



GOVERNMENT OF
WESTERN AUSTRALIA

Draft Management Plan for the Western Australian Shark Hazard Mitigation Drum Line Program 2014-17

June 2014

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DEFINITIONS

In this Plan:

Contract	means the contract entitled Shark Drum Line Deployment, Management and Associated Services DPC 1605
Contract manager	until 1 May 2015 means the Department of the Premier and Cabinet
Contractor	means those employed under the contract
DoE	means the Commonwealth Department of the Environment
DoF	means the Western Australian Department of Fisheries
DoF operations manager	means the officer at the Department of Fisheries responsible for liaison with the Contractor in each region
DPaW	means the Western Australian Department of Parks and Wildlife
DPC	means the Western Australian Department of the Premier and Cabinet
EP Act	means the <i>Environmental Protection Act 1986</i> (WA)
EPA	means the Western Australian Environmental Protection Authority
EPBC Act	means the <i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cth)
FRMA	means the <i>Fish Resources Management Act 1994</i> (WA)
Marine Monitored Area (MMA)	means the areas in which static drum lines may be deployed, and as defined in section 3.2.2
Marine protected area	means any marine protected area designated under the <i>Conservation and Land Management Act 1984</i> or the FRMA
MNES	means matters of national environmental significance as defined under the EPBC Act
Non-target species	means all vertebrate species that are not target species.
Observer program	means the provision of employees to monitor operations and observe the performance of the contractor
Plan	means this document titled “Draft Management Plan for the Western Australian Shark Hazard Mitigation Drum Line Program 2014-17”
Program	means the Western Australian Shark Hazard Mitigation Drum Line Program 2014-17

Static drum lines	means drum lines to be set continuously (or as directed by the Contract Manager) at approximately 1km offshore of popular swimming beaches and surf breaks within either MMA between 15 November and 30 April each year and monitored daily.
Temporary drum lines	means drum lines deployed in response to an identified shark threat or incident anywhere in Western Australian waters at any time, until 30 April 2017. Temporary drum lines would be set for a maximum of one hour in response to a sighting or for up to one week in response to an incident.
Target species	means, in reference to the static drum line element of the program, any white shark (<i>Carcharodon carcharias</i>), tiger shark (<i>Galeocerdo cuvier</i>) or bull shark (<i>Carcharhinus leucas</i>) with a total length of three metres or greater; or in reference to the temporary drum line element and responding to an identified shark threat or incident, any shark considered to be posing a threat or responsible for the incident.
Total length	is defined as the distance from the snout to a point on the horizontal axis intersecting a perpendicular line extending downward from the tip of the upper caudal lobe to form a right angle
WC Act	means the <i>Wildlife Conservation Act 1950</i> (WA)
Western Australian waters	has the same meaning defined by Geoscience Australia and is 'coastal waters between the territorial sea baseline, usually the low water line along the coast, and a line three nautical miles seaward from the baseline'

1 INTRODUCTION

1.1 Name of plan

This plan is the Draft Management Plan for the Western Australian Shark Hazard Mitigation Drum Line Program 2014-17 (the Program) (hereafter “Plan”).

1.2 Date of commencement

This Plan will come into force on 15 November 2014 and will be in force between 15 November and 30 April 2014-17.

1.3 Definition of the activity

- (1) The activity of drum lining is herein defined as the setting of up to 60 static and 12 temporary baited drum lines to provide the public with an additional shark hazard mitigation measure within the metropolitan and south west region Marine Monitored Areas (MMAs) (refer to Section 3 and Attachment 9.1)
- (2) Target species in reference to the static drum line element under the Program will be any white shark (*Carcharodon carcharias*), tiger shark (*Galeocerdo cuvier*) or bull shark (*Carcharhinus leucas*) three metres or greater in total length. Target species in reference to the temporary drum line element under the Program will be the shark considered to be posing the threat or responsible for the incident.
- (3) Static drum lines will be set between 15 November and 30 April each year for a period of three years, commencing 15 November 2014 and ceasing 30 April 2017.
- (4) Static drum lines are to be placed approximately 1km (0.53 nautical miles) offshore off popular swimming beaches and surf breaks within the two MMAs.
- (5) The Program includes provision for responding to identified shark threats or incidents including the deployment of temporary drum lines anywhere in Western Australian waters at any time until 30 April 2017.

1.4 Authority for the activity

The drum lining activities are authorised as per approvals granted under the *Environmental Protection Act 1986* (WA) (EP Act) and the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act). The drum lining activities also take place under exemptions from the *Fish Resources Management Act 1994* (WA) (FRMA) and licences under the *Wildlife Conservation Act 1950* (WA) (WC Act).

1.5 Proponent of the activity

For the purpose of this Plan the Proponent is taken to mean the Western Australian Department of the Premier and Cabinet (DPC).

1.6 Contract manager

The Program will be managed by DPC on behalf of the Western Australian Government for the first year of operation after which discussions will be held with other agencies including the Department of Fisheries (DoF).

1.7 Environmental assessment

- (1) This Plan is an Appendix (Appendix 2) to the Public Environmental Review (PER) conducted under bilateral agreement between the Western Australian Environmental Protection Authority

(EPA) and the Commonwealth Department of the Environment (DoE) under the EP Act and the EPBC Act respectively.

- (2) The PER includes a comprehensive environmental risk assessment of the Program.

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2 AIMS AND OBJECTIVES

2.1 Development of the program

The Program has been designed following a close examination of shark control programs in other jurisdictions, and a review of the catch data from the trial program. The result is a very conservative Program, explicitly designed to minimise environmental impacts.

