Rock Lobster Biotoxin Plan and Decision Protocol

July 2015

Department of Primary Industries, Parks, Water and Environment

Tasmania
Explore the possibilities

Rock Lobster Biotoxin Plan and Decision Protocol

This *Rock Lobster Biotoxin Plan and Decision Protocol* has been developed by the Department of Primary Industries, Parks, Water and Environment in consultation with the Tasmanian Rock Lobster Fishermen's Association, the Commonwealth Department of Agriculture and other stakeholders.

This document, i.e. the July 2015 version, is the document that has been adopted for determining management outcomes and/or responses in relation to PST in the rock lobster fishery going forward.

Please note that this document may be amended and altered if/as more information comes to hand, in response to policy changes or learnings from the first operatioanalisation of this plan and decision protocol – as such it is considered a 'living document'.

Rock Lobster Biotoxin Plan and Decision Protocol

Background

The impacts experienced across the Tasmanian seafood industry during 2012 from the toxic algae *Alexandrium tamarense* have highlighted the need for formalised management and processes for future bloom episodes for the full range of potentially toxic algae.

The previously unrecorded in Tasmania *Alexandrium*, impacted a range of wild capture and marine farming sectors, including the bivalve shellfish marine farming sector, the shellfish wild capture fishery, the scallop fishery, commercial dive fishery, the abalone fishery and particularly the rock lobster fishery.

The key imperatives during this episode were the protection of public health and supporting processes to ensure critical ongoing market access to trading partners, and corresponding approval for export through the regulator within the Australian Government - the Department of Agriculture Fisheries and Forestry (DAFF).

As this was a new species and occurrence in Tasmania, the response was undertaken with little information or understanding of the algae and its interactions with species in the food chain, with *ad hoc* 'emergency' decisions being made at short notice with limited expertise and information. There was also some uncertainty regarding where responsibilities for key processes lay, including key technical support to expedite sampling and preparation for dispatch to the laboratory based in Sydney.

With only one laboratory in Australia set up to perform the necessary tests, the turn around time (TAT) of results from when lobster were taken from the water to the receipt of those results was an ongoing issue – together with the capacity of the laboratory to process samples at a period of high demand.

The potential of sentinel species (i.e. mussels and oysters) or other information (e.g. water sampling & remote sensing) indicative of the presence and impacts of *Alexandrium* emerged as issues of utility, but also some uncertainty, during the process.

Several rounds of sampling for rock lobster were undertaken that resulted in some levels of paralytic shellfish toxin (PST) reported above the regulatory limit of 0.8mg/kg. Correspondingly, a range of closures were implemented along the east coast with rolling opening and closures being implemented for the commercial and recreational sectors. Communication of the processes being undertaken, the results received and importantly the measures being implemented at any one time was a challenge.

One of the key issues identified was the issue of what should be done from the date lobster were sampled until results were received.

If any rock lobster samples returned results above the maximum prescribed regulatory limit for bivalve shellfish (0.8mg/kg), then all rock lobster from that area that had been harvested on or after the day the samples were taken (not the date of the test results) are potentially subject to a national and international recall.

For the 2012 episode, this risk was ameliorated on most occasions by closing areas to the harvesting of rock lobster on the date samples were taken, with a subsequent decision to open or keep shut depending on the results. One area was, however, sampled under a warning from the Director Marine Resources (DMR) that samples would be taken on a date and fishers and processors should be aware of the consequences of taking and receiving fish from the area until results were received. Subsequent results over the regulatory limit saw urgent efforts to identify all the fish taken from the area and isolate holdings, or utilise dispatch protocols agreed by the Department of Health and Human Services (DHHS). It also highlighted the limited capacity for traceability of product in the commercial rock lobster fishery.

The consequences of the above issues, together with the extended TAT remains a key challenge for future processes for managing PST. The interconnected issue of traceability in the post harvest sector is also key.

Other issues that arose include:

- the uncertainty of using sentinel species and information;
- when and where to test (timing and distance between sample);
- sampling regimes and protocols;
- decision protocols;
- uptake and depuration;
- cost of sampling and testing etc (significant resources were expended);
- need for clarity and agreed processes to secure public health and critical market access;
- communication and liaison with DAFF and need for rigour and transparency to satisfy regulators;
- communication with stakeholders.

The spatial scale of the episode and subsequent management intervention saw a number of management areas emerge based around the locations of sample sites, the availability of other sentinel information and data, east coast geography and fleet dynamics. As the event progressed, a range of management scenarios were discussed and agreed between DMR and DHHS and consulted with DAFF in advance of particular results. These management areas/units and decision protocols have some utility for developing formalised management responses for future events.

Also, a range of information gaps and uncertainties arose during the event. Subsequently, Southern Rock Lobster developed a research program in consultation with key experts, government and industry that has now been funded by the Seafood CRC. The information from this project will be important for future decisions and management.

Understandably, when monitoring or assessing the scope and impact of a particular bloom event, all data that might be informative should/could be used in management processes. For this paper such data is referred to as sentinel data. This data is separate to the data acquired from the sampling and analysis of rock lobster.

The utility of sentinel information remains, however, somewhat problematic with uncertainties regarding the interpretation of such data or findings, potential impacts on rock lobster and subsequent response decisions. However, it is considered prudent to maximise the the use of all information available.

Remote sensing information may provide some guidance as to areas of high primary production that might also contain *Alexandrium*, and ocean circulation and current information may assist in assessing where blooms may spread.

Ongoing water sampling may also provide useful indicative data at the presence/absence level and also relative abundance. However, given that *Alexandrium* apparently impacts some species at low levels of abundance and may have markedly different levels of abundance over relatively small areas, assessing such data is difficult.

