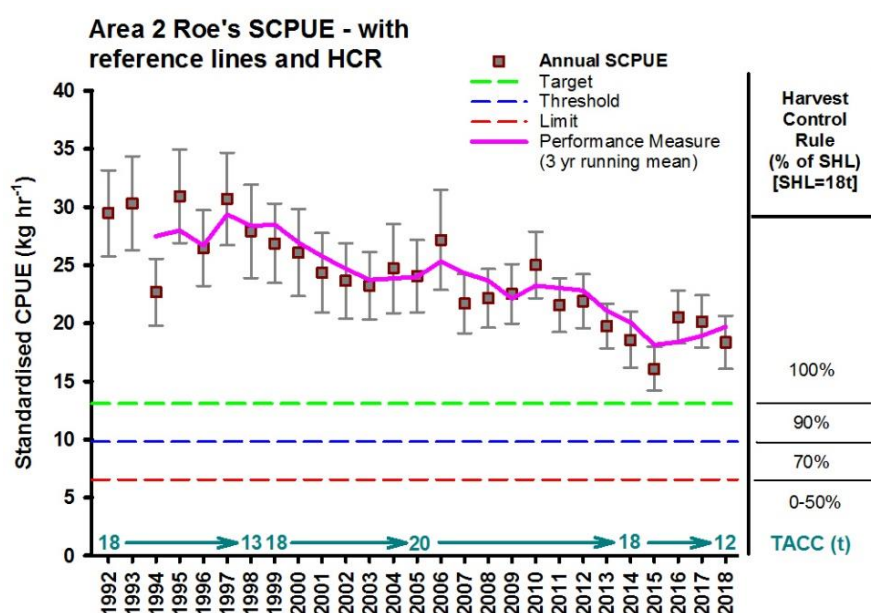


Figure 5: The annual standardised CPUE ($\text{kg} \cdot \text{hr}^{-1}$) for Roe's abalone with the performance indicator (3 year running mean), reference levels (target, threshold and limit) and harvest control rule in Management Area 2.

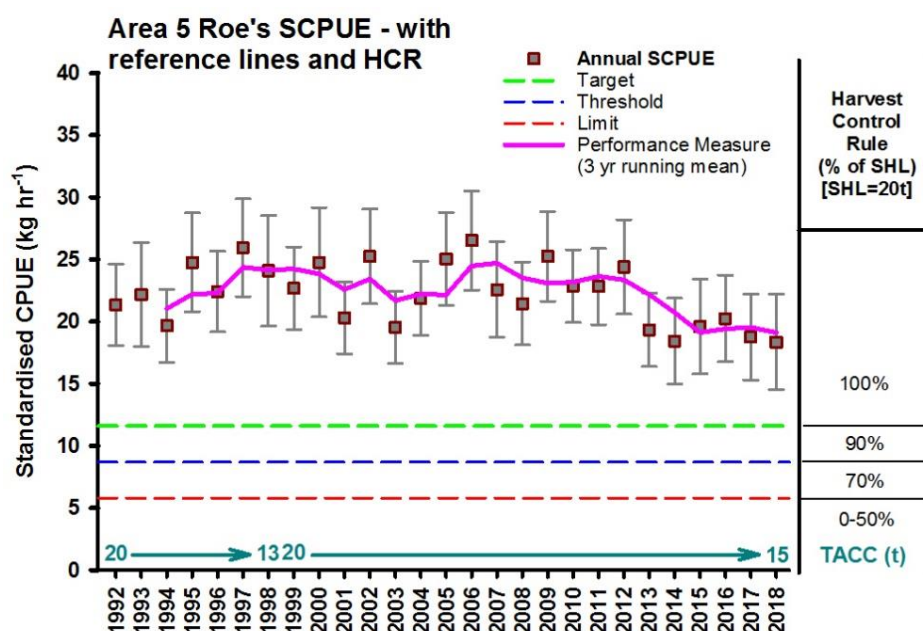


Figure 6: The annual standardised CPUE (kg.hr⁻¹) for Roe's abalone with the performance indicator (3 year running mean), reference levels (target, threshold and limit) and harvest control rule in Management Area 5.

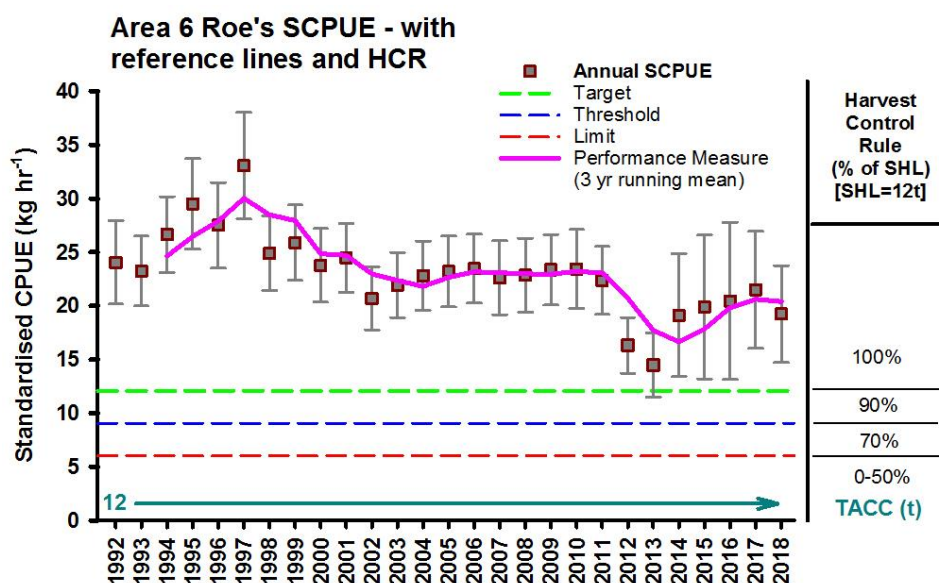


Figure 7: The annual standardised CPUE (kg.hr⁻¹) for Roe's abalone with the performance indicator (3 year running mean), reference levels (target, threshold and limit) and harvest control rule in Management Area 6.

