

**Subject:** ES Working Group meeting  
**Location:** LND - L4 Cradle 4.03

**Start:** Fri 27/11/2020 9:30 AM  
**End:** Fri 27/11/2020 12:30 PM  
**Show Time As:** Tentative

**Recurrence:** (none)

**Meeting Status:** Not yet responded

**Organizer:** Bannister, Raymond  
**Required Attendees:** Churchill, Mark; Gallagher, Stephen G; Wilson, Kate; Brain, Eric; Hoyle, Kate; Jeff Ross; Catriona MacLeod; Horner, David  
**Resources:** LND - L4 Cradle 4.03

Hi all,

This afternoon you will receive a copy of the draft Environmental Standard. Given we are getting close to consultation, it is important that you all read this document, digest its content and provide constructive feedback on how we can improve its readability and message to EL holders.

It is important that we get the structure right, ensure that it is easy to follow and self-explanatory. Most of you have not seen a draft of the ES and this provides an ideal time to test whether the document stacks up.

I know there are still some areas to improve in terms of water quality measurements/triggers (Dave Horner to provide comment on). In addition, other ad-hoc monitoring (i.e when Therapeutants are used, or when special habitat monitoring is required etc, etc) has currently not been included, we have to identify the best way to tackle this in the standard.

You will notice there are a bunch of attachments referred to in the standard... I am still working my way through these. They are referring to methodology (i.e. how to do redox or fauna analysis) and these will be provided later for comment, so at this stage I am really seeking feedback on the main ES document, its structure and feasibility for regulating environmental performance.

This meeting will provided us with an opportunity to go through and address all the major comments and provide a way forward to finalise the draft ES for industry consultation...

Cheers,

Raymond

**Dr Raymond Bannister | Senior Environmental Officer**  
 Salmon Environmental Management Section | Environmental Operations South

**EPA Tasmania**

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**From:** Bannister, Raymond  
**Sent:** Wednesday, 11 November 2020 3:25 PM  
**To:** Gallagher, Stephen G; Churchill, Mark; Hoyle, Kate; Wilson, Kate; Horner, David; Brain, Eric; 'Jeff Ross'; 'Catriona MacLeod'  
**Cc:** Ford, Wes  
**Subject:** Draft Environmental Standard  
**Attachments:** DRAFT EPA Environmental standard\_Nov2020.docx; Recommendations from review.docx

**Follow Up Flag:** Follow up  
**Flag Status:** Flagged

Hi all,

Please find attached the draft Environmental standards.

As mentioned in my meeting invite earlier today, we are getting close to industry consultation, it is important that you all read this document, digest its content and provide constructive feedback on how we can improve its readability and message to EL holders. It is a draft, and I am sure it can be improved. It is important that we get the structure right, ensure that it is easy to follow and self-explanatory. Most of you have not seen a draft of the ES and this provides an ideal time to test whether the document stacks up.

I know there are still some areas to improve in terms of water quality measurements/triggers (Dave Horner to provide comment on). In addition, other ad-hoc monitoring (i.e when Therapeutants are used, or when special habitat monitoring is required etc, etc) has currently not been included. It would be good if you all can think about how we best tackle these requirements in the standard. Not to mention where we place the disclaimer that the ES will be reviewed and updated regularly (Every 5 years).

You will notice there are a bunch of attachments referred to in the standard... I am still working my way through these. They are referring to methodology (i.e. how to do redox or fauna analysis, water quality sampling etc etc) and these will be provided later for comment, so at this stage I am really seeking feedback on the main ES document, its structure and feasibility for regulating environmental performance.

I have also provided the list of recommendations that we provided Wes as part of the international review that we have all agreed on, maybe this can be useful when reading the Standard.

This meeting will provided us with an opportunity to go through and address all the major comments on the draft ES and provide a way forward to finalise the draft ES for industry consultation... Please be mindful that we have agreed to a lot of the content that is in the standard, so I do not want this meeting to be a re-justification of all the content that we have already agreed on in the ES, but how to ensure that the structure, readability, and usability of the standard is to an acceptable level for environmental management.

BTW, this document remains confidential until Wes has agreed to a version that is ready to be release to industry!

Good luck!

Cheers,

Raymond

**Dr Raymond Bannister | Senior Environmental Officer**  
 Salmon Environmental Management Section | Environmental Operations South  
 EPA Tasmania

Below is a list of recommendations that the working group has established for the future development of the 'Environmental Standard':

1. *Utilise a zones concept for the environmental management of Tasmanian finfish leases. The recommended zones are Farm-Zone (Operational area of the marine farming lease extending out to cage edge) and the AZE (extending from the edge of the Farm-Zone and out to 35 m from the lease boundary). Measurements undertaken at locations extending beyond the AZE should be referred to as beyond the AZE.*
- 2a. *Maintain the existing outer fixed distance for the AZE, this being set at 35 m from the edge of the lease boundary, while also providing the aquaculture industry with the opportunity to propose an alternative site-specific AZE. To propose a site-specific AZE, it would be expected that state-of-the-art modelling tools (e.g. 3D Hydrodynamic models and particle/nutrient deposition/dispersal models) should be used to demonstrate an acceptable dispersive / depositional footprint for each separate marine farming lease. Before approval and implementation of a site-specific AZE, the EPA may require peer-review for expert evaluation of the modelling work to ground truth the site-specific AZE.*
- 2b. *Propose the validation of site-specific AZE over a number of production cycles. If any lines of evidence demonstrate an environmental effect outside of the site-specific AZE, this would trigger a review of attributable causes and appropriate management actions.*
3. *As is current practice, suggest that the EPA should establish lease-specific monitoring plans in consultation with the 'Environmental Licence' holder to ensure the correct placement of all monitoring stations to assess environmental performance. The use of real-time data (i.e. Doppler current meter data) and modelling tools will be integral in providing additional information regarding current direction and speed, and the potential footprint to aid in the placement of these monitoring stations.*
4. *Include the selection of representative reference stations at distances appropriate to site-specific environmental forcing (e.g. wave activity, hydrodynamics) when undertaking quantitative AZE sampling to enable suitable comparisons of AZE environmental conditions to background environmental conditions. The sites chosen and the parameters required for quantitative sampling should be determined as part of the baseline sampling program.*
5. *Consider increasing the number of monitoring stations within the Farm-Zone. This will provide a better understanding of the environmental condition of the near-field environment within the marine farming lease area in-line with international practice.*
6. *Outline a requirement to regularly review BEMP reports to ensure the appropriateness of the monitoring sites, the parameters used, and the established investigative levels within these programs. Revised water quality guideline values should be provided for use within the new Environmental Standard for all MFDPs across Tasmania to enable site-/region-specific investigative levels to be established to increase the success of protecting ecosystem health.*
7. *In-line with international practice, undertake all environmental monitoring surveys during the period of peak feed input. As this is the time-period when the load of organic waste is greatest on the seabed, and when environmental impacts on the seabed are likely to occur.*
8. *Consider conducting regular detailed benthic environmental surveys (e.g. quantitative physico-chemical and biological parameters) across monitoring stations to benchmark environmental performance. The sampling frequency of these detailed surveys should reflect an individual lease's Farm-Zone and AZE environmental performance over successive production cycles.*
9. *Continue to use existing benthic indicators of organic enrichment (e.g. bacterial mat-forming species, gas bubbling and opportunistic polychaetes) for visual surveys within the Farm-Zone and at AZE monitoring stations. These indicators are globally applied visual indicators for organic enrichment. However, threshold values of these indicators within both the Farm-Zone and AZE require standardisation to reduce potential inconsistencies when assessing and reporting.*

10. Consider implementing the video scoring index for environmental condition (established by Macleod and Forbes in 2004) currently being reviewed by IMAS as part of FRDC project 2015-024, as a means to determine environmental performance.
11. Maintain existing water quality monitoring associated with salmonid farming should be a priority. Water quality measurements are important rapid determinants of change in a system. Furthermore, consider monitoring water quality at individual leases, and adopting real-time sensor technology to monitor critical water quality parameters at higher temporal resolutions (e.g. turbidity, chlorophyll, oxygen, etc.) at appropriate spatial scales.
12. Consider that the current parameters required for baseline sampling reflect international practice. In addition, recommend the establishment of a *robust pre-development time-line of selected water quality, biological, physico-chemical and environmental datasets at sites that are representative of local and regional environments needs consideration. These datasets would aid in establishing site and region-specific indicator guideline values, which would enable better identification of local and broader ecological changes measured during ongoing compliance and broad scale environmental monitoring.*
13. Acknowledge and incentivise continued environmental compliance and good environmental performance over consecutive production cycles.
14. Review and align the existing EPA compliance and auditing system with the implementation of the new 'Environmental Standard'.
15. Encourage industry to implement best practice management actions to achieve environmental compliance independent of a regulatory response to ensure long-term environmental sustainability.

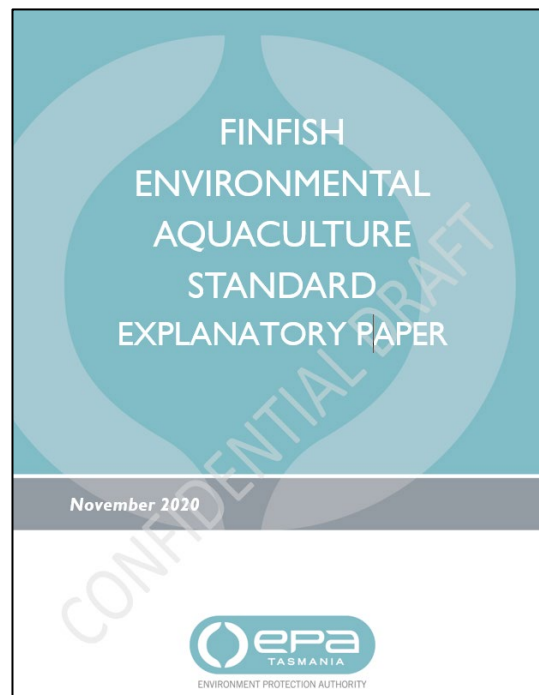
The Working Group acknowledges that sound scientific rationale underpin current environmental regulations in Tasmania; however, they also acknowledge that given the expansion and evolution of the salmonid farming industry, environmental monitoring must follow suit. The recommendations made by the Working Group in this paper expand the existing monitoring framework, but also considers contemporary international scientific knowledge and regulatory practices to enhance a progressive monitoring system representing best practice environmental management.

The new Environmental Standard should consist of region-specific, up-to-date biological, and physico-chemical indicators and thresholds for benthic and pelagic environments, together with a more accountable monitoring program, that will ensure environmental monitoring occurs during the time period when the risk for environmental impacts are likely to be at their greatest. This robust approach will ensure that finfish farmers operate within clearly defined 'Environmental Standards' and have the capacity to follow a performance based regulatory system that acknowledges and incentivises operators for consistent environmental compliance and achieving environmentally sustainable farming practices.