It also noteworthy elevated PST levels in the flesh of rock lobster have not been recorded in Tasmania, rather the hepatopancreas is the area that has retuned such elevated results.

This document details the rock lobster PST plan that was first implemented for the 2013/14 rock lobster season. It is recognised that following the implementation of the first formal plan there will be additional information and better understandings of how the plan operationalises in practice, the practicalities and costs of such plans, and experience that might be used to amend/modify the plan, or indeed move to the consideration of other options

Some of the other options that were identified and discussed in the development of this plan are attached as an Appendix 1, together with some discussion of the potential utility or implications of that option. Those other options were:

1. do not implement any PST management actions;
2. seasonal closures for high risk times of the year or seasonal closures implemented upon monitoring of sentinel information;
3. differential labelling of product based upon sentinel data (“do not eat the gut” product warnings);
4. differential product based upon sentinel data (tail only fisheries);
5. based upon sentinel data, hold rock lobster catches and ‘test and release’;

This plan does not assume a capacity to separate lobster on a fishing vessel and in a processing facility with full traceability through the system. The capacity and implementation of such processes does change the possible consideration of alternate options to the plan now being implemented and provide additional flexibility.

The plan that has been chosen to be implemented for the 2013/14 season and beyond as detailed in this document is ***the lobster biotoxin plan*** - full monitoring and testing and area closures based upon rock lobster testing for PST.

The rock lobster biotoxin plan
Full monitoring and testing and closures based upon rock lobster PST results.
This option is the approach and methodology that will be adopted for the each rock lobster season.

That is, to institute a sampling regime and a decision protocol/matrix in response to differing results and outcomes. As such, this option may have significant cost to provide for the sampling and testing of lobsters. However, an explicit objective is to minimise costs, while providing appropriate rigour and transparency to the satisfaction of regulators.

In some respects this option builds on and refines the processes that were implemented during 2012 – whilst also attempting to address a fundamental challenge of the TAT from sampling to the receipt of results.

Correspondingly, efficiencies are sought by using the significant capabilities within industry in respect to resources that can quickly expedite the taking of samples and delivery to laboratories. That is, the industry has boats and personnel across the State that can be utilised. This is seen as analogous to the sampling program implemented by TSQAP for the sampling of water and bivalve shellfish on marine farming leases.

The decision matrix described below utilises sentinel information to determine if/when samples should be taken and decisions subsequently made depending on the results achieved. It utilises a management response trigger to move from sentinel data to lobster sampling/analysis.

Use of sentinel data
This option utilises a range of sentinel data. As detailed above, there are some issues with the use of sentinel data, and a reliance on data collected for other purposes. Over the full area of the east coast there are areas with no TSQAP based sentinel information. As a result, some additional sampling of sentinel species will be conducted to supplement existing TSQAP data.

For this policy to operate for decisions within each rock lobster PST management zone or ‘PST biotoxin zone’, some sentinel information is required from each biotoxin zone.

Collection of rock lobster samples
The collection and testing of samples is resource intensive and expensive. Expert technical skill is also required for processing and dissection of samples into the homogenised samples required for dispatch to the laboratory.

Cost effective collection processes are an explicit objective. However, a level of transparency and rigour in the collection process is also required to ensure the integrity of the sampling process.

The rock lobster industry, and the wider fishing industry, has significant resources and expertise to quickly take samples of rock lobster (and other sentinel species).

In consultation with the Marine Resources (MR), the TRLFA will manage the physical collection and transport of samples to the laboratory for processing.

MR will monitor the sentinel data and specify when/where/how many samples of lobster are required - in line with the policy. A *Living Marine Resources Management Act 1995* Section 12 permit will be issued to the TRLFA with conditions that provide for agents to collect the samples on behalf of the TRLFA. Conditions would include a requirement for notification to the Marine Police of person, vessel and time of sampling episodes.

Depending on the PST biotoxin zone(s) to be sampled, the TRLFA will identify the resources (personnel, boats etc) to collect the sample from the chosen location(s) and deliver those samples to the IMAS laboratory.

A paper trail similar to a quota audit trail will be implemented to demonstrate the 'chain of custody' of the samples to the lab.

A PST biological sample logsheet recording shot details and GPS locations will be completed on the vessel by the fisher (Part A). This includes a declaration that the information recorded is true and accurate (similar to current quota dockets). Upon transfer of the lobster, the transfer is recorded and counter signed by the receiver on the logsheet (Part B). The PST biological sample logsheet accompanies lobster to location of processing.

Upon landing, the sample lobsters need to be transported to the place of processing. Samples will be processed by a service provider on a cost for service basis – currently IMAS at the Taroona laboratories. This transportation process will be coordinated by the TRLFA.

The timing of collection for delivery at IMAS and capacity for the laboratory to test and minimise the TAT will require further examination. Initially, the logistics would be delivery to IMAS on Monday morning to allow dissection and overnight courier on that day – delivery to the laboratory Tuesday morning.

The TRLFA will advise DPIPWE in advance of the scheduled testing of the mechanism for the collection. If no process has been identified a private contractor/service provider will be engaged to take the samples and deliver to IMAS.

Collection of additional sentinel samples

As suggested above, some additional sentinel data will be collected to supplement TSQAP data. This will involve the directed collection of mussels, oysters or clams. In addition data that is collected from other wild fisheries, such as the commercial scallop fishery will also be used to inform the decision making under this biotoxin management program.

As this decision matrix will operate within each PST biotoxin zone, data is required for each zone. Where TSQAP or other wild fishery data is available, this data will be utilised. Where

there is no such data additional sentinel information will begin to be collected upon triggers within the TSQAP data.