2.2 Program aim

- (1) The aim of the Program is to offer an additional measure of shark hazard mitigation at high use swimming beaches and surf breaks whilst minimising environmental impacts.
- (2) The operational means through which this aim is achieved is set out in this Plan.

2.3 Management plan objectives

The objectives of this Plan are to:

- (1) provide the operational requirements of the Program and oversight of these specifications to fulfil the Program's aims;
- (2) minimise the impact on non-target species and ensure that the Program does not jeopardise the survival or conservation status of threatened species, populations and ecological communities, or cause species that are not threatened to become threatened; and
- (3) collect relevant catch and operational data to allow for annual review and ongoing monitoring of the Program.

2.4 Performance indicators

The following performance indicators are to be used to determine the performance of this Plan in meeting its objectives:

Objective (1)

Performance indicator: Compliance with obligations under the Contract.

Objective (2)

Performance indicator: Significant change in the number of non-target sharks and species captured.

Objective (3)

Performance indicator: Monthly publication of catch data.

3 CONTROLS ON THE ACTIVITY

3.1 Activities to be delivered through contract

- (1) Drum lining activities are to be undertaken by Contractors in accordance with the legally binding Contract with the Proponent.
- (2) Contractors will be required to comply with all conditions and requirements of the Contract.

3.2 Restrictions on timing and location

3.2.1 Timing

Static drum lines

Static drum lines will be set between 15 November and 30 April each year for a period of three years, commencing 15 November 2014 and ceasing 30 April 2017.

Temporary drum lines

Temporary drum lines may be set at any time during the year in response to identified shark threats or incidents.

3.2.2 Location

Static Drum Lines

- (1) The metropolitan MMA extends from Ocean Reef ($-31^{\circ} 44.6038'$, $115^{\circ} 43.3727'$) to Port Beach ($-32^{\circ} 2.4354'$, $115^{\circ} 44.4630'$) (30 static drum lines plus six in reserve).
- (2) The south west MMA extends from Quindalup ($-33^{\circ} 37.8569'$, $115^{\circ} 8.9470'$) to Prevelly ($-33^{\circ} 58.9200'$, $114^{\circ} 59.3834'$) (30 static drum lines plus six in reserve).

Up to 30 static drum lines are proposed to be set in each of three phases within the south west MMA as follows.¹

Phase 1:	At popular surf breaks between Moses Rock and Prevelly – November to early December.
Phase 2:	At high use swimming beaches and popular surf breaks between Dunsborough and Three Bears – early December to early February to coincide with school holidays and Surf Life Saving WA patrols.
Phase 3:	At popular surf breaks between Yallingup and Prevelly from approximately the second week of February until 30 April.

Temporary Drum Lines

Temporary drum lines may be deployed anywhere in Western Australian waters in response to identified shark threats or incidents.

¹ This schedule may vary depending on changes to Surf Life Saving WA patrols or other logistical considerations.

3.2.3 Marine protected areas

- (1) The MMAs overlap with the Marmion Marine Park and Cottesloe Fish Habitat Protection Area (FHPA) in the metropolitan region and with the Ngari Capes Marine Park in the south west region.
- (2) Static drum lines will not be deployed within any gazetted or proposed marine sanctuary zone or gazetted or proposed marine recreation zone in any Western Australian marine parks as designated under the *Conservation and Land Management Act 1984*. Static drum lines will not be placed within any FHPA as designated under the FRMA.
- (3) Temporary drum lines may be set anywhere in Western Australian waters at any time, including within marine protected areas in response to an identified shark threat or incident.

As detailed in Section 5.1 if an identified shark threat or incident requires a response within a marine protected area, appropriate consultation will be held between the DoF Operations Manager and the Department of Parks and Wildlife (DPaW) prior to giving an order to deploy.

The frequency with which a response is likely to be enacted is anticipated to be rare. Orders to deploy capture gear in response to a shark considered to be posing a threat to public safety, or following an incident, were issued only eight times over more than 200 days between October 2013 and 30 April 2014.

In the event that temporary drum lines are deployed to target a specific shark, while the capture of a target shark cannot be guaranteed, lines would be closely monitored for the duration of their deployment to minimise any environmental impacts to non-target species. Drum lines deployed in response to a sighting would be monitored continuously up to a maximum of one hour. Drum lines which are set in response to an attack would be closely monitored for up to a maximum of one week.

In considering the low frequency of when temporary drum lines may be deployed, the small number of lines that may be deployed (a maximum of five per response) and the high level of monitoring that will occur if they are deployed, it is considered that the setting of temporary drum lines in response to a shark attack or shark sighting considered to be posing a threat to public safety poses no risk to the ecological values associated with marine protected areas, and in particular sanctuary or recreation zones.

4 OPERATIONS

Under the terms of the Contract, Contractors must:

4.1 Drum lines

- (1) deploy a series of baited drum lines within the metropolitan and south west MMAs;
- (2) record the GPS location of all drum lines upon initial deployment, at all times when and if moved and upon retrieval;
- (3) maintain and patrol the drum lines between 6am and 6pm seven days per week;
- (4) drum lines to be checked as often as possible during twelve hour patrols; and
- (5) carry six additional sets of drum lines on board for deployment in the event of an identified shark threat or incident (see Section 5), or for replacement of damaged gear.

4.2 Bait

- (1) provide bait suitable to catch large sharks, and preferably sourced from shark;
- (2) bait drum lines as required. Bait to be checked at both the commencement of, and prior to the end of, each patrol day and at all other times lines are checked.² All used baits shall be disposed of on-shore.