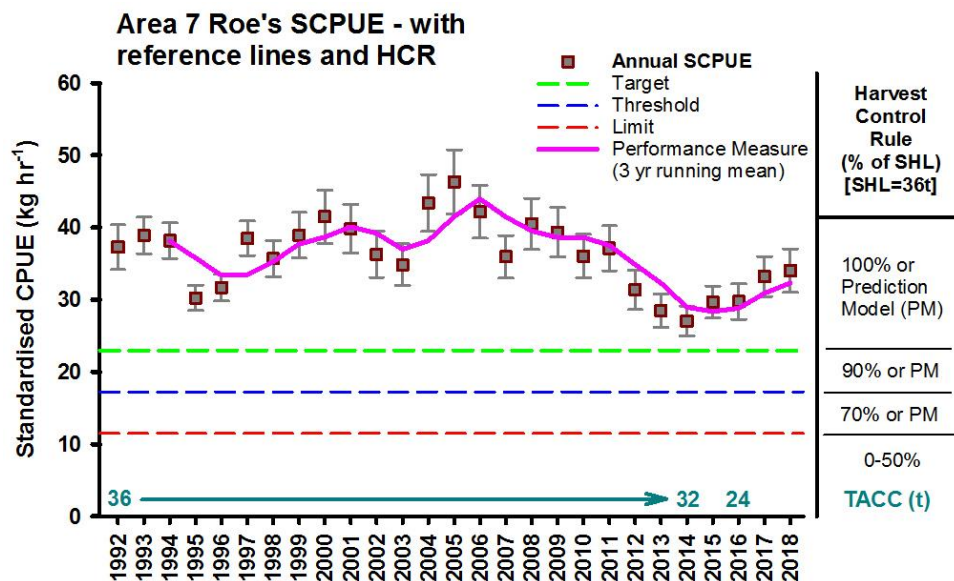


Figure 8: The annual standardised CPUE ($\text{kg}\cdot\text{hr}^{-1}$) for Roe's abalone with the performance indicator (3 year running mean), reference levels (target, threshold and limit) and harvest control rule in Management Area 7.

3.2.2 Updates on Scientific base of information

Strain et al. (2019) provides the key update on information relevant to the fishery particularly in relation to stock status of the three abalone species.

The assessment team were also advised about a new publication discussing the factors affecting recovery of invertebrate stocks from the 2011 Western Australian Extreme Marine Heatwave (Caputi et al. 2019).

3.2.3 Management changes

To increasing stock protection between the size at onset of maturity and the legal minimum length, the legal minimum length for both Brownlip and Greenlip abalone was raised to 145 mm for the start of the 2018 season in Area 2 and to 150 mm as of 9th October 2018 in Area 3.

A review of the current harvest strategy will occur in 2020/21 with any revisions to be approved and implemented in 2021. A recovery strategy is currently being developed with particular emphasis on Greenlip Abalone in Area 3.

Implementation of the new *Aquatic Resources Management Act 2016* (ARMA) has been delayed and did not come into effect on the 1 January 2019 as anticipated. The *Fish Resources Management Act 1994* (FRMA) remains in place.

3.2.4 Compliance

During the 17/18 season, for commercial Greenlip and Brownlip abalone, 54 compliance inspections were made. For commercial Roe's abalone, the numbers are 18 compliance inspections. Out of the 54 inspections for Greenlip and Brownlip abalone, 7 resulted in warnings and 1 infringement was made (Table 2). There were no warnings or infringements noted in the commercial Roe's abalone fishery during the 17/18 season. The number of infringements were similar in previous years e.g. 1 or 2 during the fishing season.

Table 2: Compliance in the Western Australian abalone fishery during the 2017/18 fishing season.

Fishery	Year	Brief	Infringement	Warning	Total
Roe's abalone (commercial)	2017/18	2	0	0	2
Greenlip/Brownlip abalone (commercial)	2017/18	1	1	7	9

3.2.5 Changes to the fishing operations and traceability systems

The assessment team was advised that one of the processing companies has obtained CoC certification but the MSC logo has not been use on the product. No other changes in operations of the fishery were reported to the assessment team.

3.3 Version details

Table 3 – Fisheries program documents versions

Document	Version number
MSC Fisheries Certification Process	Version 2.1
MSC Fisheries Standard	Version 2.0
MSC General Certification Requirements	Version 2.3
MSC Surveillance Reporting Template	Version 2.0

4 Results

4.1 Surveillance results overview

4.1.1 Summary of conditions

Table 4 – Summary of conditions					
Condition number	Condition	Performance Indicator (PI)	Status	PI original score	PI revised score
1 & 4 Combined	Provide evidence that the stock is highly likely to be above the PRI.	Greenlip 1.1.1	Back on target but see cond. 5	60	Not revised
2	Provide evidence that changes to catch are sufficient to move the stock to a level where it fluctuates around the target reference point.	Brownlip 1.1.1	On target	70	Not revised
3	Adjust the harvest strategy or provide evidence that it is responsive to the state of the stock and the elements of the harvest strategy work together.	Brownlip 1.2.1	On target	70	Not revised
5	Implement a well-defined rebuilding strategy that takes into account the circumstances that led to the current decline and the possibility that this low of level of productivity / recruitment may continue or re-occur.	Greenlip 1.1.2	New	60	
6	Update the harvest strategy to address current shortcomings / changes in productivity and provide evidence that it will achieve its objectives.	Greenlip 1.2.1	New	60	