The collection of the additional sentinel data will be triggered by the first PST levels in any bivalve shellfish collected through TSQAP or data from another wild fishery on the east coast that are above 0.4 mg/kg. That is, routine collection of the additional data will commence and be ongoing from the first TSQAP indication of significantly elevated PST levels in bivalve shellfish. Collection will continue until information suggests the bloom is receding.

After the first sample in each location is taken, sampling will then continue every 14 days if the last test was <0.4mg/kg, and weekly if the level is >0.4mg/kg in the sample.

As for lobster samples, the TRLFA will coordinate the collection and transport of sentinel samples to the IMAS laboratory. It should be noted that if four locations are being sampled weekly, the laboratory testing alone is in the quantum of $1,500 per week.

The sampling locations for the additional sentinel data is designed to provide easy access to bivalve shellfish at a location in the PST management unit. The additional bivalve shellfish samples will be collected as follows:

- the wharf at Pirates Bay;
- Bicheno (rocks or mooring ropes);
- Great Musselroe Bay;
- wharf at Lady Barron.

Other sources of sentinel data
PST data from wild harvested scallops (Tasmanian or Bass Strait Central zone fisheries) will also be utilised as additional sentinel data.

If wild scallop PST levels are > 0.4 mg/kg this will trigger the collection of mussel samples from the agreed location in that zone. If wild scallop PST levels are > 0.8 mg/kg this will trigger the collection of rock lobster samples from that zone.

Costs of sampling lobsters/sentinels (2013/ 14)
While the TRLFA will oversee the process for the collection of samples, a fee for service will be implemented to recompense fishers for the cost of collection. Cost may vary depending on the vicinity of the sampling location to port and ease of access. A schedule of fees will be developed by the TRLFA and MR. This schedule will be open and transparent. As these costs will be cost recovered from industry, efforts will be made to minimise cost whilst covering out of pocket expenses for fishers.

The TRLFA will recompense individual fishers and keep records of the ongoing activities and payments and invoice DPIPWE on a monthly basis of the activities undertaken.

The costs of laboratory testing for sentinels and rock lobster has the potential to be significant, with the ultimate cost being somewhat dependent upon the duration of the bloom

and amount of lobsters that the decision matrix determines must be tested for the management units.

At cost per test of $500, and a sample size of lobster being five lobsters, some indicative costing of laboratory tests (only) are provided below in Table 1. Table one assumes 12 sentinel samples are needed per month, and over the 6 management units 4 of the units are sampled per month. The number of individual samples is indicated at $500 per sample. Fewer samples might be required, but also potentially significantly more sampling might be required. Hence Table 1 is indicative of one scenario only with a laboratory cost of $64,000.

Sample	No units	sample size	samples/month	tests for 4 months	Cost
Sentinels	4	1	12	48	$24,000
Lobster	6	5	4	80	$40,000
				Cost =	$64,000

Table 1: Indicative costing scenario

Lobster PST biotoxin zones

Discrete areas on the east coast will be considered as PST biotoxin zones. Decisions regarding samplings and then opening/closing will be made on the basis of these biotoxin zones and the sample(s) collected within it.

Generally, the sample collection will conducted at predetermined locations. This will also facilitate the collection of an increasing data set from these set spots. Again, it is planned to generally utilise the locations used in 2012. Sites may be modified, however, to minimise the distance from a port of operation and corresponding collection costs.

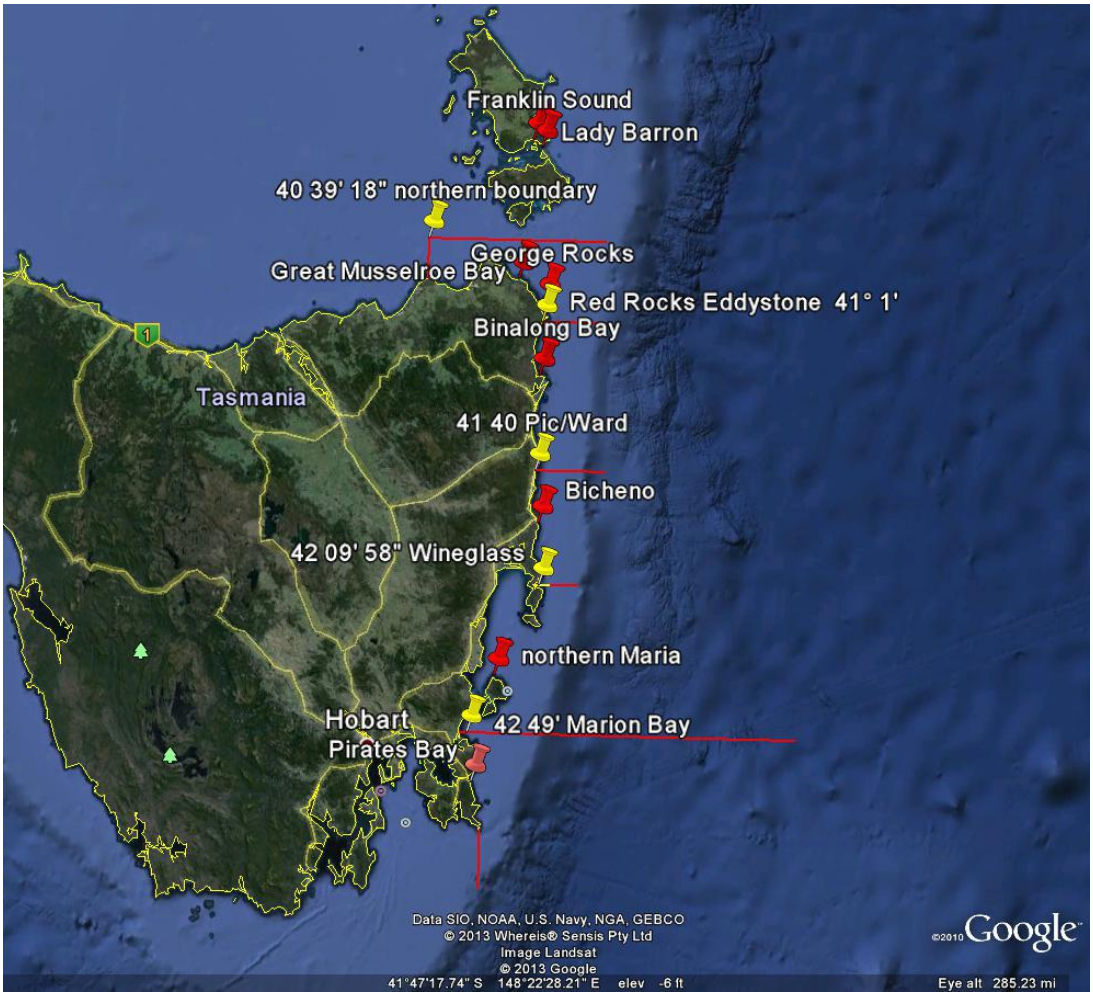
The lobster PST biotoxin zones are (see map 1 & Appendix 2):