4.3 Capture of animals

- (1) record all details as per the catch log (see Section 4.8.3 for record keeping requirements) including the sex, inter-dorsal and total lengths and species of all animals caught on drum lines;

If:

4.3.1 Target species

- a) humanely destroy by the prescribed method;
- b) notify the Contract Manager of the catch; and
- c) tag with a uniquely numbered kangaroo tag and tow offshore for disposal. Animals must be discarded in State waters, at a suitable distance offshore and away from populated areas.

If:

4.3.2 Non-target species

- a) tag with a uniquely numbered conventional fin tag and release alive where possible.

Any animals which are considered not in a condition to survive are to be humanely destroyed, tagged and taken offshore for disposal in line with 4.3.1.

4.4 Access to vessel

- (1) permit any agency officers, as requested by the Contract Manager, to observe on the vessel; and
- (2) allow non-governmental officers onto the vessel where approved by the Contract Manager.³

4.5 Placement of drum lines

move or retrieve drum lines from the water as directed by the Contract Manager at any time (e.g. for the annual Rottnest Channel Swim or in the event of a severe storm forecast).

² In the event that a vessel cannot operate due to inclement weather the Contract Manager may request lines to be re-baited as soon as practicable at the resumption of patrols.

³ The necessary approvals must have been granted to permit third parties access to animals captured on the drum lines. Third parties are responsible for seeking relevant State and Commonwealth permits to be in possession of protected species.

4.6 Drum line specifications

ensure the drum line configuration conforms to the following description:

A minimum of two Polyform buoys and a large (no smaller than an approximate 25/0 circle) design hook. The hook is to sit a minimum of approximately two metres below the surface of the water, and be anchored to the sea bed using an approximately weighted 8-12 kg anchor by a length of polypropylene rope (length of rope dependent upon water depth and local conditions). Each component of the rig is to be sectioned using swivel shackles. A third float may be added for more effective handling of an animal, in particular in rough sea conditions. Diagrams of the drum line configurations are at Attachment 9.2.

4.7 Vessel and associated requirements

ensure vessels are under appropriate commercial survey and licensing requirements and have the following capabilities and or equipment:

- (1) approximate draft - 1.5 m or less;
- (2) approximate length – 15 m or greater;
- (3) deck space longer than 6 m;
- (4) Automatic Location Communicator (ALC) capabilities, and ability to maintain a GPS Track log;
- (5) winch capable of minimum 1.5 tonnes lifting capacity and suitable to bring a 1.5 tonne shark (or other marine animal) on board the vessel, and return it to the ocean for release;
- (6) all lifting equipment rated for safe working loads in excess of 1.5 tonne;
- (7) ramp or suitable and approved alternative system (such as a sling, or conveyor system) capable of bringing a large marine animal on board, and support releasing it, minimising further injury to the animal;
- (8) approximate cruising speed of 20 knots;
- (9) ability to store retained catch on board the vessel;
- (10) vessels surveyed to carry above-deck loads in excess of 1.5 tonne;
- (11) firearm (12 gauge shotgun as a minimum), secure storage and relevant licences; and
- (12) pumping equipment or deck wash system suitable to ventilate gills of live sharks prior to release.

4.8 Record keeping

4.8.1 Photography

- (1) photograph all animals caught on drum lines to establish species and size (ensuring safety of crew and no undue additional stress to the animal). Photographs should include .exif files including the time and date of image capture; and
- (2) record the photo numbers for each capture on the relevant data log sheet.

4.8.2 Tagging

- (1) be provided with sufficient kangaroo and conventional fin tags from DoF prior to the commencement of operations;
- (2) fit uniquely numbered kangaroo tags to dead or destroyed animals and record on the relevant data log sheet;
- (3) fit uniquely numbered conventional fin tags to animals being released and record on the relevant data log sheet;
- (4) allow for acoustic, telemetry or other research tags to be fitted to animals as directed by the Contract Manager; and
- (5) return any existing tagging or tracking research equipment, found on animals that are dead or destroyed, to DoF.

4.8.3 Data log sheets

maintain data log sheets for each day of operation and provide these to the Contract Manager on a weekly basis. Data log sheets are to include:

- (1) date of patrol;
- (2) start and end times, hours and km;

- (3) location of drum lines;
- (4) bait type;
- (5) volume of bait used on each hook and rebaiting times;
- (6) times drum lines are checked;
- (7) species caught;
- (8) condition of the animal;
- (9) measurements including total and interdorsal lengths;
- (10) sex;
- (11) any maintenance undertaken on drum lines, signs of wear and tear or loss or damage;
- (12) any other comments or observations relevant to the Program; and
- (13) details of responses to identified shark threat or incident deployments including location of drum lines deployed and outcomes.

4.8.4 Collection of biological samples

- (1) where directed collect biological samples for research and record relevant information.

Additional data or information may be requested to be recorded by the Contract Manager at any time. This may include a requirement to record water temperatures, salinity and water depth.

4.9 Training

perform operations in line with information provided at pre-operational training sessions. Training will be provided on:

- (1) baiting and setting drum lines;
- (2) fitting of fin tags;
- (3) completion of data log sheets;
- (4) animal handling techniques to minimise stress on captured animals (see 4.10);
- (5) photographic requirements;
- (6) techniques for obtaining specimens for research;
- (7) techniques for accurately measuring captured animals; and
- (8) shark identification.