7	Update the harvest control rules to address current shortcomings / changes in productivity and provide evidence that it will achieve its objectives.	Greenlip 1.2.2	New	65	
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4.1.2 Total Allowable Catch (TAC) and catch data

Table 5 – Greenlip Abalone Total Allowable Catch (TAC) and catch data (meat weight)

TAC	Year	2018	Amount	17t
UoA share of TAC	Year	2018	Amount	17t
UoA share of total TAC	Year	2018	Amount	17t
Total green weight catch by UoC	Year (most recent)	2018	Amount	15.1t
Total green weight catch by UoC	Year (second most recent)	2017	Amount	36.75t

Table 6 – Brownlip Abalone Total Allowable Catch (TAC) and catch data (meat weight)

TAC	Year	2018	Amount	10t
UoA share of TAC	Year	2018	Amount	10t
UoA share of total TAC	Year	2018	Amount	10t
Total green weight catch by UoC	Year (most recent)	2018	Amount	8.3t
Total green weight catch by UoC	Year (second most recent)	2017	Amount	8.99t

Table 7 – Roe's Abalone Total Allowable Catch (TAC) and catch data (whole weight)

TAC	Year	2018	Amount	63t
UoA share of TAC	Year	2018	Amount	63t

UoA share of total TAC	Year	2018	Amount	63t
Total green weight catch by UoC	Year (most recent)	2018	Amount	47t
Total green weight catch by UoC	Year (second most recent)	2017	Amount	48.21t

4.2 Conditions

Table 8 – Condition 1 (includes Condition 4)	
Performance Indicator	1.1.1 (Greenlip abalone)
Score	60
Justification	<p>The justification was revised in surveillance audit 2 as a result of merging conditions 1 and 4, as well as incorporating updated information.</p> <p>The trend in sCPUE indicates that, although catches have been substantially reduced, stock abundance has continued to decline in both areas of the fishery for the last 8 years. This raises concerns about both scoring issues in PI 1.1.1.</p> <p>PI 1.1.1.a: Due to the protection to mature females provided by the size limit we have concluded that it is <i>likely</i> that the stocks of Greenlip abalone are above the PRI, thus meeting the SG60 level. However, the most recent annual and three-year average values for SCPUE are below the LRP in one area and just above it in the other. Consequently, it is no longer <i>highly likely</i> that the stock is above the PRI, and hence the SG80 level is not met.</p> <p>PI 1.1.1.b: Target reference points have only been recently implemented in the fishery but the performance of the fishery has been examined in relation to these using data from the last 20 years. Over this period, the stock has only occasionally exceeded a target consistent with a proxy for MSY. The stock is therefore neither at nor fluctuating around a level consistent with MSY and the SG80 level is not met.</p> <p>There is evidence that this fishery has experienced changes in productivity due to natural environmental fluctuations in 2010/11. Given this, adjustments to the reference points consistent with natural environmental fluctuations are acceptable, although have not been developed in this case.</p>

Condition	<p>The condition was revised in surveillance audit 2 as a result of merging conditions 1 and 4.</p> <p>By the 4th surveillance audit, provide evidence that the stock is highly likely to be above the PRI and is fluctuating around a level consistent with MSY (permitting for adjustments due to natural environmental fluctuations).</p>
Milestones	<p>Existing 2nd surveillance audit milestones:</p> <p>Condition 1: There was no milestone for the 2nd audit, however the revised client action plan stated: Provide an assessment of the various stock indicators (e.g. annual catch rate and recruitment surveys where available) to demonstrate that the decline in abundance has been halted or reversed. If there is no evidence that the stock has responded to the HCRs, provide evidence that a formal recovery strategy has been developed to return the stock to the target level (and thus above the point of recruitment impairment) within two times the generation time of Greenlip abalone.</p> <p>Condition 4: Provide updates on the standardised CPUE, recruitment, and other indicators of stock status for Greenlip abalone as evidence that the decline in stock abundance has been slowed or halted.</p> <p>Revised milestones for third and fourth surveillance audits:</p> <p>Milestones for subsequent audits were revised in surveillance audit 2 as a result of merging conditions 1 and 4.</p> <p>By the third surveillance audit provide a consolidated assessment of the various stock indicators and a drafted analysis of the appropriate target referenced point(s) consistent with MSY that take into account natural environmental fluctuations.</p> <p>Achieving the milestone at the third surveillance audit will not change the score.</p> <p>By the fourth surveillance audit:</p> <ul style="list-style-type: none"> • Determine target reference point(s) consistent with MSY that take into account natural environmental fluctuations • Demonstrate that the stock is fluctuating around the revised target reference point(s) • Demonstrate that the stock is highly likely to be above the PRI. <p>Achieving the milestone at the fourth surveillance audit will increase the score to 80.</p>