- lower east coast zone - Tasman Island to Marion Bay (42° 49');
- Maria Island zone - Marion Bay to Wineglass Bay (42° 09' 58");
- central east zone/Bicheno area - Wineglass Bay to Wardlaws Creek (41° 40');
- upper east coast zone - Wardlaws Creek to Red Rocks (41° 1');
- north east zone – Red Rocks to Waterhouse Island/Banks Strait;
- Furneaux zone.

The standard rock lobster sampling locations within the PST biotoxin zones are (from south to north):

- Pirates Bay;
- Northern Maria;
- Bicheno;

- Binalong Bay;
- Georges Rocks;
- Eastern end Franklin Sound.



Map 1: PST Management zones and standard sampling locations

Policy and decision matrix

Decisions on if and when an area will be sampled and subsequent processes and decisions from that point will be conducted within a decision tree as is detailed below. That is, the decision matrix applies to each PST biotoxin zone.

This plan is based on a conclusion that any rock lobster fishing occurring in a biotoxin zone must cease in that zone on the day that a ***rock lobster*** sample is taken for PST testing from that biotoxin zone. The risk of non-compliant lobster entering the market chain of supply is considered unacceptable at this time.

When a decision to sample rock lobster is made, a process to statutorily close the fishery, inform fishers, allow boats fishing the area with pots in the water to leave the area and ensure all activity has ceased by sampling day, will be expedited. It is envisaged that a period of 7-10 days will be required to facilitate this outcome so that sampling can proceed

with no risk of any catches after that date and possibly non-compliant lobster being in the chain of supply.

Marine Resources will oversee the matrix, monitor information and task the collection of samples as required to the TRLFA. The closures and openings of management units will be achieved – at this time - through statutory instruments under the provisions of the *Living Marine Resources Management Act 1995*. Such processes provide statutory rigour to closures, however, additional time is required to implement the necessary instruments and each opening or closure of a unit will cost in the vicinity of $1,000. In future, more streamlined voluntary processes would appear to hold potential to provide quicker more efficient processes at much lower cost.

It also needs to be recognised that the decision matrix provides decision rules for a range of scenarios, however, not all outcomes and contingencies can be foreseen. As such, some outcomes might not fall neatly into the decision matrix and decisions will need to be made in a manner that is complementary to the rationale behind the explicit management rules. For example, in particular in cases when sentinel information or lobster results are trending consistently in an upwards direction, decisions may be made to sample earlier if it is clear that the bloom and PST results are increasing. Such decisions will be taken in consultation with the TRLFA.

The decision matrix is as follows and as per the attached flowchart.

1. Monitor status of algal bloom activity throughout the year through sentinel data, i.e. TSQAP bivalve shellfish meat sampling (including wild scallop PST data) and water sampling program. Bivalve shellfish meat and water samples will provide data for indications of algal bloom activity in waters adjacent to Ansons Bay, St Helens, Great Oyster Bay and Mercury Passage.
2. Monitor TSQAP meat results - if below 0.4mg/kg – no response/action taken other than continued monitoring of sentinel trends (back to 1).
3. TSQAP bivalve shellfish meat results are 0.4mg/kg + (but below 0.8mg/kg) – continue monitor affected area (biotoxin zones) based on TSQAP sentinel data and satellite imagery of bloom activity. Monitor satellite imagery to attempt to gauge extent of any bloom activity.

   Now activate the collection of additional sentinel data as outlined above from areas with no other sentinel information.

   Notification and warning to rock lobster fishers and processors that sentinel levels have reached threshold levels in corresponding bioxtoxin zones (i.e. greater than 0.4).

   DAFF is notified.

   Continue to monitor sentinel data – go to 4 or 5.

4. TSQAP and other sentinel meat results drop below 0.4mg/kg for 2 consecutive sampling episodes – notice to rock lobster fishers and processors that sentinel levels have returned below threshold 0.4 mg/kg and that situation will continue to be monitored (go to 1 and 2).

DAFF is notified.

5. TSQAP and/or other sentinel meat result 0.8 mg/kg or greater (lobster sampling trigger).

   Determine which PST biotoxin zones have non compliant sentinel results.

   Notification and warning to rock lobster fishers and processors that sentinel levels have reached threshold levels in which biotoxin zones.

   Notice/warning that sentinel levels exceed maximum prescribed levels and all operators should be aware that **rock lobster samples will be collected** from certain biotoxin zones on specified dates.

   Fishery in biotoxin zones to be sampled closed by DMR.

   DAFF notified.

   Samples of rock lobster collected from biotoxin zones and assigned to laboratory for analysis.