4.10 Animal handling protocols

perform operations using best practice animal handling protocols to minimise the stress on captured animals and assist in post release survival of non-target animals. These include:

- (1) removing hook, measuring and tagging the animal while it is in the water where possible;
- (2) using a sling or stretcher to lift animal from water where possible and if necessary;
- (3) using pressure on the dorsal fin where restraint of a shark is required;
- (4) covering the animal's head with a wet cloth and run seawater through the mouth to oxygenate the gills once the animal is removed from water;
- (5) use a de-hooking device to remove hooks where a device is available and practicable; and
- (6) holding an animal in the water facing the current while the boat is underway until it recovers sufficiently to swim away.

The method adopted in Western Australia for the capture and tagging of white sharks is taken from procedures developed by CSIRO and Sydney Aquarium which have been assessed through formal animal welfare committees.

Any application of acoustic tags will only be undertaken by trained operators.

Current direction on the humane destruction of large sharks involves the use of a firearm.

DPaW has considerable expertise in disentanglement procedures of large marine animals, in particular whales and turtles. Should entanglement of one of these species occur, access to the disentanglement team at DPaW, and advice of how to respond before they can be deployed, will be available through the DoF Operations Manager.

5 RESPONDING TO AN IDENTIFIED SHARK THREAT OR INCIDENT

5.1 Threat or incident within an MMA

- (1) The DoF Operations Manager to notify relevant Contractor of the location of the target shark (see Attachment 9.3 for response criteria).
- (2) The Contractor is to attend the given location as quickly as possible within approximately one hour from notification⁴ and set up to five drum lines.⁵
- (3) Drum lines are to be set for a maximum of one hour in response to a sighting, or for a maximum of one week in response to an incident.
- (4) In responding to a sighting, the Contractor must move the drum lines out to approximately 1km offshore within one hour after arrival at the site and/or remove the lines from the water no more than one hour after arrival at site.
- (5) If an animal is caught the Contractor is to follow the procedures set out in Sections 4.3.1 and 4.3.2.
- (6) Contractor is to complete the relevant data log sheet.

If an identified shark threat or incident requires a response within a marine protected area (see Section 3.2.3) appropriate consultation will be held between the DoF Operations Manager and the Department of Parks and Wildlife (DPAW) prior to giving an order to deploy.

5.2 Threat or incident outside an MMA

Depending on the location of the incident (i.e if near the boundary of the MMA and the Contractor is close by) the DoF Operations Manager may request deployment of the Contractor to the area of the incident or sighting. Under these circumstances the Contractor should respond in line with Section 5.1, or until such time that a DoF vessel can take over.

⁴ some variance in response time is allowable with due respect to the vessel location and activity at the time of notification.

⁵ the drum lines used in a response scenario will be similar to those at Attachment 9.2.

6 COMPLIANCE PLAN

- (1) Data log sheets containing information set out in Section 4.8.3 are to be provided, together with photographs, to the Contract Manager on a weekly basis.
- (2) To ensure compliance with Contract, permit and legislative requirements and conditions, a minimum of 10 observer trips on each vessel between 15 November and 30 April each year will be undertaken, with additional trips undertaken as required. Observers will be present on the first trip of each season on each vessel to observe the start of operations and deployment of drum lines within each MMA. The observers' role will be to observe the performance of the Contractor and ensure contractual and legislative conditions are being met. Observers will be officers from agencies including, but not limited to, DoF, DPaW and DPC. Reports will be completed following each observer trip in each region.
- (3) Training will be provided to Contractors prior to the commencement of operations (see Section 4.9). Training will be provided by officers experienced in the setting of fishing gear and handling of marine animals from DoF and DPaW as well as others with expertise in the relevant areas. Training will refer to safe work methods including minimising stress to animals and safety of crew.
- (4) Meetings between the Contractor and Contract Manager will be held to ensure clear lines of communication and understanding of all Contract requirements. Meetings will be held prior to the commencement of operations, adhoc and as required throughout the operational phase of the Program and following the completion of the Program post 30 April each year.

7 RESEARCH COMPONENT OF THE PROGRAM

- (1) Access to animals protected under the EPBC Act for research purposes can only be facilitated provided the relevant approvals are granted by the Commonwealth. Subject to these approvals, relevant authorisations to conduct research on protected fauna under the FRMA and WC Act will be sought at a State level.

The Program offers significant opportunities for research including:

- a) analysis of blood samples;
- b) analysis of DNA samples;
- c) tagging and tracking of captured animals;
- d) life history and reproduction studies;
- e) access to tissue samples and other features; and
- f) studies based on catch and effort.

An invitation will be extended to researchers at DoF, the University of Western Australia and Curtin University to submit research proposals to be undertaken as part of the Program. Other interested parties not listed may also submit research proposals for consideration by the Contract Manager.

- (2) A gear selectivity trial may be undertaken during the Program to determine the effectiveness of different size hooks on minimising catch of non-target species and undersize sharks. Hooks no smaller than an approximate 25/0 circle design will be used at all times.

In addition to research opportunities available through the Program, research in Western Australia into white shark populations and aggregation areas is continuing, with a joint Commonwealth funded program continuing into 2014-15.

8 PROGRAM REVIEW AND MONITORING

8.1 Trigger criteria and appropriate contingencies

As per the requirements under Section 4.8.3, Contractors will be required to submit data log sheets, including detailed records of all catches, on a weekly basis to the Contract Manager.

Weekly catch data will be reviewed by DoF in the context of the risk assessment to verify catch data against predictions and initiate contingency actions as appropriate in consultation with DPC. This may include examining the number and species of animals caught to determine whether corrective action should be taken with respect to drum line deployments to manage catch rates.