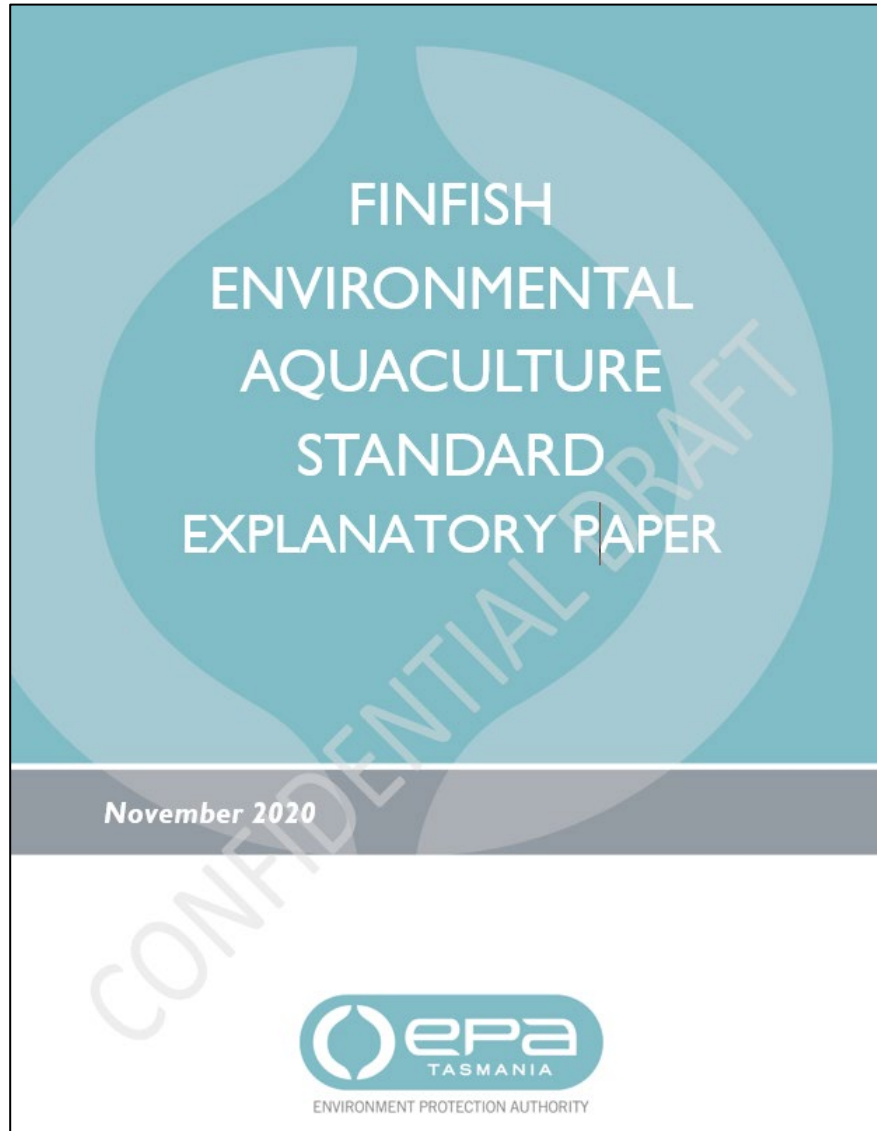
# Finfish Environmental Aquaculture Standard for Tasmania

## Overview

- Brief highlights of the Environmental Standard (20-30 min)
  - What is changing
- Open discussion on improving Standard (1hr 30 min)
- Way forward (15 minutes)



# Highlights of the Environmental Standard



# Environmental Standard Inclusions

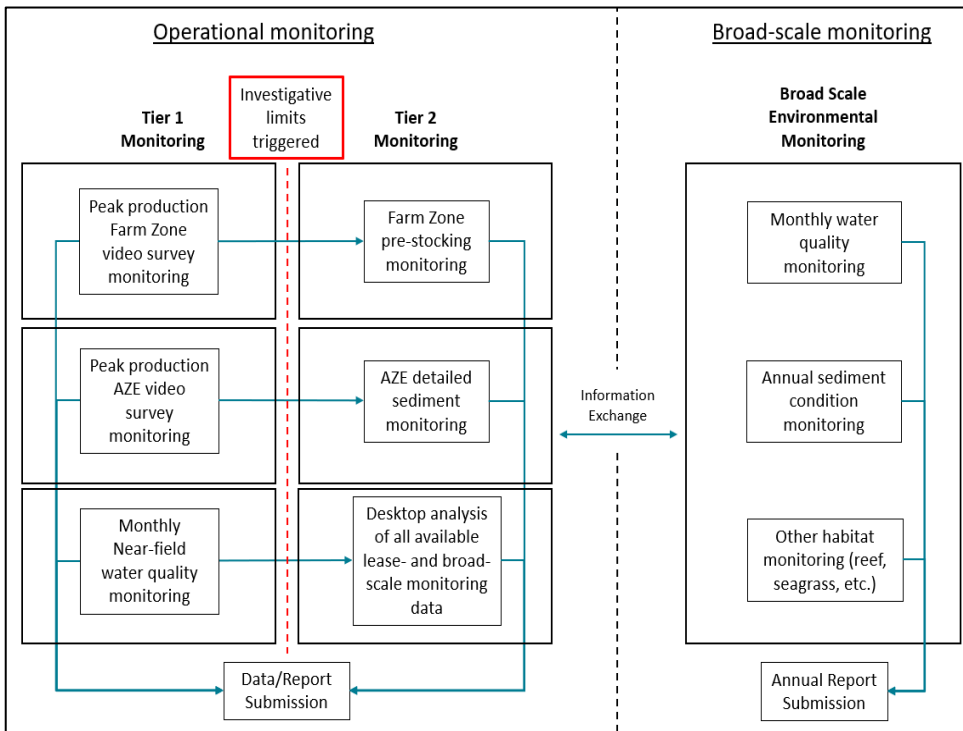
- Established a framework to ensure:
  - Performance based - defined management zones
  - Consistency – Standardised across farming regions
  - Robust and contemporary – relevant for Tasmania
  - Transparency
- Timing of sampling fixed across leases
  - Peak production (Feed input and cages stocked)
- Farm-Zone monitoring
  - Choice between sampling methodology
- # cages to sample for Farm-Zone monitoring based on:
  - Cumulative feed input (Under cage)
  - All cages (Cage edge)



## Environmental Standard Inclusions

- Environmental investigative limits to be established (Local data)
  - Farm Zone and Boundary of AZE
- Boundary of AZE Environmental investigative limits
- Boundary of AZE – Tier 2 - detailed sampling
  - Benchmarking performance over time
- Extending recent/updated BEMP requirements (Storm Bay/Okehampton Bay) across other regions where applicable.
- Adding auditing approach
  - Farm surveys will be audited
    - Process
    - Monitoring results

# Monitoring framework



Framework has been:

- Standardised
- Robust
- Contemporary
- Relevant for Tasmania

Environmental investigative limits need to be:

- Habitat specific
- Based on baseline / reference conditions
- Quantifiable

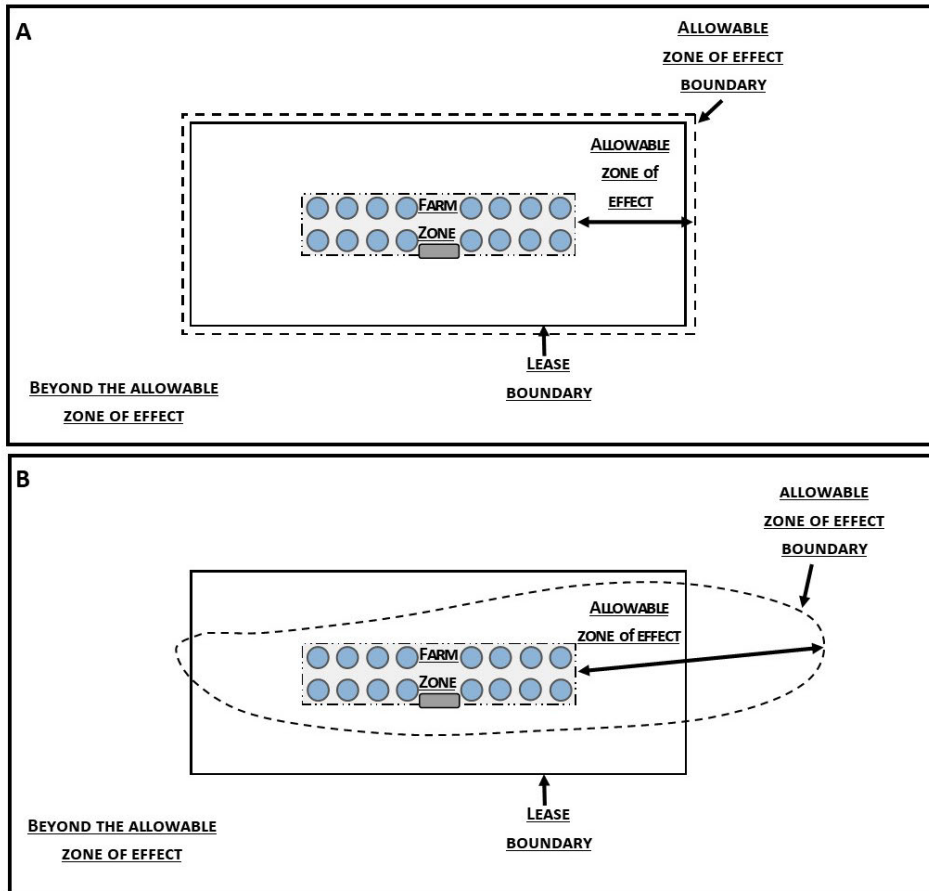
# Monitoring framework

## Compliance / Lease Management Zones

- Farm Zone
- AZE
- Beyond the AZE

Adopt **modelling tools** to establish:

- AZE boundary
  - Default (35 m)
  - **Site specific**

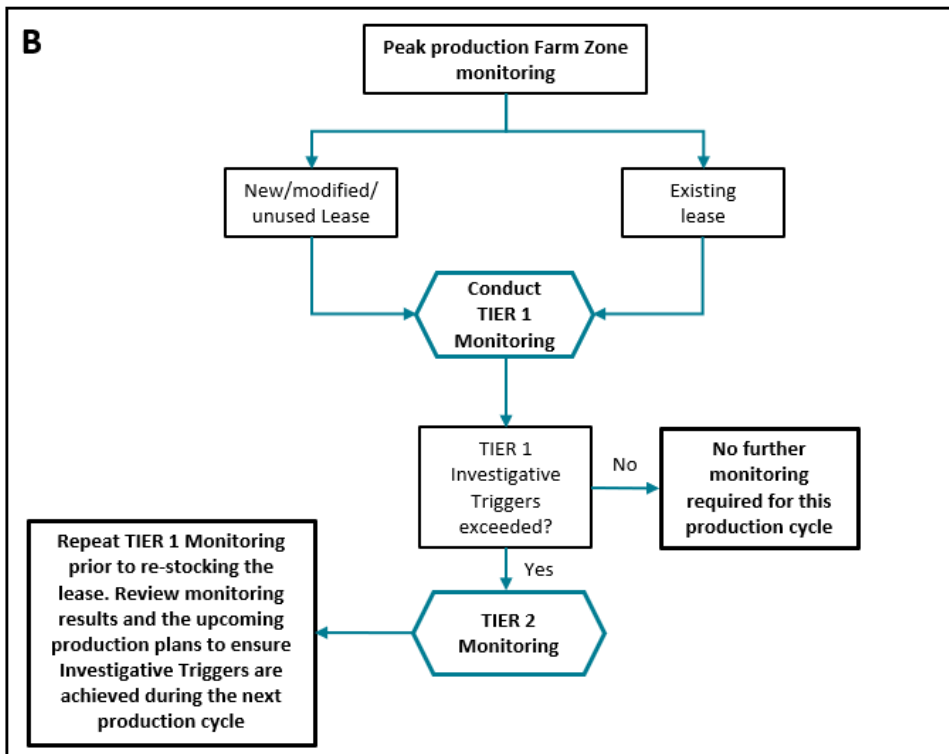


# Highlights of the Environmental Standard

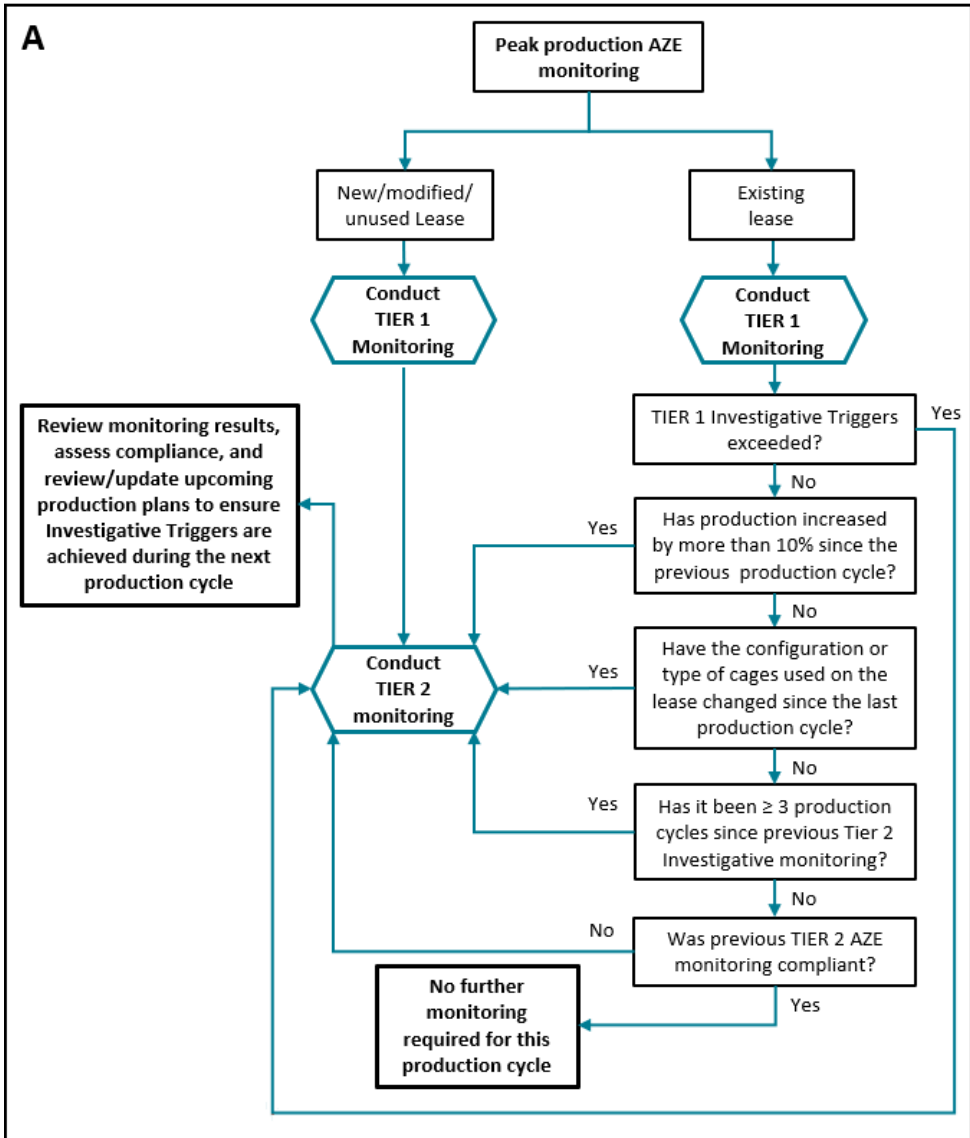
## Tiered monitoring framework:

### Farm Zone

- New/modified, unused and Existing leases
  - Must do Tier I Monitoring
  - Risk based to determine Tier 2
- Tier I Monitoring
  - Visual survey
  - Investigative triggers established using Macleod and Forbes and project 024 data.
- Tier 2 Monitoring
  - Pre-stocking surveys



# Monitoring framework



## Tiered approach:

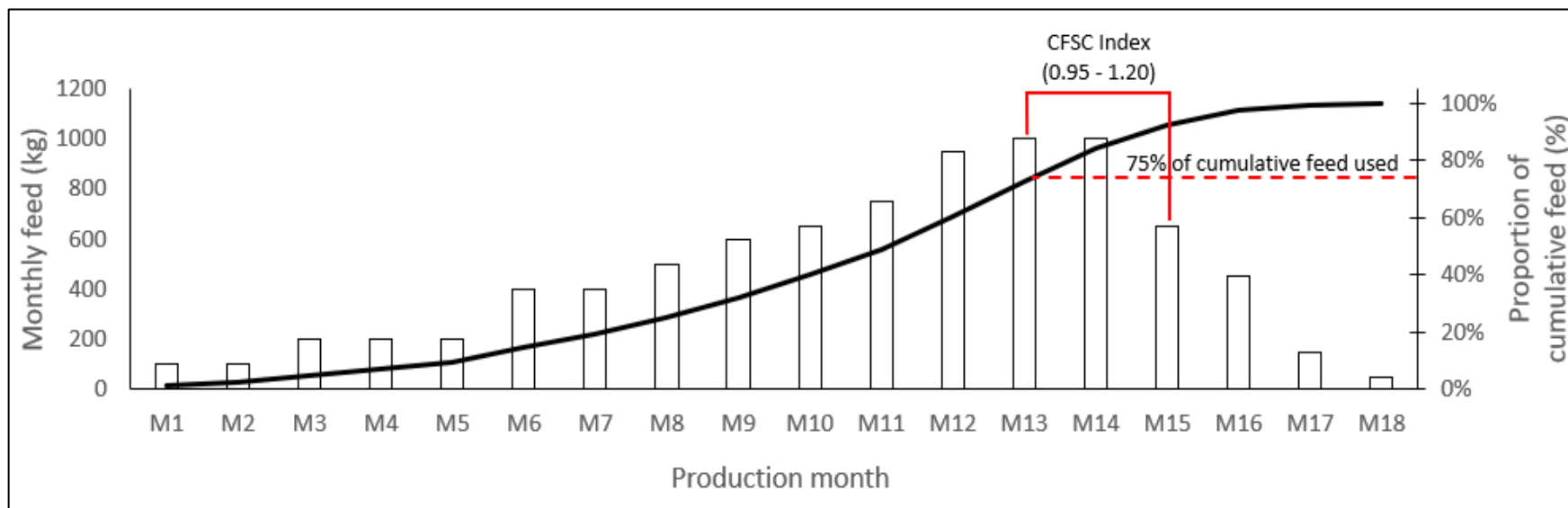
### Boundary of AZE

- New/modified or unused leases
  - Must do Tier 1 and Tier 2
- Existing leases
  - Must do Tier 1
  - Risk based to determine Tier 2
- Tier 1
  - Visual survey – Baseline investigative limits
- Tier 2
  - Detailed sampling – Environmental quality standards based on baseline/ref conditions

# Timing of Monitoring

## Peak production:

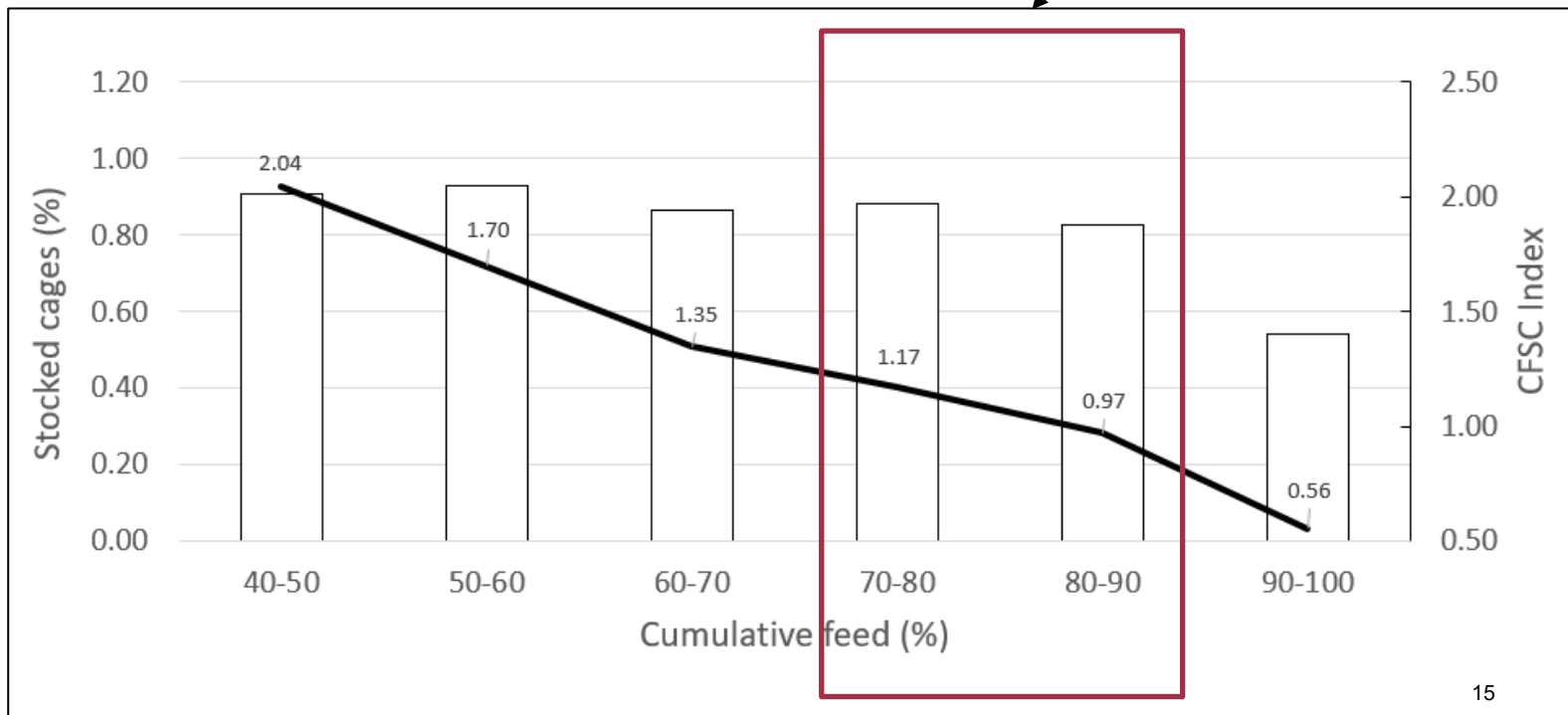
- Feed input (>75% cumulative feed used)
- Maximise # cages with active farming
- Maximum risk or detecting impact



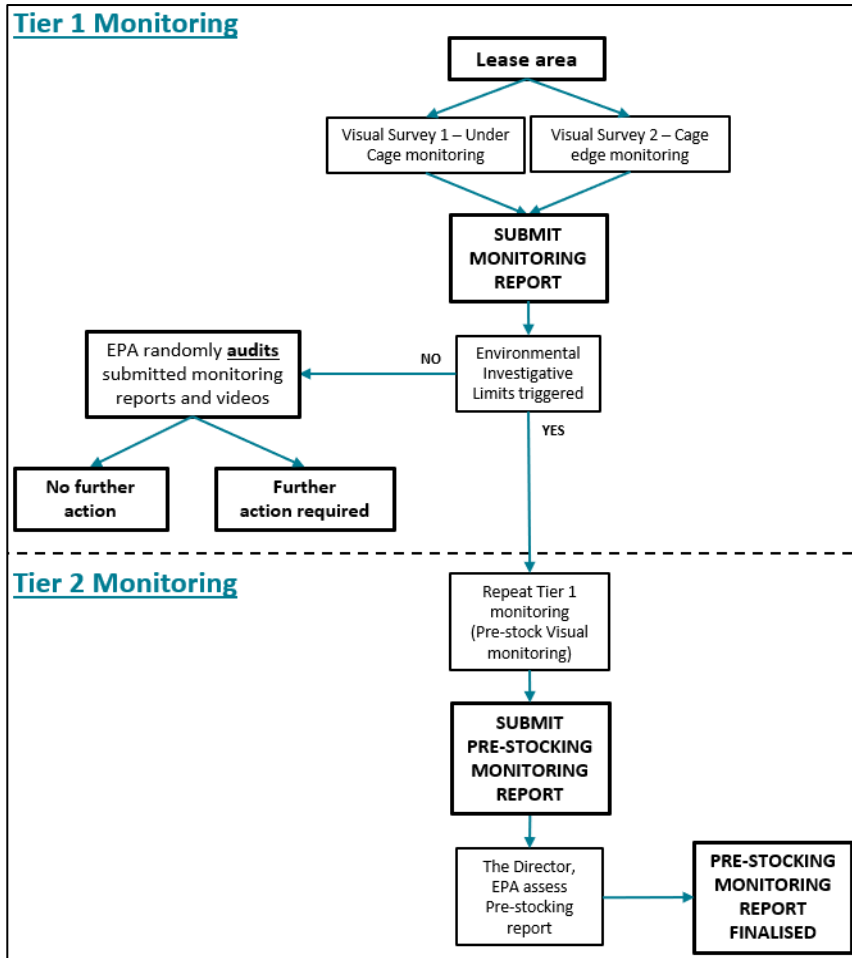
# Timing of Monitoring

Peak production:

- Feed input (>75% cumulative feed used)
- Maximise # cages with active farming
- Maximum risk or detecting impact