6. Rock lobster samples return below 0.5 mg/kg – rock lobster fishing licence holders and licensed processors notified.

   Fishery in that management zone reopened.

   Revert back to monitoring sentinel and TSQAP data.

   If sentinel data exceeds 0.8 mg/kg in 2 sequential weekly samples, or after one fortnightly sample, then further lobster samples must be taken, fishery is closed on sampling date.

   If sentinel data is above 0.4 and below 0.8 for 4 sequential weekly samples or 2 fortnightly samples, then further lobster samples must be taken, fishery is closed on sampling date.

   Advise DAFF.

7. Rock lobster samples return above 0.5 mg/kg but below 0.8 mg/kg – rock lobster fishing licence holders and licensed processors notified.

   Fishery in that biotoxin zone remains closed.

   Additional rock samples must be collected from that management unit to determine the trend in PST levels.

   If PST results have then decreased from the first result, then revert to decision rules from dot point 6.

   If level is the same or has increased then fishery remains closed until 4 weekly sentinel samples are below 0.4 or 2 fortnightly samples. Then follow decision rule in dot point 6.

   Advise DAFF.

8. Rock lobster samples return 0.8 mg/kg or above. Area continues to be closed to commercial rock lobster fishing. Rock lobster fishing licence holders and licensed processors notified.

Advise DAFF.

Advise DHHS.

Monitor TSQAP sentinel data.

Continue review closure area in light of TSQAP, sentinel data and satellite imagery.

Advise DAFF.

9. Sentinel data indicates bloom is abating/levels of toxin are reducing in closed area. When sentinel data is below 0.4 for 5 weeks collect rock lobster samples from closed area and submit to laboratory for analysis.

10. Rock lobster samples return 0.8 mg/kg, area remains closed. Licensed rock lobster fishers and licensed processors advised of ongoing closure.

    Advise DAFF.

    Advise DHHS.

    Further rock lobster samples on signals that bloom continues to recede.

11. Rock lobster samples return below 0.8 mg/kg, closure lifted. Rock lobster fishing licence holders/licensed processors advised.

    Advise DAFF.

    Advise DHHS.

    Revert to monitoring sentinel data. Decision rules on further samples in line with rules above for levels in lobster below 0.8 mg/kg.

12. Sentinel data indicate bloom has abated – advise rock lobster fishing licence holders and licensed processors.

    Discontinue collection of additional sentinel data.

    Ongoing monitoring TSQAP sentinel data

APPENDIX 1: Different response models to address PST on the east coast for the rock lobster fishery

Some of the possible options that were identified and discussed in the development of this plan were:

1. do not implement any PST management actions;
2. seasonal closures for high risk times of the year or seasonal closures implemented upon monitoring of sentinel information;
3. differential labelling of product based upon sentinel data ("do not eat the gut" product warnings);
4. differential product based upon sentinel data (tail only fisheries);
5. based upon sentinel data, hold rock lobster catches and 'test and release';

1: Do not implement any PST actions

This option provides that no management actions would be implemented to monitor or address PST in rock lobster.

This option has implications and risks in terms of potential actions by regulators in Australia and overseas.

A test of product overseas above the regulatory limit would have serious implications in the short term (recall) and impact upon long term confidence in southern rock lobster as well as damaging the market image of other Tasmanian seafood products..

This option is not considered a tenable option.

2: Seasonal closures for high risk times of the year or seasonal closures implemented upon monitoring of sentinel information

This option aims to utilises standardised actions to minimise the complexity of a management response and also minimise costs.

Given that a range of closures already operate in the fishery for different reasons, this model could see a set fishery closure for the east coast fishery each year over the high risk bloom period. Potentially, one lobster sampling event might be required to ensure the opening data aligns with permissible levels of PST. The duration of any proposed closure might dictate if any sampling might be required – other sentinel data might also be informative (e.g. bivalve shellfish marine farms are open).

A refinement might see sentinel data utilised to set an agreed trigger or decision point upon which such a closure is implemented (e.g. report of 0.8 mg/kg in sentinels during a season). The closure could be of an agreed length after that closure data, or as for the above, sentinel data or a round of lobster meat samples might determine when the fishery reopens. The length of a standard closure would need to be adequate to suggest with confidence that a

bloom event would have receded and rock lobsters had time to depurate to permissible levels.

To some degree, the overall efficacy of this solution might depend upon the regularity and predictability of bloom events and an understanding of their location and duration. If future events were somewhat predictable, a standardised “one response fits all” scenario such as this could in fact see a similar response eventuate on the water, a similar impact upon the industry, but at lower management costs than for a more sophisticated test and response model.

This model would be lower in management cost than the more sophisticated models that involve ongoing testing, but could also see closures in place restricting the operation of the fleet and impacting local processors, when in fact PST levels in lobster were below the regulatory limit.

A better understanding of the relationship between blooms, uptake rates and following depuration rates would assist in developing and implementing this option. Given that there are currently many information gaps, this option is not supported at this time.

3: Differential labelling of product based upon sentinel data (do not eat the gut);

Several options described in this paper involve closing the fishery for a portion of the year in response to certain data or predetermined triggers. Those options continue to support the operation of the current marketing regime in the fishery that generally involves the export of live product to overseas markets, predominately China. This marketing scenario potentially maximises the return for each rock lobster taken.

However, depending on the potential cost of a PST management response to support that marketing model exclusively, an alternate model is that the ‘cost’ accrued is through a reduced return for some rock lobster taken from the east coast – rather than through the expense of PST monitoring and response, together with the cost accrued from limiting the activities of the fleet based on the east coast and processors highly reliant on fishing in that area.

Again, the trigger or decision point for implementation of this option could be sentinel data (e.g. agreed levels of PST in bivalve shellfish).