Client Action Plan	<p>3rd Audit: DPIRD to provide a consolidated assessment of the various stock indicators (e.g. annual catch rate and recruitment surveys where available) since the harvest/rebuilding strategy was implemented, taking into account factors that may be affecting these indicators. Use the results from the updated draft analyses as a basis for reviewing the outcomes of applying the strategy and adjust this to ensure target reference point(s) are appropriate to maintain the stock fluctuating at or around a level consistent with MSY.</p> <p>4th Audit: DPIRD to provide a published Resource Assessment Report for the WA Abalone Resource, which incorporates analyses undertaken to support the rebuilding strategy and demonstrate that the reference points in the updated harvest strategy are appropriate to maintain the stock fluctuating at or around a level consistent with MSY.</p>
Consultation on condition	The action plan has been developed in close consultation with DPIRD (formerly the Department of Fisheries) and the AIAWA.
Progress on Condition (Year 1)	The latest information on stock status shows that the stock has continued to decline in both Area 2 and Area 3. This is evidence that the stock is <u>not</u> responding to the changes in catch that the application of the HCR has required and that the HCR is <u>not</u> moving the stock towards the TRP. The expected progress for the 1 st Surveillance audit has therefore <u>not</u> been achieved and the PI was rescored and a new condition 4 assign against the scoring element b.
Status	Open. Behind target.
Progress on Condition (Year 2)	<p>The latest information on stock status shows that the stock has continued to decline in both areas and is below the limit reference point in Area 3. This is evidence that the stock is <u>not</u> responding to the changes in catch that the application of the HCR has required and that the HCR is <u>not</u> moving the stock towards the TRP.</p> <p>As there was no evidence that the stock has responded to the HCRs, a draft recovery strategy has been provided to the assessment team and the combined condition is back on target. A finalised draft is expected before the end of the year. The ongoing development and implementation of the rebuilding strategy will be tracked by new Condition 5, whilst the updated Condition 1 will focus on monitoring stock status (the intent behind the associated PI 1.1.1).</p>
Status	Open. Back on target.

Additional information	In the second surveillance audit conditions one and four which relate to the same PI were combined. The resulting condition 1 was refined to provide clearer contrast with new conditions 5, 6 and 7 and the intent behind the corresponding PIs.
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Table 9 – Condition 2

Performance Indicator	1.1.1 (Brownlip abalone)
Score	70
Justification	At the time of certification, the Brownlip abalone stock was not fluctuating around a level consistent with MSY, hence evidence is required to show that the stock has returned to this level.
Condition	By the 3rd surveillance audit , provide evidence that changes to catch are sufficient to move the stock to a level where it fluctuates around the target reference point.
Milestones	<p>By the 1st and 2nd Surveillance Audit - Provide an assessment of various stock indicators to demonstrate that the stock is responding to the harvest control rule (changes in catch). No increase in score would be achieved and the score remains at 70.</p> <p>By the 3rd Surveillance Audit - Provide a consolidated assessment of the various stock indicators. Achieving the milestones at the third surveillance audit will increase the score to 80.</p>
Consultation on condition	The action plan has been developed in close consultation with DPIRD (formerly the Department of Fisheries) and the AIAWA.
Progress on Condition (Year 1)	The latest information on the status of the stock shows that the declining trend in sCPUE has flattened out in Area 2 and continued to gradually increase in Area 3. We have considered this to be evidence that the changes to catch required by the application of the HCR are moving the stock back towards the target reference level.
Status	Open, On target.
Progress on Condition (Year 2)	The latest information on the status of the stock shows that sCPUE is increasing in both Area 2 and 3. Area 2 is approaching the threshold reference level and Area 3 has exceeded the target reference level. We consider this to be evidence that the changes to catch required by the

	application of the HCR are moving the stock back towards the target reference level.
Status	Open, On target.
Additional information	<i>The CAB may provide any additional information for this condition here.</i>

Table 10 – Condition 3

Performance Indicator	1.2.1 (Brownlip abalone)
Score	70
Justification	The gap between onset of maturity and the legal size limit may be too small to provide sufficient protection of the female breeding stock and the limit reference point may not be robust. Consequently, changes are necessary to ensure that the elements of the harvest strategy work together to achieve stock management objectives.
Condition	By the 3rd surveillance audit, adjust the harvest strategy or provide evidence that it is responsive to the state of the stock and the elements of the harvest strategy work together towards achieving stock management objectives reflected in PI 1.1.1. This should address providing a biological basis for selection of the limit reference point.
Milestones	<p>At the 1st and 2nd Surveillance Audit - Provide an update on how the fishery is performing to validate if the current reference levels are appropriate. No increase in score would be achieved and the score remains at 70.</p> <p>At the 3rd Surveillance Audit – Provide a review of the state of the stock with respect to the application of the harvest strategy to provide evidence that elements of the harvest strategy work together towards achieving stock management objectives. Achieving the milestones at the third surveillance audit will increase the score to 80.</p>
Consultation on condition	The action plan has been developed in close consultation with DPIRD (formerly the Department of Fisheries) and the AIAWA.
Progress on Condition (Year 1)	The information provided about the status of Brownlip abalone is indicative that the stock is responsive to the catch reductions implemented under the harvest strategy. The assessment team were also advised that research to better identify the size at onset of maturity has been initiated for

	<p>Brownlip abalone in both Area 2 and Area 3. This is intended to help verify whether that the reference points are appropriate for the stock.</p> <p>The assessment team considers that this evidence is sufficient to demonstrate the expected progress towards closing out the condition.</p>
Status	Open, on target.
Progress on Condition (Year 2)	<p>The information provided about the status of Brownlip abalone is indicative that the stock is responsive to the catch reductions implemented under the harvest strategy. The assessment team were also advised that research to better identify the size at onset of maturity has been initiated for Brownlip abalone in both Area 2 and Area 3 and should be available by the third audit. This is intended to help verify whether that the reference points are appropriate for the stock. Size limits were raised to provide greater protection of the breeding stock.</p> <p>The assessment team considers that this evidence is sufficient to demonstrate the expected progress towards closing out the condition.</p>
Status	Open, on target.
Additional information	<i>The CAB may provide any additional information for this condition here.</i>