# Farm Zone monitoring



## Farm Zone:

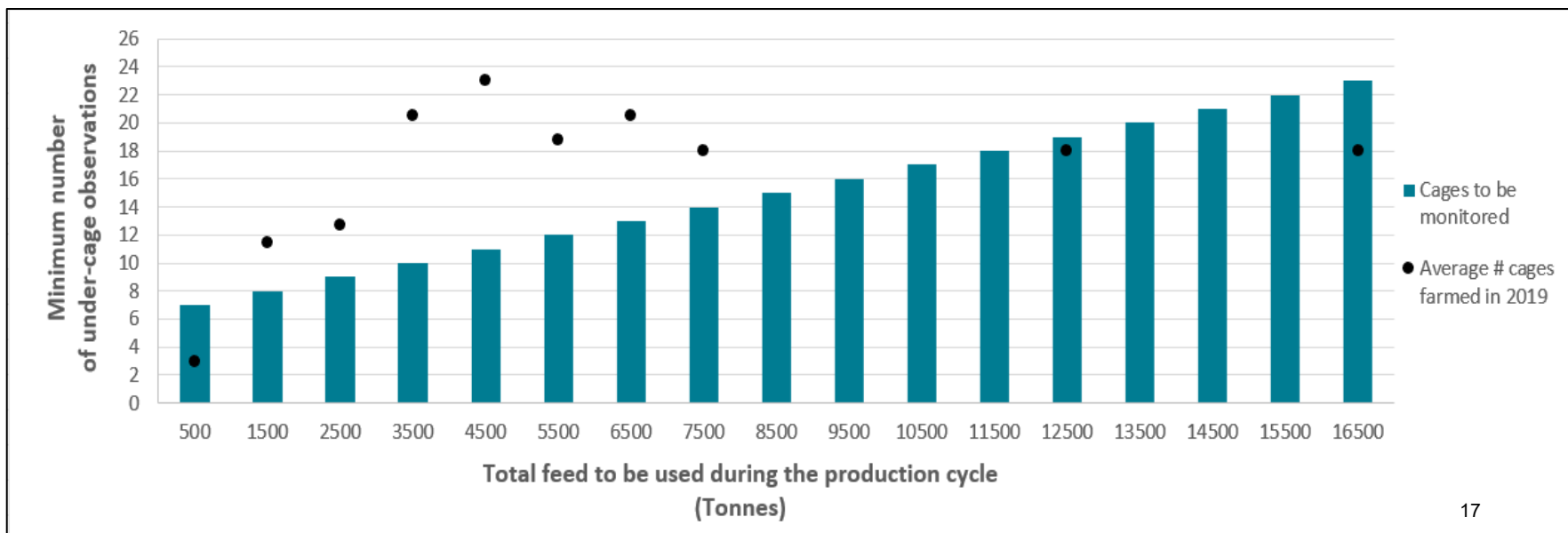
- Two visual survey approaches
  - Under cage (Primary)
    - % of all cages
  - **Cage edge (alternate)**
    - All cages
    - Limited to data availability for EIL's
- Environmental Investigative Limits
  - Baseline conditions
  - Regression analysis between under cage and cage edge data
- **Auditing process**



# Farm Zone monitoring

## Under cage monitoring

- # cages to be sampled is determined on total forecasted feed usage
  - Highest feed input cages (Highest risk)
- Additional cages must be sampled based on risk (Previous poor performance based on past monitoring data)



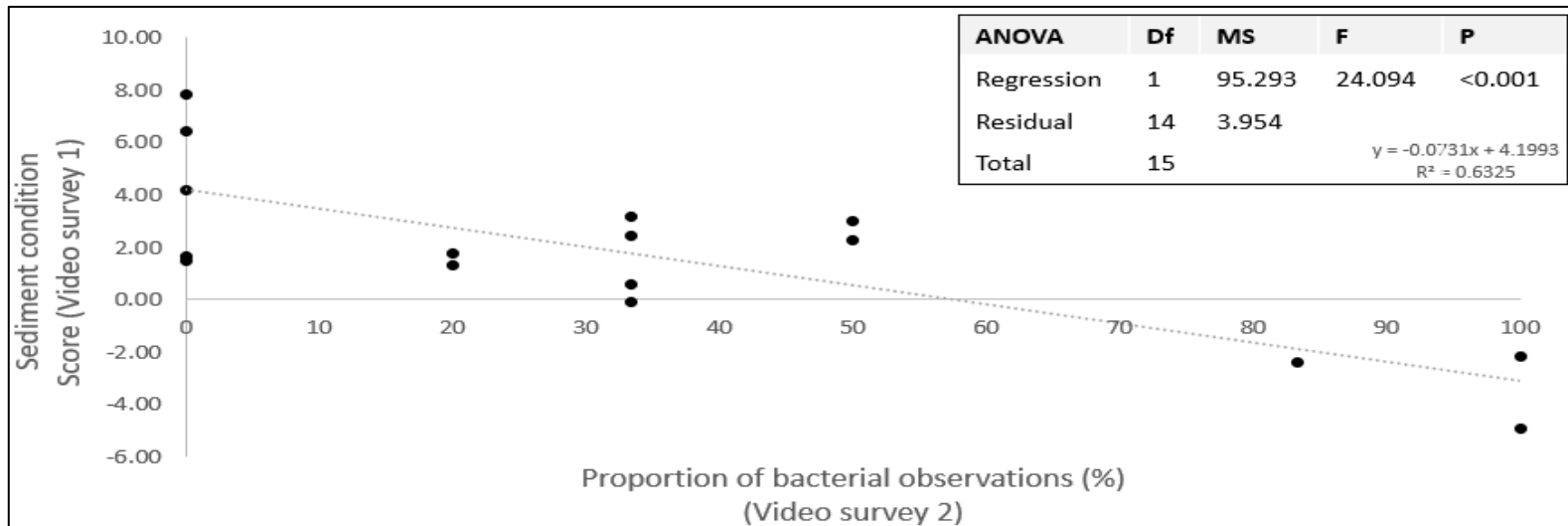
# Farm Zone monitoring

## Cage edge monitoring

- **All cages** must be sampled
- Requires **historical data** to determine EILs

Table 7: Example of inter-calibrated video survey data using regression analysis to match environmental status between different survey methods.

Environmental Status	Sediment condition score (Video survey 1)	Bacterial observation score (Video Survey 2)
Very good	> 5	0 %
Good	2.5 - 5	1 - 23 %
Moderate	0 - 2.5	24 - 57 %
Poor	< 0	> 57 %



# Farm Zone monitoring

**Table 1: Example of Environmental Investigative Triggers criteria for Video Survey 1**

Survey Method	# pen bays required to be surveyed	Sediment Condition Score	Environmental Status	Action Required
Video Survey 1	To be determined based on the total feed input (Figure 6) and any cages that required Tier 2 Farm-Zone (pre-stock) monitoring during the last monitoring survey	> 5	Very good	No action required
		2.5 - 5	Good	
		0 - 2.5	Moderate	
		< 0	Poor	Tier 2 Investigative monitoring

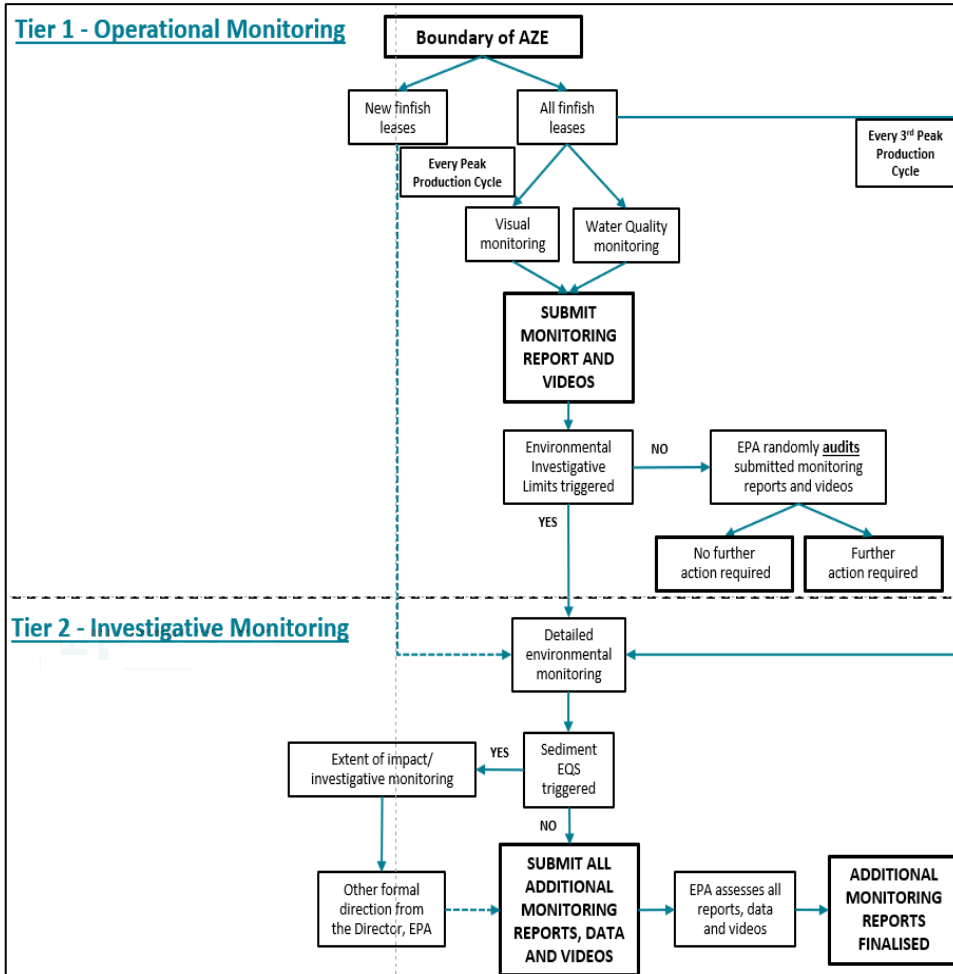
**Table 2: Example of Environmental Investigative Triggers criteria for Video Survey 2**

Survey Method	# cages required to be surveyed	Observations with white bacteria or gas bubbling (%)	Environmental Status	Action Required
Video Survey 2	All cages that received feed since the last environmental survey	0% with white bacteria	Very Good	No action required
		1 - 25% with white bacteria	Good	
		25 - 50% with white bacteria	Moderate	
		51 - 75% with white bacteria	Poor	Tier 2 Investigative monitoring
		> 75% with white bacteria	Very Poor	
		1 - 100% with gas bubbling	Very Poor	

# Boundary of AZE monitoring

## Boundary of AZE:

- Tier 1
  - Visual monitoring
  - **WQ monitoring**
- Environmental Investigative Limits
  - Baseline/ref conditions
- **Auditing process**
- Tier 2
  - Detailed sediment sampling
  - Extent of impact/investigative monitoring



# Boundary of AZE monitoring

Table 5: Example of Environmental Investigative Triggers criteria for Tier 1 AZE Visual monitoring

Survey method	Environmental Investigative Triggers	Sediment Condition Score	Environmental status	Action required
Fixed AZE Visual monitoring	80 <sup>th</sup> percentile of Baseline value	13.2	Very good	No action required
	Median of Baseline value	9.5	Good	
	Median – 20 <sup>th</sup> percentile of Baseline value	8.2-9.5	Moderate	Undertake additional video monitoring to assess scale of impact
	20 <sup>th</sup> percentile of Baseline value	8.2	Poor	Tier 2 – Investigative monitoring

## Tier 2 AZE detailed sampling

- Sediment chemistry, biota and grain-size
  - Significant change from Baseline conditions.

## Open discussion on improving Standard

- Is there any existing content that needs further consideration?
  - Practicality of Outer edge sampling (Video survey 2 Farm-Zone) when cages are no longer on the station.
  - Timing for Tier 2 reports (30 days at the moment – turn around of benthic samples)
  - No BEMP in Tamar – Hard to identify WQ exceedances of background levels without including

## Open discussion on improving Standard

- Is there anything else missing from the Standard that should be included?
  - Reactive monitoring
    - Use of antibiotics or other therapeutants
    - Intertidal/nuisance algae?
  - Review of the Standard
    - Time frame for reviewing the standard
  - Section on acceptable management actions
    - Refer to this section in the body of the standard that defines acceptable management actions for various exceedances of Environmental Investigative Limits and detailed environmental quality standards (Chemistry, fauna etc)

## Way forward

- Finish off methods (need IMAS to review for contemporary approaches) for explanatory paper and update comments.
- Write up the conditions into a regulatory standard.
- Consultation with industry (we are delayed).
- Consultation with other stakeholders (we are delayed).