Appropriate trigger criteria are to be discussed and agreed with the EPA and DoE as part of the ongoing development of the draft management plan.

A staged contingency response is proposed to be finalised as part of the ongoing development of the draft management plan with EPA and DoE.

Strategies to be considered may include but not be limited to:

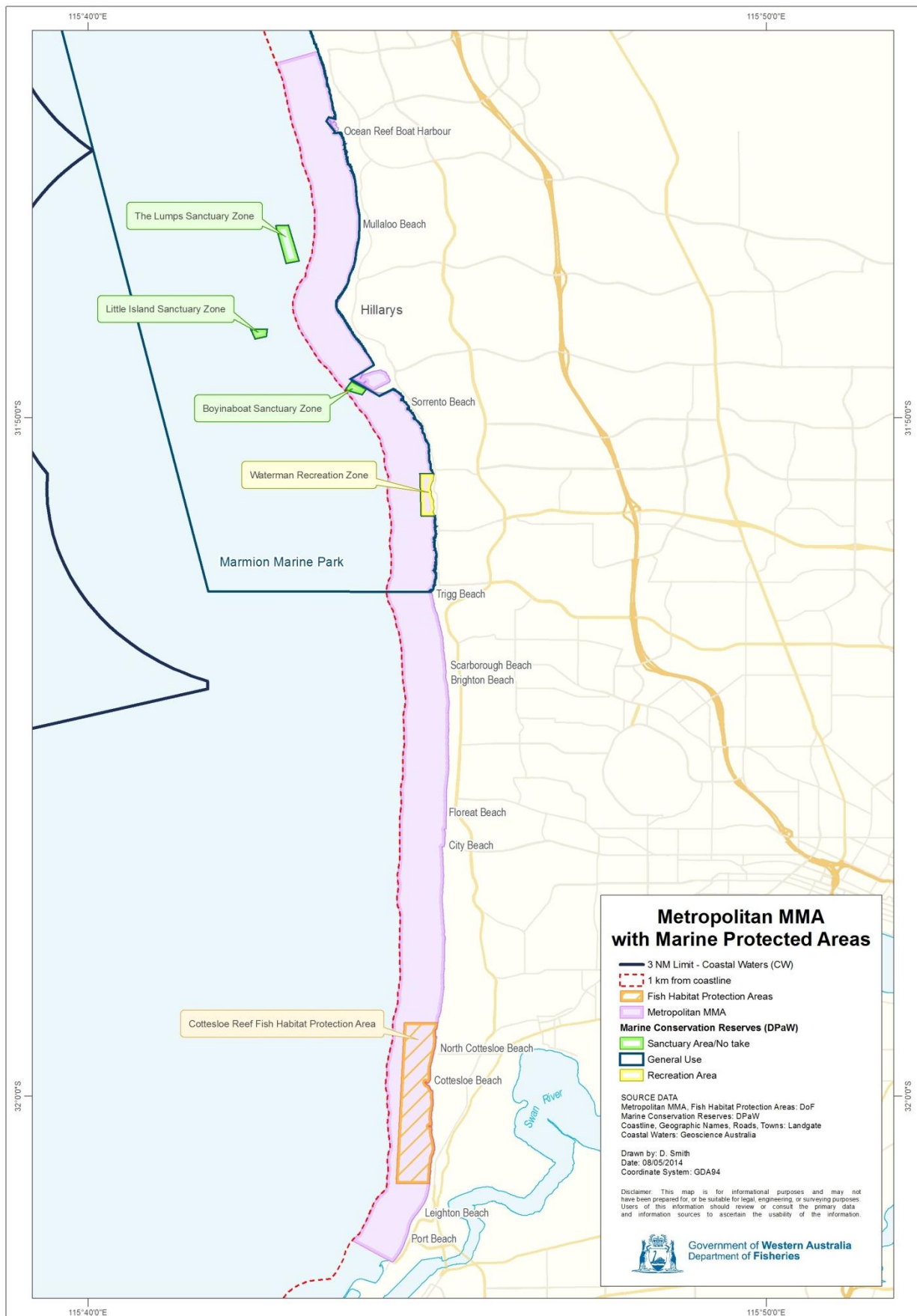
- not baiting drum line hooks overnight;
- consideration of the use of a larger hook (see Section 7 for consideration of a gear selectivity trial);
- consideration to varying the type of baits used on the hooks;
- increased patrolling of a designated location within the MMA where appropriate; and
- a within season review to assess the catch of the relevant species or species group that has triggered a contingency response.