Table 11 – Condition 5 - NEW	
Performance Indicator	1.1.2 (Greenlip abalone)
Score	60
Justification	The ongoing decline in sCPUE has been unexpected and was considered highly unlikely by earlier simulation modelling. Consequently, there is no evidence that stocks are rebuilding or likely to do so based on simulation modelling.
Condition	By the fourth surveillance audit implement a well-defined rebuilding strategy that, based on simulation modelling, exploitation rates or previous performance, is likely to rebuild the stock within the specified timeframe.
Milestones	By the third surveillance audit provide a fully developed rebuilding strategy which has been fully consulted on with stakeholders. Achieving the milestone at the third surveillance audit will not alter the score.

	By the fourth surveillance audit implement a rebuilding strategy that is likely to rebuild the population and takes into account the circumstances that led to the current decline and the possibility that this low of level of productivity / recruitment may continue or re-occur. Achieving the milestone at the third surveillance audit will increase the score to 80.
Client action plan	<p>3rd Audit: By the third surveillance audit DPIRD to finalise the recovery strategy based on updated population modelling to ensure it is likely to recover the stock within appropriate rebuilding timeframes. The Recovery Strategy will be consulted on with relevant stakeholders.</p> <p>4th Audit: By the fourth surveillance audit DPIRD will implement the Recovery Strategy. This document will be published as an appendix to the updated Harvest Strategy, following public consultation.</p>
Consultation on condition	The client action plan has been developed in consultation between the client and DPIRD.

Table 12 – Condition 6 - NEW

Performance Indicator	1.2.1 (Greenlip abalone)
Score	60
Justification	The ongoing decline in sCPUE provides evidence that the harvest strategy is not achieving its objectives and the elements of the harvest strategy do not work together sufficiently well to ensure the stock management objectives are achieved.
Condition	By the fourth surveillance audit update the harvest strategy and provide evidence that the elements of the harvest strategy will work together to achieve its objectives.
Milestones	<p>By the third surveillance audit develop and consult with industry on an updated harvest strategy, ensuring that the elements of the harvest strategy work together and will achieve the harvest strategy objectives. Achieving the milestone at the third surveillance audit will not alter the score.</p> <p>By the fourth surveillance audit undertake public consultation and publish the updated harvest strategy and provide evidence that the elements of the harvest strategy will work together to achieve its objectives. Achieving the milestone at the fourth surveillance audit will increase the score to 80.</p>
Client action plan	3rd Audit: By the third surveillance audit DPIRD to undertake an assessment of the stock and review the performance

	<p>indicators and reference levels to ensure they are appropriate for achieving the harvest strategy objectives. The updated harvest strategy will be discussed with industry.</p> <p>4th Audit: By the fourth surveillance audit DPIRD to undertake public consultation on the updated harvest strategy, in line with the published stakeholder engagement guidelines. The Harvest Strategy will be published following Ministerial approval.</p>
Consultation on condition	The client action plan has been developed in consultation between the client and DPIRD.

Table 13 – Condition 7- NEW

Performance Indicator	1.2.2 (Greenlip abalone)
Score	65
Justification	The ongoing decline provides evidence that the HCR is not robust to the main uncertainties and cannot be expected to keep the stock at a level consistent with MSY.
Condition	By the fourth surveillance audit implement an updated HCR that is well defined, robust to the main uncertainties, including changes in productivity and is expected to keep the stock at a level consistent with MSY.
Milestones	<p>By the third surveillance audit, develop and consult with industry on an updated HCR, ensuring that it is well defined, robust to changes in productivity and that after recovery it will maintain the stock at a level consistent with MSY. Achieving the milestone at the third surveillance audit will not alter the score.</p> <p>By the fourth surveillance audit undertake public consultation and publish the HCR and provide evidence that the HCR will maintain the stock at a level consistent with MSY. Achieving the milestone at the fourth surveillance audit will increase the score to 80.</p>
Client action plan	<p>3rd Audit: By the third surveillance audit DPIRD to undertake an assessment of the stock and review the long term Sustainable Harvest Limit (SHL) and HCRs for future TAC setting processes to ensure they are well defined and sufficiently precautionary to account for potential changes in productivity. The updated Harvest Strategy and HCRs will be discussed with industry.</p> <p>4th Audit: By the fourth surveillance audit DPIRD to undertake public consultation on updated Harvest Strategy and HCRs, in line with the published stakeholder engagement guidelines.</p>

	The Harvest Strategy will be published following Ministerial approval.
Consultation on condition	The client action plan has been developed in consultation between the client and DPIRD.

4.3 Client Action Plan

The client action plans to the new conditions 5-7 is provided in the Tables above. An updated client action plan to the revised condition 1 will also need to be provided.

5 References

Strain, L., Hart, A. and Jones, R. (2019). Western Australian Abalone Managed Fishery. Western Australian Marine Stewardship Council Report Series No. 8. Addendum 2 pp. 28.

Caputi, N., Kangas, M., Chandrapavan, A., Hart, A., Feng, M., Marin, M. and de Lestang, S. (2019) Factors affecting recovery of invertebrate stocks from the 2011 Western Australian Extreme Marine Heatwave. *Frontiers in Marine Science*. <https://www.frontiersin.org/articles/10.3389/fmars.2019.00484/full>

DPIRD (in prep.) *DRAFT Greenlip abalone recovery strategy*.