## File Note

File Ref:

Date: 18 Dec. 2020

Author: Katrina Wilson

### Subject: Environment Standards Working Group Meeting Friday, 27<sup>th</sup> November 2020

**Attendees:** Raymond Bannister (SEMS), Wes Ford (Director, EPA), Stephen Gallagher (Section Head - SEMs), Jeff Ross (IMAS), Mark Churchill (SEMS), Graham Woods (Branch Manager MFB), Eric Brain (MFB), Kate Hoyle (SEMS), Dave Horner (SciTech), Katrina Wilson (SEMS).

**Apologies:** Catriona MacLeod (IMAS)

**Purpose:** Discuss current draft Environmental Standard (ES) with a focus on readability, structure, and improvements as to key areas that may require amending or inclusion.

**Raymond Bannister (RB):** Provided overview of the ES. Refer to PowerPoint presentation (myDAS link)

- Currently collating all comments
- Potential showstoppers for industry
  - Timing of sampling at peak production
  - Farm zone monitoring - Tier 1 (to maintain) and Tier 2 (pre stock survey) are the same type of survey.
  - Different video survey types drop camera vs under cage
  - Allowable Zone of Effect
  - Farm surveys will be audited in regard to process and monitoring results
- All new leases must undertake Tier 2 monitoring
  - ? If leases are compliant for 3 years on Tier 1 then a decision may be made to allow for the requirement of Tier 2 monitoring to be extended out to 5 years, rather than 3. – this is a carrot and needs further discussion.
- ES needs quantifiable limits

#### Under Cage and Cage Edge Monitoring

**New Farms:** Where the decision is made to use cage edge monitoring, industry must undertake under cage monitoring and set up regressions prior to EPA approval in change to monitoring.

**Existing Farms:** Where the decision is made for monitoring on existing farms to transition from under cage to cage edge, existing data could potentially be used to set up regressions. Therefore, in areas such as the DC&HR MFDP, there may already exist enough BEMP information to at least develop interim triggers for industry until such time as there is enough datum to finalise triggers. This is a standard practice.

- In area where there is not enough BEMP information there may be other data available – For the Tamar there are some data from the TEER (Tamar Estuary Esk Rivers program) that may be applicable.
- Sampling effort will also be based on cage size. The larger cages therefore having increase sampling effort.
  - This considers the potential larger footprint that the larger cages have.

## Timing of Monitoring (Slides 10, 11 & 13) - Determining when to sample

- Data in slide 13 based on 2019 data.
- Determination needs to be based on forecasted data to determine the number of cages that are required to be monitored within the predicted >75% application of feed across a lease grid.
- Need an EL condition that points to a period, in time, for Tier 1 monitoring @75% of feed application. Thus, there is need to create a relationship between that that number and how many cages need to be monitored.
  - We need to take the above info and write in a way that is an enforceable licence condition – this requires further thought.
  - Industry should be responsible for working out the number of cages that require monitoring, not the regulator. The regulator should check that/ audit that the process used is in accordance with the ES.
  - This requires further thought as to how we, would do this.

**NOTE:** If we use X amount of feed requires x number of pens surveyed, we need to avoid industry using the ES to minimise the amount of monitoring required.

Therefore, we need to **define a starting point** refer slide 10 and we must document it

**Slide 13** – the time to monitor is set up with the forecasted monthly feed vs production data and then industry predicts the number of cages versus when achieve/hit peak forecast of 75%.

- Need to consider that forecasts can vary within a 3-monthly period.
- Need to consider how we sell this to industry as we may be potentially narrowing the window of industry sampling in so much as when industry resources enable the sampling to occur within a narrower window of time. Industry will need to adjust and become more flexible with its resourcing.
- Need enough time from decision as to when the 75% occurs and then the monitoring is undertaken.

## Nos of Cages to sample

- **GW** -Consider keeping it simple – number of cages sampled may be based on cage size, for example 120 – 30% cages sampled, 168, 50% cages sampled, 260 – 100% sampled, as an example.
- **WF** – There can be two options Feed and Cages size to determine number of cages monitored. Whether we write in in or not EPA, needs to decide what our position will be and then how we sell it.
- **WF** – convert Figure on ‘the number of cages to be sampled’ to a table for the ES.
- **GW** – slide 13 – Do we know the level of compliance and where for the graph?
- Company push back about narrowing window to sampling, Companies will need top gear up to do the monitoring.
- **JR** – Yellow Bluff, Zuidpool and Storm Bay - IMAS notes that increase the cage size = increase impact = increase survey.
- **WF** – **policy position** – larger cages at an individual level have a greater impact – the figure on slide 13 is one way to do this.

## Farm Zone Monitoring Video Survey 1 and Video Survey 2 (Slide 15)

- How to interpret scoring
- Need clarity in scoring process – score at cage level then average over the lease-
- **WF - Need clarity in the scoring system**
  - **Decision point for the EPA** – mechanics for the scoring, there may be some problematic areas in capturing those where there is no active farming, what does it mean (?)
- **WF** - with current data which leases can we have going direct to cage of edge monitoring immediately? Earliest being potentially at the end of the year?
  - **Decision Point** – what do we want from the transition?
- **JR** – Video Survey 1 is good for ecological condition
  - Do we want a condition for every cage, this something the EPA should encourage.

- **WF** – Consequence of management – what will be the response/consequence if after tier 2 monitoring if the lease is still not performing.
  - Response – destock immediately
  - Fallow post-harvest then pre-stock
  - Partial fallowing then also pre-stock on remaining pens; or
  - Look at percentiles of cages monitored. – if look at 10 and only 2 need to fallow then may not require a pre-stock T2 survey.
- **JR** - Industry performs numerous video surveys – every cage – EPA should consider incentivising industry to share these videos.
- **GW** – If use feed input is easier to control TPDNO in cages.
- **JR** – industry has been reporting increased benthic impacts on lower nitrogen feed.
- **WF** – monitoring needs to be indicative of farm plans – rolling 3-year plan
- Grid system – some flip flop – how does industry manage grid system
  - i.e. Table Head – chess board viable pen bays moving within the lease – how do we manage this?
  - Creeses Mistake are looking at filling gaps between cages.
- **MC** – Need to know how many cages we are dealing with.
- **WF** - what is the decision process for when a lease is pushed too hard and limits placed on production level?
  - Point of time between industry limits and govt limits

### Monitoring Framework Slide 7

- **GW** - how does, the model apply each time the cage locations change on the lease?
  - Need to decide when to validate monitoring points.
  - Don't want change in AZE monitoring points all the time, have to set longer time frames.
- **JR** - nervous about the predictability of the of the AZE.
  - Lease level 95% depositional in the lease
  - What are the acceptable trade-offs?
  - Need to look at language used –no effect outside – what does this mean?
  - Need to look at other important communities
- **WF** – Define broadscale impact
- **JR – Decision point** - what effects prepared to have on reef habitats?
- **WF** – Define benthic impact
  - **Need to be clear related to direct impact** – not currently addressed – need to consider language in this way.
- **JR** – Benthic definitions – improved vs good benthic condition
  - Benthic issues are in the broadscale - consider the language
- **RB** – If trigger WQ at compliance points then trigger mandatory monitoring to understand broadscale impacts

AZE is about benthic deposition DAZE (Depositional Allowable Zone of Effect) - distinction in language is very important.

- **WF – Specify the calculation process** – how to do the score.

### Boundary AZE Monitoring – Slide 17

- **JR** – not environmental status more environmental performance – language is important.
  - Need to discuss terminology of this table – for IMAS a sediment score of 8 is good. Need to think about what the number shows.
- Include the calculation formulas in the Appendix
  - Need to codify in the ES how to calculate the %iles – look at the DC&HR BEMP 2019/2020.

### Open Discussion on improving the ES - Slide 18

- **WF** - Timing for the T2 reports think about the date description
- **JR** - it takes 2-3 months for the benthic reports

- **GW** - use and app?
- **JR** – Tier 2 style monitoring already exists. Need to discuss access with industry.
- **EB** - implementation plan – how reporting will rotate around the State – consider a staged approach. – same for compliance management -what are the resources available?
  
- **WF – Environmental Standard to include.**
  - Environmental monitoring regime for the industry.
  - Information presented to include what the ES is and what it stands for.
  - Flow charts could be in appendices
  - Other activities to include that require monitoring and reporting.
    - Escapes
    - Morts
    - Noise – standard noise conditions on the licences
    - Light
  - Think... what do we want the ES to look like Post Standard?
- **SG** – Split the Draft into an explanatory paper and the ES which outlines only the legal obligations
- **WF** – Noise – expectation all encompassing – noise 35 vs 32 dB(A) at night
  - Light?
  - Well boats?
  - Link to biosecurity plan
  - Industry Caps – Biomass and TPDNO
- **WF – Summary Additional for the ES**
  - Biomass
  - TPDNO
  - Noise
  - Light
  - Vessel Operations
  - Morts
  - Escapes

**Subject:** ES Meeting -  
**Location:** LND - L2 Mawson 2.03

**Start:** Wed 25/08/2021 1:00 PM  
**End:** Wed 25/08/2021 3:30 PM  
**Show Time As:** Tentative

**Recurrence:** (none)

**Meeting Status:** Not yet responded

**Organizer:** Bannister, Raymond  
**Required Attendees:** Jeff Ross; Brain, Eric; Gallagher, Stephen G; Dowson, Greg P; Churchill, Mark; Woods, Graham; Horner, David  
**Optional Attendees:** Ford, Wes; Cook, Darryl W; Wilson, Kate  
**Resources:** LND - L2 Mawson 2.03

Hi all,

It is timely to have another ES working group meeting. Here is an invite to discuss terminology and how we approach management zones for the Environmental Standard. I still think we all need to agree on the right wording for the management zones, ensure we have the right zones in place to capture particulate and dissolved waste impacts, and that we align the monitoring appropriately to these zones. I will provide some alternative scenarios at the meeting that we can discuss!

I have also attached the latest Draft Environmental Standard document. It is not the FINAL draft slowly getting there. I think in its current standard it would be great to get all of your feedback, unfortunately the deadline is rather short – I would love your feedback by Wednesday next week as the document may need to go higher up by the end of next week.

**Please note, I still think there are a few things missing from the Draft ES:**

1. Appendix A4 – missing detail on Investigative AZE Boundary Surveys – I will add this before Wednesday, currently light on in detail.
2. Appendix A4 – Missing section on Intercalibration of Farm-Zone video survey A and B to set Trigger limits - I will add this before Wednesday, currently light on in detail.
3. Appendix A8 – reporting section
  - a. In the other 7 appendices all reporting requirements are highlighted in Yellow, these yellow highlighted sections will need to be incorporated into Appendix A8.0 which will cover all reporting and analysis requirements.
4. Incorporating Trigger level tables into the body of the ES, the majority currently sit in the appendices
5. Whether we need a section on mitigation/management actions when farming continues to degrade the environment.
6. General work-smithing

Cheers,

Raymond

**Dr Raymond Bannister | Senior Environmental Officer**  
 Salmon Environmental Management Section | Environmental Operations South  
 EPA Tasmania