In response to the decision trigger, product sold from discrete areas would be marketed with labelling or designation indicating that the gut and head of the lobster should not be consumed. The decision trigger to remove such labelling would be the same as for option 2, using an agreed period and/or sentinel data potentially followed by a lobster sample.

An assessment of this model requires an understanding of the amount of product that might be so dispatched, the likely decreased return per lobster compared against the cost of any alternate PST regime, including the cost of any closures under that model that would be imposed upon the fishery and processing sector.

A response from some quota holders might be to withhold their quota from being caught on the east coast at this time. Such a market response could in fact minimise the overall loss to the fishery in terms of total revenue. However, the cost might manifest upon lease fishers who fish exclusively that area. In time, this model could in fact see a limited catch on the east coast over that period and see a similar outcome to agreed seasonal closures as described in option 2. It would, however, provide the flexibility for quota holders and the market to determine the outcome and the optimal model for minimising overall cost to the fishery.

This option is relatively low cost in terms of monitoring and sampling and also minimises government intervention allowing licence holders to determine the seasonal fishing pattern for their business model. It would also need to be endorsed by DAFF as adequately mitigating the risk of PST contaminated lobster entering the export supply chain.

This option, however, potentially downgrades the SRL product overall and needs to be approached with caution. Whilst this option is not supported by industry at this time, depending on the outcomes and impact of future events, in future it might be considered as a possible alternative (although option 4 might be a preferred option to option 3).

4: Differential product based upon sentinel data (tails)

This option is basically the same as for option 3, however, the response is not the labelling or designation of product as not to consume the head and gut, but instead the release of 'tail only' product taken from within the impacted area within the period.

The practicalities of this model and its cost/benefit are very similar as for option 3, but with a different product that does not carry the potential negative marketing implications of a warning label.

As for option 3, this model is not supported at this time, although depending on ongoing cost of the management methodology adopted, it might be considered as a possible alternative.

5: Upon sentinel data, hold and test and release

This option involves directly determining if 'batches' of lobster are within regulatory permissible limits before they are released into the chain of supply from processors. As such, the risk of compromising export markets under this scenario is low. Also, it is not predicated upon an ability to trace all lobsters and potentially undertake a recall.

This model also utilises sentinel data to determine when holding and testing would begin. One scenario is that batch testing would begin from the first results from bivalve shellfish over 0.8 mg/kg – or a set period afterwards to accommodate a slower uptake rate.

Once the predetermined trigger had been reached, batches of lobster harvested from the impacted area from and after the date of the sentinel trigger would be held separately from other lobster. Samples would be dispatched to the laboratory and the lobsters released for sale upon receipt of results under the permissible levels.

A number of technical issues arise under this option – a critical issue being what constitutes 'a batch'. Does this mean the landings from a single vessel, or a group of vessels over a set area and time period? Potentially, a model might be developed utilising agreed batch areas and include all fish caught over rolling time periods. This process might be undertaken by each processor for the lobster they receive, or theoretically this might be organised between groups of processors who liaise and work cooperatively and use the same set of samples to inform the release of lobsters. Clearly, good communication and organisational/reporting frameworks would be required under this broader scenario. Batch testing by single processors would provide more autonomy for each processor.

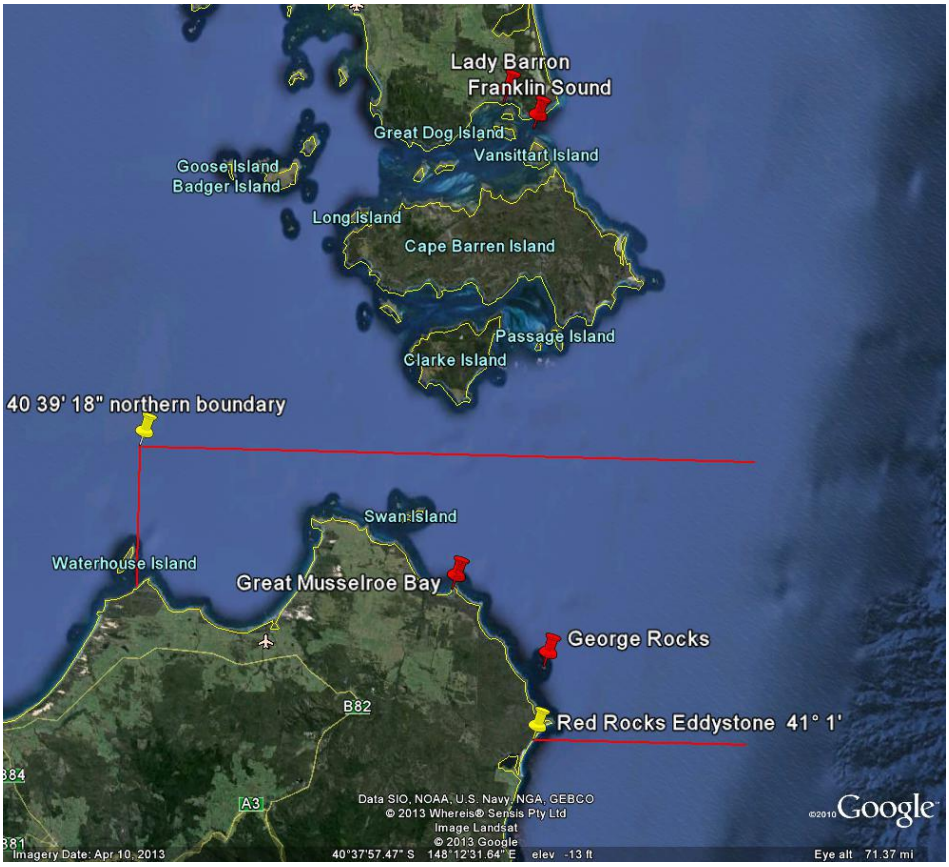
Any proposal for determining how a batch might be defined and over what period of time would need approval by the appropriate regulator.