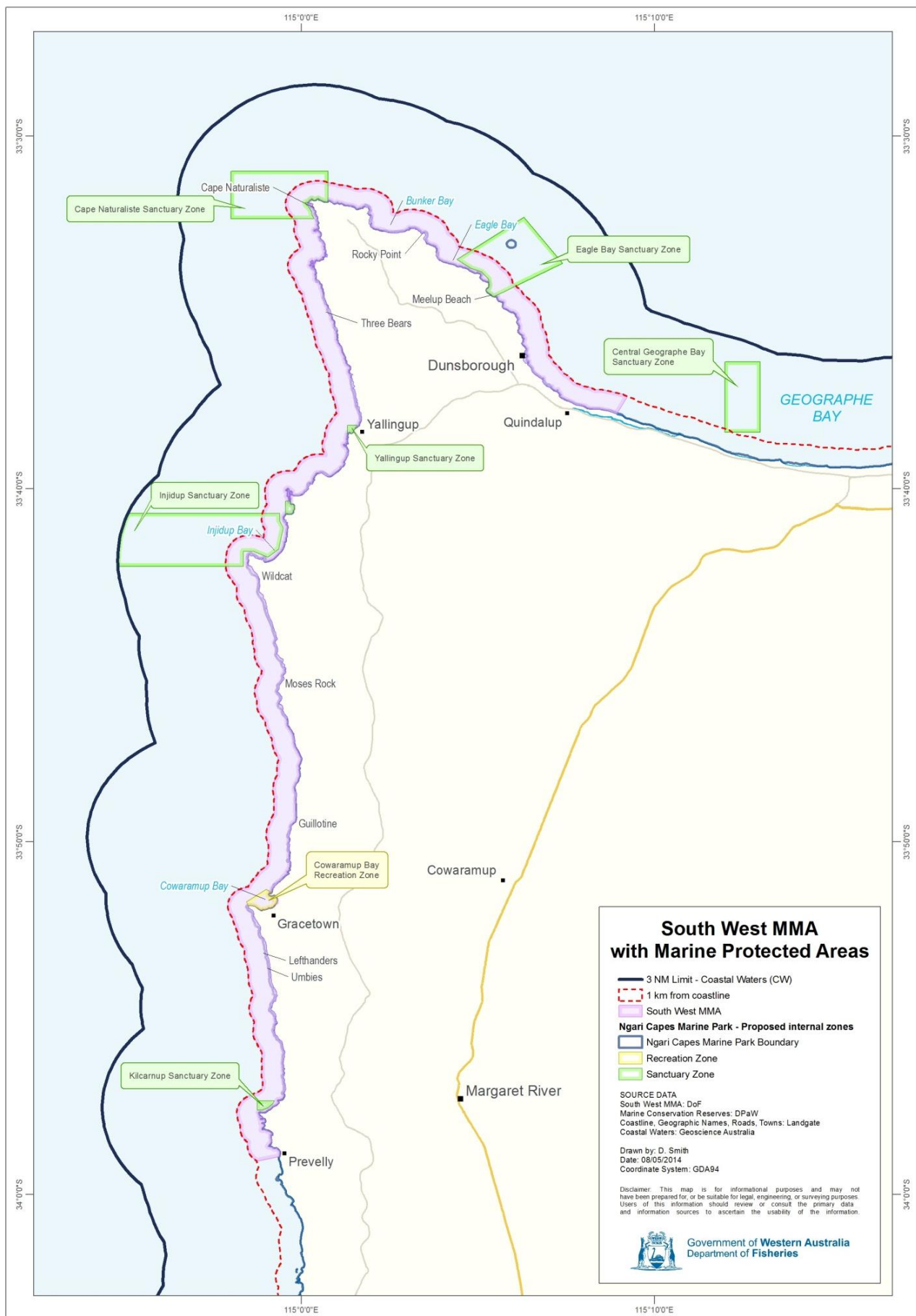
8.2 Long term monitoring

- (1) The Program will be reviewed annually at the end of each season (e.g. post 30 April each year)
- (2) The Program will be reviewed at the end of the three year program (post 30 April 2017).