# Farming Footprints and Terminology

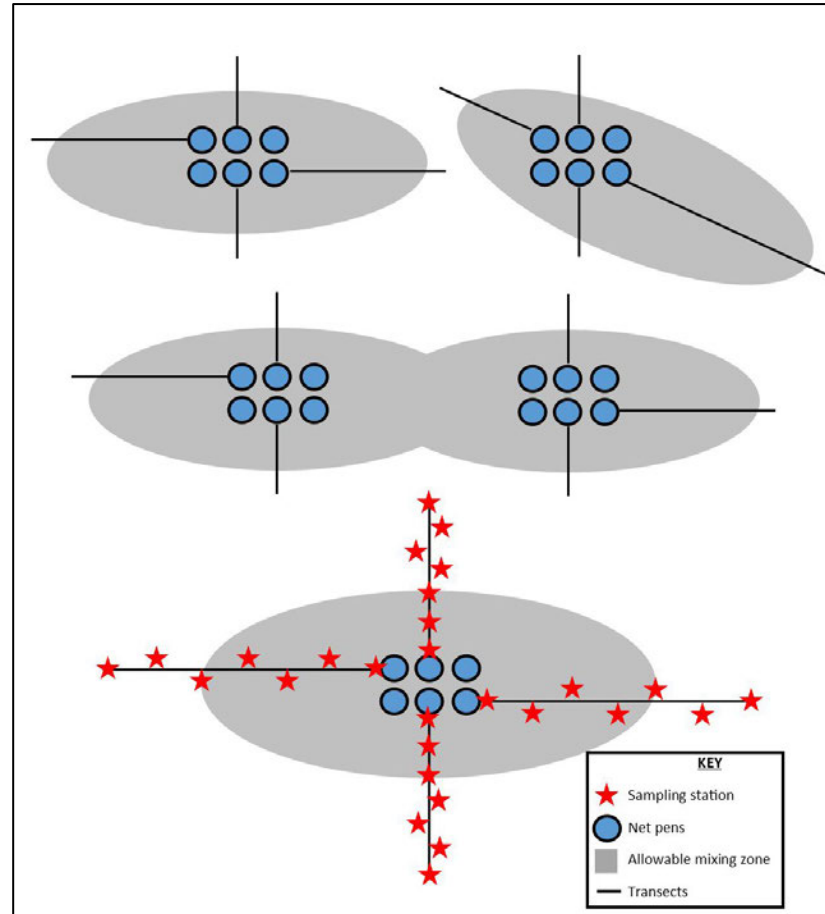
# Problem

- Terminology & definitions of management zones
  - Can be misleading – does not encapsulate all impact types
    - Farm Zone – Is the area of likely maximum effect and is defined as the area encompassed within the outer edges of the cages
    - AZE – Defines the area of obvious and measurable environmental impacts from particulate waste released from the edges of the fish cages
    - Regional Zone – The area outside of the Allowable Zone of Effect boundary
  - All agree that we need to capture dissolved wastes and their likely impacts
- Meeting outcome –
  - Robust discussion and agreement on new terminology/definitions and

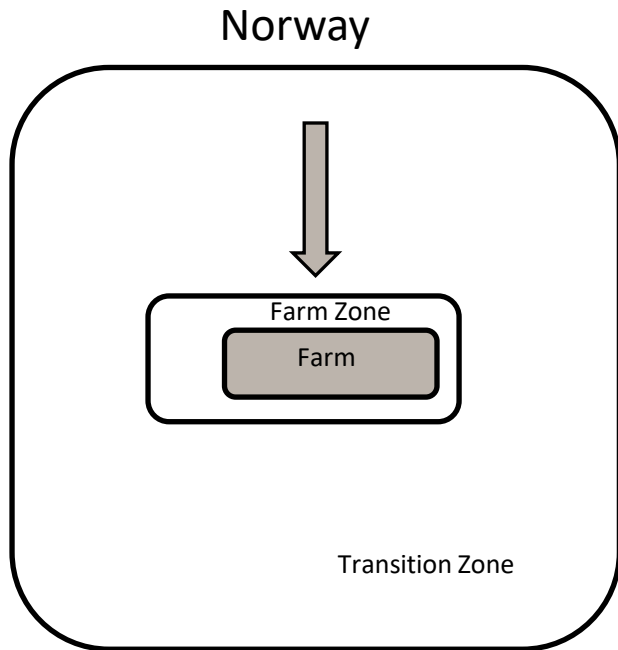
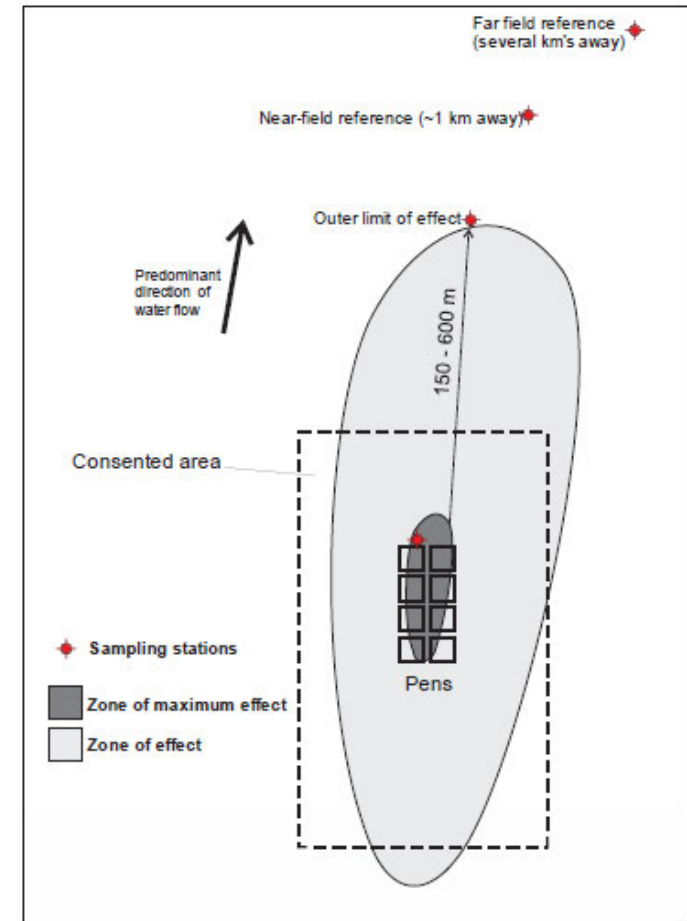
# Compliance and lease management zones

- Using zones for environmental regulation

Scotland



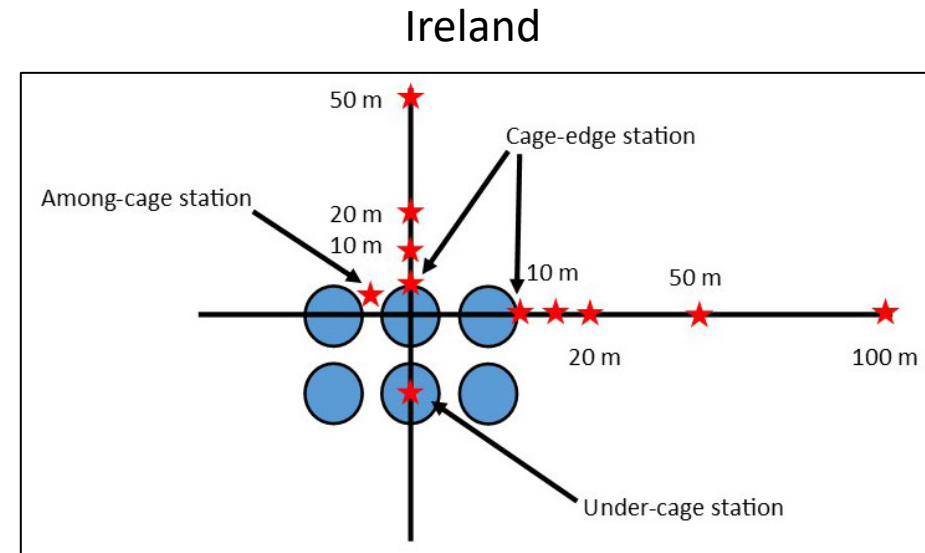
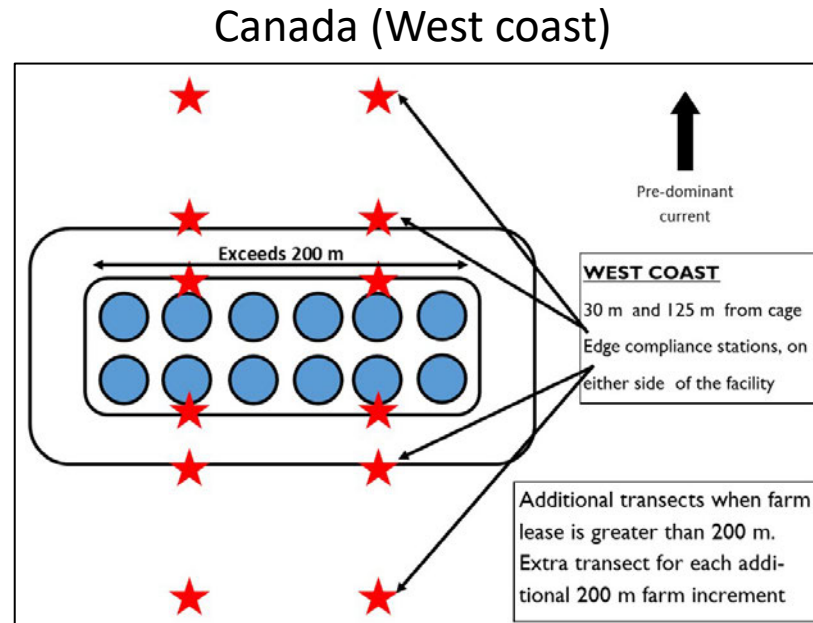
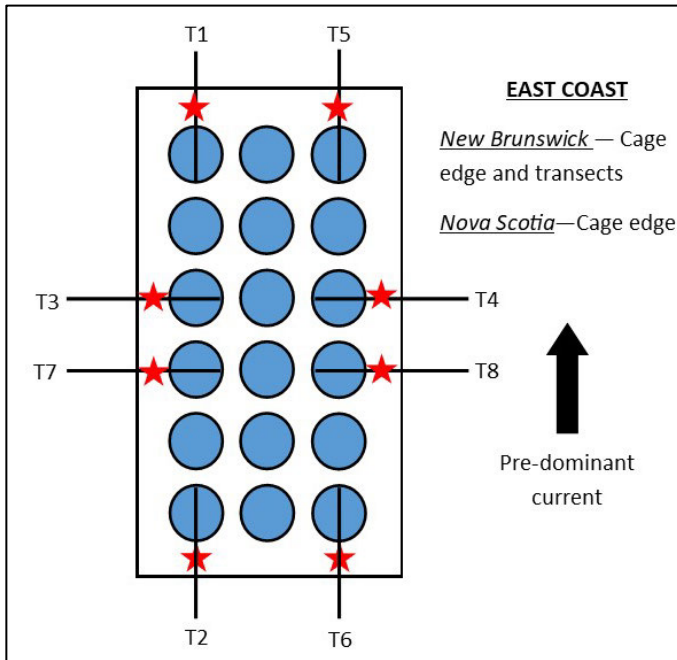
New Zealand