Batch testing might be halted after sentinel data suggested the bloom had receded and the results of say sequential 2 batches showed low or no levels of PST.

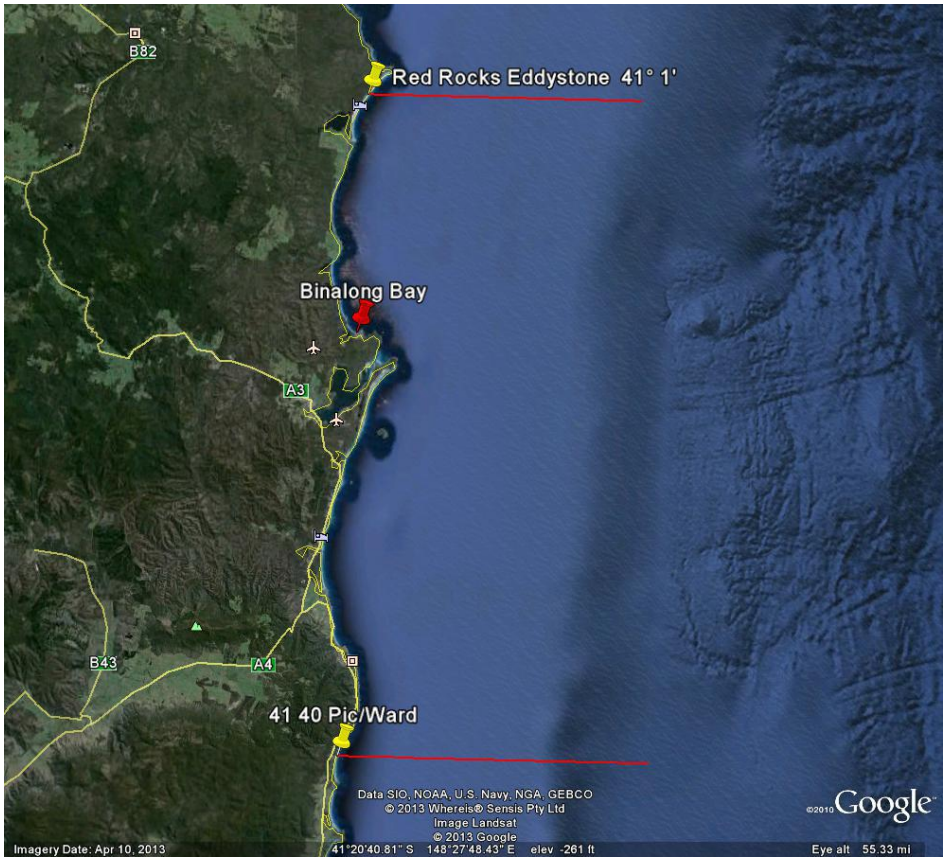
This option would attract significant cost in sample testing and potential capital cost for processors in installation of the necessary infrastructure to hold batches of lobster.

This option is not considered viable of the 2013/14 season.

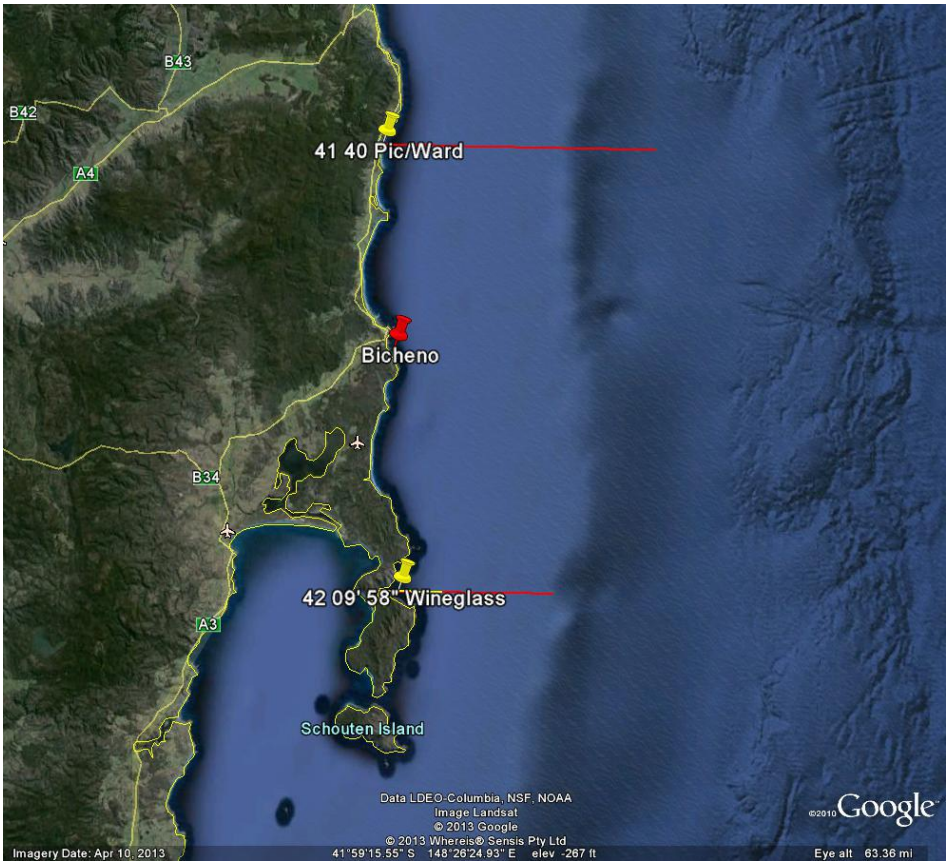
APPENDIX 2: Boundaries and sampling locations within PST management zones