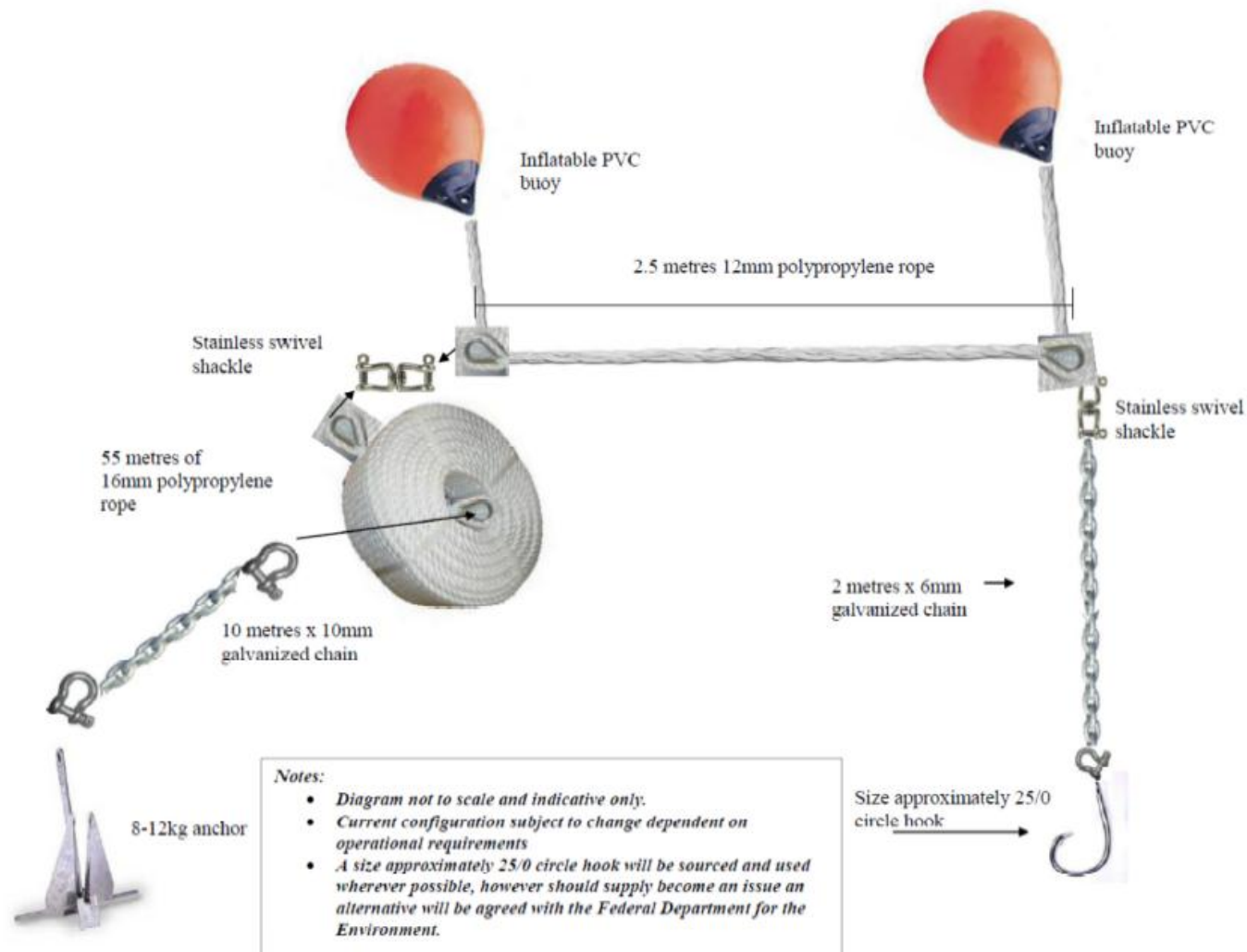
9 ATTACHMENTS

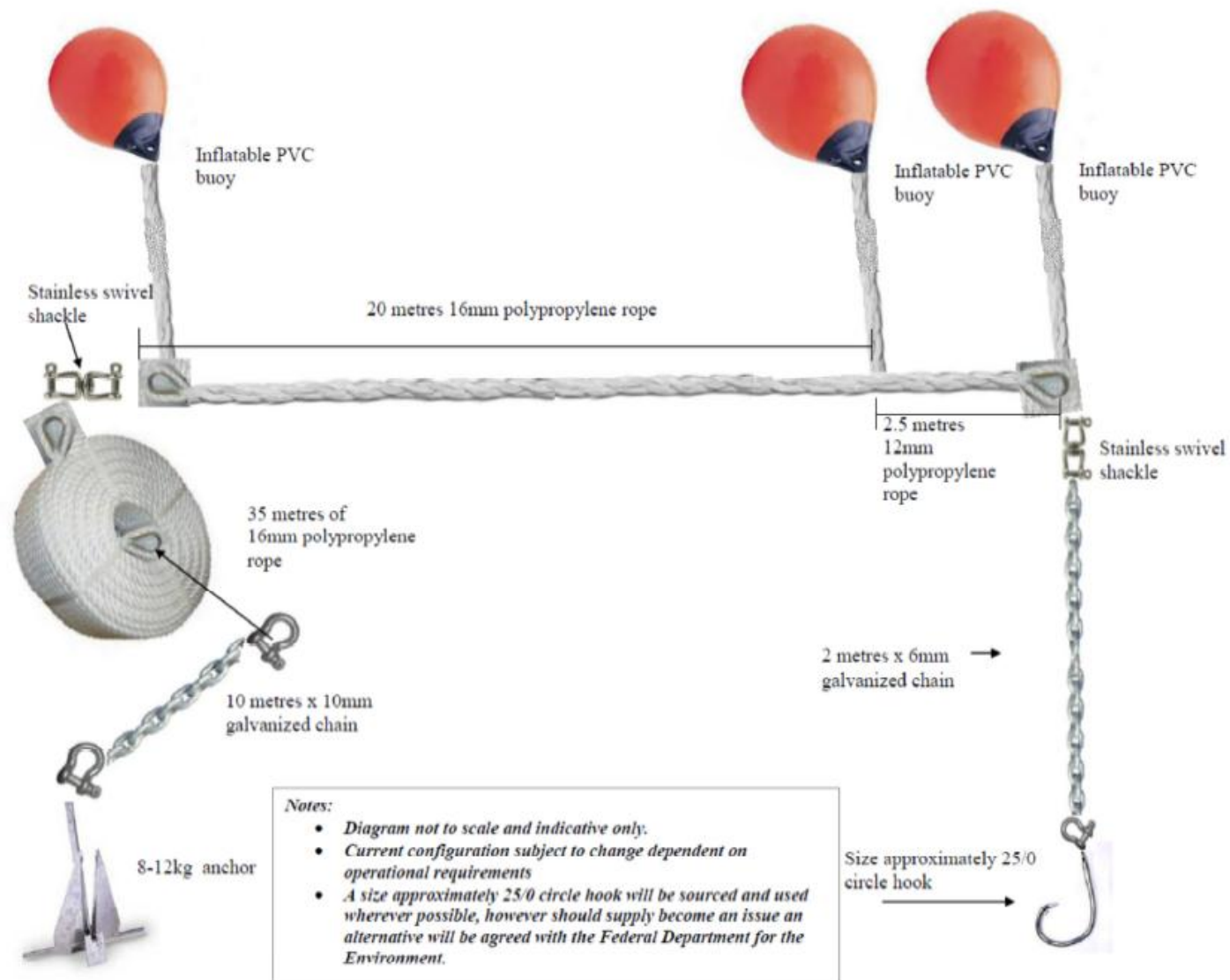
9.1 Location and extent of the MMAs in relation to marine protected areas