# Compliance and lease management zones

- Regulating at discrete locations or along transects

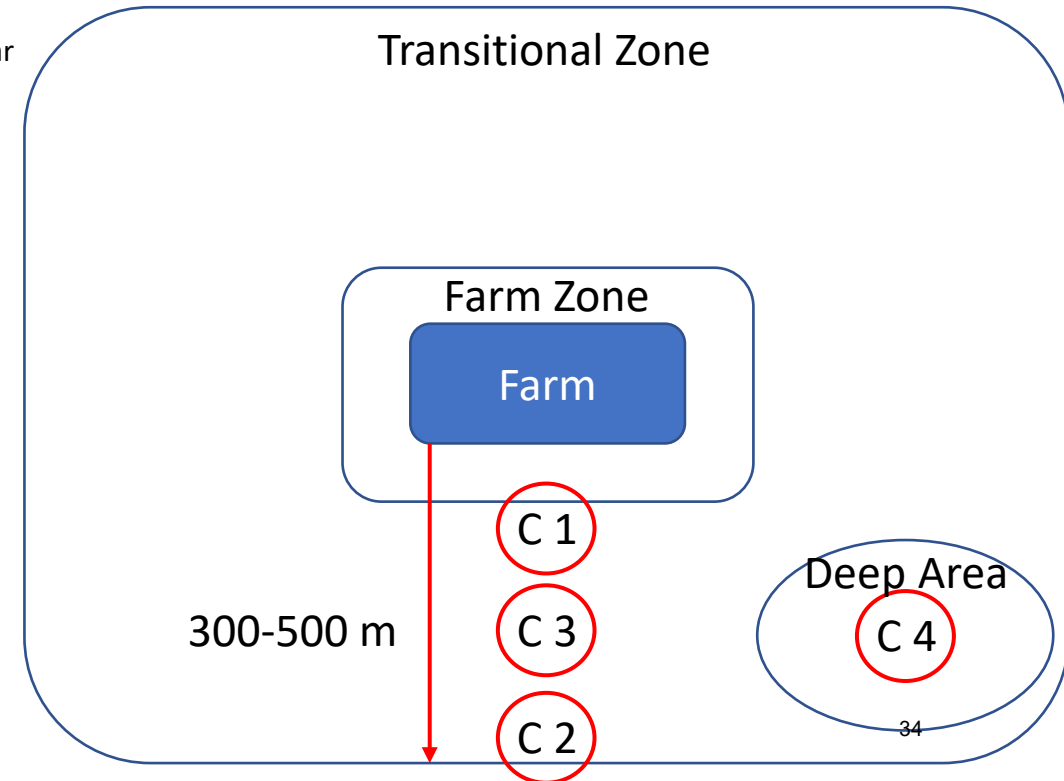


# Norway standard

- Comparisons with Tassie

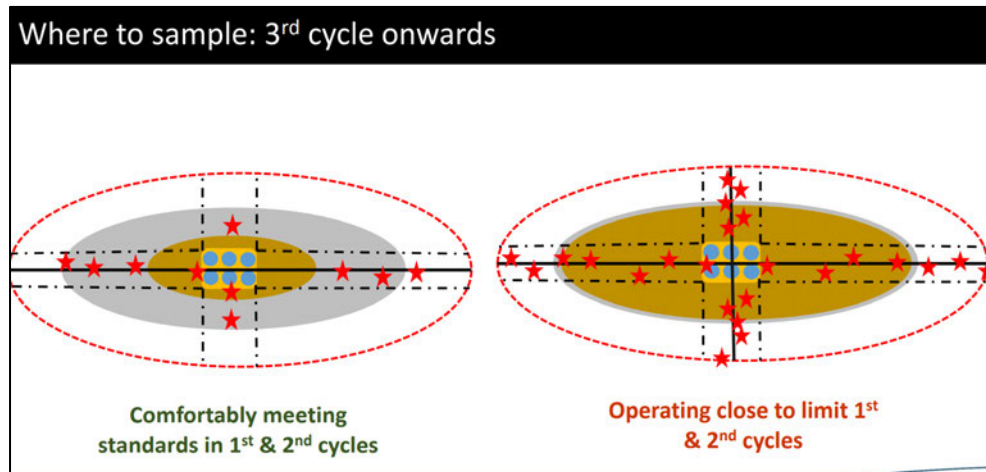
- Farm = Farm Zone (Samples taken at cage edge to determine level of impact)
- Transitional Zone (300 - 500m) = AZE (35m or Site specific)
  - # sample depends on maximum standing biomass
- Benthic sampling only no water quality/macrofauna monitoring
  - Reefs/hard bottom habitats starting to be monitored, but framework is unclear

MSB at location (tonnes)	Distance of outermost station for transitional zone (m)	Number of transitional zone sampling stations
≤ 1 999	300	3
2 000 until 3 599	400	4
3 600 until 5 999	500	5
≥ 6 000	500	6

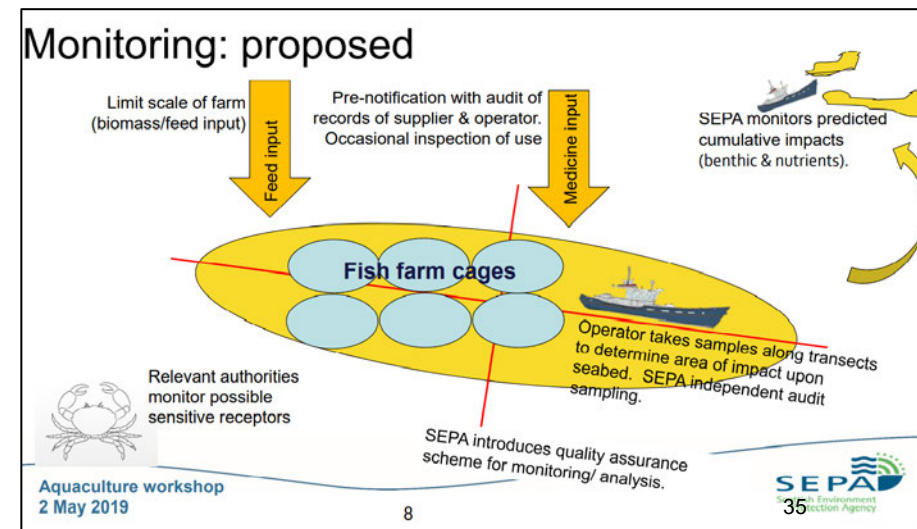
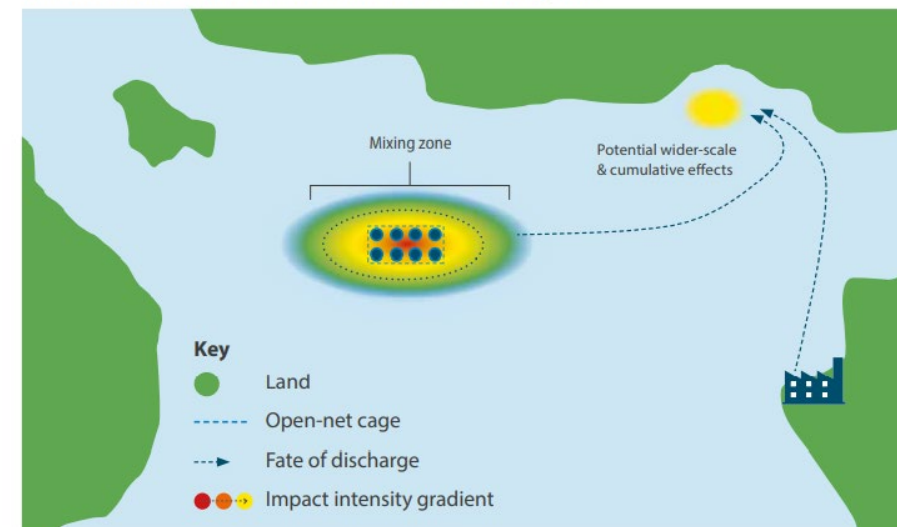


# Scotland standard

- Comparisons with Tassie
  - Mixing Zone = AZE (Samples taken along transects to determine level – scale of impact)
  - Mixing Zone ( extends 100m from cage edge)
    - Can be greater than 100m with modelling – but not greater than the total area allocated under default
    - # sample depends on performance
  - Benthic sampling only no water quality
    - Reefs/hard bottom habitats starting to be monitored, but framework for sampling is unclear
    - Cumulative effects monitored



Cumulative risks to the wider marine environment (Figure 2)



# New Zealand standard

- Comparisons with Tassie

- ZME = Farm Zone (Samples taken at down-current edge of cages to determine level of impact)
- Zone of effect (150 - 800m from cage edge) = AZE (35m or Site specific)
- OLE = AZE Boundary

Centred on soft sediment sampling

- Broadscale impacts

- Water quality measurements
  - Similar to our BEMP

- Reef and macroalgae impacts

- Independent from WQ monitoring
- Locations at greatest risk
- Up to 1km from marine farms or in Neighbouring bays
- Continue monitoring for 5 years after marine farm reaches stable level of feed discharge and no future increases proposed.

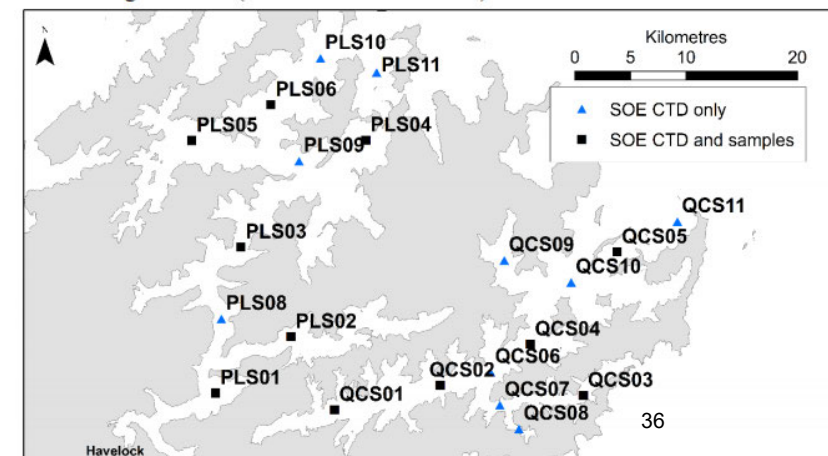
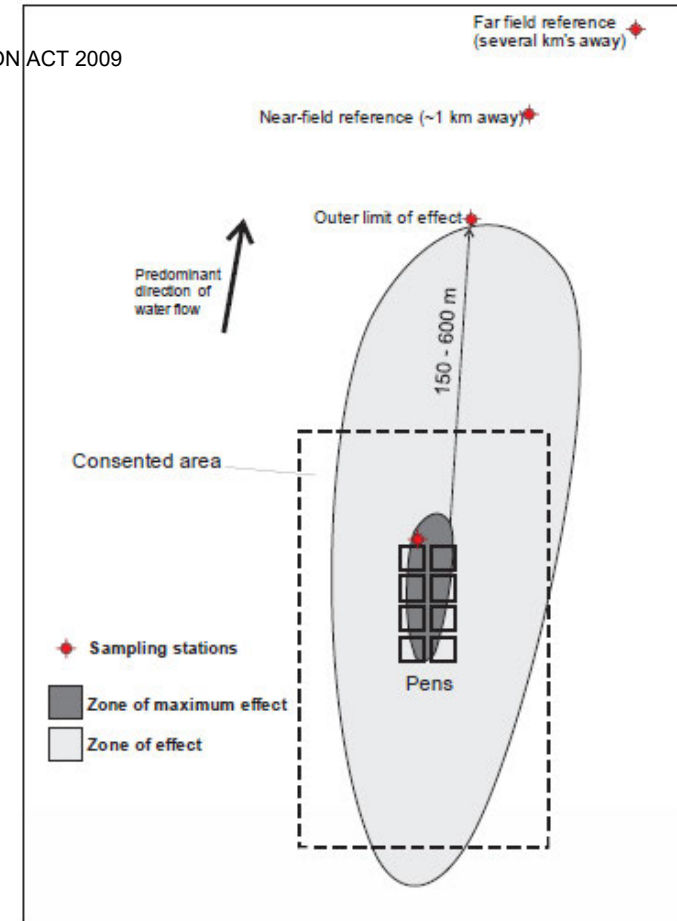


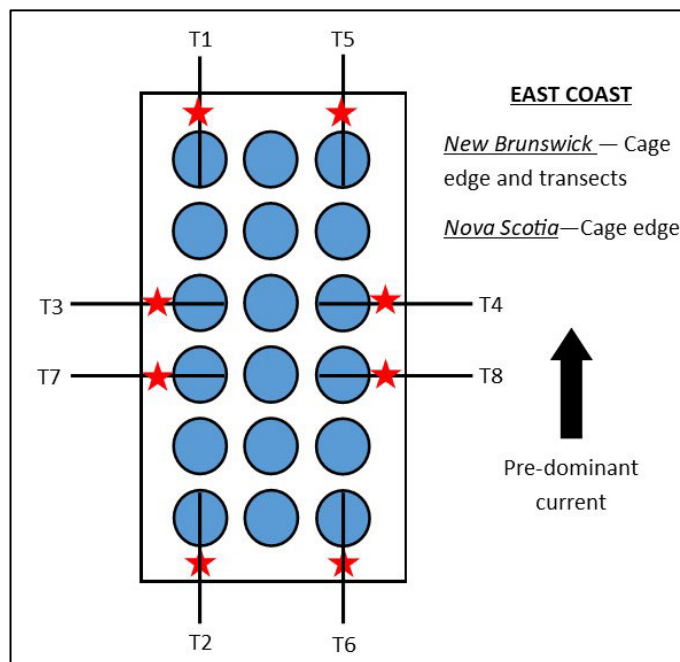
Figure 4: MDC monitoring stations in the Marlborough Sounds.