6 Re-scoring Performance Indicators

Principle	Component	Wt	Performance Indicator (PI)		Wt	Score
One	Outcome	0.333	1.1.1	Stock status	0.333	60
			1.1.2	Stock rebuilding	0.333	60
			1.1.3	Genetic outcome	0.333	100
	Management	0.667	1.2.1	Harvest strategy	0.167	60
			1.2.2	Harvest control rules & tools	0.167	65
			1.2.3	Information & monitoring	0.167	90
			1.2.4	Assessment of stock status	0.167	90
			1.2.5	Genetic management	0.167	95
			1.2.6	Genetic Information	0.167	100
Overall weighted Principle-level scores						Score
Principle 1 - Target species						80.0
Principle 2 - Ecosystem						87.5
Principle 3 - Management						99.4

Several performance indicators under Principle1 required to be re-scored as the status of Greenlip abalone has continued to decline and has fallen below the limit reference point in Area 3. **Note: revised rationale is shown in red.**

PI 1.1.2 – Stock rebuilding: Greenlip abalone

PI 1.1.2		Where the stock is reduced, there is evidence of stock rebuilding within a specified timeframe		
Scoring Issue		SG 60	SG 80	SG 100
a	Rebuilding timeframes			
	Guid epos t	A rebuilding timeframe is specified for the stock that is the shorter of 20 years or 2 times its generation time . For cases where 2 generations is less than 5 years, the rebuilding timeframe is up to 5 years.		The shortest practicable rebuilding timeframe is specified which does not exceed one generation time for the stock.
	Met?	Y		N
	Justi ficati on	<p>Greenlip abalone stocks have fallen below the threshold reference point but remain marginally above the limit reference in both assessed areas (Hart et al. 2013a). The use of a three-year sCPUE tends to smooth trends in this indicator, which means with a trend of declining SCPUE, the status in the most recent year is lower than indicated by the sCPUE average.</p> <p>The two times the generation time of Greenlip abalone is approximately 16 years (i.e. 2 x 8 years, based on 1/M+L₅₀ maturity, where M is assumed to be 0.2 and L₅₀ maturity is 3 years).</p> <p>The harvest strategy has responded to declines in SCPUE by reducing catch. The timeframe is not specified but the historical response of the stock to changes in catch shows that rebuilding at lower catch can occur within the 2-generation period.</p> <p>The shortest possible timeframe (and less than one generation time) is not however specified and historical periods of recovery suggest durations longer than the one-generation period of 3-4 years will be required so the fishery cannot be said to meet SG100.</p>		
		Rebuilding evaluation		

PI 1.1.2		Where the stock is reduced, there is evidence of stock rebuilding within a specified timeframe		
b	Guid e p o s t	Monitoring is in place to determine whether the rebuilding strategies are effective in rebuilding the stock within the specified timeframe.	There is evidence that the rebuilding strategies are rebuilding stocks, or it is likely based on simulation modelling, exploitation rates or previous performance that they will be able to rebuild the stock within the specified timeframe.	There is strong evidence that the rebuilding strategies are rebuilding stocks, or it is highly likely based on simulation modelling, exploitation rates or previous performance that they will be able to rebuild the stock within the specified timeframe.
	Met?	Y	N	N
	Justi fi ca ti o n	<p>The reference point uses sCPUE as an indicator and this is collected and reported annually so effectiveness of the strategy in rebuilding the stock will be monitored. Hence the fishery meets SG60.</p> <p>Simulation modelling have been conducted of the probability of the reference points being breached, given assumptions of recruitment and natural mortality which indicate very low risk at current catch, thus the fishery originally met SG80.</p> <p>Whilst initial simulation modelling had indicated a very low probability of breaching reference points, this has now occurred in one area and there is no clear indication that the stock rebuilding strategy is rebuilding stocks. Hence the fishery does not meet SG80.</p>		
Reference s		Hart et al. 2016.		
OVERALL PERFORMANCE INDICATOR SCORE:				60
CONDITION NUMBER (if relevant):				5

PI 1.2.1 – Harvest strategy: Greenlip abalone

PI 1.2.1		There is a robust and precautionary harvest strategy in place		
Scoring Issue		SG 60	SG 80	SG 100
a	Harvest strategy design			
	Guide post	The harvest strategy is expected to achieve stock management	The harvest strategy is responsive to the state of the stock and the elements of	The harvest strategy is responsive to the state of the stock and is designed to