9.2 Drum line configurations





9.3 Criteria for initiating a response to an identified shark threat or incident

The following must be confirmed before initiating a response:

1. Report made within one hour of sighting and response able to be in place within one hour of report being made.
2. Location is clear (e.g. land or ocean marker or GPS waypoint).
3. The sighting is credible. This assessment can take into account the source of the report (Surf Life Saving WA, commercial fisher, agency vessel) or be confirmed by contacting the individual reporting the sighting.
4. The shark is believed to have a length of three metres or greater and be within 1km of the shore.
5. Where possible the shark species is identified as a target species under the Program.
6. The DoF Operations Manager is satisfied that public safety is of concern (beach is occupied, shark remains in the vicinity, shark is close to shore etc.).
7. The Land Manager (or delegated authority) must agree to, and have capacity to give effect to, beach closure for the period of deployment and removal of shark hazard.
8. In the event that the Land Manager will not agree to beach closures the deployed vessel will still attend and place drum lines 1km off shore.

Clarification on the following will assist in the confirmation and initiation of a response:

- Person reporting the sighting can explain how they determined the length of the shark and the detail is plausible.
- Length can be gauged in comparison to an object e.g. the reporter's water vessel or other visual marker.
- Person can explain how they determined distance from beach and the detail is plausible.
- Person can describe any patterns or particular features of the shark's body, assisting in species identification.
- Environmental conditions are favourable to water visibility.
- Sighting can be verified by another person.

Procedure to be followed to initiate a response:

1. Identify resources to support deployment operation (e.g. vessel availability, beach closures, aerial support).
2. Obtain verification that beaches have been cleared as appropriate.
3. The deployed vessel attends the site and sets up to five baited drum lines.
4. In responding to a sighting, the drum lines must be moved back out to approximately 1km offshore within one hour of arrival at the site, and/or removed from the water no more than one hour after arrival at site (per response).
5. In responding to an attack, up to five drum lines may be set in the vicinity of the attack zone. Drum lines will be moved out to no further than 1km offshore and maintained and monitored for a maximum of seven days (per incident).

A decision on the deployment of resources in the event of a shark threat or attack will be made by the DoF Operations Manager.

9.4 Summary of the risk analysis, risk scores and risk evaluations for the Program

Component	Risk Analysis	Risk Scores	Risk Evaluation
TARGET SPECIES			
White shark	With catch levels expected to be < 10 individuals per year there is only a remote likelihood (Likelihood Level 1) that this would have a minor level of consequence (Consequence Level 1) on the total size, or migratory patterns, of the southwestern Australian population of white sharks.	1	Negligible
Tiger shark	If the levels of capture of tiger sharks remain within the expected levels (~40 tonne per year) and assuming high levels of release mortality rates, it would be possible (Likelihood Level 3) for the Proposal to generate a minor consequence (Consequence Level 1).	3	Low
Bull shark	Expected capture rate is none to a few individuals each year. Therefore there is a high likelihood the Proposal will have no impact (Consequence Level 0).	0	Negligible
NON-TARGET SPECIES			
Dusky shark	If the annual level of capture and mortality of large dusky sharks remains in the revised expected range (< 10), there is now only a remote likelihood (Likelihood Level 1) of a minor level of impact (Consequence Level 1).	1	Negligible
Other non- listed elasmobranchs	There is a high likelihood (Likelihood Level 5) that few individuals from each of the other species of sharks and rays will be caught and therefore generate negligible impacts (Consequence Level 0).	0	Negligible
Demersal scalefish	There is a high likelihood (Likelihood Level 5) that no demersal scalefish will be caught and also that few, if any, other finfish species will be caught (Consequence Level 0).	0	Negligible
PROTECTED OR LISTED SPECIES			
Grey nurse shark	There is a high likelihood that no grey nurse sharks will be caught and, even if a few are caught they will most likely be able to be released alive resulting in no or negligible impacts (Consequence Level 0).	0	Negligible
Shortfin mako shark	There is a high likelihood that the Proposal will have a negligible impact (Consequence Level 0) on the shortfin mako shark population of Australia.	0	Negligible
Other listed elasmobranchs	There is a high likelihood (Likelihood Level 5) that no whale sharks, manta rays or other listed species of sharks and rays will be caught resulting in no or negligible impacts (Consequence Level 0).	0	Negligible
Seals and sea lions	With no seal or sea lion captures anticipated to occur there is a high likelihood of no impact (Consequence Level 0).	0	Negligible

Turtles	With no captures of turtles anticipated to occur there is a high likelihood of no impact (Consequence Level 0).	0	Negligible
Whales	With no captures of whales anticipated to occur there is a high likelihood of no impact (Consequence Level 0).	0	Negligible
Dolphins	With no captures of dolphins anticipated to occur there is a high likelihood of no impact (Consequence Level 0).	0	Negligible
Seabirds	With no captures of seabirds anticipated to occur there is a high likelihood of no impact (Consequence Level 0).	0	Negligible
ECOSYSTEM			
Habitat	The extremely small footprint of the anchors used for the drum lines and the high resilience of the sandy substrates where most are deployed results in a high likelihood (Likelihood Level 5) of only negligible impacts (Consequence Level 0).	0	Negligible
Community structure	The high historical level of commercial catch of sharks in this region was not found to have generated any measurable shift in the community structure for the broader fish community. Now that this catch has been reduced by half, an additional ~45 tonne of all species of sharks to be captured under the Proposal is highly likely (Likelihood 5) to have no measurable effect (Consequence Level 0) on the community structure of the West Coast Bioregion.	0	Negligible