# Canada standard

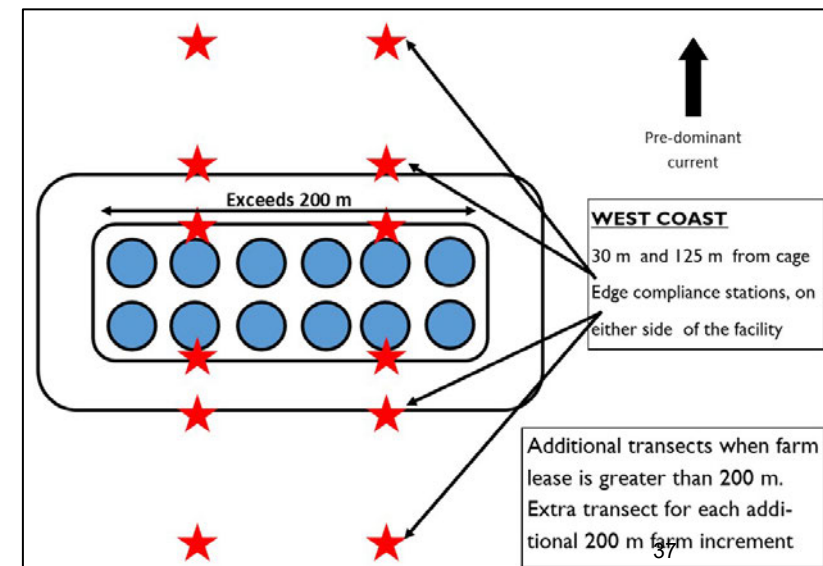
- Comparisons with Tassie

- Cage edge sampling = Farm Zone
- Compliance points (30 & 125m from cage edge)
- Transects sampling (50m transects away from cage edge)
- Centred on soft sediment sampling & hard bottom
- No reefs
- No broadscale impacts

Canada (East coast)



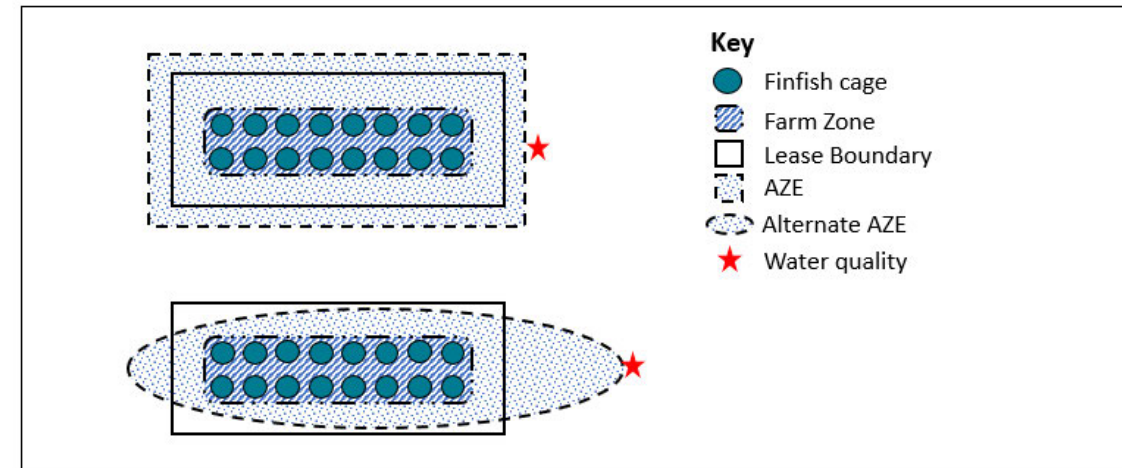
Canada (West coast)



# Terminology comparisons

## Cage area sampling

- Farm Zone – Grid of cages (Tasmania)
- Farm Zone – Array of cages (Norway)
- ZME – Zone of maximum effect (NZ)
- Cage edge (Canada)
- Mixing zone (Scotland)
- Cage edge, among cages, under cages (Ireland)

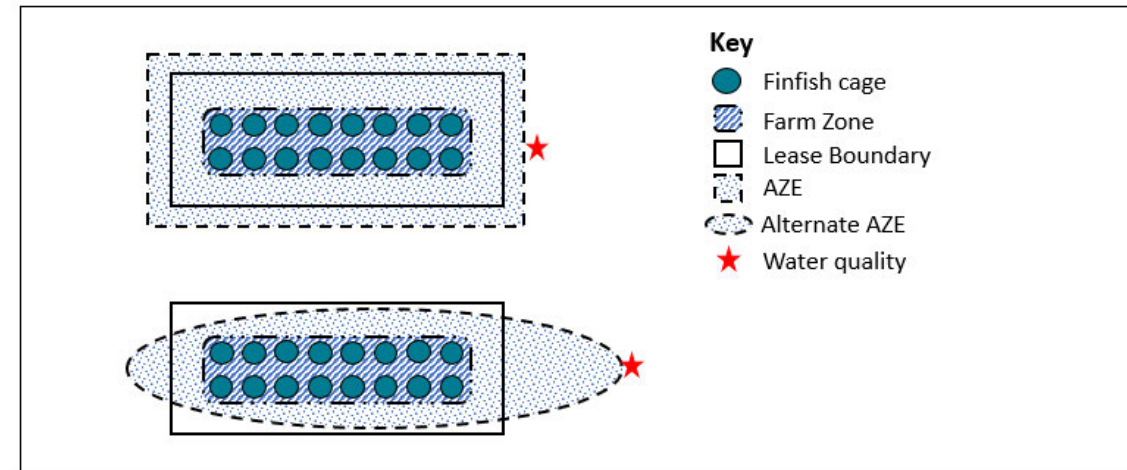




# Terminology comparisons

## Beyond lease boundary sampling

- AZE– Allowable Zone of Effect 35m (Tassie)
- Transitional zone – up to 500 m(Norway)
- OZE – Outer zone of effect 150 – 800m (NZ)
  - Use modelling to determine
- 30m and 125m (Canada)
- Mixing zone – up to 100m (Scotland)
- Cage edge, among cages, under cages (Ireland)



# Alternate Terminology

## Options

1. Maintain existing AZE name
  - Focus on refining the definitions of AZE and/or Regional Zone
2. Re-word AZE & refine definition
  - Depositional Zone of Effect (DZE)
  - Transitional Zone
  - Mixing Zone

**Define an acceptable distance where dissolved nutrients can have an acceptable level of impact.**

- **Define acceptable impact levels and appropriate responses.**
  - L1 – Water quality trigger level.
    - Further investigation/monitoring
  - L2 – Nuisance algal % cover trigger level.
    - Further monitoring – biodiversity
  - L3 – Macroalgal canopy loss trigger level.
    - Management actions (reducing production)

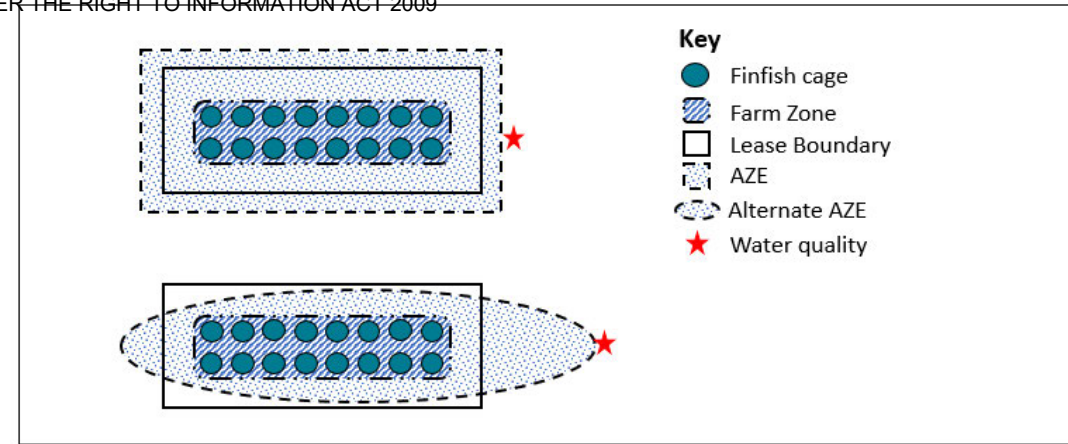


Table 1: Overview of management areas

	Farm-Zone	Allowable Zone of Effect (AZE)	Regional Zone
<b>Definition</b>	Is the area of likely maximum effect and is defined as the area encompassed within the outer edges of the cages	Defines the area of obvious and measurable environmental impacts from particulate waste released from the edges of the fish cages	The area outside of the Allowable Zone of Effect boundary
<b>Source of impact</b>	The fish farm	The fish farm	The fish farm is potentially one of several sources of impact
<b>Potential impact</b>	Major changes in the physical, chemical and biological conditions on the seafloor	Reduced impacts relative to the Farm-Zone	No significant change to water or sediment quality and no detectable and persistent change in ecosystem function and biodiversity. Potential cumulative effects may occur resulting in increased primary production, oxygen consumption but minor impacts to pelagic and benthic ecosystem health Oxygen depletion may occur in locations with poor water exchange. Potential environmental nuisance from noise and light.



# Alternate Terminology

## Options

### 3. Add an additional zone

- Dissolved Nutrient Zone of Effect (DNZE)?

**Define an acceptable distance where dissolved nutrients can have an acceptable level of impact.**

**Define acceptable impact levels and appropriate responses.**

L1 – Water quality trigger level.

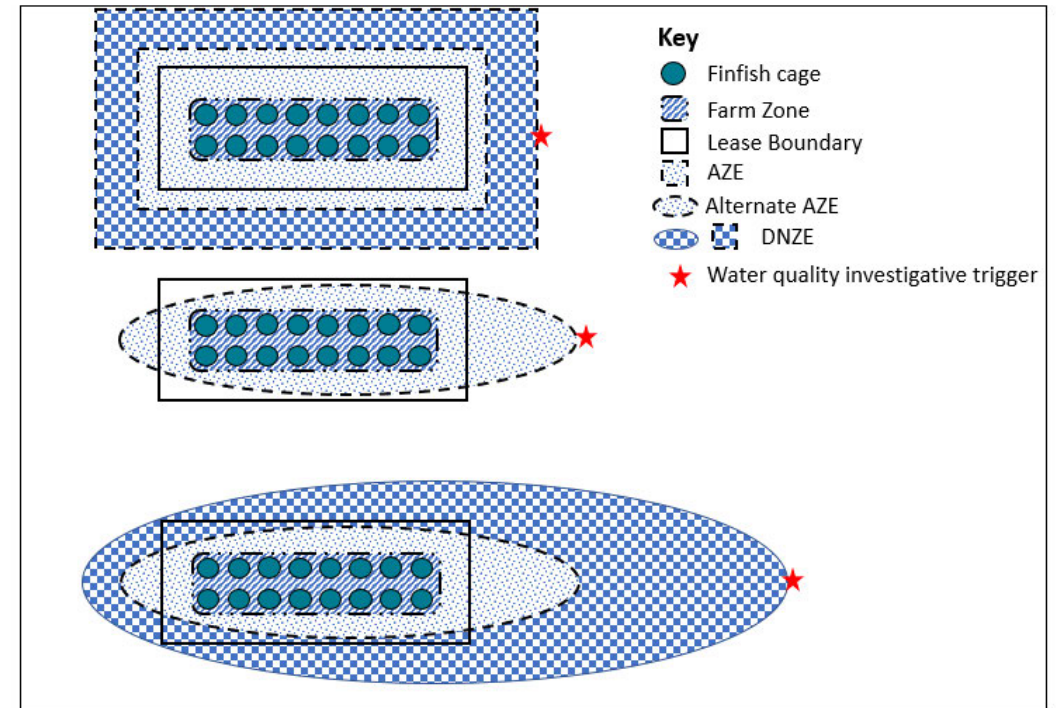
Further investigation/monitoring

L2 – Nuisance algal % cover trigger level.

Further monitoring – biodiversity

L3 – Macroalgal canopy loss trigger level.

Management actions (reducing production)



DNZE - Defines the area of obvious and measurable environmental impacts from dissolved nutrients released beyond the DZE

# Alternate Terminology

## Options

### 3. Adopt WA Terminology

Indicator Type	Max LEP	High LEP	Mod. LEP	Low LEP
EQG for physico-chemical stressors	No detectable change from natural background	20 <sup>th</sup> and/or 80 <sup>th</sup> percentile of natural background, whichever is relevant	5 <sup>th</sup> and/or 95 <sup>th</sup> percentile of natural background, whichever is relevant	No EQG apply
	Beyond DNZE	AZE Boundary to DNZE boundary	Farm Zone – AZE Boundary	Farm Zone