PI 1.2.1		There is a robust and precautionary harvest strategy in place		
		objectives reflected in PI 1.1.1 SG80.	the harvest strategy work together towards achieving stock management objectives reflected in PI 1.1.1 SG80.	achieve stock management objectives reflected in PI 1.1.1 SG80.
	Met?	Y	N	N
	Justification	<p>The harvest strategy (HS) responds to decline in standardized catch rate by lowering catches as this proxy for biomass declines. The strategy involves regular annual assessments with associate regular adjustment to the total allowable catch if indicated. The harvest strategy thus meets SG60.</p> <p>The harvest strategy is strongly reliant on the protection of the legal minimum size limit for Greenlip abalone. Size at onset of maturity is well established for this species in WA.</p> <p>The selection of the limit reference point is reliant on a single arbitrary decision in the development of the HS. This is that the lowest catch rate observed during the reference period (1992 to 2006 in the case of greenlip abalone) equates to 30% of the unfished stock (Hart et al. 2016, WA Government 2016). From this arbitrary decision, the limit reference point is set at 2/3 of the lowest observed biomass during the reference period.</p> <p>The use of observed historical catch rates to set reference points is a common approach but limit reference points are more commonly based on catch rates actually seen historically. That is because the subsequent history of the stock provides evidence on whether recruitment was affected.</p> <p>The approach used here for the Greenlip abalone HS enables the exploitable biomass component of the stock to be depleted to levels substantially lower than at any point seen historically (i.e. 2/3) yet not be classified as recruitment overfished. Despite this problem, the elements of the harvest strategy can be considered to work together to achieve the management objective of maintaining spawning stock biomass at a level where the main factor affecting recruitment is the environment. This is because of protection of spawning biomass with the minimum size limit. The stock decline to below the sCPUE limit in 2018 indicates that the elements of the harvest strategy do not work together sufficiently to halt sustained ongoing declines. Hence the fishery does not meet SG80.</p>		
b	Harvest strategy evaluation			
	Guide post	The harvest strategy is likely to work based on prior	The harvest strategy may not have been fully tested but evidence exists that	The performance of the harvest strategy has been fully evaluated and

PI 1.2.1		There is a robust and precautionary harvest strategy in place		
		experience or plausible argument.	it is achieving its objectives.	evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels.
	Met?	Y	N	N
	Justification	Testing of the reference points within the HS has been conducted although to a basic level assuming constant recruitment. Outcomes were highly reliant on assumptions of possible (unknown) levels of F and M. This analysis did not involve full evaluation of the whole strategy; thus, the fishery cannot be said to meet SG100. Ongoing sCPUE declines down to levels below the limit reference point despite catches being reduced by the HS indicate that there is no evidence that the HS is meeting its objectives. Thus, the fishery cannot be said to meet SG80. Nonetheless, based on simulation testing and the protection afforded to spawning biomass by the size limit, the harvest strategy is likely to work outside of the influence of major environmental fluctuations resulting in recruitment failure as experience after the 2011 heat wave. Hence the fishery meets SG60.		
c	Harvest strategy monitoring			
	Guide post	Monitoring is in place that is expected to determine whether the harvest strategy is working.		
	Met?	Y		
	Justification	The fishery is assessed each year which provides updated information on trends in the stock, and whether the decision rules effectively maintain the stock around target reference points.		
d	Harvest strategy review			
	Guide post			The harvest strategy is periodically reviewed and improved as necessary.
	Met?			Y

PI 1.2.1		There is a robust and precautionary harvest strategy in place		
	Justification	The harvest strategy has only been implemented for a short period but there is a demonstrated history of review and improvement. Changes were made to shift emphasis away from industry selected reference points to those with a biological basis.		
e	Shark finning			
	Guide post	It is likely that shark finning is not taking place.	It is highly likely that shark finning is not taking place.	There is a high degree of certainty that shark finning is not taking place.
	Met?	Not relevant	Not relevant	Not relevant
	Justification	Not relevant		
f	Review of alternative measures			
	Guide post	There has been a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock.	There is a regular review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock and they are implemented as appropriate.	There is a biennial review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock, and they are implemented, as appropriate.
	Met?	Not relevant	Not relevant	Not relevant
	Justification	Scoring issue not scored as there is no unwanted catch of the target stock.		
References		Hart et al. 2016, WA Government 2016.		
OVERALL PERFORMANCE INDICATOR SCORE:				60
CONDITION NUMBER (if relevant):				6

PI 1.2.2: Harvest control rules and tools: Greenlip abalone

PI 1.2.2		There are well defined and effective harvest control rules (HCRs) in place		
Scoring Issue		SG 60	SG 80	SG 100
	HCRs design and application			

PI 1.2.2		There are well defined and effective harvest control rules (HCRs) in place		
a	Guid e p o s t	Generally understood HCRs are in place or available that are expected to reduce the exploitation rate as the point of recruitment impairment (PRI) is approached.	Well defined HCRs are in place that ensure that the exploitation rate is reduced as the PRI is approached, are expected to keep the stock fluctuating around a target level consistent with (or above) MSY, or for key LTL species a level consistent with ecosystem needs.	The HCRs are expected to keep the stock fluctuating at or above a target level consistent with MSY, or another more appropriate level taking into account the ecological role of the stock, most of the time.
	Met?	Y	N	N
	Justi fi c a t i o n	Harvest control rules are in place to reduce catch as the performance indicator of sCPUE falls below the threshold reference point and approaches the limit reference point. The fishery thus meets SG60. Given the unexpected ongoing decline in stocks and sCPUE through to 2018, there is no evidence to suggest that the harvest strategy is expected to keep the stock fluctuating around a target level consistent with MSY. Under the current HCR the TACC reductions required as the PRI is approached are also not well defined. Consequently, the fishery does not meet SG80. The HCR implements catch at higher levels of stock abundance that have historically prevented the stock staying above the target reference point most of the time therefore not meeting the SG100.		
	HCRs robustness to uncertainty			
b	Guid e p o s t		The HCRs are likely to be robust to the main uncertainties.	The HCRs take account of a wide range of uncertainties including the ecological role of the stock, and there is evidence that the HCRs are robust to the main uncertainties.
	Met?		N	N
	Justi fi c a t i o n	The HCRs increasingly reduce catch to the point that the fishery is closed when unexpected events occur in the example of the		