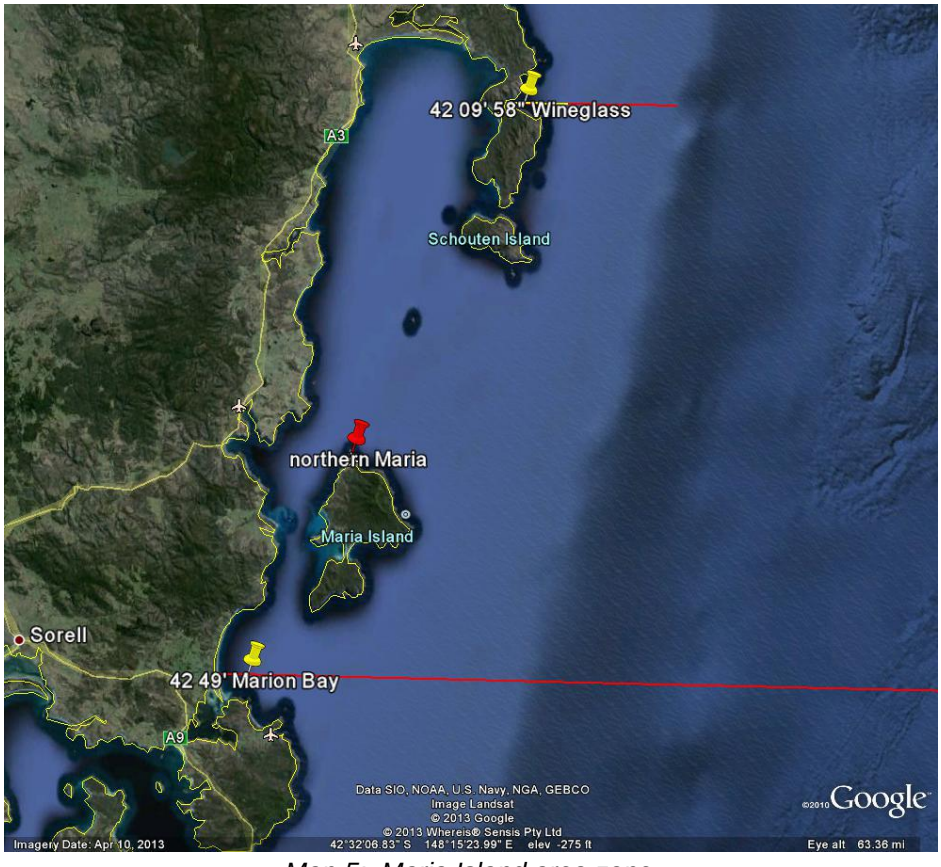
Map 2: Furneaux zone and north east zone



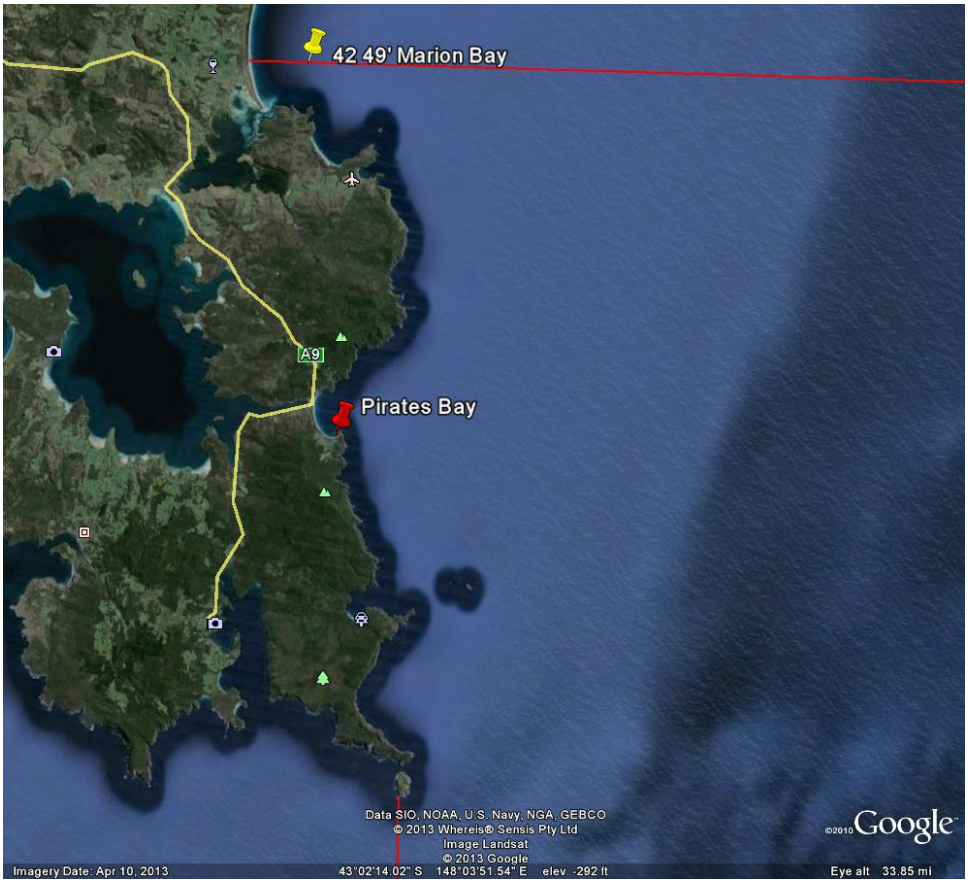
Map 3: Upper east coast zone



Map 4: central east coast (Bicheno) zone



Map 5: Maria Island area zone



Map 6: lower east coast zone