PI 1.2.2		There are well defined and effective harvest control rules (HCRs) in place			
		2010/11 heatwave. This has been tested in the example of Roe’s abalone which has remained closed in Area 8. The HCR was not robust to the conditions that caused the decline in sCPUE to below the limit reference point in 2018. Consequently the fishery does not meet SG80.			
c	HCRs evaluation				
	Guid epos t	There is some evidence that tools used or available to implement HCRs are appropriate and effective in controlling exploitation.	Available evidence indicates that the tools in use are appropriate and effective in achieving the exploitation levels required under the HCRs.	Evidence clearly shows that the tools in use are effective in achieving the exploitation levels required under the HCRs.	
	Met?	Y	Y	N	
	Justi ficati on	There is evidence that controls on catch are effective in achieving required exploitation rates, as evidenced by stability in the fishery prior to 2010. The fishery thus meets SG80. There is not yet clear evidence that the HCR has been sufficiently responsive to restore sCPUE following the heatwave induced decline from 2010. Hence the fishery does not meet SG100.			
Reference s		Hart et al. 2016.			
OVERALL PERFORMANCE INDICATOR SCORE:					65
CONDITION NUMBER (if relevant):					7

7 Appendices

7.1 Evaluation processes and techniques

7.1.1 Site visits

The surveillance audit for 2019 comprised:

- An Audit Plan was provided to the client, management, and scientists before the meeting. The opening meeting included an exchange of information relevant to the surveillance audit.
- A meeting took place in Perth on the 8th of August 2019 with client representatives, scientists and managers of the fishery (Table 14). Other stakeholders were notified of the time and location of the meeting. They were invited to participate or submit comments in writing. No requests for meetings were received.
- Necessary documents were sent to the CAB by the client prior to and after the meeting.

Table 14 – Meeting Attendees

Meeting Attendees	Role	Organisation
Peter Rickerby	Client Representative	AIAWA
Nathan Adams	Client Representative	AIAWA
Nick Caputi	Research	DPIRD
Lachlan Strain	Research	DPIRD
Emily Fisher	Research	DPIRD
Rhiannon Jones	Management	DPIRD
Kim Walshe	Management	DPIRD
Sabine Daume	Lead auditor, P2 expert	Bio.inspecta Pty Ltd
Klaas Hartmann	P1 expert	Contractor/ Bio.inspecta Pty Ltd

7.2 Stakeholder participation

As required by FCP v2.1 Section 7.28, stakeholders were informed about the time, place and scope of the surveillance audit, the surveillance team as well as the surveillance level for this fishery. There were no requests from stakeholders for in-person interviews. No written submissions were received.

7.3 Revised surveillance program

A level 5 surveillance program was suggested for this fishery for the initial certification period with an on-site audit for the first, third and fourth surveillance audit. Since an additional condition was assigned during the first surveillance audit and additional conditions during this audit due to concerns about Greenlip abalone stock status the level has been changed to level 6 (defaults surveillance audit level) with onsite audits during each year.

Table 15– Fishery surveillance program

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

Table 16 – Timing of surveillance audit

Year	Anniversary date of certificate	Proposed date of surveillance audit	Rationale
1	28 April 2018	25 October 2018	This review was conducted 5 months and 28 days after the anniversary date to allow the WA Government tender process to select the successful proposal for the 1st surveillance audit be finalised.
2	28 April 2019	8 August 2019	The audit was scheduled 3 ½ months after the anniversary date to allow to consider initial results and scientific advice for the 2018/19 season which started in May.
3	28 April 2020	July 2020	To allow the 2019/20 season catch data and analysis to be presented.
4	28 April 2021	July 2021	To allow the 2020/21 season catch data and analysis to be presented. With the new FCP v 2.1 this will also coincide with the onsite for the re-assessment

7.4 Harmonised fishery assessments

Principle 1: Not required.

Principle 2: Not required.

Principle 3: In accordance with Fishery Certification Process (FCP) Annex PB, efforts have been made to harmonise those parts of Principle 3 that are relevant to all Western Australian fisheries. The Abalone Fishery shares a management system with the Fisheries listed in Table 17 and harmonisation is therefore required with the Governance and Policy PIs (3.1.1-3.1.3). The Guidelines for Stakeholder Engagement Document (DoF 2016) was published by the then Department of Fisheries which resulted in revised scoring of earlier assessments and PI 3.1.2 scoring higher in the most recent assessments.

Table 17 – Overlapping fisheries			
	Fishery name	Certification status and date	Performance Indicators to harmonise
1	Peel Harvey Estuarine Fishery	Certified 23 June 2016	3.1.1, 3.1.2, 3.1.3
2	West Coast Deep Sea Crab	Certified 14 July 2016	3.1.1, 3.1.2, 3.1.3
3	Exmouth Gulf Prawn	Certified 20 October 2015	3.1.1, 3.1.2, 3.1.3
4	Shark Bay Prawn	Certified 21 Oct 2015	3.1.1, 3.1.2, 3.1.3
5	Australia Pearl Oyster	Certified 6 Sept 2017	3.1.1, 3.1.2, 3.1.3
6	Australian Western Rock Lobster	Re-certified 30 May 2017	3.1.1, 3.1.2, 3.1.3

Table 18 – Scoring differences (Numbers refer to relevant fisheries in Table 17 above)						
Performance Indicators (PIs)	1	2	3	4	5	6
3.1.1	100	100	100	100	100	100
3.1.2	75(85)*	75 (85)*	75(100)*	75(100)*	100 (WA UoC)	100
3.1.3	100	100	100	100	100	100

*scores in brackets are the new scores that were given after the condition was closed. Differences in scores, as summarised in Table 17, were justified in the respective reports